Interpretation of English Reflexives by

Child and Adult L2 Learners

Amer Al Kafri

A thesis submitted to the

School of English Literature, Language and Linguistics

for the degree of

Doctor of Philosophy

At

Newcastle University

February, 2013

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Abstract

The question of adult L2 learners' UG access is still under debate. One way of casting new light on this debate is by comparing the performance of adult L2 learners with that of child L2ers who presumably still have access to UG (Schwartz, 2003). This study compares Arabic- and Chinese-speaking child and adult L2ers' acquisition of English reflexives, in particular, the differences between child and adult L2ers in terms of their a) acquisition of the local binding of English reflexives, b) obedience of UG constraints on reflexives and c) knowledge of the syntactic difference between reflexives and pronouns. While English and Arabic allow only local binding of reflexives, Chinese allows local and long-distance binding of reflexives:

(1) Arabic:

humma$_i$ simʔ-u ʔinn NP[ʔahmad w mona]$_j$ bi-y-Hibb-u nafs-uhum$_{*i/\ j}$

they heard-3pl that Ahmad and Mona PRES-3-like-pl self-their

"They heard that Ahmad and Mona like themselves."

(Osman, 1990: 160)

(2) Chinese:

Zhangsan$_i$ renwei Lisi$_j$ zhidao Wangwu$_k$ xihuan ziji$_{i/j/k}$/ ta ziji$_{*i/*j/k}$

Zhangsan thinks Lisi knows Wangwu likes self he-self

"Zhangsan thinks that Lisi knows that Wangwu likes himself."

(Progovac, 1993: 757)

60 L2 learners were given a word-based MLU proficiency test (Whong-Barr and Schwartz, 2002) to confirm their proficiency level and then divided into six groups: Arabic-speaking children (n= 15), Arabic-speaking adults (n= 15), Chinese-speaking children (n= 15), Chinese-speaking adults (n= 15), an L1-English child (mean age 9.60) control group (n= 15), and an L1-English adult control group (n= 15). The L2 children had arrived before the age of six and had lived in the UK for about 2.5 years at testing. The L2 adults had arrived after the age of sixteen and had lived in the UK for about two years at testing. L2ers' interpretation of English reflexives was elicited through a 48-item Simon Says game (Simon says Jack should touch himself) where participants individually met the experimenter to play the game (Chien and Wexler, 1990).

Results showed significant differences between the performance of the L2 groups and native speakers, yet the majority of L2ers were close to an 83.33% threshold of acquisition. Results also showed no significant difference between the child and adult L2 groups indicating continued operation of UG. As for the syntactic difference between reflexives and pronouns, L2ers did not differentiate between them, scoring higher in reflexives. Overall, this study supports the view that adult L2ers can have access to UG in advanced stages of L2 acquisition.

To my wife and son,

to my family,

to the martyrs of Syria.

Acknowledgement

I would like to thank my supervisor, Prof. Martha Young-Scholten for her great patience and valuable advice. Without her valuable guidance and advice, I would not be able to complete this thesis. Her professional supervision will surely have great impact on me as a future researcher.

I also would like to thank my second supervisors: Dr. Dimitra Kolliakou, Dr. Hannah Sowden and Dr. Cristina Dye. Every one of them has provided me with the necessary linguistic and research tools that will be necessary for my career.

I am also in great debt to Al-Furat University in Syria for granting me a scholarship to pursue my post-graduate study in the UK.

Sincere thanks are also due to all the participants who kindly agreed to participate in my study. Without their valuable help, this work would not have been completed.

Last but not least, I owe special thanks to my lovely wife and son who are always the source of love, warmth and tenderness. For certain, without their encouragement, I would not be able to achieve any success in my entire life. I also would like to thank my lovely parents, sisters and brothers whose help to me has always been infinite.

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Chapter 1. Introduction

The fact that children acquire their native language in a relatively short period of time has bewildered linguists and others for several decades. Linguists wonder how children can acquire the complicated system of language in a very short period, and what type of mechanism is involved in language acquisition (Chomsky, 1981/1986). Several theories and hypotheses have been proposed to account for language acquisition. Two dominant approaches in this regard are: Usage-Based-Approaches and Generative Approaches. The proponents[1] of each approach have proposed their assumptions and empirical evidence to support their claims on the nature of linguistic knowledge and how it is acquired.

Generative grammarians argue that linguistic cues in input are insufficient to construct a grammar, and that an innate specific linguistic knowledge called Universal Grammar (UG) should be involved to help children acquire their mother tongue. Otherwise, children will form incorrect grammar that cannot be corrected even if we try our best efforts to teach them the grammatical form of our language:

(1.1) Child: Nobody don't like me.
Mother: No, say "Nobody likes me."
Child: Nobody don't like me.

[dialogue repeated eight times]
Mother: Now, listen carefully, say "NOBODY LIKES ME."
Child: Oh! Nobody don't likeS me.

(McNeill 1966 cited in Pinker, 1991: 12)

The function of UG is to constrain the grammar of children and provide a theory space which allows children to acquire their language from the inconsistent linguistic input (Schwartz and Sprouse, to appear).

Researchers have not only focused on first language acquisition but also on second language acquisition which, they argue, is more complicated than first language acquisition because different factors are involved in second language acquisition (Herschensohn, 2007). For example, researchers wonder what roles UG, age and L1 influence have in second language acquisition.

This thesis addresses the above issues by investigating the acquisition of English reflexives by second language learners (L2ers). Chomsky (1981) defines binding as a set of restrictions that determine the relation between nominal expressions within a sentence. Chomsky (1986) formulated these restrictions in a theory called the Standard Binding Theory:

[1] For Usage-Based-Approaches, see (Skinner, 1957/74; Plunkett, 1998; Goldberg, 2003; Ellis, 2007; O'Grady, 2008). For Generative Approaches, see (Chomsky, 1959/65; Chomsky, 1981/86; Chomsky, 1995/2004; among others).

(1.2) **Standard Binding Theory (Chomsky, 1986: 166)**

A. An anaphor is bound in a local domain

B. A pronominal is free in a local domain

C. An r-expression is free (in the domain of the head of its chain)

Example (1.3) below illustrates the restrictions of principles A, B and C, respectively:

(1.3) a. $John_j$ said $Jack_i$ likes $himself_{i/*j}$.
b. $John_j$ said $Jack_i$ likes $him_{*i/j}$.
c. *He_i said $Jack_{*i}$ is happy.

The relation between nominal expressions above is illustrated through the use of subscripted notations. As is shown in (1.3a), the reflexive pronoun *himself* can refer to *Jack* because it is within the local domain of the reflexive, but it cannot refer to the subject of the main clause *John* because it is outside the local domain. The personal pronoun *him* in (1.3b), in contrast, cannot refer to the subject of the embedded clause *Jack* because it is within the local domain of the pronoun, but *him* can refer to *John* because it is not in its local domain. As for the r-expression *Jack* in (1.3c), it should be free so it cannot refer to the subject of the main clause *he*.

As said before, this thesis focuses on the interpretation of English reflexives by L2ers. Reflexive binding is researched in this thesis because, as argued in chapter two, it is so complicated that it is difficult to make a case that its acquisition is not under-determined by the input (Crain and Pietroski, 2002). In other words, it is difficult for language learners to construct a grammar of reflexive binding by relying on linguistic input alone. Instead, a specific linguistic knowledge is involved in the acquisition of reflexives as is discussed in chapter two. The argument is that if the interpretation of reflexive binding is under-determined by input, and L2ers apply the constraints that generative grammarians ascribe to UG, this would indicate that UG is operative in the interlanguage grammar of L2ers.

L2ers in this study were of two L1s, Arabic and Chinese, acquiring English as their second language. Such a choice of languages involved in the study is important for comparative reasons. That is, English and Arabic share the same grammar of reflexive binding in terms of domain and orientation (Kremer, 1997). As is shown in (1.4) below both languages allow only local binding of reflexives (domain), and reflexives in Arabic and English can be bound by subject or object antecedents (orientation):

(1.4) ḥattā ekšifa-hu_i -l-$batal_j$ 'amāma nafs-a-$hu_{j/i}$
so.that reveals.3msg-him the-hero before SELF-NOM-him
“so that the hero reveals him before himself”

(Kremer, 1997)

Both of the subject *-l-batal* 'the hero' and the object *hu* 'him' of the clause locally c-command the reflexive *nafs-a-hu* 'himself', and both of them can function as an antecedent for the reflexive.

Chinese is different from English and Arabic in the fact that it has two types of reflexives: long-distance *ziji* 'self' and local *ta ziji* 'himslef'. *Ziji* can be bound by only c-commanding subject antecedents in a local or long-distance domain, whereas *ta ziji* is similar to reflexives in English and Arabic in the fact that it can be bound by only local subject or object antecedents.

(1.5) Zhangsan$_i$ renwei Lisi$_j$ zhidao Wangwu$_k$ xihuan ziji$_{i/j/k}$/ ta ziji$_{*i/*j/k}$
Zhangsan thinks Lisi knows Wangwu likes self he-self
"Zhangsan thinks that Lisi knows that Wangwu likes himself"

(Progovac, 1993: 757)

In (1.5), the local reflexive *ta ziji* can be bound by only the local embedded subject *Wangwu*, but not by *Lisi* or *Zhangsan* because both of them are outside the local domain of the reflexive. *Ziji*, in contrast, can be bound by *Wangwu*, *Lisi* or *Zhangsan*.

All these facts about reflexives in the three languages will be discussed in detail in chapter two.

Based on the above mentioned differences/similarities between reflexives in the three languages, a study on the interpretation of English reflexives by L1 Chinese-speakers and Arabic-speakers can answer the question whether UG is available to L2ers via the L1 transfer, or they still have access to UG in L2 acquisition. That is, if Arabic-speakers achieve native-like performance in the interpretation of English reflexives while the Chinese-speakers do not, such results would support the view that UG is available to L2ers via the L1 transfer. The Arabic-speakers achieve native-like performance because they transfer the values of the binding parameter in their L1which is the same in English so that they achieve native-like performance in the acquisition of English reflexives. The Chinese-speakers, in contrast, transfer the values of the binding parameter in their L1 which is different from English so that they could not achieve native-like performance in the acquisition of English reflexives. However, if both Arabic-speakers and Chinese-speakers achieve native-like performance in the acquisition of English reflexives, such results would indicate that UG is operative in the interlanguage grammar of L2ers and they still have access to UG because they, especially the Chinese-speakers, were successful in resetting the values of their L1 binding parameter to that of English reflexives.

In addition to L1 differences between participants in this study, there is age difference as well. This study is conducted on child and adult L2ers of English. Therefore, there will be child and adult Chinese-speakers, child and adult Arabic-speakers and child and adult control groups. The inclusion of such groups in the study, as discussed later, is to see whether access to UG in L2 acquisition is a matter of UG differences or age differences (Schwartz, 2003). In other words, is it the case that adult L2ers do not have access to UG in L2

acquisition, or access to UG in L2 acquisition is restricted to some modules (e.g. syntax)? All of these issues about the roles of UG and age in L2 acquisition will be discussed in detail in chapters two and three.

All in all, this study addresses the following research questions:

(1.6)

1- Will L2ers apply UG constraints in second language acquisition?

2- Will L2ers reset their binding parameter to the values of the local binding of English reflexives?

3- Will L2ers differentiate between the syntactic properties of lexical items?

4- Will there be any difference between child and adult L2ers in the acquisition of English reflexives? (With respect to 1, 2 and 3.)

The first research question investigates whether L2ers apply UG constraints in the acquisition of English reflexives. The second research question addresses the issue of access to UG in the acquisition of English reflexives. In other words, it investigates whether UG is available to L2ers via L1 transfer or access to UG in L2 acquisition. The third research question is related to L2ers knowledge of the fact that reflexives in English are locally bound by c-commanding antecedents and personal pronouns are locally free. In this thesis, it is argued such knowledge is important to the findings in research questions one and two. The fourth research question addresses the issue of age differences in the L2 acquisition of English reflexives. All of these research questions and their hypotheses and implications are discussed in detail in chapter three.

The outline of the thesis goes as follows: chapter one is a general introduction to the study. Chapter two discusses the linguistic assumptions and empirical evidence of each of Usage-Based-Approaches and Generative Approaches with regards to language acquisition, in general, and the interpretation of reflexives, in particular. The discussion shows many aspects of languages, for example reflexive binding, are underdetermined by input and a specific linguistic mechanism is involved to help learners acquire the grammar of their language. Adopting Generative Grammar as a theoretical background for this thesis, age effects on access to UG in first and second language acquisition are discussed in chapter three. Chapter four presents different views on access to UG in second language acquisition and reviews previous studies on the acquisition of reflexives by L2ers. The review shows that the question of access to UG by adult L2ers is still under debate, and a comparison between the performance of child and adult L2ers in the acquisition of reflexives is required to cast new light on this debate. At the end of chapter four, research importance, questions and hypotheses are introduced.

Chapter five discusses the methodology of this study in terms of participants' selection, materials used, procedures followed and data analysed. Chapter six presents the results of the study as group and individual

results to give comprehensible interpretation of data. Finally, chapter seven discusses the results of the study with regards to previous studies and theories. It shows that the grammar of adult L2ers is constrained by UG and they can have full access to UG in advanced stages of L2 acquisition.

Chapter 2. Language Acquisition and Reflexive Binding

2.1 Introduction

Language acquisition from a generative point of view will be discussed in this chapter. First of all, Poverty of Stimulus will be discussed, taking reflexive binding as an example of POS. The discussion shows that the grammar of reflexive binding is so complicated that it is difficult to make a case that its acquisition is not underdetermined by input and hence UG must be involved. In this regard, two main streams, Usage-Based-Approaches and Generative Approaches, have tried to account for the distribution of reflexives and their antecedents and show how children can acquire the properties of reflexives. The discussion shows that generative grammarians present a plausible theoretical account and empirical evidence that shows knowledge of binding principles and constraints might be innate. In particular, the Standard Binding Theory (Chomsky, 1986), the Governing Category Parameter (Wexler and Manzini, 1987) and the Relativized Subject Approach (Progovac, 1993) are discussed. As for the empirical evidence, it shows that the results of L1 studies support the view that knowledge of the syntactic principles involved in reflexive binding might be innate and L1 children fully master the interpretation of reflexives by the age of six (Wexler and Chien, 1985; Chien and Wexler, 1987; Solan, 1987; Chien and Wexler, 1990; McDaniel, Crains and Hsu, 1990; Mckee, 1992; among others). As English, Arabic and Chinese are involved in this thesis, the properties of reflexives in these three languages are presented from a general generative point of view.

2.2 Language Acquisition

Language acquisition, the subject of continuous debate about how humans acquire a language, has given rise to many theories in L1 acquisition. Although these theories have rendered different claims about the development of language, all of them share the same goal which is to account for how children learn a language in a relatively short period of time.

Chomsky (1995), who argues for a specific internal linguistic knowledge (Language Faculty) involved in language acquisition, points out that research on language acquisition should focus on finding an answer to the following two main questions (Chomsky, 1995: 1):

(1) What are the general conditions that human language faculty should be expected to satisfy?
(2) To what extent is the language faculty determined by these conditions, without special structure that lies beyond them?

Chomsky (1995) points out that any answer to these two questions should consider which conditions are imposed on the language faculty, its relation with other cognitive systems of the human mind, and its respect

of the conceptual naturalness (e.g. economy, simplicity, non-redundancy and symmetry). If generative researchers can provide logical answers to these important questions, they will be able to give an image about language as a "perfect system" that guides the child in the process of L1 acquisition (Chomsky, 1995). In contrast, non-generative grammarians claim that language is acquired by using general cognitive mechanisms to analyse input and induce grammar. As such, no internal specific linguistic mechanism is involved in language acquisition (Plunkett, 1998; Goldberg, 2003; Ellis, 2007; O'Grady, 2008). Any discussion to support any of these two contradictory views should give a plausible account to the logical problem of language acquisitions, Poverty of Stimulus.

2.2.1 Poverty of Stimulus

The logical problem of language acquisition is stated by Hornstein and Lightfoot (1981) who claim that people have much knowledge about the structure of their language although they do not have direct evidence in the input to guide them to that knowledge. Similarly, Chomsky (1986) argues that people know so much about the structure of their language despite the very little evidence they are exposed to. In literature on L1 acquisition, this argument appears under different terms: The Projection Problem (Baker, 1979), Plato's Problem (discussed in Chomsky, 1981), the Poverty of Challenge (Lasnik and Uriagereka, 2008), the Standard Poverty of the Stimulus Argument (Lawrence and Margolis, 2001), and the Logical Problem of Language Acquisition (Pinker, 2004). In this thesis, this argument will be called Poverty of Stimulus (henceforth, POS).

Baker (1979) discussed POS as the projection problem which lies in the relation between the arbitrary linguistic experience that children have and the resulting adult intuitions. In this regard, linguists question whether it is possible for children to learn the grammar of a natural language just by relying on the general cognitive mechanisms of human beings (Usage-Based-Approaches), or they depend on a specific linguistic mechanism to guide them throughout the acquisition of their L1 (Generative Approaches).

An example of the POS is the referential relation between nominal expressions, namely reflexives.

(2.1) Jack_i said that John_j loves $\text{himself}_{*i/j}$.

The coreferential relation in (2.1) is illustrated by subscripted indices next to each possible antecedent within the sentence. In (2.1), the referential relation between the reflexive *himself* and its possible antecedents is illustrated by the use of subscript notations. As is indicated in (2.1), the English reflexive pronoun *himself* can refer to *John*, but not *Jack*. The important question here is where this knowledge comes from.

If children depend on the human general cognitive mechanism to acquire binding of reflexives, they will learn reflexives in the same way they acquire other skills, such as swimming and running. Proponents of Usage-Based-Approaches, such as Behaviorism (Skinner, 1957/74), Constructionism (Goldberg, 2003), Associative-

Cognitive Creed (Ellis, 2007), Emergentism (O'Grady, 2008), and Connectionism (Plunkett, 1998), support such a view and claim that "acquisition of grammar is the piecemeal learning of many thousands of constructions and the frequency-biased abstraction of regularities that emerge from learners' lifetime analysis of the distributional characteristics of the language input." (Ellis, 2002:144). In the case of the example mentioned in (2.1) adoption of a learning strategy, such as a linear order strategy which states that the closest NP can be an antecedent for the reflexive would result in an inappropriate interpretation of (2.2):

(2.2) The son_i of $Jack_j$ pointed to $himself_{i/*j}$.

As is shown in (2.2), a linear order strategy cannot work out because the reflexive *himself* does not refer to the closest NP *Jack*, but it refers to the NP *The son*. Such inappropriate interpretation of reflexives would result if we assume children overgeneralize in the acquisition of reflexives. However, Lightfoot (2005) argues overgeneralization in the case of reflexive binding does not work, and it is very difficult for children to retreat from an inappropriate overgeneralization such as (2.2) above because there is no negative evidence or parental feedback provided to correct them. Lightfoot points out the majority of corrective feedback documented was in cases of inflectional morphology (e.g. *go* and *goed),* but in the case of reflexives it will pass "unnoticed".

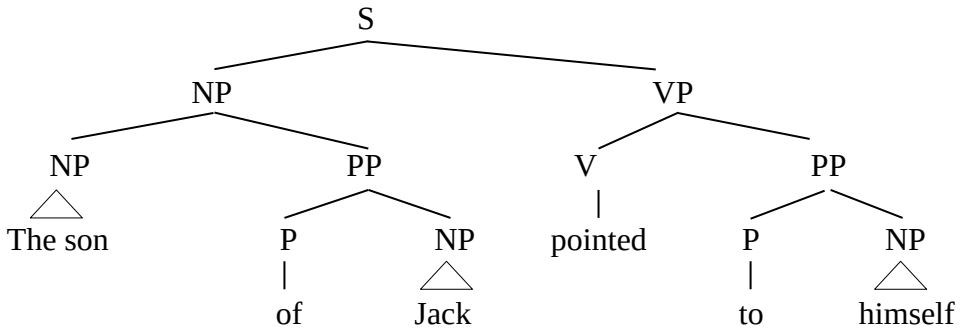
One possible solution to the problem is to postulate an innate knowledge of binding as defined by Chomsky (1981: 184):

(2.3) An NP *A* is BOUND if and only if there is an NP *B* such that both of the following conditions are satisfied:

(a) *A* and *B* are coindexed;
(b) *B* c-commands *A*;

Coindexation is defined in terms of coreference; we say that *A* is coindexed with *B* if *A* and *B* share the same indices (Chomsky, 1981). C-command, however, is still a controversial topic in the literature, yet for our discussion we will adopt the definition used in Chien and Wexler (1987: 30), "In a phrase-marker, node *A* c-commands node *B* if and only if the first branching node which dominates *A* also dominates *B*." In the case of our example in (2.2), the relation of c-command is illustrated as follows:

(2.4)



It is not only c-command that defies the linear order strategy, but also the coreference relation between a reflexive and its antecedent/s in long-distance languages where domain exceeds the minimal clause/noun phrase to include the whole sentence. Thus, a reflexive can be coindexed with more than one antecedent outside the minimal clause. Example (2.5) illustrates reflexive binding for Chinese:

(2.5) a. Zhangsan$_i$ renwei Lisi$_j$ zhidao Wangwu$_k$ xihuan ziji$_{i/j/k}$.

Zhangsan thinks Lisi knows Wangwu likes self

"Zhangsan thinks that Lisi knows that Wangwu likes self"

(Progovac, 1993)

Moreover, within long-distance reflexives, we have a distinction between two types of reflexives: the first kind takes the whole sentence as a domain for the reflexive, so that the reflexive can be co-referential with more than one antecedent in the higher clause, e.g. *ziji* in Chinese. In the second type, domain closes off with the first finite clause so that domain can overlook non-finite clauses but not finite ones as is the case in Russian:

(2.6) a. Professor$_i$ poprosil assistenta$_j$ [PRO$_j$ čitat' svoj$_{i/j}$ doklad].

Professor asked assistant read self's report

'The professor$_i$ asked the assistant$_j$ to read self's$_{i/j}$ report'

b. Vanja$_i$ znaet [čto Volodja$_j$ I jubits svoju$_{*i/j}$ ženu].

Vanja knows that Volodja loves self's wife

(Progovac, 1993)

The Russian reflexive *svoj* in (2.6a) can exceed the infinitival clause and be coindexed with the matrix subject *Professor*. However, the Russian reflexive *svoju* in (2.6b) can be coindexed only with the subject of the subordinate clause *Volodja*, but not the subject of the main clause *Vanja* because long-distance domain for Russian reflexives closes off with the first finite clause.

According to the observations discussed above, the grammar of reflexive binding is so complicated that it is difficult to make a case that its acquisition is not under-determined by the input (Crain and Pietroski, 2002).

However, the majority of L1 studies conducted on children showed that L1 children above the age of six showed knowledge of the majority of the properties of reflexives discussed above (Wexler and Chien, 1985; Chien and Wexler, 1987; Solan, 1987; McDaniel, Crains and Hsu, 1990; Chien and Wexler, 1990; Mckee, 1992; among others).

If knowledge of the coreferential relation between reflexives and their possible antecedents is not explicitly taught to children, and children show consistent and systematic knowledge of binding at an early stage of their life, then the important question is: where does knowledge of binding come from? Any answer to this question should show and account for the mechanisms used in language acquisition. In other words, it should show whether first language acquisition involves the same mechanisms used to acquire other human skills (walking, driving or swimming), or if it involves a specific linguistic mechanism used to acquire language. In this regard, two prominent accounts are common in the literature. According to the first account (Usage-Based-Approaches), language can be learned from input without the help of any innate linguistic knowledge. All what is required from the learner is to analyse input and induce cues to form the suitable grammar. The second account (Generative Approaches), on the other hand, supports the view that language is endowed to human beings, and the principles and constraints of UG control the acquisition of L1. Language also cannot be learned from input without the help of UG because information provided by input is either vague or insufficient to form a grammar (Lightfoot, 2005).

The next two sections discuss the assumptions and empirical evidence of Usage-Based-Approaches and Generative Approaches in terms of two points: first, how they theoretically accounted for the distribution of reflexives, and second what empirical evidence they presented to support their account. The aim behind this discussion is to choose one of these accounts to be adopted as a theoretical background for this thesis.

2.2.2 Usage-Based-Approaches and Reflexive Binding

The outline of this section is as follows: first, an overview of Usage-Based-Approaches is presented, showing their theoretical views and assumptions on language acquisitions. Second, their reflexive binding account/s is discussed in the light of the POS argument mentioned above, and finally any empirical evidence to support their account for reflexive binding is discussed.

2.2.2.1 Overview

In this overview, I classify many approaches, such as such as Behaviorism (Skinner, 1957/74), Constructionism (Goldberg, 2003), Associative-Cognitive Creed (Ellis, 2007), Emergentism (O'Grady, 2008), and Connectionism (Plunkett, 1998), under the general name Usage-Based-Approaches. All of them support the view that language can be acquired via the use of general cognitive mechanisms to analyse input and formulate grammar.

The earliest views of Usage-Based-Approaches in 1950s considered language as a single form of overt behaviour that needs to be considered in relation "…to the study of human behavior as a whole" (Skinner, 1957: 11). In this regard, Skinner claims that children use the same learning mechanisms that are used by other living beings (e.g., animals), and as such children learn language by 'principles of association' and 'principles of induction' to abstract the language of their community. Another Usage-Based-Approach is proposed by Goldberg (2003) who advocates a Constructionist Approach that relies on general cognitive mechanisms and linguistic input to explain L1 acquisition. She claims that the 'totality' of linguistic knowledge is acquired in the form of constructions- form-meaning mappings. Similarly, Ellis (2007) advocates an Associative-Cognitive-Creed that considers Constructions as the result of form-meaning mappings which are rationally abstracted from the linguistic input. The abstraction of linguistic knowledge depends on different factors such as frequency, recency, and context of constructions. The acquisition of constructions is an "intuitive statistical learning problem." (Ellis, 2007:80).

Another Usage-Based-Approach is Emergentism which also supports the view that language acquisition is driven by input and general cognitive mechanisms. O'Grady (2008: 456) claims that, "language acquisition can be reduced to the use of simple learning mechanisms to extract statistical regularities present in ordinary linguistic input." O'Grady points out that the extraction of regularities of the input can be done via the aid of a processor which is responsible for processing and interpreting linguistic input during the lifespan of language acquisition (e.g., binding account below).

Connectionism is also another approach that is classified under Usage-Based-Approaches. This approach, as Plunkett (1998) points out, supports the view that L1 children acquire their mother tongue by relying on human general cognitive mechanisms to detect cues in the seemingly arbitrary input and extract regularities to construct a grammar.

As can be seen from this quick theoretical review, Usage-based-Approaches generally claim that L1 children can acquire their mother tongue by relying only on input and general cognitive mechanisms without any need of innate linguistic knowledge.

2.2.2.2 Binding Account/s of Reflexives

Proponents of Usage-Based-Approaches, according to my knowledge, have not yet focused on complex syntactic linguistic phenomenon, such as reflexive binding. Therefore, it is very hard to find in their literature

a complete syntactic account for reflexive binding. The only account that can be found is an Emergentist account by O'Grady (2005)[2].

Before proceeding to O'Grady's (2005) binding account, it is important to shed light on some of his assumptions. O'Grady (2005) argues that language consists of two components: the Lexicon and the Computational System. The Lexicon is a repository of information for the symbols of language, and it includes important information about lexical items, such as their categories and combinatorial possibilities. For example, a word such as *carry* is a verb with the following information (V= verbal; N= nominal; ag= agent; th= theme):

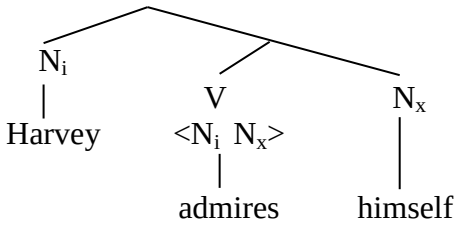
(2.7) Carry: V, <N N> (e.g., Harry carried the package.)
↑ ag th
category of the word ↑
arguments in the grid form.

(O'Grady, 2005: 4)

As for the computational system, it has combinatorial mechanisms that work to combine lexical items and resolve dependency between them. Such an aim is achieved via the use of Combine operation and respect of the Efficiency Requirement which states that dependencies between lexical items should be resolved at the first opportunity (O'Grady, 2005). All of these ideas will be clear in our discussion of the resolution of nominal dependencies, namely reflexive binding.

On this view, a sentence such as *Harvey admires himself*, is formed as follows: first, the efficiency processor resolves the dependency of the verb which requires two arguments, so a Combine relation is established between the verb and its first argument *Harvey*. At this point, the index of *Harvey* is copied into the verb grid, and then the verb is combined with its second argument *himself* to resolve the second dependency of the verb as is shown in (2.8).

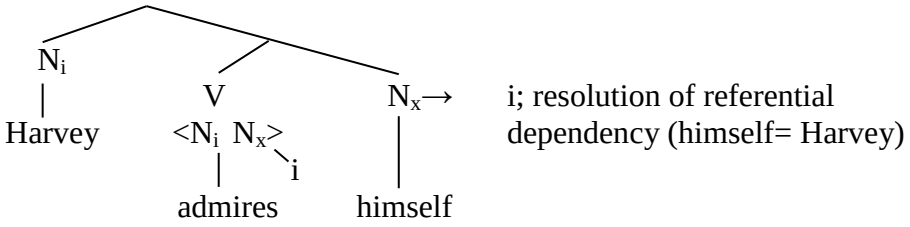
(2.8)



[2] O'Grady's (2005) account is used here for the discussion of an example of binding accounts proposed by Usage-Based-Approaches. As for the empirical evidence by proponents of Usage-Based Approaches, there is a study by Harris and Bates (2002), but it is not discussed in this thesis because the main focus is generative accounts.

However, the referential dependency of the reflexive has not been resolved yet, and the Efficiency Requirement imposes that referential dependencies should be resolved at the first opportunity. Therefore, the computational system immediately resolves the referential dependency of the reflexive (represented as *x* above) by the time it encounters the index of Harvey (represented as *i*) in the verb grid, and the reflexive copies the index of Harvey as is shown in (2.9):

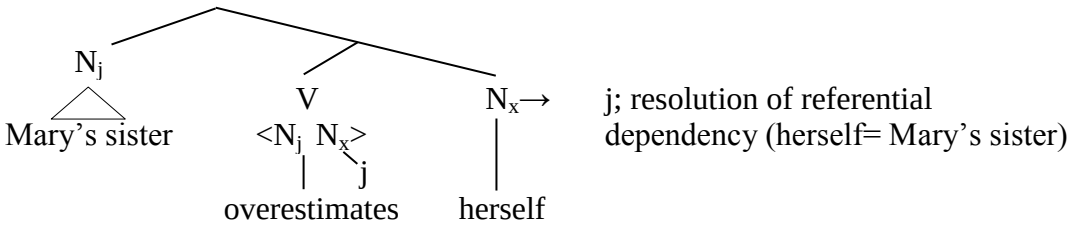
(2.9)



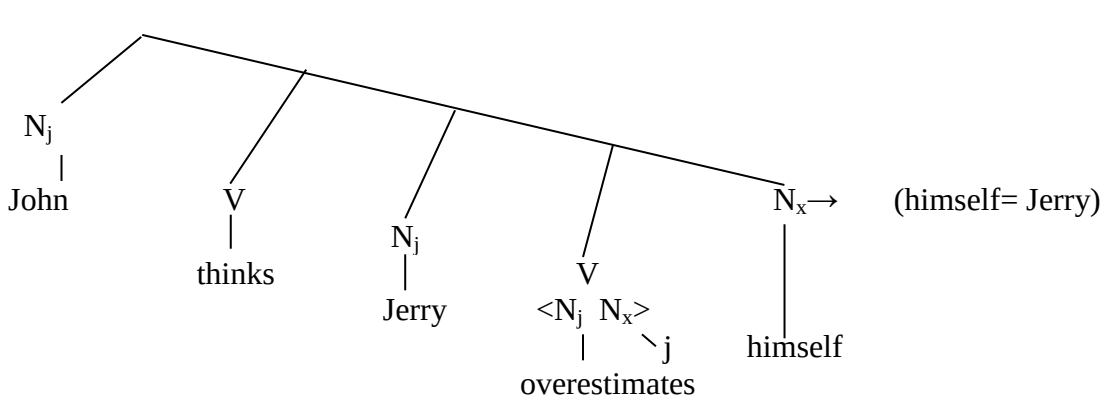
O'Grady (2005) argues his account does not impose any grammatical constraints, such as c-command and locality, on the resolution of the referential dependency of reflexives. That is because locality and c-command are a natural outcome of the work of the efficiency processor, as is illustrated in (2.10a, b) for c-command and locality, respectively:

(2.10)

a.



b.



In (2.10a), O'Grady argues there are independent reasons that prevent the processor from reaching *Mary's*. That is, the combination starts first between *Mary's* and the NP *sister* which are then combined with the verb *thinks* as the first argument. Since the NP *Mary's sister* is the verb first argument, its index (j) is copied to the

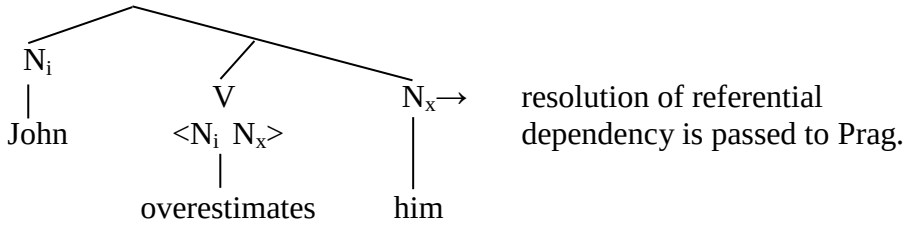
verb grid, and it is used to resolve referential dependency when the second argument *herself* of the verb is combined. As such, the reflexive *herself* takes the index of the nominal *Mary's sister*. As for locality in (2.10b), O'Grady explains that the reflexive *himself* cannot refer to the subject of the matrix clause *John* because when the reflexive is combined to the subordinate verb *overestimates*, the grid of the verb will contain only the index of its subject *Jerry*. Hence, *himself* is coreferential with *Jerry*, not *John*. Based on this analysis, O'Grady (2005:36) argues that referential dependency of reflexives is resolved in two steps:

(2.11) i. F $\perp$ N-*self*$_x$
$<N_i...N_x>$
(combination of the reflexive pronoun with a functor (verb) whose grid contains the index of another element)

ii. N-*self*$_{x\rightarrow i}$
(resolution of the pronoun's referential dependency by the index already in the functor's argument grid)

As for long-distance reflexives, O'Grady (2005) claims that their referential dependency can be resolved in the same manner that the plain pronoun's dependency is resolved. According to O'Grady, the resolution of referential dependency of pronouns is not within the level of the sentence, but it is passed to another pragmatic system which is outside the domain of syntax. This representation is illustrated in (2.12) where the arrow → means that the resolution is passed into a pragmatic system:

(2.12)



O'Grady claims the resolution of the referential dependency of long-distance reflexives is the same as the one for plain pronouns.

Based on this analysis, O'Grady (2005) argues that reflexives can be learned from the input via the use of the efficiency processor that is part of the general cognitive mechanisms of humans. As such, language acquisition is nothing more than input analysis via the use of general cognitive mechanism.

Although O'Grady's (2005) account is an important progress in Usage-Based-Approaches, it is still problematic. First, Hawkins (2008) criticizes O'Grady's efficiency-driven-processor which faces critical problems in some structures in English as is shown in (2.13):

(2.13) a. There's/are lots of people in the room.

b. Here's/are the books you ordered. (Hawkins, 2008: 614)

Hawkins (2008) points out that some varieties of English allow plural nouns after singular copulas. If the efficiency-driven-processor is applied to these examples, there will be a clash between the dependency feature [3sg] and the [IIIPL] feature of the following N. Second, O'Grady's (2005) binding account seems to work in the case of local reflexives, but it is problematic in the case of long-distance reflexives. That is, long-distance reflexives (e.g., *ziji* in Chinese) cannot be treated as pronouns because they have their own special characteristics that cannot be found with pronouns. For example, there are two types of long-distance reflexives: one which takes the whole sentence as domain (*ziji* in Chinese) and one (*svoj* in Russian) which cannot overlook finite clauses (see examples 2.5 and 2.6). Also, long-distance reflexives cannot be bound by any object antecedents:

(2.14) Zhangsan_i gei le Lisi_j yi zhang $\text{ziji}_{i/*j}$ de zhaopian.
Zhangsan give PFV Lisi one CL self DE photograph

As is shown in (2.14), the Chinese reflexive *ziji* can be bound by the subject antecedent *Zhangsan* or any possible higher subject antecedents, but it cannot be bound by the object antecedent *Lisi*. Such an observation is also true in the case of long-distance object antecedents. Moreover, the relation between long-distance reflexives and their antecedents is controlled by the c-command constraint which is not the case with plain pronouns. In other words, a long-distance reflexive should be c-commanded by its antecedent/s, whereas a plain pronoun can be bounded by a non-commanding antecedent. All of these observations make long-distance reflexives distinct from plain pronouns. Hence, any account for reflexive binding should account for such observations.

2.2.2.3 Empirical Evidence

As Usage-Based-Approaches have not yet proposed any complete and consistent account for reflexive binding, they have not, according to my knowledge, presented any empirical evidence to support a usage-based binding account.

2.2.2.4 Conclusion

This section has shown that knowledge of reflexive binding in L1 acquisition, to the best of my knowledge, has not been investigated by proponents of Usage-Based-Approaches. Children might struggle to find a clue in input to help them acquire the grammar of reflexive binding, but as was shown, the input is impoverished. Proponents of Usage-Based-Approaches have not been able to provide a consistent account for the cross-linguistic variation in the distribution of reflexives. The account proposed by O'Grady tried to avoid the complexity of long-distance reflexives by claiming that they are pronoun-like. However, the discussion of the

characteristics of long-distance reflexives has shown that they are distinct from plain pronouns. As proponents of Usage-Based-Approaches have not presented a complete theoretical account of reflexive binding, they have not yet presented any empirical evidence to show that reflexives can be acquired by relying on input and general cognitive mechanisms. As such, the view that knowledge of reflexives can be acquired by depending on input and general cognitive mechanisms is not adopted in this thesis. The view that a specific linguistic mechanism is involved in the acquisition of reflexives is considered in the sections that follow.

2.2.3 Generative Approaches and Reflexive Binding

The outline of this section is as follows: first, an overview of the main Generative Approaches is presented, showing their theoretical views and assumptions on language acquisitions. Second, generative accounts of reflexive binding are discussed in the light of the POS argument mentioned above, and finally any empirical evidence to support their accounts for reflexive binding is presented. The aim behind this section is to see whether Generative Approaches could present any consistent binding account that can be adopted in this thesis.

2.2.3.1 Overview

Chomsky (1959) argues the internal language should be the main point of focus in a linguistic theory. In this regard, he defines Universal Grammar as "a system of rules that in some explicit and well-defined way assigns structural descriptions to sentences" (Chomsky, 1965: 8). Chomsky (1986: 24) goes into more detail about this system and argues that "knowledge of language is a knowledge of a certain rule system … that this knowledge arises from initial state S_0 that coverts experience into a 'steady state' S_s ." Upon these claims, generative grammarians called the initial state knowledge of language UG, and they started to give explanatory accounts of the operation of UG.

In their analysis of the nature of UG, generative grammarians claim that all human beings have a set of innate universal principles and parameters which control the shape that any natural language takes. Thus, a language acquirer is endowed with a language faculty which enables him/her to arrive at a grammar of a language on the basis of the exposure to the primary linguistic data. This faculty consists of invariant principles and binary parameters. One example of the universal principles is that every natural language should have a subject. The realization of that subject is determined via the Null-Subject Parameter. To put it informally, a language can be either a null-subject language where it allows a covert realization of the subject or a non-null-subject language where it allows only the overt realization of the subject (Radford, 2004). Such a parametric difference can be found between English and Arabic:

(2.15) a. Arabic (Kenstowicz, 1989)
(Hiy) ištarat l-fustaan.
(She) bought the dress.

b. English
She bought the dress.

As is shown in (2.15a), Arabic allows a covert realization of the subject, whereas in English (2.15b) the overt realization of the subject is obligatory.

Empirical success and development in linguistic research led to the most developed version of Generative Approaches which is the Government and Binding Theory GB which considers language modular (Chomsky, 1981). Farmer (1985: 25) points out language is modular in the sense that "language (a "linguistic system") is construed as a system of rules and representations factorable into independent but interacting subsystems." These sub-systems are the modules of language. They include a Phrase Structure module, a binding module, a control module, a case module and a locality module. Importantly, principles and parameters are present in each module, yielding module-specific constraints. The convergence of these modules, in turn, results in constructional complexity which respects the values of each language (Chomsky, 1981). An example of the GB modules is the binding module which contains the three Binding Principles that specify the referential relation between nominal expressions and their antecedents:

(2.16) The Standard Binding Theory (Chomsky, 1986:166)

(A) An anaphor is bound in a local domain
(B) A pronominal is free in a local domain
(C) An r-expression is free (in the domain of the head of its chain)

In the light of these three principles, the referential relation in (2.17) is determined as follows: the English reflexive *himself* in (2.17a) is coreferential with *Jack*, but the pronoun *him* in (2.16b) is not coreferential with *Jack*. As for (2.17c), the r-expression *Jack* cannot refer to *Jack*.

(2.17) a. $Jack_i$ hurt $himself_i$.
b. $Jack_i$ hurt him_{*i}.
c. $Jack_i$ hurt $Jack_{*i}$.

The core of GB theory is the introduction of Governing Category. Chomsky (1981, cited in Rappaport, 1986: 102)[3] defines a governing category as:

[3] In fact, Rappaport (1986) proposes this definition as a simplified version of what was exactly mentioned in Chomsky (1981, p 211)

(2.18) *A* category *C* is the governing category of a category *A* if and only if *C* is the minimal category in which all the three of following conditions are satisfied:

a. *C* contains *A*;

b. *C* contains a category *B* which is a SUBJECT, where a subject is any of the following:

(ii) AGR, a nominal agreement element assumed to be present in a finite clause as a sister node to the subject NP and the Verb phrase.

(iii) The subject of a finite clause.

(iv) The empty subject of an infinitival clause, *PRO*;

(v) The specifier of a lexical category (e.g. of an NP)

c. *B* c-commands *A*.

This complex definition of a governing category will be clear when we consider the following example:

(2.19) a. Jack_i said that [$_{IP}$ Tom_j hurt $\text{himself}_{*i/j}$]

b. Sarah_i read [$_{NP}$ Susan's_j letter about $\text{herself}_{*i/j}$]

c. [$_{IP}$ John wants-AGR [himself_i to win]]

In (2.19a), the governing category is IP; it has the anaphor *himself*, a governor of the anaphor, *hurt*, and the clausal subject *Tom*. Likewise in (2.19b), the governing category is NP; the anaphor is *herself*, the governor of the anaphor is *about*, and the subject is *Susan*. Therefore, *herself* can be bound by *Susan* but not *Sarah* because *Susan* here is inside the governing category defined as NP while *Sarah* is not. In (2.19c), the anaphor is also *himself*, the governor for the anaphor is *want*, and the minimal accessible SUBJECT for the anaphor is AGR. Therefore, the matrix clause is the governing category for the anaphor and the anaphor is bound by *John*.

Newmeyer (2004) also criticizes the parametric approach to language acquisitions, claiming that its "hopeful ambitions" are not empirically applicable. Newmeyer claims that the cross-linguistic variation is outside the scope of the Principles and Parameters of UG because the binarity of parameters is not applicable in reality. Newmeyer (2004), for instance, refers to the attempts by Jakobson (1936/1971) to reduce the cases in Russian to binary values but those attempts were not successful. Instead, Newmeyer (2004) advocates a rule-based model that is less constrained than the UG-model. Newmeyer (2004: 183-184), for instance, replaces the Head-Complement Parameter (2.20) with language-specific rules as is shown in (2.21):

(2.20) Head Parameter: Complements are to the left or to the right of the head.

a. HEAD-LEFT (English, Swahili, …)
b. HEAD-RIGHT (Japanese, Lakhota, …)

(2.21) a. English: Complements are to the right of the head.
b. Swahili: Complements are to the right of the head.
c. Japanese: Complements are to the left of the head.
d. Lakhota: Complements are to the left of the head.

However, Roberts and Holmberg (2005) consider Newmeyer's proposal (2.21) as another variant of the parameter (2.20). Whether it is a parameter or a rule, there are just two options available and the learner has to choose one of them based on the linguistic input. Moreover, the proposal of Newmeyer in (2.21) means that children already know what a head and a complement are, which means that there is innate knowledge of head and complements. Otherwise, Newmeyer should give a logical account with regards to the origin of such knowledge (Roberts and Holmberg, 2005).

As can be seen from this overview, generative grammarians argue that children are born with an innate linguistic knowledge that helps them to acquire language. Such specific linguistic knowledge, as generative grammarians claim, is distinct from the general cognitive mechanisms that people use to acquire other skills. The important question here is that if language principles and parameters are innate, then how could knowledge of reflexive binding be acquired? The subsequent section discusses binding accounts proposed by generative grammarians.

2.2.3.2 Binding Account/s of Reflexives

Reflexive binding has been one of the major topics in Generative Approaches because it represents one of the strong supports to the POS and the necessity of UG to acquire language. This section presents different generative accounts for reflexive binding[4]. The aim behind this section is to see how generative researchers accounted for reflexive binding.

2.2.3.2.1 Standard Binding Theory (Chomsky, 1981, 1986)

The principles of binding syntactically deal with different kinds of relation with more than one element in a sentence. This relation could be related to empty elements such as null pronouns and traces, lexical anaphors such as reflexives and reciprocals, and pronouns (Chomsky, 1981). In his publications, Chomsky (1981, 1986) defines binding as set of restrictions on the co-occurrence of nominal elements in a specific context. Thus, he proposes the Standard Binding Theory which was mentioned in (1.2) and is repeated here as (2.22):

[4] Minimalism and binding accounts in the Minimalist Program will not be discussed in this thesis, but the focus will be on the Government and Binding Theory (Chomsky, 1981/86).

(2.22) **Standard Binding Theory (Chomsky, 1986: 166)**

A. An anaphor is bound in a local domain

B. A pronominal is free in a local domain

C. An r-expression is free (in the domain of the head of its chain)

To illustrate these three principles consider example (2.23):

(2.23) a. Grover_i said the father_j of the Ninja Turtle_k fed $\text{himself}_{*i/j/*k}$.
b. John_i said Jack_j does not like $\text{him}_{i/*j}$.
c. He_i said the Ninja Turtle_{*i} has the best smile.

(Crain and Pietroski, 2002: 175)

In (2.23a), the reflexive pronoun *himself* cannot be coreferential with the subject of the matrix clause *Grover* because it is outside the local domain of the reflexive. However, according to principle A of the Standard Binding Theory, *himself* can be coreferential with the subject of the embedded clause *the father of Ninja turtle*. On the other hand, principle B of the Standard Binding Theory prohibits any coreferential relation between *Jack* and *him* in (2.23b) because both of them are within the same domain. However, the English pronoun *him* in (2.23a) can refer to the subject of the matrix clause *John* or any other entity. As principle C of the Standard Binding Theory states that r-expressions should be free, *the Ninja turtle* in (2.23c) should be free and cannot be coreferential with the subject of the matrix clause *He*.

A binding domain differs from one language to another. For example, a local domain in English is defined as the minimal governing category containing the expression, a governor for the expression, and an accessible SUBJECT (see 2.18 above for the definition of a governing category). Example (2.24) illustrates the binding domains for English:

(2.24) a. John_i said that [$_{IP}$ Simon_j hurt $\text{himself}_{*i/j}$]
b. Ann_i read [$_{NP}$ Cinderella's$_j$ letter about $\text{herself}_{*i/j}$]
c. [$_{IP}$ Jack wants-AGR [himself_i to win]]

As is shown in (2.24a), the governing category is IP; it has the anaphor *himself*, a governor of the anaphor, *hurt*, and the clausal subject *Simon*. *Himself* can be bound by *Simon* because *Simon* is the clausal subject of the governing category IP. However, *himself* cannot be bound by *John* because *John* is not in the domain of the governing category, IP. Similarly, in (2.24b), the governing category is NP; the anaphor is *herself*, the governor of the anaphor is *about*, and the subject is *Cinderella*. Therefore, *herself* can be bound by *Cinderella* but not *Ann* because *Ann* here is not within the governing category defined here as NP while *Cinderella* is within the governing category, NP. In (2.24c), the anaphor is also *himself*, the governor for the anaphor is

want, and the minimal accessible SUBJECT for the anaphor is AGR. Therefore, the matrix clause is the governing category for the anaphor and the anaphor is bound by *Jack*.

According to Standard Binding Theory and the definition of bound, an anaphor can refer to any possible antecedent within the same clause whether it is an infinitival or finite clause, but a reflexive cannot refer to an antecedent in a higher clause, e. g.:

(2.25) a. $John_i$ likes $himself_i$.
b. $Jane_i$ advised Ann_j to take care of $herself_{i*/j}$.
c. The $sister_i$ of $Cinderella_j$ points to $herself_{i/*j}$.

As is obvious in (2.25a), *John* and *himself* are co-referential because the antecedent *John* is within the local domain of the reflexive *himself*. For the same reason in (2.25b), *herself* refers to *Ann* because *Ann* functions as the subject of the infinitival clause *to take care of herself*. However, *herself* cannot refer to *Jane* because *Jane* as the subject of the finite clause is not in the local domain of the reflexive; it does not c-command *herself*. In (2.25c), *herself* can only refer to *The sister of Cinderella* but not to *Cinderella* because *The sister of Cinderella* c-commands the reflexive *herself* but *Cinderella* does not. Sometimes, more than one NP can function as an antecedent for a reflexive, e.g.:

(2.26) Sam_i showed $John_j$ a picture of $himself_{i/j}$.

In (2.26), both *Sam* and *John* are within the local domain of the reflexive *himself*, and they c-command it. Therefore, any one of them can function as an antecedent for the reflexive. According to what we have discussed so far, the Standard Binding Theory accounts for the binding conditions for local reflexives (e.g. himself). They are locally bound and have subject/object orientation- they can be bound by local subject and object antecedents. However, cross-linguistic variation shows that Principle A in the Standard Binding Theory cannot account for reflexive distribution in what is called long-distance binding languages, e.g. *ziji* in Chinese and *sebe* in Russian. Therefore, many proposals have been introduced to account for cross-linguistic variation.

2.2.3.2.2 Governing Category Parameter

Since the Standard Binding Theory cannot account for crosslinguistic variation in reflexive binding, many proposals have been introduced (see Yang, 1983; Pica, 1987; Wexler and Manzini, 1987; Cole *et al*., 1990; Katada, 1991; Progovac, 1993; Reinhart & Reuland, 1993). For example, Wexler and Manzini (1987: 64) propose their binding principles which are similar to the principles of the Standard Binding Theory, but with different considerations:

(2.27) a. an anaphor is bound in its governing category by a proper antecedent
b. a pronominal is free in its governing category from proper antecedents.

By looking at binding principle A in (2.27), we will start wondering at the new contribution of Wexler and Manzini to the Standard Binding Theory. However, they define the governing category in a way which differs from what was discussed in Chomsky (1981). In their discussion, they assume that a governing category is a parameter with five implicational values. Under this consideration, Wexler and Manzini (1987: 53) propose the Governing Category Parameter:

(2.28) γ is a governing category for α iff
γ is the minimal category which contains α and:
a. has a subject, or
b. has an INFL, or
c. has a TNS, or
d. Has an indicative TNS, or
e. has a root TNS

By defining five values for a governing category, Wexler and Manzini could present an account for cross-linguistic variation in the distribution of reflexives. For example, value (2.28a) above accounts for what counts as a domain or a category for a reflexive like *himself* in English. Value (2.28d), on the other hand, accounts for the domain of a reflexive like *sig* in the Icelandic languages while value (2.28e) accounts for the domain of a reflexive like *ziji* in Chinese. Wexler and Manzini (1987) also propose the Lexical Learning Hypothesis in which they argue that these values are not associated with the distribution of reflexives in languages, but these values are used to account for the distribution of lexical items in a language. For example, value (2.28e) is not associated with all the types of reflexives in Chinese because in Chinese we have two types of reflexives: simplex such as *ziji*, and complex such as *ta ziji*. The former is associated with value (2.28e) and has long-distance antecedents while the latter is associated with value (2.28a) and has local antecedents as is shown in (2.29):

(2.29) Zhangsan_i renwei Lisi_j zhidao Wangwu_k xihuan $\text{ziji}_{i/j/k}$ /ta $\text{ziji}_{*i/*j/k}$.
Zhangsan thinks Lisi knows Wangwu likes self/himself
"Zhangsan thinks that Lisi knows that Wangwu likes self/himself"

Ziji in (2.29) can refer to *Wangwu*, *Lisi*, or *Zhangsan* because this reflexive is associated with value (2.28e) in which the root TNS determines the minimal category of the antecedent. *Ta ziji*, in contrast, refers *only* to *Wangwu* because this reflexive is associated with value (2.28a) in which the subject determines the minimal

category of the reflexive. Hence, it is erroneous to say that the above discussed values (2.28a-e) are associated with languages, but we have to say that they are associated with lexical items in languages.

So far Wexler and Manzini (1987) have discussed the domain of different lexical anaphors in different languages. However, how could they account for the orientation of reflexives? In other words, Wexler and Manzini have to account for the fact that simple reflexives (e.g., *ziji*) are bound by only subject antecedents while complex reflexives (e.g., *ta ziji*) are bound by both subject and non-subject antecedents. To satisfy this requirement, Wexler and Manzini (1987: 64) parameterize the orientation of lexical reflexives by proposing the Proper Antecedent Parameter:

(2.30) A proper antecedent for α is
   a. a subject *ß*; or
   b. an element *ß* whatsoever

According to this condition, a reflexive can be either bound by subject antecedents, or any potential antecedent within the domain. Long-distance reflexives are usually correlated with subject antecedents while local reflexives are usually correlated with subject/object antecedents. Irrespective of the type of reflexive, local or long-distance, UG prohibits any kind of binding to long-distance object antecedents. Example (2.31) below illustrates this idea.

(2.31) Mary_j told Anne_k that Susan_i recommended $\text{herself}_{i/*k/*j}$ for the job.

As is shown in (2.31), for English the reflexive *herself* is coindexed with the local subject *Susan*, but not with any of the long-distance antecedents *Anne* or *Mary*. If we have a counter Chinese translation to this example, a reflexive such as *ziji* can be coindexed with the local subject antecedent *Susan* or the long-distance subject antecedent *Mary*. However, *ziji* cannot be coindexed with the long-distance object antecedents because such coindexation is blocked by UG.

Since the publication of Manzini and Wexler's (1987) proposal, it has been subject to criticism. For example, Newmeyer (2004) claims that the possible binding domains discussed in Manzini and Wexler (1987) are said to be a set of implicational subset values, rather than a binary distinction. However, Roberts and Holmberg (2005: 2) refute Newmeyer's criticism against Manzini and Wexler's (1987) binding domains by arguing that these domains can be restated as a set of implicationally binary parameters as in (2.32):

(2.32) a. Is the binding domain determined by Infl? YES/NO
   b. If NO, is the binding domain determined by Tense? YES/NO
   c. If NO, is the binding domain determined by referential Tense? YES/NO
   d. If no, is the binding domain is determined by root tense? YES/NO

In another criticism against Manzini and Wexler's (1987) proposal, Safir (1987: 80) argues that restricting the values of the Governing Category Parameter or any parameter to lexical items in a language *L* is "confronted by with a potential undergeneralization problem as a result." Hence, there is a conflict between undergeneralization in Manzini and Wexler's (1987) proposal and the overgeneralization spirit of the Standard Parameter Theory (Chomsky, 1981) which states that parameters are few while their effect is pervasive within a language. Safir (1987) points out that if a language *L* has different values of a parameter for different lexical items in that language, then a theory of parameters will not compare the parameters of language *L* with the parameters of language *Ĺ*. On the contrary, the comparison will be between the lexical items of *L* with the lexical items of *Ĺ*.

2.2.3.2.3 The Relativized Subject Approach

Progovac (1993) argues that the Standard Binding Theory fails to give an account for the attested correlation between domain and orientation for local and long-distance reflexives. That is, local reflexives (domain) can be bound by either subject or object antecedents (orientation) while long-distance reflexives can be bound by only subject antecedents. Example (2.33a-b) illustrates this difference:

(2.33) a. John$_i$ told Peter$_j$ a story about himself$_{i/j}$.

b. Milicioner$_i$ rassprasival arestovannogo$_j$ o sebe$_{i/*j}$
policeman questioned suspect about self
'The policeman questioned the suspect about himself.'

(Progovac, 1993: 762)

As is shown in (2.33a), the local English reflexive *himself* can be syntactically bound by the local subject antecedent *John* or the local object antecedent *Peter*. The long-distance Russian reflexive *sebe* in (2.33b), in contrast, can be bound by only the subject antecedent *Milicioner* (policeman), but not by the object antecedent *arestovannogo* (suspect).

Progovac (1993) assumes a distinction between local reflexives (morphologically complex) and long-distance reflexives (monomorphemic). While complex reflexives do not take Agr as their binder, monomorphemic reflexives do. In this regard, Progovac (1993) argues that there is a close relation between the type of (±) Agr and the domain for long-distance reflexives. That is, if a language that allows long-distance binding has overt morphological agreement, then the domain of long-distance reflexives closes off with the first finite clause (e.g. Russian). However, if a language that allows long-distance binding does not have overt morphological agreement but anaphoric Agr, domain of long-distance reflexives can overlook finite clauses (e.g. Chinese).

According to the argument above, *ziji* in (2.34) will be bound by Agr in the local clause:

(2.34) Zhangsan$_i$ Agr2$_i$ shuo [Lisi$_i$ Agrl$_i$ chang piping ziji$_i$].
Zhangsan say Lisi often criticize self
'Zhangsan says Lisi often criticizes herself'

(Progovac,1993: 758)

Progovac argues that Agr1 is also bound to Agr2 in (2.34) by transitivity. Progovac explains binding in this sense is feature-indexing, not coreference indexing which would result in actual coreference as is the case in the relation between complex reflexives and their antecedents. As Agr is not a referential entity, and it is conventionally coindexed to its SUBJECT (Chomsky, 1981), *Lisi* and *Zhangsan* in (2.34) are coindexed by transitivity of their Agrs (Progovac, 1993). However, feature-coindexation requires compatibility in the person and number features of subjects or binding will be blocked as is the case in (2.35):

(2.35) Zhangsan$_i$ Agr2 renwei wo$_j$ Agr1 hai-le ziji$_{*i/j}$
Zhangsan think I hurt-$_{ASP}$ self
Zhangsan thinks that I hurt myself

(Progovac 1993: 760)

As is shown in (2.35), Agre1 can be the SUBJECT for *ziji*, but Agr2 cannot because Agr2 is 3rd person while Agr1 is 1st person.

Taking the above differences between Agr type (±), actual coreference and feature-indexing into account, Progovac (1993: 757) proposes the Relativized Subject Approach which states that:

(2.36) **a.** A reflexive R must be bound in the domain D containing R, a governor for R, and a SUBJECT (see Chomsky 1981).
b. If R is an X$^{\circ}$ (monomorphemic) reflexive, then its SUBJECTs are X$^{\circ}$ categories only, that is, Agr (as the only salient (c-commanding) head).
c. If R is an X^{max} (morphologically complex) reflexive, its SUBJECTs are X^{max} specifiers, therefore [NP, IP] and [NP, NP].

According to (2.36), the choice of a possible antecedent to any type of reflexives depends on X-bar compatibility. Progovac (1993) assumes a relation between the morphological status of a reflexive and its SUBJECTS. That is, if the reflexive is X$^{\circ}$ (e.g., *ziji*), then its SUBJECTS are only X$^{\circ}$ categories. Thus, the only c-commanding head is Agr. Example (2.35) above illustrates the Chinese reflexive *ziji* as an example of X$^{\circ}$ reflexive.

However, if the reflexive is X^{max} (e.g. *himself*), its SUBJECTS are X^{max} specifiers, namely [NP, IP] or [NP, NP]. Example (2.37) illustrates the Arabic reflexive *nafs-uhum* as an example of a morphologically complex reflexive:

(2.37) humma$_i$ simʔ-u ʔinn $_{NP}$[ʔahmad w mona]$_j$ bi-y-Hibb-u nafs-uhum$_{*i/j}$
they heard-3pl that Ahmad and Mona PRES-3-like-pl self-their
"they heard that Ahmad and Mona like themselves."

(Osman, 1990: 160)

Progovac (1993) argues that the assumption that X° reflexives are bound by only c-commanding X° elements while X^{max} reflexives can be bound by only c-commanding X^{max} specifiers is important to account for the subject orientation of long-distance reflexives. According to this assumption, Agr which is conventionally coindexed to its SUBJECT is the only c-commanding X° element that can bind the X° reflexive, which excludes object orientation to X° reflexives. Hence, only [NP, IP] can be a possible antecedent for X° reflexives. X^{max} reflexives, in contrast, can be bound by c-commanding X^{max} specifiers, which makes [NP, IP] and [NP, NP] possible binders for the X^{max} reflexive.

2.2.3.2.5 Conclusion

The main aim behind this review was to see how generative grammarians have accounted for reflexive binding. We have seen that the Standard Binding Theory could not account for the cross-linguistic variation in the distribution of anaphoric elements so it cannot be adopted here. Similarly, the Governing Category Parameter (Manzini and Wexler, 1987) cannot be adopted because it restricts the values of the Governing Category Parameter to lexical items in language which in turn poses a conflict between undergeneralization in Wexler and Manzini's (1987) proposal and the overgeneralization in generative grammar which states that parameters are few while their effect is pervasive within a language (Safir, 1987).

As for the Relativized Subject Approach, it relies on the idea of the morphological status of reflexives to account for their distribution in a language. In this thesis, the main assumption is that the X-bar compatibility between a reflexive and its SUBJECTS is the crucial factor in determining its domain and orientation. Now, we move to see whether generative grammarians could empirically support the innateness of linguistic knowledge of reflexive pronouns.

2.2.3.3 Empirical Evidence

Research on the interpretation of reflexives by L1 children has been a topic of interest to a large number of generative researchers (Wexler and Chien, 1985; Chien and Wexler, 1987; Solan, 1987; Chien and Wexler, 1990; McDaniel, Crains and Hsu, 1990; Mckee, 1992; among others). Reasons behind this interest go back to the nature of reflexives where the acquisition of the grammar of reflexive binding represents one instance of the POS. In this regard, Lust (1986) argues that the study of anaphora in L1 acquisition is important for two reasons. First, anaphors depend on a computational relation with other NPs to decide their meaning. For example, as shown above, coindexation and c-command are involved in the computational relation between reflexives and their antecedents. Second, the study of anaphors is critical for the study of the interaction between the language faculty and other cognitive faculties (e.g. the interaction between anaphora binding and pragmatics). Similarly, Wasow (1986: 111) points out that "if the foremost goal of linguistic theory is to discover what the child brings to the task of language acquisition, and if much of the structure of language is determined by the conditions on anaphora-antecedent pairings, then determining what the children know about anaphoric relations should be an especially enlightening avenue of investigation." Thus, if generative researchers can empirically show that children show uniform interpretation of reflexives according to UG claims, their evidence will support the existence of UG as innate linguistic ability endowed to humans. All the studies which will be discussed in this section were designed to test the interpretation of reflexives and pronouns, yet we will restrict our discussion to cover only reflexives because the main interest of this thesis is in the interpretation of reflexives.

The first study on the interpretation of reflexives by L1 children was carried out by Wexler and Chien (1985) who were interested in testing the Lexical Learning Hypothesis which states that Binding Principles A and B are already in place, but children have to learn whether a lexical item is an anaphor or a pronoun. In other words, they wanted to test whether these two principles are present in the grammar of young children as predicted for UG-constrained development. To test this hypothesis, Wexler and Chien (1985) conducted three studies on young children. The first study reported was on 129 children who were living in the USA, ranging in age from 2;6 to 6;6. Participants were divided into eight groups according to their age, with six month intervals, with no less than 15 participants in each group. The test tool was a picture identification task with 16 possessive constructions containing reflexives. (2.38) is one of test items used in the study (Wexler and Chien, 1985: 141):

(2.38) Cinderella$_j$'s sister$_i$ points to herself$_{i/*j}$.

Such a sentence was presented with two pictures: one with Cinderella pointing to herself and the other with the sister pointing to herself. To see if there was any pragmatic effects for the verbs, Wexler and Chien (1985) used four different verbs (point to, touch, dress, and wash), with two items for every verb. Wexler and Chien

found that children's responses in all groups grew from chance level 50% to about 90% level of correct responses as is shown in figure (2.1):

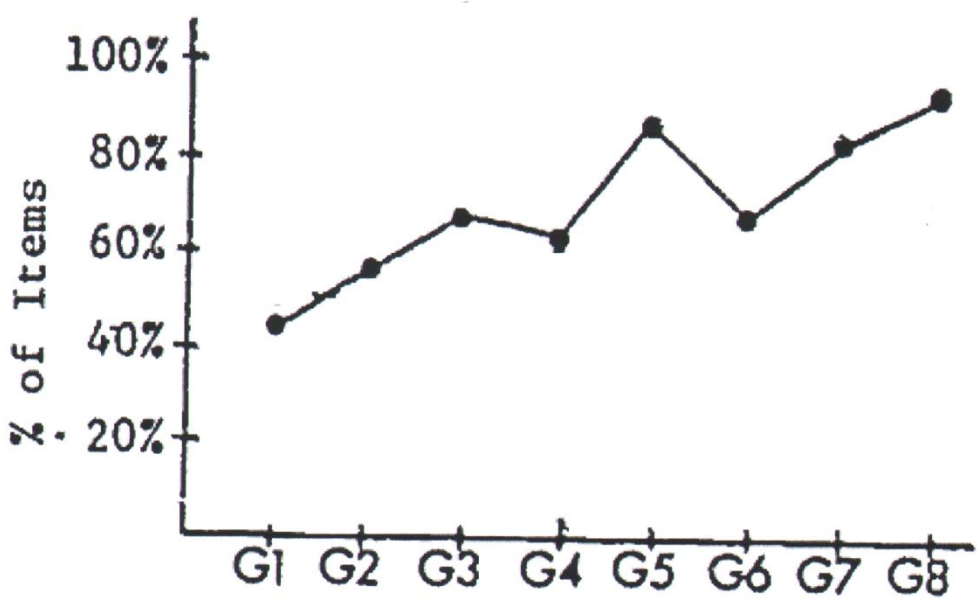


Figure 2.1 Correct responses of groups in reflexive sentences in study one (Wexler and Chien, 1985: 143)

There was also no difference in response to the different verb types used in the test. Therefore, Wexler and Chien concluded that children were sensitive to the syntactic construction of possessives and c-command, and there was no pragmatic effect on the interpretation of reflexives in their study.

The second study which Chien and Wexler reported in their 1985 paper was conducted to test children's sensitivity to the syntactic property of c-command so they reversed the order of the previous test items. Example (2.39) below shows one of the test items used in the study (Wexler and Chien, 1985: 142):

(2.39) The sister of Cinderella points to herself.

If children were sensitive to the syntactic property of c-command, they were expected to choose the noun *sister* as the correct response while if they were not sensitive to such a syntactic property, and they were developing linear order strategies, they were expected to choose the incorrect response *Cinderella*. 124 of the previous children were included in this study with the same conditions discussed above, namely age groups and 6 month intervals. In the results, Wexler and Chien found that the level of responses in all groups increased from 60% to 82% of correct responses as is shown in figure (2.2):

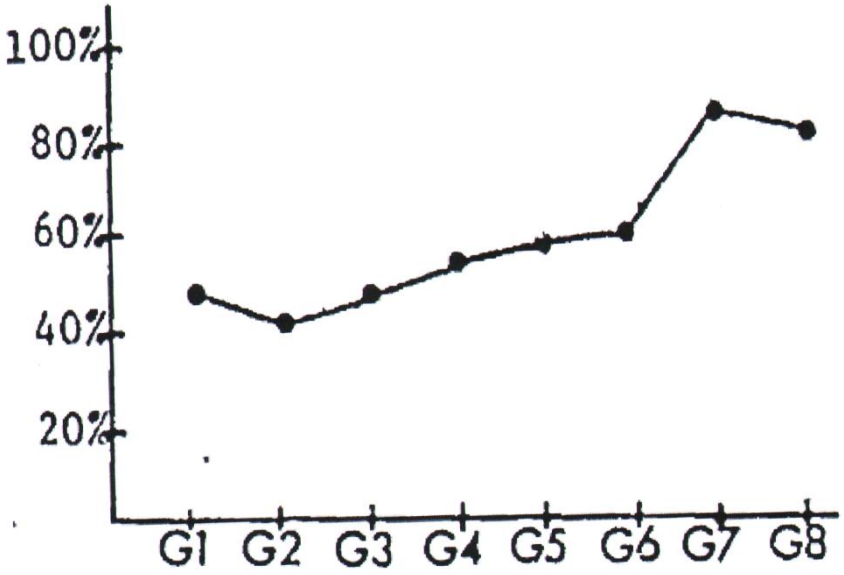


Figure 2.2 Correct responses of groups in reflexive sentences in study two (Wexler and Chien, 1985: 143)

However, Wexler and Chien found that minimal distance principle[5] seemed to distract younger children's judgments (less than 60% for children younger than 5;6) while this principle did not have any effect on the judgments of older children (older than 5;6).

The third study that Wexler and Chien conducted and reported on in their 1985 paper was somehow similar to the two previous ones but with a different type of task. They reported their study on 156 children with the same conditions discussed in the previous studies. The test tool, however, was a Simon-Says game in which the participants were involved in a game (for details see Wexler and Chien, 1985). Example (2.40) below is one of the test items used in the study:

(2.40) Biclausal finite sentences:

a. Kitty says that Sarah should point to herself.

b. Snoopy says that Adam should point to himself.

Importantly, a sentence such as (2.40a) was used with female participants while a sentence such as (2.40b) was used with male ones. The analysis of children's understanding of reflexives depended on their response. That is, if *Sarah* in (2.40a) points to herself, this indicates that she knows that *herself* is a local reflexive. However, if *Sarah* points to *Kitty*, this indicates that she has not yet acquired the local properties of English reflexives. Wexler and Chien (1985) found that the chance level of responses increased from 20% to 90% of correct responses. However, they found that children younger than 4;6 had a tendency to bind reflexives to long-distance antecedents while older children had a tendency to bind reflexives to local antecedents.

[5] It is when learners apply a linear order strategy and take the closest NP as an antecedent.

In a general discussion of the three studies, Wexler and Chien (1985) argued that children at a young age (5;6) demonstrated a clear understanding of the most two important syntactic properties of English reflexives, namely c-command and locality. Also, Wexler and Chien claim that their participants' results were in support of the Lexical Learning Hypothesis; the increase of the improvement in interpretation of English reflexives does not mean that younger children did not have knowledge of principle A, but they were passing through a developmental stage through which they knew that the lexical item was an anaphor so that they started binding it locally. All in all, Wexler and Chien (1985) conclude that binding principles and constraints were already there but it is a matter of time before they mature and become operative in the grammar of L1 children. That is, if L1 children at early stages of acquisition violate one of UG principles or constraints, say c-command constraint, this does not mean UG is not operative or does not exist in their grammar, but that constraint is not mature enough to fully control the grammar of young children.

The binding proposal of Wexler and Manzini (1987) and the claims of the Lexical Learning Hypothesis discussed above were a major topic of investigation in the 1980s/1990s. For example, Solan (1987) reported three studies on the interpretation of binding principles by L1 children. Solan was mainly interested in investigating what counts as a domain for children; do children hold a tensed/infinitival distinction with regards to domain? Is the acquisition of tensed domains easier than the acquisition of infinitival ones? Solan (1987) reported the first study on 37 children, ranging in age from 4 to 7. The participants were then divided into two experimental groups: younger (n=19, mean age 4;10) and older (n=18, mean age 6;0). As a test tool, an act out test was used in the study. The experimenter sat at a table with four toy animals representing four sentence types used in the test[6]. In the test, two sentence types were used to investigate reflexives: one sentence investigated binding of reflexives in an infinitival domain while the other investigated binding of reflexives in a tensed domain. Example (2.41) below is one of the test items used in the study (Solan, 1987: 194):

(2.41) a. The dog_j said the $horse_i$ hit $himself_{i/*j}$.
b. The dog_j told the $horse_i$ to hit $himself_{i/*j}$.

Each sentence was followed by a pragmatic misleading cue to see if children's principles were affected by pragmatic considerations. For example, in a test item such as (2.41a) the experimenter will say this is a story about the dog to include the long-distance antecedent (for discussion see Solan 1987). Table (2.1) below provides detailed results of the first study:

[6] These four sentence types were used to investigate the interpretation of reflexives and pronouns. We are going to discuss only two types which were used to investigate reflexives.

Table 2.1Percentage of participants' correct responses (Solan, 1987: 195)

Clause type	Without misleading cue	With misleading cue	total
Tensed	95	88	92
Infinitival	82	70	76

In the results, Solan (1987) found that the age of the child and the primary linguistic cue made no difference in the responses. However, clause type was highly significant; sentences with tensed clauses (70% correct) were easier than sentences with infinitival clauses (57% correct). As a preliminary conclusion for the first experiment, Solan (1987) claimed that tensed clauses are easier than infinitival clauses in the acquisition of English reflexives.

Studies two and three were designed to investigate whether picture noun phrases as shown in (2.43) are problematic or not. Experiment two included only one sentence type investigating reflexive binding. Example (2.42) below is one of the test items used in the study (Solan, 1987: 196):

(2.42) The dog_j found the $horse_i$'s picture of $himself_{i/*j}$.

Solan (1987) found 85% of correct responses to this type. However, he wanted to test whether this response is constant irrespective of the clause type. Therefore, he reported the third study in which he included two types of test items: one type included a picture noun phrase in a tensed clause and the other type included a picture noun phrase in an infinitival clause. Example (2.43) below is one of the test items used in the study (Solan, 1987: 197):

(2.43) a. The dog_j said that the $horse_i$ found the picture of $himself_{i/*j}$.
b. The dog_j told the $horse_i$ to find the picture of $himself_{i/*j}$.

In the results, Solan found that binding a reflexive in a tensed clause is easier (86% of correct responses) than binding a reflexive in an infinitival clause (68% of correct responses). Moreover, a variance analysis between the sentence types in experiment one with sentence types in experiment three showed that the type of the constituent in which the reflexive occurred was significant. In other words, it was harder for children to interpret reflexives that were embedded in noun phrases that were themselves embedded in complement clauses, than those reflexives that were directly embedded in complement clauses.

Based on the results of the three studies, Solan (1987) attributed the ease of interpreting reflexives in tensed clauses, over those in infinitival ones, to factors that are related to the processibility of these sentences and ruled out the possibility of children assuming Icelandic domain for English reflexives. In Icelandic, learners hold the tensed/infinitival distinction so that they allow long-distance binding of a reflexive to a subject

antecedent outside an infinitival clause, but they reject such binding outside a tensed clause. Solan also argues that, at early stages of acquisition, children mistakenly applied principle A of the Standard Binding Theory (Chomsky, 1986) to both reflexives and pronouns although both principles A and B were present in their grammar. As for picture noun phrases, Solan considered them as a challenge to both the Governing Category Parameter (Wexler and Manzini, 1987) and the Standard Binding Theory (Chomsky, 1986).

Chien and Wexler (1990) found Solan's (1987) claim of tensed/infinitival distinction questionable so they conducted two studies to see if it is possible for children to hold such a distinction. Experiment one was designed to test infinitival structures and see whether gender control can help children to decide the correct antecedent for the reflexive. 142 children were recruited between age 2;6 and 6;6, with a mean age of 4;5. In addition to those children, 20 adults were recruited as a control group. For purposes of analysis, children were divided into eight groups with six-month intervals, with 15 participants at least in each group. The test tool was a Simon-Says Game with two types of items investigating reflexives. Example (2.44) below shows two of the test items used in the study (Chien and Wexler, 1990: 142):

(2.44) a. reflexive sentence
Snoopy$_j$ wants Adam$_i$ to point to himself$_{i/*j}$

b. Gender control reflexive sentence

$$\left\{\begin{matrix}\text{Kitty}\\ \text{Snoopy}\end{matrix}\right\} \quad \text{wants} \quad \left\{\begin{matrix}\text{Sarah}\\ \text{Adam}\end{matrix}\right\} \quad \text{to point to} \quad \left\{\begin{matrix}\text{herself}\\ \text{himself}\end{matrix}\right\}$$

All the test items also included the verb *say* as a matrix verb. There were two items for every verb, yielding 10 items for every sentence type. Children older than 5;6 were successful in responding to all sentence types, with more knowledge of the locality properties of reflexives with want-reflexives than with say-reflexives. Table (2.2) below provides detailed information about participants' responses:

Table 2.2 Participants' responses to reflexive sentences (Chien and Wexler, 1990: 245)

Groups	Correct response %	Adults correct response %
G1	36.20	98
G2	48.80	
G3	41.90	
G4	75.90	
G5	77.90	
G6	77.50	
G7	90.00	
G8	94.70	

In general, children's knowledge of the locality principle increased from 36% at age 2;6 to adult-like performance with older children. However, younger children allowed reflexives to be bound by long-distance antecedents. Interestingly, gender control did not help children in the choice of the suitable antecedent. Table (2.3) below provides detailed information about gender control responses:

Table 2.3 Participants' correct responses to gender control sentences (Chien and Wexler, 1990: 245-246)

Groups	Children correct response %	Adults correct response %
G1	40.60	100
G2	57.00	
G3	46.70	
G4	82.30	
G5	83.20	
G6	80.00	
G7	95.00	
G8	100	

Chien and Wexler (1990) questioned these results because they might be resultant from pragmatic bias in the responses of children. Thus, they reported the second study with the purpose of eliminating pragmatic bias by using another test tool. A Party Game Task was the choice for the second study; it is an interesting test where pragmatic bias is either eliminated or minimized. Some incentives such as the act of giving oneself something were used in the test to make the choice of the local antecedent more attractive. 174 children, in the same age range as the previous study (Chien and Wexler, 1990), participated in the study. 20 adults were also recruited as a control group. Four sentence types were used in the game, but only two investigated reflexives. Example (2.45) below is one of the test items used in the study (Chien and Wexler, 1990: 247):

(2.45) a. Reflexive sentence

Snoopy$_j$ says that Adam$_i$ should give himself$_{i/*j}$ a car.

b. Gender control reflexive sentence

{Kitty / Snoopy} says that {Sarah / Adam} should give {herself / himself} a cup.

Half of the sentences in the study involved the matrix verb 'say' with a tensed complement while the other half involved the matrix verb 'want' with an infinitival complement. Table (2.4) below provides detailed information about subjects' responses to both tensed and infinitival sentences:

Table 2.4 Participants' correct responses to reflexive sentences (Chien and Wexler, 1990: 248-249)

Groups	Say-Correct response %	Want-Correct response %	Adults correct response %
G1	56.75	55.00	Say 97.50
G2	43.50	42.00	
G3	80.75	69.25	
G4	84.25	73.75	
G5	90.00	90.00	Want 98.75
G6	88.75	90.00	
G7	90.75	92.00	
G8	98.50	98.50	

According to these results, Chien and Wexler (1990) found the average of incorrect responses was about 16.75% which means that children chose long-distance antecedents about 16.75% of the time. This high percentage primarily occurred in the results of children younger than 3;6, specifically G1 and G2. Similar to the case of the previous study, gender control did not help children in the choice of suitable antecedents. Table (2.5) below provides detailed information about children's responses to gender control reflexive sentences.

Table 2.5 Participants' correct responses to gender control (GC) reflexive sentences (Chien and Wexler, 1990: 251-252)

Groups	GC Say-Correct response %	GC Want-Correct response %
G1	68.25	66.75
G2	48.75	47.25
G3	85.00	83.50
G4	86.75	86.75
G5	95.00	93.25
G6	90.00	91.25
G7	97.25	96.00
G8	97.00	100

Chien and Wexler (1990) found that about 9.50% of the time children allowed long-distance binding in GC-say sentences, and 9.75% of the time they did the same in GC-want sentences. However, when we compare the results of the Party Game (in this study) with the results of the Simon-Says Game (the previous study), we find that children had higher performance in the Party Game (party game: say, 80.25%; want, 76.25%. Simon-Says: say, 57.30%; want, 57.30%). When the party game was introduced, knowledge of local binding was about 90% level in the age range of 4;6 to 5;0 while the same level of performance was in the age range of 5;5 to 6;6 for the Simon-Says game. Thus, long-distance binding nearly disappeared in the performance of younger children because of the new task used.

According to the results of these two studies, Chien and Wexler (1990) argued that children at an early stage of L1 acquisition, between the age range 2;6 and 3;6, behaved according to response bias and not according to the binding principle A. By the age of 6, children seemed to fully acquire the locality condition of English

reflexives irrespective of the clause type. Chien and Wexler (1990) see their results were interpretable under maturational considerations; UG binding principles constrain the child's grammar at every stage of acquisition. However, binding principles are not fully acquired at early stages and are thought that they need time to mature, but they are already there. It is also important to keep a clear distinction between performance and principles; some results might be questionable because of the task used in the test so non-adult performance does not mean children do not have knowledge of principles.

If we look at the studies which have been reported so far, we find some factors which might have affected the results. First of all, participants directly took the test without training sessions on the linguistic structures at question. Thus, a participant's result might not be a proximate reflection of his grammar as much as a reflection of ignorant responses. In such a case, it is a good idea to have a training session in advance of the study. Such sessions should be careful not to contain any of the test items because this is specifically to raise linguistic awareness of participants. Second, results were reported as group results, and sometimes as sub-group results, but not as individual results. Therefore, we do not know whether these results were a real reflection of the participants involved in the study since low results might be obscured by high results. To avoid such confusion, it is highly recommended to report individual results in addition to group results. Third, no standard deviation was mentioned in the previous studies to show better understanding of results and variation among groups.

McDaniel, Crain and Hsu (1990) paid attention to these important methodological issues in their two studies. In the first study, 20 children learning English, with the age range of 3;9 to 5;4, were included. Two adults were also recruited as a control group. Each participant in the study was met three times: the first time for a training session, the second time to collect act-out data, and the third time to elicit judgments of the sentence at question. In addition to the monocluasal and biclausal items included in the test, there were some gender control items and reflexives in the subject position items. Example (2.46) below is one of the test items used in the study (McDaniel *et al*. 1990: 127):

(2.46) a. *I_i am washing himself$_{*i}$.
b. *Himself is washing Grover.

Results showed that all the participants, except four, showed knowledge of principle A. Those four children were all younger than 4;1. Gender control was also helpful in test items such as (2.46a) where all the participants rejected such sentences as incorrect. However, four of the older children did not reject reflexives in a sentence such as (2.46b) above. Overall, results indicated that reflexives are free for children which in turn led McDaniel *et al*. (1990:137) to give four possible grammars to be tested:

(2.47)

a. **Grammar Type A**: reflexives are not categorized as separate category of NP. In this grammar, *himself* is treated like a possessive +self. Therefore, Binding principle A will not apply and there is no reason to reject reflexives in the subject position.

b. **Grammar Type B**: Reflexives are categorized as NPs, hence they are subject to principle A. The emphatic reflexive[7], however, has not been acquired. We further subcategorize Type B into two subtypes, B1, in which the domain is not correct, and B2, in which it is.

c. **Grammar Type C**: These children also obey principle A, but they have only partially acquired the emphatic reflexive such that it can appear with or without overt NP.

d. **Grammar Type D**: These children are like adults with respect to principle A and the reflexives.

According to these types of grammar, it is possible to find children who show knowledge of principle A, and they are still in the stage of acquiring the emphatic effect of reflexives so that they allow reflexives in the subject position. However, these hypothetical types of grammar will be contradicted if we find children who obey principle A and allow reflexives in the subject position, but do not show knowledge of the emphatic effect (McDaniel *et al*., 1990).

To test the aforementioned types of grammar (2.47a-d), McDaniel *et al.* conducted a second study on 19 children learning English, ranging from ages 2;9 to 6;7. Only the judgment part of the previous study was included as a test tool in this study. Also, some items were included to see if subjects consider *self* as a lexical item or not. Example (2.48) below is one of the test items used for this purpose: (McDaniel *et al*., 1990: 137).

(2.48) Grover draws a picture of Cookie Monster's self.

If children accept such a sentence, this indicates that they interpret *self* a lexical item meaning *body*. To test the emphatic effect of reflexives, McDaniel *et al*. (1990: 134) included some of items such as (2.49) below which help to clarify the point:

(2.49) a. He_i $himself_i$ is going to school.
b. *I_i am washing $himself_{*i}$.
c. *I am washing him himself.

Children who have acquired emphatic reflexives are expected to accept sentences such as (2.49a) and reject (2.49b-c). If those children also accept (2.49b) above, this indicates that children are developing a Type C grammar. Table (2.6) below provides full details of the individual performance of children according to the four possibilities discussed in (2.47) above.

[7] E.g. He himself is washing the car.

Table 2.6 Individual performance of children to the judgment task (McDaniel *et al.* , 1990: 134-135)

	Grammar Type				
	A	B		C	D
		B1	B2		
Children Number	4	3	7	4	4

According to these results, the four children in the Type A Grammar considered reflexives as completely free so they did not respect the Binding principle A. The three children in Grammar B1 Type, in contrast, obeyed Principle A with the wrong domain. On the other hand, B2 children obeyed principle A, but they did not acquire the emphatic interpretation of reflexives so they rejected reflexives in the subject position. The four children in Grammar C type accepted reflexives in the subject position which means that they obeyed principle A, but they did not fully acquire the emphatic nature of reflexives. Finally, the 4 children in Grammar C Type acquired adult-like grammar. Based on these results, McDaniel *et al*. (1990) argue that the acquisition of English reflexives and the emphatic effect of reflexives develop through different stages. Thus, children will accept reflexives in the subject position because principle A has not matured yet. Once this principle is matured, they will reject such position of reflexives. However, if the emphatic effect is imperfectly matured, their grammar again will accept reflexives in the subject position. Once the emphatic effect is fully matured, they will show adult-like grammar. Importantly, such a claim supports the view that language develops in a process in which grammars change, not where constructions change.

To test the innateness of binding principles, McKee (1992) conducted two studies on the interpretation of reflexives by L1 children; the main concern of the studies was to find out whether children demonstrate knowledge of c-command. The first study was on 60 English preschool children. Of those 60 children, only 30 children (age range 2;9 to 5;3) participated in the experiment on binding principle A. Also, 10 adults participated as a control group. The test battery consisted of a pretest which was a practice session and the real test which was a Truth-Value Judgment Task (henceforth, TVJT). The TVJT included two types of sentences: monoclausal and biclausal. Example (2.50) below is one of the items used in test (McKee, 1992: 30-31):

(2.50) a. The horse$_i$ undressed himself$_i$.

b. While the clown$_j$ was sitting down, Roger Rabbit$_i$ covered himself$_{i/*j}$.

Each sentence was presented with two contexts: one referring to intrasentential antecedent, and the other to extrasentential antecedent. Group results showed that children know the binding requirements in English. Table (2.7) below provides detailed information about group results.

Table 2.7 Correct responses of English children to TVJT (McKee, 1992: 34)

N= 30	1IC (yes)	1XC (no)	2IC (yes)	2XC (no)
%Correct	100	88	98	81
frequency	120/120	105/120	117/120	97/120

1IC: monoclausal internal referent; 1XC: monoclausal external referent; 2IC: biclausal internal referent; 2XC: biclausal external referent.

The control group performed as was expected in all of the categories (from 98% to 100%). Children also responded correctly about 91% of the time to the target sentences. Children were divided into two groups to investigate age effects. The younger group included 15 children, ranging in age from 2;9 to 4;7, with mean age of 3;6. The older group also included 15 children, ranging in age from 4;8 to 5;3, with mean age of 4;10. While the younger group responded correctly 88% of the time to the target sentences, the older group's performance was significantly higher, 95% of the time. Thus age effect was significant, $t(1, 18.4) = 2.07$, $p < .05$. Individual results were also in support of group results; only one child (age 3;3) did not show knowledge of binding in English. That child responded correctly 56% of the time to the target sentences. Other children's performance, in contrast, was above 60%. 5 children ranged in accurate results from 69% to 81%. Out of the overall subjects, 24 children responded correctly over 88% of the time, 16 of them responded correctly 100% of the time. Hence, McKee (1992) concludes that children show knowledge of principle A at an early stage of acquisition.

McKee (1992) conducted a second study on the interpretation of Italian clitic anaphors by 30 Italian children, ranging in age from 3;7 to 5;5. 10 adults were recruited as a control group. The test battery was the same as the one used in the English experiment, with the English sentences translated into their Italian equivalents. Table (2.8) below provides detailed information of the Italian children's results.

Table 2.8 Correct responses of Italian children to TVJT(McKee, 1992: 33)

N= 30	1IC (yes)	1XC (no)	2IC (yes)	2XC (no)
%Correct	97	94	96	91
frequency	116/119	113/120	115/120	109/120

1IC: monoclausal internal referent; 1XC: monoclausal external referent; 2IC: biclausal internal referent; 2XC: biclausal external referent.

As was the case with the English control group in study one, the Italian control group in study two performed as expected in all the test categories, from 95% to 98% of the time. Like adults, the overall performance of the Italian children was correct about 95% of the time. These children were divided into two age groups: younger ranged in age from 3;7 to 4;9, with mean age of 4;3; and older group ranged in age from 4;9 to 5;4, with mean age of 4;11. Interestingly, there was no significant age effect between the two groups since the younger children responded correctly 93% of the time, and the older group responded correctly 96% of the time. Individual results were also in support of group results; only one child (4;4) responded at the chance level,

about 56% of the time. The other 29 children responded correctly over 85% of the time to all test categories, 13 out of them responded correctly 100% of the time to all test categories.

According to the results of the two previous studies, Italian and English, McKee (1992) argues that L1 children show good knowledge of the binding principle A from a relatively early stages of language acquisition (over 4;4 years old). Thus, the overall results of children support the innateness of binding principle A.

In conclusion to this section, we have seen that generative grammarians have presented substantial evidence to support their views on the innateness of linguistic knowledge of UG principles and constraints involved in reflexive binding. Although input is impoverished with regards to reflexive binding, the above reported studies showed that L1 children normally demonstrate good knowledge of binding principle A and the c-constraint on reflexive binding. They start their acquisition with free binding of reflexives because principle A is not fully developed and parameters responsible for binding are not set yet. By age 6, they are expected to fully realize that they are dealing with reflexives. Thus, they demonstrate good knowledge of reflexive binding.

2.2.4 Conclusion

The discussion of reflexive binding as an example of the POS has shown that a specific innate linguistic knowledge, rather than general cognitive mechanisms, is involved in the acquisition of reflexives. As shown above, the grammar of reflexive binding is complicated, and the proponents of Usage-Based-Approaches have not, according to my knowledge, provided any consistent theoretical or empirical evidence to show that reflexives can be acquired by depending on input and general cognitive mechanisms.

Generative grammarians, in contrast, have presented a powerful theoretical and empirical evidence to support their view that an innate linguistic knowledge is involved in the acquisition of reflexives. As for the empirical evidence, it showed that L1 children demonstrated good knowledge of the properties of reflexives by the age of six, and this knowledge is ascribed to UG.

As this study involves three languages, English, Arabic and Chinese, the following section presents the properties of reflexives in these three languages from a general generative point of view.

2.3 Properties of Reflexives in English, Arabic and Chinese

The review below shows that English and Arabic reflexives share the same properties in terms of local domain and subject/object orientation, while Chinese differs from Arabic and English because it allows two kinds of reflexives: long distance reflexives (e,g., *ziji*) which are characterized for long-distance domain and only subject orientation, and local reflexives (e.g., *ta ziji*), which are similar to English and Arabic and characterized for local domain and subject/object orientation.

2.3.1 Properties of Reflexives in English

An English reflexive (e.g. himself) is a morphologically complex object that consists of a root *Self* and a pronominal prefix. According to the Relativised-Subject-Approach (Progovac, 1993), English reflexives can be bound by only local c-commanding antecedents as shown in (2.51):

(2.51) a. John$_i$ said that [$_{IP}$ Simon$_j$ hurt himself$_{*i/j}$]
b. Mary$_i$ advised [$_{IP}$ Ann$_j$ to take care of herself$_{i*/j}$]
c. Ann$_i$ read [$_{NP}$ Cinderella's$_j$ letter about herself$_{*i/j}$]

As shown in (2.51a), the reflexive *himself* can be bound by *Simon* but not *John* because *John* is outside the local domain (IP) of the reflexive. Similarly, *herself* in (2.51b) can be bound by *Ann* but not *Mary* because *Mary* is outside the local domain (IP) of the reflexive. In other words, English reflexives must be locally bound in biclausal finite and infinitival sentences. In addition to IP domains (2.51c) shows that the English reflexive *herself* can be locally bound by *Cinderella* but not *Ann* because *Ann* is outside the local domain (NP) of the reflexive.

In addition to the local domain property, the orientation of English reflexives is that they can be bound by any c-commanding subject or object antecedents:

(2.52) John$_i$ always tells Jack$_j$ jokes about himself$_{i/j}$

As shown in (2.52), *himself* can be bound by either *Jack* or *John* because both of them are within the local domain of the reflexive and they c-command it.

Finally, it is important to mention that English reflexives obey UG constraints so that they can be bound only by c-commanding antecedents as shown in (2.53):

(2.53) The sister$_i$ of Cinderella$_j$ points to herself$_{i/*j}$.

Although both of *The sister* and *Cinderella* are within the local domain of the reflexive *herself*, only *The sister* and not *Cinderella* can be its antecedent because it c-commands it while *Cinderella* does not.

To sum up, English has morphologically complex reflexives which can be locally bound by subject or object antecedents.

2.3.2 Properties of Reflexives in Arabic

Similar to English, Arabic reflexives are locally bound with subject/object orientation (Kremers, 1997). Osman (1990) and Kremers (1997) argue that Standard Arabic has one kind of reflexive which is

morphologically complex. These reflexives consist of a root *nafs* (literally meaning *soul*) and a pronominal suffix (e.g. *nafs-u* which means *himself*). Like other morphologically complex reflexives, they are locally bound:

(2.54) humma$_i$ simʔ-u ʔinn $_{NP}$[ʔahmad w mona]$_j$ bi-y-Hibb-u nafs-uhum$_{*i/j}$
they heard-3pl that Ahmad and Mona PRES-3-like-pl self-their
"they heard that Ahmad and Mona like themselves."

(Osman, 1990: 160)

As is shown in (2.54), the reflexive *nafs-uhum* 'themselves' can be bound by the embedded subject *ʔahmad w mona* 'Ahmad and Mona', but it cannot be bound by *humma* 'they' because it is outside its local domain, namely the embedded finite clause.

Similar to English, Arabic reflexives are common with *masdars* which are equivalent to English infinitival clauses (Kremers, 1997) as is shown in (2.55):

(2.55) naḥnu lā nurīdu ḥaṣr-a 'anfus-i-nā
we not wish.1pl restraining-ACC SELF-GEN-our
"We do not wish to restrain ourselves"

Kremers (1997) explains that the reflexive *'anfus-i-nā* 'ourselves' is locally bound by a covert *PRO* in the embedded infinitival clause *ḥaṣr-a 'anfus-i-nā* 'to restrain ourselves', and *PRO* in turn is coreferential with the matrix subject *nahnu* 'we'. If we replace the reflexive *'anfus-i-nā* 'ourselves' with a pronoun *hum* 'them', the intended meaning which is that the speakers are referring to themselves, will completely change into talking about other people.

Similar to English, Osman (1990) argues that the minimal local domain for a reflexive in Arabic can be an NP as shown in (2.56):

(2.56) ʔana b-a-Hibb a-smaʔ Hikayaat $_{NP}$[il-ʔaTfaal$_i$ ʔan nafs-hum$_i$]
I PRES-1s-like 1s-listen stories the-children about self-their
"I like to listen to children's stories about themselves."

(Osman, 1990: 163)

In (2.56), the minimal local domain for the reflexive *nafs-hum* 'themselves' is the NP *il-ʔaTfaal$_i$ ʔan nafs-hum* 'children about themselves' where the noun *il-ʔaTfaal* 'children' functions as the local antecedent.

Finally, the orientation of Arabic reflexives is similar to that of English so Arabic reflexives can be bound by any local c-commanding subject or object antecedents (Kremers, 1997):

(2.57) ḥattā ekšifa-hu$_i$ -l-batal$_j$ 'amāma nafs-a-hu$_{j/i}$
so.that reveals.3msg-him the-hero before SELF-NOM-him
"so that the hero reveals him before himself"

As is shown in (2.57), both of the subject *-l-batal* 'the hero' and the object *hu* 'him' of the clause locally c-command the reflexive *nafs-a-hu* 'himself', and both of them can function as an antecedent for the reflexive.

To sum up, we can claim that Arabic reflexives, which are morphologically complex, are similar to English reflexives in the sense that they can be locally bound by subject or object antecedents.

2.3.3 Properties of Reflexives in Chinese

Different from Arabic and English, Chinese has two types of reflexives: morphologically complex (e.g., *ta ziji*) and morphologically simple (e.g., *ziji*) (Progovac, 1993). *Ta ziji* is a local reflexive pronoun that should be bound in its local domain, while *ziji* is a long-distance reflexive pronoun that can be bound by long-distance antecedents as is shown in (2.58):

(2.58) Zhangsan$_i$ renwei Lisi$_j$ zhidao Wangwu$_k$ xihuan ziji$_{i/j/k}$/ ta ziji$_{*i/*j/k}$
Zhangsan thinks Lisi knows Wangwu likes self he-self
"Zhangsan thinks that Lisi knows that Wangwu likes himself"

(Progovac, 1993: 757)

In (2.58), the local reflexive pronoun *ta ziji* can be bound by only the local embedded subject *Wangwu*, but not by *Lisi* or *Zhangsan* because both of them are outside the local domain of the reflexive. *Ziji*, in contrast, can be bound by *Wangwu*, *Lisi* or *Zhangsan*. According to the Realtivized-Subject-Approach (Progovac, 1993), the reason behind such a long distance binding of *ziji* is the fact that *ziji* is an X° so only X° categories can bind it. Being the only c-commanding X° head, Agr is a potential binder for *ziji*. Importantly, Progovac (1993) assumes a relation between the type of Agr that a language has and the domain for reflexive binding. That is, if a language has overt Agr (e.g. English), it allows only local binding of reflexives. However, if a language has null Agr (e.g. Chinese), it allows long-distance binding of X° reflexives as is shown in the case of *ziji* in (2.59):

(2.59) Zhangsan$_i$ Agr 2$_i$ shuo [Lisi$_i$ Agr l$_i$ chang piping ziji$_i$].
Zhangsan say Lisi often criticize self
'Zhangsan says Lisi often criticizes herself'

(Progovac, 1993: 758)

However, Progovac points out that long-distance binding of *ziji* involves feature sharing which means that there should be compatibility in the features shared. Otherwise, long-distance binding of *ziji* will be blocked as is shown in (2.60):

(2.60) Zhangsan$_i$ Agr2 renwei wo$_j$ Agr1 hai-le ziji$_{*i/j}$
Zhangsan think I hurt-$_{ASP}$ self
Zhangsan thinks that I hurt myself

(Progovac 1993: 760).

Most importantly, *ziji* cannot be bound by long-distance object antecedents because objects are not X° categories. In fact, such a property of *ziji* is predicted by generative grammarians to be universal for all natural languages (Progovac, 1993). In other words, no natural language allows long-distance reflexives to be bound by long-distance object antecedents. Thus, long-distance reflexives have only subject orientation.

In summation, Chinese, unlike English and Arabic, has two types of reflexives: morphologically simple reflexives that can be bound by long-distance subject antecedents and morphologically complex reflexives that are locally bound by c-commanding antecedents.

2.3.4 Conclusion

The properties and distribution of reflexives in English, Arabic and Chinese were reviewed, showing that English and Arabic share the same grammar of reflexives in terms of domain and orientation while English and Chinese differ. That is, English and Arabic allow only local domain for reflexives with subject or object orientation, while Chinese allows local and long distance binding of reflexives, with only subject orientation for the latter. Such a syntactic difference between these three languages will be considered in the analysis of results to see if there is any effect of the L1 grammar on the acquisition of L2 reflexives. To put it differently, there will be investigation of whether syntactic difference or similarity between languages facilitates or hardens the acquisition of L2 reflexives.

Chapter 3. Language Acquisition and the Age Factor

3.1 Introduction

If we adopt a generative approach to L1 acquisition and we agree that the environment is impoverished to provide linguistic clues for L1 children to help them acquire reflexive binding, the question then becomes; is there any effect of age on UG access? This question is the main topic of discussion in the sections that follow.

This chapter discusses age effects on access to UG. In particular, it discusses whether language learners, L1 or L2, can have an open unlimited access to UG at any stage of life, or access to UG is restricted to a certain period of the learner's life. The focus in this discussion is on three hypotheses: the Critical Period Hypothesis (Lenneberg, 1967), the Fundamental Difference Hypothesis (Bley-Vroman, 1989/2009) and the Domain-by-Age Model (Schwartz, 2003).

3.2 The Critical Period Hypothesis

3.2.1 The Critical Period Hypothesis in L1 Acquisition

All children of the same tongue acquire language in a rapid and uniform way, provided that they have exposure to linguistic input and they do not have biological problems (Herschensohn, 2007). If we adopt a generative approach to L1 acquisition and we agree that the environment is impoverished to provide linguistic cues for L1 children to help them acquire their mother tongue, the question then becomes whether there is any effect of age on UG access in L1 acquisition. The debate of age and UG access has been subject to dispute for several decades. The strongest spark of this debate started with Lenneberg's (1967) claim of the existence of a Critical Period (henceforth, CP) for first language acquisition. Depending on biological changes in the plasticity of the brain, Lenneberg argues that the ability to acquire a first language is confined in time, particularly between the age range of 2 and 12. After that, there is a sudden cut-off and the language faculty is not sensitive to the linguistic input. Similarly, Chomsky (1986) argues that the process of language acquisition and access to UG to be co-terminate, either because of some features of the S_s or the language faculty has reached into a state of maturation and become less sensitive to the input. Thus, natural language acquisition after the CP is impossible. Since this claim, some research has been reported either to support or refute the CP effects in first language acquisition.

Theoretically, it can be argued that there are clear criteria for a CP in L1 acquisition, but with a less extreme version than the primary CP. Herschensohn (2007) discusses a set of common features that can define a CP in L1 acquisition: this less extreme version of the CP is characterized by the biological development of the brain

which allows the language faculty to receive the enriched Primary Linguistic Data and set the linguistic parameters. In contrast to Lenneberg's threshold (starting at age 2), L1 acquisition usually starts from birth, and nearly lasts to an age range between 5 and 12 (Herschensohn, 2007). Also, there is much evidence supporting a gradual decline in the ability to acquire a first language rather than an abrupt decline (Curtiss, 1977; Newport and Supalla, 1987; Herschensohn, 2007).

It is difficult to conduct studies on the purpose of testing the hypothetical CP in L1 acquisition. This difficulty lies in the rarity of children (*Feral Children*) who were deprived from linguistic communication with people until late stages of their childhood. If everything is normal with these children and they are unable to acquire a natural language *Y*, it will be strong evidence supporting the existence of a CP for L1 acquisition. However, if those children can acquire *Y*, it will be counterevidence against a CP in L1 acquisition. The most famous study about feral children was reported by Curtiss (1977). It was a study about Genie, a girl who was deprived of language and social communication until her discovery at the age of thirteen. Despite intensive rehabilitation system that Genie had undergone, she had obvious problems with her linguistic knowledge. Her semantic knowledge was appropriate for her post-exposure age, but she had problems with her syntactic knowledge, particularly with verb tense, word order, prepositions, and pronouns. Rymer (1993: 160) points out that Genie, "never mastered the rules of grammar, never could use the little of pieces- the word endings, for instance. She has a clear semantic ability but could not learn syntax." Moreover, there was a clear difference between her production and comprehension. In general, this apparent difficulty with acquisition was considered as evidence for the existence of a CP in L1 acquisition. However, this evidence was weakened as is shown in the overall assessment that Curtiss (1977: 204) presents:

> Genie's language is far from normal. More important, however, over and above the specific similarities and differences between Genie's language and the language of normal children, we must keep in mind that Genie's speech is rule-governed behavior, and from a finite set of arbitrary linguistic elements she can and does create novel utterances that theoretically have not upper bound…Therefore, abnormalities notwithstanding, in the most fundamental and critical aspects, Genie has language.

As Curtiss shows, Genie's communication is a language after all. Besides, the problem was in one aspect of her language, e.g. syntax, while semantics was appropriate for her post-exposure age. Some linguists questioned whether Genie's lack of linguistic competence was due to other factors. Johnson and Newport (1989: 62) pointed out "the abnormal conditions under which Genie was reared, including nutritional, cognitive, and social deprivation, have led some investigators to question whether her language difficulties have resulted only from lack of linguistic exposure during early life."

Later on, some research on a CP in L1 acquisition moved to sign language. Many deaf children are born to hearing parents, and those children do not usually have exposure to the standard sign language until they go into formal education in schools. The special features of these deaf children make them a good case for

investigating the effects of CP in L1 acquisition. Newport and Supalla (1987) reported a study on a group of deaf children for whom American Sign Language (ASL) was their L1. The informants of the study were of three groups: native learners who were exposed to ASL from birth, early learners who were exposed to ASL between the ages of 4 and 6, and late learners who were exposed to ASL at age 12 or later. The informants were tested on their production and comprehension of ASL verb morphology. Results showed that native learners scored better than early learners, and early learners scored better than late learners. Therefore, this study provides strong evidence for the decline of L1 acquisition with increased age of first exposure to language. Also, the results of this study defy Lenneberg's extreme version of the CP by showing that although early learners outperformed late learners, first language acquisition did not become "unlearnable" after puberty as Lenneberg claims.

It can be noticed that in the case of Genie and ASL studies the focus was not on examples of Poverty of Stimulus, but on the complete acquisition of language and comparing their grammars with the grammar of adult natives. If the above mentioned studies focused on studying examples of grammar that are underdetermined by input, say reflexive binding or structure-dependent-rules, their results would be informative about the role of UG in exceptional circumstances.

To summarize the argument of a CP in L1 acquisition, it seems hard to support Lenneberg's strong CP claim in L1 acquisition. On the contrary, there are common features that are less extreme than Lenneberg's CP where, according to this common trend, language acquisition starts from birth until age 5 and then there is a gradual decline in the ability to acquire language until age 12. The younger a child acquires a language, the more adult-like grammar is expected. After the terminus (age 12) L1 acquisition is difficult but not impossible (Herschensohn, 2007).

3.2.2 The Critical Period Hypothesis in L2 Acquisition

If the extreme version of the CP argument is not supported in L1 acquisition, can it be applied in L2 acquisition? Actually, the effect of a CP in L2 acquisition has been the subject of debate for a long time. First, the claim of a CP in L2 acquisition is much more complicated than L1 acquisition due to several factors. For example, Herschensohn (2007) points out that in the course of L1 acquisition, the brain is under biological development so the plasticity of the brain makes language acquisition natural and uniform. In L2 acquisition in contrast, the brain is already developed and acquired a language. Thus, the existence of L1 is expected to have an effect on the acquisition of L2. Furthermore, there is no clear threshold for L2 acquisition; L1 acquisition starts from birth but in the case of L2 acquisition, it is not clear at all because different L2ers start L2 acquisition at different times. Also, the duration and the terminus of a CP in L2 acquisition are not clear. Moreover, the final attainment of the two types of acquisition is different; in L1 acquisition, there is a complete mastery of the properties of L1 grammar among all the children of the same tongue. For example,

the above discussed studies on the acquisition of reflexives by L1 children (Wexler and Chien, 1985; Chien and Wexler, 1987; Solan, 1987; McDaniel, Crains and Hsu, 1990; Chien and Wexler, 1990; Mckee, 1992; among others) showed that children of the same tongue mastered the properties of reflexives in their native language by the age of six. The researchers ascribed such mastery of grammar in a relatively short period of time to the operation of UG principles and constraints with regards to reflexive binding. L2 acquisition, in contrast, lacks such complete mastery of the target language. General failure or success varies according to many factors, such as L1 effect and age of acquisition (Herschensohn, 2007).

Despite the unclear characteristics of a CP in L2 acquisition, different alternative models have been proposed. For example, Johnson and Newport (1989) defend a "Use It or Lose It" model which states that once the language learning faculty is used, it will never be lost. They propose two alternative hypotheses for the primary CP: the Exercise Hypothesis and the Maturational State Hypothesis. According to their claims:

(3.1)

> **Version One**: The exercise hypothesis. Early in life, humans have a superior capacity for acquiring languages. If the capacity is not exercised during this time, it will disappear or decline with maturation. If the capacity is exercised, however, further language learning will remain intact throughout life.
>
> **Version Two**: The maturational state hypothesis. Early in life, humans have a superior capacity for acquiring languages. This capacity disappears or declines with maturation.
>
> (Johnson and Newport, 1989: 64)

To test these two hypotheses, Johnson and Newport (1989) studied 46 Chinese and Koreans who were acquiring English in the US as their second language. 23 native speakers of English were also recruited in the study as a control group. Importantly, selection of participants was based on the condition of five unbroken years of continuous stay in the L2 community. Achieving this condition, participants were then divided into early arrivals (n=23) who came to the US before age 15, and late arrivals (n=23) who came to the US after age 17. To test the influence of age on L2A, subjects were later divided into four age groups: 3-7 group (n=7), 8-10 group (n=8), 11-15 group (n=8), and 17-39 group (n=23). Johnson and Newport(1989) tested participants' knowledge in syntax and morphology by using a Grammaticality Judgment Task which contained 12 rule types as is shown in table (3.1) below:

Table 3.1 Twelve rule types used in the grammaticality-judgment-task (Johnson and Newport, 1989)

i.	Past tense	ii.	Particle movement
iii.	Plural	iv.	Subcategorization
v.	Third person singular	vi.	Auxiliaries
vii.	Present progressive	viii.	Yes/no questions
ix.	Determiners	x.	Wh-questions
xi.	Pronominalization	xii.	Word order

The grammaticality Judgment Task included 276 sentences: 140 ungrammatical and 136 grammatical counterparts. Each rule type was tested using from six to twelve pairs (grammatical vs. ungrammatical) distributed into the two opposite halves of the task so that no two counterparts come next to each other. Example (3.2) illustrates a pair used in the task (Johnson and Newport, 1989: 73):

(3.2) a. Yesterday the hunter shot a deer.
b. Yesterday the hunter shoots a deer.

The ungrammatical sentences were recorded with the same intonation of grammatical sentences. Participants were tested individually in a laboratory where they listened to each item twice with a two-second gap separating repetitions. They were instructed to judge the grammaticality of sentences and they were told to consider any incomplete sentence as ungrammatical. If they were unsure about a sentence, they were told to guess. To avoid fatigue on the part of participants, they were given a break in the middle of the test.

Johnson and Newport (1989) concluded that the AOA has significant influence on the final attainment, thus early arrivals were better than late arrivals. Table (3.2) provides detailed information about the mean scores of participants.

Table 3.2 Mean scores of non-natives and natives in English (Johnson and Newport, 1989: 78)

	NS (n=23)	**3-7 (n=7)**	**8-10 (n=8)**	**11-15 (n=8)**	**17-39 (n=23)**
Means*	268.8	269.3	256.0	235.9	210.3
SD	2.9	2.8	6.0	13.6	22.8
Range	275-265	272-264	263-247	251-212	254-163
Errors	1-11	4-12	13-29	25-64	22-113

*Maximum score was 276

As is shown in table (3.2), the performance of 3-7 group was comparable with the native speakers' results, then gradual decline is noted in the results with increasing age of arrival. Johnson and Newport (1989) found that before puberty (age 15), there was very few individual differences in the performance of L2ers' age groups. After that age, L2ers' performance was variable and affected by the individual performance by participants. Importantly, Johnson and Newport (1989) noticed a linear relation between age and performance; this line started to gradually decline at age 7 as is shown in figure (3.1) below:

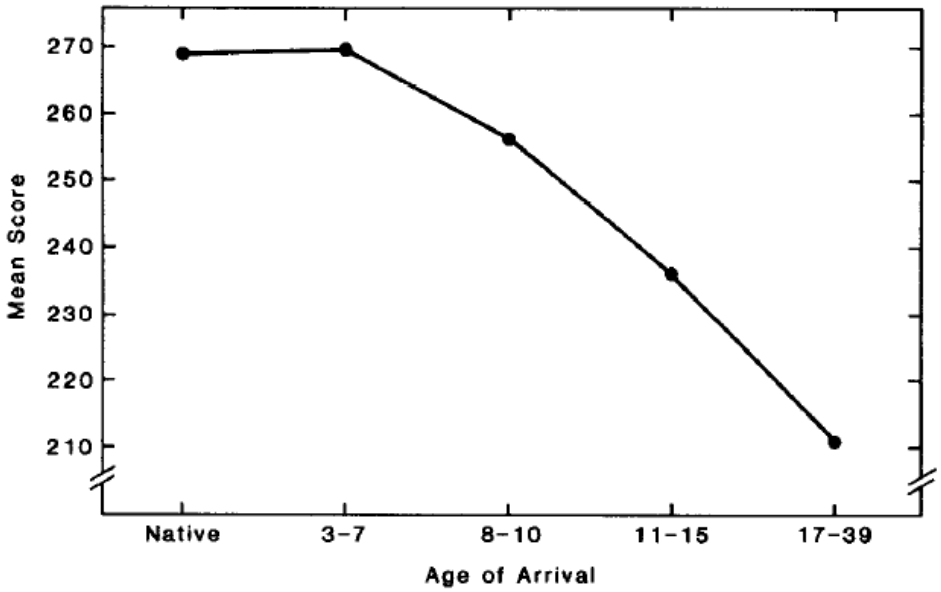


Figure 3.1 The relationship between age of arrival in the US and total score correct on English grammar test. (Johnson and Newport, 1989: 79)

Contrary to the claims of Lenneberg (1967) that language acquisition is impossible beyond the CP, Johnson and Newport (1989) found that the majority of late learners they tested were able to score above the chance level in their performance. Johnson and Newport (1989: 96) concluded that "quite a few aspects of language are learnable to a fair degree at any age, even though deficiencies in this learning occur." In general, the results of this study support the maturational account of age effects in language acquisition. They found a strong correlation between age and final attainment for participants who arrived before 17 years old while there was no such correlation for late learners. Johnson and Newport (1989) argue that the learning ability develops rapidly during maturation (i.e. at puberty) while this ability falls slowly "as the human matures and plateaus at a low level after puberty." (p. 90).

Since the publication of Johnson and Newport's (1989) landmark study, many critiques and replications have been reported on the literature, questioning the validity of these results (e.g. Bialystok and Hakuta, 1994; Bialystok and Miller, 1999; Birdsong and Molis, 2001; DeKeyser, 2000; Seol, 2005). For example, Bialystok and Hakuta (1994) criticize the study for many reasons: first, they consider the minimum length of residence (LOR) of 5 years that the study adopted is not long enough for the L2ers to reach ultimate attainment; and second, the test had so many items (276) that is highly possible participants lost concentration. To avoid such concerns, Dekeyser (2000: 503) advises that any replication of Johnson and Newport (1989) should consider studying participants who have been in the L2 community for ten years to make sure that they reached ultimate attainment. Also, fewer test items will be better to avoid fatigue on the side of participants.

Taking this criticism into account, many replications of Johnson and Newport (1989) have been reported. For example, a partial replication of Johnson and Newport (1989) was by Seol (2005) who tried to avoid the criticism directed against Johnson and Newport (1989) for mixing Chinese and Korean as one group. Seol

recruited only Koreans in his study. 34 Koreans were recruited with the same conditions and methodology used by Johnson and Newport (1989). The participants were divided into early arrivals (n=18) who arrived in the US before age 15, and late arrivals (n=16) who arrived in the US after age 16. As is the case in Johnson and Newport(1989), participants were then divided into five age groups: 3-7 group (n=7), 8-10 group (n=4), 11-15 group (n=6), 16-24 group (n=10), and 25-34 group (n=6). Seol (2005) used a modified version of the grammaticality-judgment test used in Johnson and Newport (1989) with the same twelve rule types, but only 200 items used in the task which included 100 grammatical items and 100 ungrammatical ones. Seol considered such a modification as a necessary procedure to avoid fatigue on the part of the participants. In the results, Seol (2005) found a strong negative correlation between AOA and performance among all the groups of L2, $r = .84$, $p<0.01$. Table (3.3) below provides detailed information about the performance of L2ers.

Table 3.3 Mean, standard deviation, and range of correct items on grammaticality judgment test for five age groups (Seol, 2005: 9)

Age of Arrival (AOA)					
	3-7 (n=7)	8-10 (n=4)	11-15 (n=6)	16-24(n=10)	25-34(n=6)
Mean	183.6	184	149	136.6	116.5
SD	4.79	3.36	19.27	15.95	27.33
range	190-177	186-179	178-117	151-108	179-87

As is the case with Johnson and Newport (1989), Seol found a gradual decline in the ability of language acquisition with increased AOA. However, the ceiling effects in this study were different from those in Johnson and Newport (1989). Figure (3.2) provides a clear illustration of this relation.

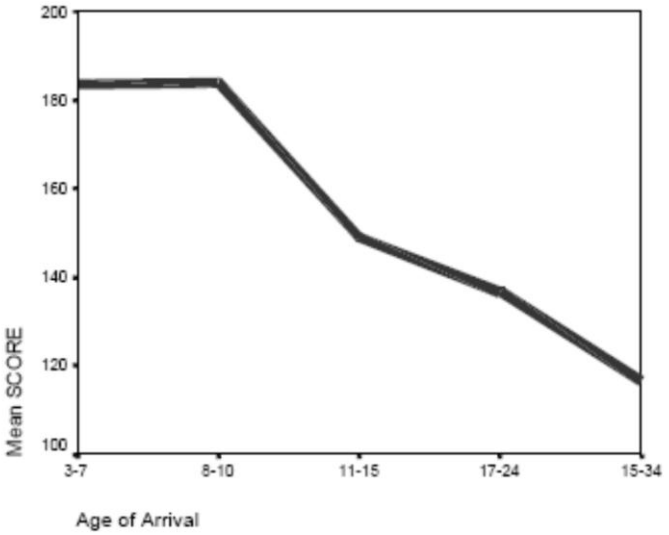


Figure 3.2 Different AoA groups and their mean scores on the grammaticality judgment task (Seol, 2005)

While ceiling effects in Johnson and Newport (1989) ceased at age 7, Seol (2005) found that the ceiling effects for his learners ceased at age 10, and then there was gradual decline till age 15. It is important to note that the gradual decline that precedes the maturation (i.e. at puberty) in Johnson and Newport (1989) was significant, which is argued to be important if the hypothetical end of the CP is present for L2 acquisition. In other words,

if the gradual decline between ages 10 and 15 in Seol's study was significant, this indicates that there is a CP in L2 acquisition and the age of 10 is the offset of the CP for Seol's (2005) participants. However, Seol (2005) did not find any significance for this decline, and this made it difficult to conclude that the gradual decline found in his study supports any gradual offset of the CP. Moreover, Seol found a significant correlation between AOA and performance for late arrivals (r = .667, p <0.01). Thus, AOA is still significant after the maturation of the brain. Johnson and Newport (1989), in contrast, did not find such significant correlation between AOA and performance for late arrivals; their performance was characterized by individual differences and random distribution in the results. At this stage of analysis, Seol (2005: 17) questioned whether AOA is the only responsible variable for the decreasing sensitivity for late arrivals. If not, then there are other factors that contribute to such decline, and a "postmaturational effect may not be deemed as an indicator of decreasing maturational sensitivity, and as a result not be available to counter the existence of the CP." Statistical analysis showed that AOA is not the only responsible indicator of the maturational decline; when other experiential variables, such as the use of L1 or L2, were ruled out, the correlation between AOA and score became insignificant (for more discussion see Seol, 2005).

Similar to Johnson and Newport (1989), Seol (2005) found that the performance of late arrivals varied according to the rule type. More specifically, late arrivals found some grammatical structures such as; determiners, plurals, 3rd person singular, and past tenses to be problematic while they found word order and particle movement less problematic. Thus, a sudden cut-off in the learning ability is not supported.

As a conclusion to the existence of a CP in L2 acquisition, a sudden decline in the ability to learn a language is not supported while a gradual decline in the learning ability can be noticed in the literature.

3.3 The Fundamental Difference Hypothesis

The effects of a CP in adult L2 acquisition is supported by Bley-Vroman (1990) who proposes the Fundamental Difference Hypothesis in which he argues that adult L2ers lack direct access to UG and its associated learning principles. Alternatively, adult L2ers depend on the knowledge of their native language and general problem-solving strategies to acquire the L2 grammar. Bley-Vroman (1990) points out that there are ten characteristics distinguish adult L2 acquisition compared to child L1 acquisition: lack of success, general failure, variation in goals, variation in success, correlation of age and proficiency, fossilization, indeterminate intuitions, importance of instruction, role of affective factors, and the role of negative evidence. Taking these characteristics into account, Bley-Vroman (1990) argues that there are two components that control child L1 acquisition and distinguish it from adult L2 acquisition:

(3.3)

a) A definition of possible grammar: Universal Grammar.
b) A way of arriving at a grammar based on available data: a Learning Procedure (or a set of procedures)

As is argued in Bley-Vroman's assumption, child L1 learners depend on UG as a linguistic knowledge base and a set of domain-specific learning procedures to reach the target grammar. Adult L2 acquisition, according to Bley-Vroman (1990), substitutes UG with knowledge of the L1 and domain-specific learning procedures with general-problem-solving systems. Similarly, Bley-Vroman (2009) argues that child L1 acquisition depends on UG while adult L2ers depend on L1 in the initial state of L2 acquisition. Hence, the development of L1 acquisition is characterized by reliability and convergence while the development of adult L2 acquisition is characterized by unreliability and nonconvergence. He adds that when adult L2ers find a difference between their native language and the target grammar, they start to utilize learning strategies and techniques, such as patching, to fill the gap between the two languages. In his comments on the patching system, Bley-Vroman (2009: 193) claims that: "The core system is not working (or not working well), so the patching system is taking the burden. To the foreign language learning system, language is neither more nor less strange than the funny order of *can't* and *seem* in *he can't seem to get it right*."

The Fundamental Difference Hypothesis views are also supported by Moskovsky (2005) who claims that pre-puberty language acquisition depends on UG as an innate linguistic knowledge base in addition to domain-specific learning procedures while post-puberty or adult L2 acquisition relies on the knowledge of L1 as a linguistic knowledge base and a set of domain-general learning procedures.

It can be noticed that the Fundamental Difference Hypothesis has missed an important point of discussion. In particular, the state of child L2 acquisition and its relation to the comparison between child L1 acquisition and adult L2 acquisition has not been discussed. Therefore, we move now to discuss this point and its relation to the CP and access to UG in adult L2 acquisition.

3.4 The Domain-by-Age Model

Schwartz (1992) discusses Bley-Vroman's (1990) claims, and she argues that if the interlanguage grammar of child and adult L2ers is constrained by UG, a single sequence of acquisition is expected. Conversely, if a problem-solving approach guides the grammar of L2 adults, the sequence of adult L2 acquisition is expected to be different from that of child L2 acquisition. Schwartz (1992: 5) criticizes L2 research that focuses on comparing the L2 developmental sequences for a target grammar of acquirers with different L1s because such a comparison "cannot straightforwardly decide between (a) a hypothesis that says that essentially the same type of process underlies L1 acquisition and L2 acquisition (i.e. an L2-UG model), as compared with (b) a hypothesis that claims that L1 acquisition and adult L2 acquisition rely fundamentally on different mechanisms…" To overcome such problems, Schwartz argues that the focus should be on comparing the developmental sequences of L2 children and adults of the same mother tongue because such comparisons can control transfer effects from the native language. Schwartz highlights the importance of child/adult comparisons by arguing that the majority of L2 researchers agree that child L2 acquisition is still constrained

by the principles of UG while L2 researchers disagree on whether adult L2 acquisition is enabled by UG. This line of argument is elaborated on by Schwartz (2003: 27-28) who shows that there are two positions in the literature with regards to the comparison between child L1 acquisition, child L2 acquisition and adult L2 acquisition:

(3.4)

- **Position A (Schwartz, 1992):**
  - (i) Course of development: child L2 acquisition is like adult L2 acquisition and both are distinct from child L1 acquisition.
  - (ii) Ultimate attainment: there are differences between the L1 child and (at least) the L2 adult.
- **Position B (Weerman, 2002):**
  - (i) Course of development: child L2 acquisition is like child L1 acquisition and both of them are distinct from adult L2 acquisition.
  - (ii) Ultimate attainment: there are differences between the L1 child and the L2 child (and the L2 adult).

Discussing these two positions, Schwartz (2003) proposes the Domain-by-Age-Model in which she points out that the similarity between child L1 acquisition and child L2 acquisition lies in the realm of inflectional morphology. The similarity between child L2 acquisition and adult L2 acquisition, in contrast, lies in the realm of syntax. In both cases, the inflectional morphology of adult L2ers lags behind their acquisition of syntax. Thus, the Domain-by-Age-Model is characterized by two assumptions. First, L1 transfer is restricted to syntax and it does not influence inflectional morphology. Second, inflectional morphology is affected by age of onset while syntax is not. This model is summarized in (3.5):

(3.5) **Domain-by-Age Model (Schwartz, 2003)**

a. child L1 ≠ child L2 = adult L2 in the domain of syntax.

b. child L1 = child L2 ≠ adult L2 in the domain of inflectional morphology.

Importantly, such a view was partially confirmed by Johnson and Newport (1989: 96) who found out that, "quite a few aspects of language are learnable to a fair degree at any age, even though deficiencies in this learning occur." Johnson and Newport mentioned that adult L2ers in their study found English determiners and plural morphology more difficult than other rule types. On the other hand, all of the adult L2ers in their study showed a native-like performance on word order and knowledge of progressive tense. It is worth mentioning here that these two rule types were also the only two aspects of English acquired by Genie (Curtiss, 1977). Likewise, Seol's (2005) study found that adult L2ers were successful in the acquisition of word order and particle movement while they found morphological structures problematic. Schwartz (2004) investigates these findings by comparing between child L1 acquisition and child L2 acquisition and the relation of such a comparison to the maturational account of UG. That is, if the development of phenomenon *F* in L1 matures at time *T*, then, there are two possibilities when child L1 acquisition is compared to child L2 acquisition. First, the development of child L1 acquisition is distinct from the development of child L2

acquisition which, in this case, will be compatible with the maturational account of L1 acquisition. Second, if child L2 acquisition follows the same path of development of child L1 acquisition this will be against the maturational explanation in the development of child L1 acquisition. In this regard, Unsworth (2005) argues, as shown in her study below, that the result of such a comparison is dependent on the target property in question because different linguistic properties mature at different stages of life. However, Unsworth (2005: 41) points out that, "Given that most aspects of syntax and morphology are in place by age four and child L2 acquisition is defined as acquisition where first exposure between the ages four and seven, it will generally be the case that L2 children differ in non-trivial way from L1 children, namely they will already have linguistic knowledge which they could transfer to their interlanguage grammar." Thus, the prediction is that child L2 acquisition will be different from child L1 acquisition while the comparison between child L2 acquisition and adult L2 acquisition is still open to investigation. Importantly, Schwartz (2004) argues that child L2 acquisition and adult L2 acquisition comparison can tell us more about adult L2 acquisition since the majority of researchers in L2 acquisition agree on the accessibility of UG to L2 children. However, the focus should be on developmental stages, not ultimate attainment, because although L2 children and L2 adults share the same pattern of development, it is only L2 children who are more likely to achieve native speakers' level.

If age effects in L2 acquisition vary according to the type of the target grammar, can this argument be empirically supported? Only two studies (Unsworth, 2005; Blom, 2008) have been reported to test the assumptions of the Domain-by-Age Model. What follows is a discussion of these two studies.

One of the studies that show a strong support to the assumptions of Domain-by–Age-Model was by Unsworth (2005) who investigated the acquisition of Dutch direct object scrambling over negation by L2ers. In Dutch, direct object (definite and indefinite) scrambling involves the movement of direct object DP from its base preverbal position over sentential negation or adverb. However, this scrambling is optional with differences in meaning as is shown in (3.6).

(3.6) **(Unsworth, 2005: 2):**

a- De jongen heeft geen (niet + een) vis gevangen. [non-scrambled]
the boy has no (not + a) fish caught
'The boy did not catch a(ny) fish.'

b- De jongen heeft een vis niet gevangen. [scrambled]
the boy has a fish not caught
'The boy did not catch a certain fish.'

As is shown in (3.6a), the unscrambled direct object *fish* refers to any fish whereas the scrambled direct object in (3.6b) refers to a specific fish. English, in contrast, does not allow syntactic overt object scrambling. Thus, L2ers of Dutch should show knowledge of scrambling to say that L2 acquisition is UG driven. A combination

of truth-value-judgment task and an elicited production task were used in the study. The task included utterances where scrambling could (not) occur. There were six items in each of three conditions: definite DP (target: scrambled), specific indefinite DP (target: scrambled) and non-specific indefinite DP (target: non-scrambled). In addition to this task, a spontaneous production of pictures is used to decide the proficiency level of L2ers in Dutch. 31 native speakers of English (11 children and 22 adults) acquiring Dutch as their L2 were recruited in this study. Age of L2ers at time of testing ranged between 5 and 50 years with LOR ranging between 2 months and 27 years. In addition to L2ers, 11 native speakers were recruited as a control group. Results of scrambled definite and indefinite DP objects over negation are reported in tables (3.4- 3.5):

Table 3.4 Scrambling of definite DP objects over negation (Unsworth, 2005)

	Condition	Definite DP		
	Scrambling	-	-/+	+
Adults	% scrambled	0% 0/29	26.7% 4/15	100% 50/50
	subjects (n)	6	3	11
	proficiency score (average)	15.74	21.70	25.66
Children	% scrambled	0% 0/34	38.9% 7/18	100% 6/6
	subjects (n)	8	4	1
	proficiency score (average)	14.61	17.81	23.37

Table 3.5 Scrambling of indefinite DP objects over negation (Unsworth, 2005)

	Condition	Definite DP		
	Scrambling	-	-/+	+
Adults	% scrambled	0% 0/15	25% 2/8	100% 18/18
	subjects (n)	5	2	6
	proficiency score (average)	15.67	24.25	26.17
Children	% scrambled	0% 0/17	55.6% 5/9	100% 5/5
	subjects (n)	5	3	1
	proficiency score (average)	18.76	17.96	23.37

Based on these results, Unsworth (2005) proposes a developmental trajectory for the acquisition of scrambling over definite and indefinite direct DP objects over negation by English-speaking L2ers of Dutch:

(3.7) Stage 1: Negation-Verb-Object

Stage 2: Negation-Object-Verb

Stage 3: Object-Negation-Verb

Unsworth (2005) argues that L2 children and adults pass through the same developmental stages in the acquisition of scrambling. Thus, they do not scramble in stage 1 because they are still under L1 influence. Eventually, they start to scramble with increased proficiency level until they achieve native-like scrambling in stage 3. Unsworth (2005) concludes her study by arguing that adult L2 acquisition is driven by UG.

Contrary to the results of Unsworth (2005) and the assumptions of Domain-by-Age-Model (Schwartz, 2003), Blom (2008) argues that age of onset affects both inflectional morphology and syntax. Blom conducted a study on Turkish and Moroccan children and adults acquiring Dutch as their second language. The syntactic target properties of the test are verb placement and verbal inflections. Dutch, as Blom (2008) summarizes, is head-final language with a V2 position. In declarative main clauses, the finite verb is placed in the V2 position while the non-finite verb is placed in the final position as is shown in (3.8a-b):

(3.8) **Blom (2008: 274)**

a. Jan *wil een taart bakken*
John want-fin a pie bake-inf
'John wants to bake a pie.'

b. *Jan bakt een taart*
John bake-fin a pie
'John is baking a pie.'

The V2 position in Dutch is also restricted to main clauses; therefore, the finite verb remains in the final position in embedded clauses as is shown in (3.9):

(3.9) **Blom (2008: 275)**

Ik zie dat Jan een taart bakt
I see that John a pie bake-fin
'I see that John is baking a pie.'

As for inflectional morphology, Dutch, according to Blom (2008), is poor with inflectional morphology where there are three contrastive paradigms for present tense: *-o, -t, -en*. The L1s involved in the study are Turkish and Moroccan Arabic. The former is similar to Dutch as it is a head-final language while the latter is a head-initial language. However, both L1s do not have V2 position. Thus, if L1 transfer occurs in the interlanguage grammar of L2ers, Turkish participants are expected to commit errors in SVX and XVS while they do not commit errors in SXV. Moroccan participants, on the other hand, are expected to commit errors in SXV and XVS with no errors in SVX. As for verbal inflections, Turkish and Moroccan Arabic are rich in inflectional morphology with majority of phi-features.

Four groups participated in the study: Turkish children (n=6), Moroccan children (n=17), Turkish adults (n=10), and Moroccan adults (n=4). To decide the proficiency levels of L2ers, Blom used a sentence-repetition

task (TAK) which is a standardized measure for Dutch proficiency in Turkish and Moroccan children. The main point in TAK was the correct repetition of word order and function words (see Blom, 2008 for more details). Accordingly, Turkish participants were classified as (Level 1) while Moroccan participants were classified as (Level 2). Using a picture description and situation description tasks, results show that adult L2ers lag behind L2 children in both syntax and morphology as is shown in tables (3.6- 3.7):

Table 3.6 Accuracy of verb placement for each test condition (Blom, 2008: 287)

Group	SVX	SXV	XVS
Turkish children (Level 1)	93% (267/287)	86% (152/177)	85% (146/172)
Turkish adults (Level 1)	90% (191/213)	58% (61/106)	18% (23/126)
Moroccan children (Level 2)	94% (382/406)	85% (225/264)	73% (194/265)
Moroccan adults (Level 2)	86% (249/291)	26% (42/162)	11% (18/162)

Table 3.7 Accuracy of verb inflection in 2SG and 3SG conditions (Blom, 2008: 291)

Group	Accuracy 2SG condition	Accuracy 3SG condition
Turkish children (Level 1)	85% (29/34)	89% (101/113)
Turkish adults (Level 1)	37% (16/43)	38% (32/85)
Moroccan children (Level 2)	90% (46/51)	89% (157/176)
Moroccan adults (Level 2)	60% (44/73)	46% (72/158)

According to these results, Blom (2008) argues that the assumptions of the Domain-by-Age-Model are incorrect since adult L2ers lag behind L2 children in both syntax and morphology. Moreover, Blom found out that L1 transfer has a marginal effect on the child participants since those child participants with short exposure to Dutch showed a good performance.

As can be seen from child L1- child L2- adult L2 comparisons, there are two contradictory views: the Domain-by-Age-Model (Schwartz, 2003; Unsworth, 2005) supports the view that L2 children and adults of the same L1 follow the same line of development in the acquisition of L2 syntax while they differ in the acquisition of L2 morphology where child L2ers outperform adult L2ers. The second view (Blom, 2008), on the other hand, supports the claim that adult L2ers lag behind child L2ers in the acquisition of L2 morphology and syntax. More research is needed to dis/confirm any of these views.

3.5 Conclusion

Looking at the literature reported so far, it can be noticed that L2 acquisition is negatively correlated with age, and there is a gradual decline in the ability to learn language. Also, according to Seol's (2005) results, age is not the only factor that is responsible for the performance of L2ers. Importantly, Seol found that the use of L2 was significant which indicates that the non-native-like performance of L2ers is not because they do not have access to UG, but it can be attributed to other external factors such as use of L2 and motivations. I think it is premature to say that adult L2ers are subject to CP effects and deemed to fail in L2 acquisition, but they can succeed at some aspects of L2 and they cannot achieve native-like performance at others. If we need to dis/confirm such view, it is important to compare between the performances of child L2ers and adult L2ers with regards to L2 syntax and morphology because this kind of comparison can cast new light on many issues of debate about the effects of age on access to UG in adult L2 acquisition.

Child L1, child L2 and adult L2 comparison seems to be a fruitful field of investigation because it can cast new light on the on-going debate of UG access to adult L2ers. Specifically, this three-way comparison can provide an answer to many controversial questions in L2 acquisition. First, it can show us whether age effects depend on the rule types (syntax vs. morphology) and whether there are sensitive periods in L2 acquisition rather than an extreme version of the CP. Second, it can show us whether adult L2ers have access to UG via L1-transfer or L2 access. That is, if child and adult L2ers of the same L1 were found to follow the same path in the acquisition of a target grammar in L2, this indicates that UG is still operative in the interlanguage grammar of L2 adults (Schwartz, 2003). For example, if child and adult L1 Chinese-speakers L2ers of English were found to follow the same path in the acquisition of English reflexives, it would be argued that UG is still operative in the interlanguage grammar of adult Chinese-speakers L2ers of English.

In the light of age effects on second language acquisition, the following chapter discusses the views of CP, FDH and the Domain-by-Age-Model in the L2 acquisition of reflexives.

Chapter 4. Access to UG in L2 Acquisition of Reflexives

4.1 Introduction

This chapter reviews various views on access to UG in L2 acquisition in relation to the interpretation of reflexives by L2ers. First different generative views on access to UG in L2 acquisition are reviewed, and then previous studies on the acquisition of reflexives are reviewed. L2 studies which were mainly conducted on L2 adults support different views, such as UG full access, L1 transfer, or development of a kind of intermediate binding which is neither L1-like nor L2-like, yet it is UG constrained (Finer and Broselow, 1986; Thomas, 1989, 1995; Bennett, 1994; Maclaughlin, 1998; Yip and Tang, 1998; Yuan, 1998; Al-Kafri, 2008). Second, it is noticed that the comparison of the performance of L2 adults and L2 children in the interpretation of reflexives is under-researched, with only two studies reported so far (Lee and Schachter, 1997; Lee, 2005). However, many methodological problems were found in the two studies. After reviewing these studies, the hypothesis and research questions of a new study are presented at the end of the chapter.

4.2 Generative Views on Access to UG in L2 Acquisition

If assumptions about the POS argument are supported in first language acquisition, do they have the same status in L2 acquisition? In this regard, Bley-Vroman (2009) asks the very critical question of whether L2ers have an innate universal grammar that helps them to acquire a second language in the same way as first language acquirers. Schwartz and Sprouse (to appear) argue that since adult L2ers already had access to UG when they had been children, there are two important points to consider: what roles UG and L1 play in adult L2 acquisition.

Any discussion of this question should take into account the fact that the broad version of the POS argument discussed in the previous chapter cannot be generalized to L2 acquisition because of many differences between the two types of language acquisition. Some of these differences are unavoidable while others are accidental in the sense that they can vary (Cook, 2010). For example, Schwartz and Sprouse (to appear) explain that L2ers are different from child L1 learners in the fact that they approach the initial stage of L2 acquisition from the perspective of their L1. The learnability problem in this case is to know what linguistic options licensed in the L1 and not licensed in the L2, and whether there is any evidence in the input to guide L2ers to reset their parameters. In the case where the L2 licenses a grammar not licensed in the L1, is it possible for L2ers to acquire the new grammar? To answer all of these questions, we have to discuss the roles of each of UG and the L1 in L2 acquisition.

In her discussion on the role of UG in L2 acquisition, White (2003) warns that it is important to distinguish between two important issues: first, generative L2 researchers should consider whether there is a logical problem in L2 acquisition. Knowledge of UG can be empirically supported if L2ers demonstrate knowledge of the L2 grammar is underdetermined by the L2 input. Here, the focus must be on properties of the L2 that either do not exist or behave differently in the L1. Second, researchers should test whether L2 knowledge is acquired by means of UG which, in this case, constrains the grammar of L2ers.

Since L1 influence and access to UG are interrelated, the following is a summary of the different competing views about the roles of UG and the L1 in adult L2 acquisition.

4.2.1 Full Transfer/No Access

Proponents of the Full Transfer/No Access (henceforth, FT/NA) model support the view that UG is only available to L2ers via the transfer of L1 instantiations of UG to L2. If the target property in L2 is different from its counterpart property in L1, L2ers will fail to achieve native-like acquisition of the target grammar. However, if the target property is identical in both L1 and L2, L2ers will be successful in their acquisition of L2 (Schachter, 1990; Bley-Vroman, 1990/2009; Tsimpli and Roussou, 1991; and Clahsen and Hong, 1995). Schachter (1990), for example, conducted a study on the application of Subjacency Principle in English *wh*-movement by different groups of L1: Dutch, Indonesian, Chinese and Korean. Subjacency is one of the sophisticated linguistic phenomena that are underdetermined by input. It is sophisticated because knowledge of Subjacency involves knowledge of a set of rules: wh-movement, binding relations and bounding categories. Example (4.1) illustrates Subjacency in English:

(4.1) a. What did Sue destroy?
What [$_S$ did Sue destroy *t*]
b. *What did Sue destroy a book about?
*What [$_S$ did Sue destroy [$_{NP}$ a book about *t*]

(Schachter, 1990: 101)

As is shown in (4.1), the wh-word *what* has to cross one bounding category *S* to reach to *COMP*. It leaves behind a trace *t* that is bound by the wh-word *what* and properly governed by the verb *destroy*. In the case of (4.1b), the wh-word *what* has to cross two bounding categories *NP* and *S* to reach *COMP*, yet Subjacency allows extraction from one bounding category only. Hence, extraction of the wh-word in (4.1b) is ungrammatical. Schachter argues all of these facts about Subjacency are innate and unavailable in the input.

As for the English proficiency level of participants, Schachter considered them as highly proficient speakers of English as they either passed a university placement test for English proficiency or exempted from it. Data

was collected via a set of grammaticality judgment tests that include one wh-movement test that involved one-clause movement, two-clause movement and three-clause movement. Example (4.2) illustrates a wh-object movement and a wh-subject movement, respectively:

(4.2) a. What does the professor expect us to know *t* for the exam? (wh= object)

b. Who did Bill say *t* liked Mary? (wh= subject)

(Schachter, 1990: 106)

In addition, there were four syntactic construction tests where each test included six grammatical sentences. The constructions used in the tests were as follows:

(4.3)

a. Sentential Subject (SS):
That oil prices will rise again this year is nearly certain.
b. Noun complements (NC):
The judge rejected the evidence *that the student committed the crime*.
c. Relative clauses (RC):
The theory *we discussed yesterday* will be on the exam next week.
d. Embedded questions (EQ):
The dorm manager asked me *who I wanted to have as a roommate*.

(Schachter, 1990: 106)

The task also included four Subjacency tests with six ungrammatical sentences (violation of Subjacency corresponds to the construction mentioned in 4.3) in each test as is shown in example (4.4).

(4.4) SS: *Which party did for Sam to join *t* shock his parents?

(Schachter, 1990: 107)

The total test items used in the experiment were 66. The experiment was administered at one sitting in each class after a discussion of some un/grammatical sentences with the participants who were allocated 30 minutes to complete the task.

Schachter found that the Dutch L2ers were able to apply the Subjacency principle in English because Dutch shares the same Subjacency effects with English in terms of type and domain of extraction of the *wh*-word. On the other hand, other groups of L1 speakers, especially the Koreans, showed considerable violations of the Subjacency principle, and such violation was dependent on the availability of similar Subjacency effects in the L1. Table (4.1) shows the overall performance of participants.

Table 4.1 Overall performance of the participants for the three types of tests (Schachter, 1990: 111)

	Total grammatical (24 sentences)		Total ungrammatical (24 sentences)		Wh-movement (9 sentences)	
Group	Mean	S.D.	Mean	S.D.	Mean	S.D.
Native	21.6	2.7	21.2	1.9	7.1	1.07
Dutch	22.2	1.9	21.9	2.8	7.6	.98
Indonesian	21.2	2.6	15.2	4.5	5.26	1.2
Chinese	21.2	2.2	17.2	3.7	5.0	1.4
Korean	19.8	3.8	12.4	4.5	5.6	1.0

Schachter (1990) argues that the Korean learners in this study responded randomly to the ungrammatical sentences in the test because the Subjacency principle is not activated at all in their native language. Using these results as evidence, Schachter (1990) claims that the view that UG can be reactivated in adult L2 acquisition is ruled out. She explains that if principles of UG that are related to Subjacency are not activated in the L1, they will not be triggered by input in the course of adult L2 acquisition. If UG can be activated in adult L2 acquisition, the Chinese, Indonesian and Korean participants would correctly be able to apply the Subjacency principle in English, but they did not.

The FT/NA view is also supported by Tsimpli and Roussou (1991) who conducted a study on L1-Greek speakers acquiring English as their second language. Tsimpli and Roussou focused in their study on the pro-drop parameter and the constructions related to the setting of this parameter (e.g. null-subjects, *that*-t, postverbal subjects, dislocated subjects and dislocated objects). Greek is a pro-drop language which allows null subjects while English is not a null subject language and it requires the subject to be overt. 13 adult native speakers of Greek learning English as their L2 participated in the study. The participants were of two levels of proficiency in English: 6 intermediate and 7 post-intermediate. The test consisted of two parts: first, grammaticality judgment task where participants were presented with 30 English sentences to indicate their un/grammaticality and make corrections if possible as is shown in (4.5):

(4.5) a. *Who did you say that John married?
b. *Has children.
c. *Seems that Mary is happy.

(Tsimpli and Roussou, 1991: 166)

Second, there was a Greek-to-English translation test which included 10 sentences. All of the Greek sentences were grammatical with a variety of constructions such as: null-subjects, *that*-t, postverbal subjects, dislocated subjects and dislocated objects. In their results, Tsimpli and Roussou (1991) found that the majority of L2ers incorrectly transferred that-t effects (see 4.5a) to English and allowed over 80% of null subjects in English, especially when the subject was expletive one (4.5b,c). In the conclusion of their discussion, Tsimpli and

Roussou (1991) argued that parameter resetting is determined by the critical period effects. Thus, adult L2ers will not have full direct access to UG in their L2 and, consequently, the parametric values of L1 will be imposed on L2 leading to transfer errors.

Clahsen and Hong (1995) also studied the clustering of null subjects and agreement in L2 German. 33 Koreans and 19 native Germans participated in the study. Unfortunately, Clahsen and Hong (1995) did not mention anything about the L2 proficiency level of participants in German, but they said that all of the participants were students at the University of Düsseldorf within the age range (22-35). As for the difference between German and Korean, table (4.2) shows the difference between the two languages with regard to null subjects in embedded clauses.

Table 4.2 Null subjects in embedded clauses (Clahsen and Hong, 1995: 63)

	German	Korean
Licensing of null subjects	+	+
Φ-features exist	+	-
Agr= [+pronominal]	-	X

According to table (4.2), the interlanguage grammar of L2ers should move from a language that does not use Φ-features into one that does, and the underspecified agreement should be (-pronominal). Clahsen and Hong (1995) used a reaction-time sentence matching task for both groups. The participant has to judge instantly and precisely whether the two sentences that occur on the computer screen in front of them were identical or not. Once the participant clicks any key on the keyboard, a sentence appears at the top of the screen followed by another sentence at the bottom of the screen, after a short time. The sentence matching task contained grammatical and ungrammatical sentences that test L2ers' knowledge of subject-verb agreement and null-subject properties in German. Examples (4.6-4.7) present some of the test items used in the experiment (Clahsen and Hong, 1995: 72-73).

(4.6) **Agreement:**

a. Du flieg-st nach Korea am nächsten Sonntag.
you fly-2nd sg. to Korea next Sunday.

b. * Du flieg-t nach Korea am nächsten Sonntag.
you fly-3rd sg. to Korea next Sunday

(4.7) **Null-subjects**

a. Der Lehrer sagt daβ er Musik hör-t.
the teacher says that he music hear-s

b. *Der Lehrer sagt daβ oft Musik hör-t.
the teacher says that often music hear-s

Clahsen and Hong (1995) argue that reaction time (henceforth, RT) for grammatical sentences should be shorter than RT for ungrammatical sentences. Tables (4.3-4.4) summarize mean RTs for both experimental groups.

Table 4.3 Native speakers' mean RTs for subject-verb agreement and null subjects (Clahsen and Hong, 1995, p74)

	Grammatical	Ungrammatical	ANOVA
Agreement	1674	1953	min F (1,35)=20.74, p<.001
Null subjects	1872	2141	min F (1,28)=21.08, p<.001

Table 4.4 Korean acquirers' mean RTs for subject-verb agreement and null subjects (Clahsen and Hong, 1995: 77-78)

	Grammatical	Ungrammatical	ANOVA
Agreement(n=18)	3547	3939 (+392)	min F (1,32)=13.05, p<.01
Null subjects (n=26)	3005	3310 (+305)	min F (1,21)=16.17, p<.01

Only 18 out of the 33 Korean participants acquired the subject-verb agreement paradigm of German and only 26 out of the 33 Koreans acquired the correct properties of subjects in German. However, 18 of the 33 participants acquired the two paradigms separately from the other and they did not show any clustering of these properties. Also, Clahsen and Hong found that the difference between RTs for grammatical and ungrammatical sentences not significant. In the conclusion, Clahsen and Hong (1995) argue that the development of the two phenomena, null subjects and subject-verb agreement, are independent in the interlanguage grammar of L2ers. Thus, their results do not support any resetting of UG parameters in L2 acquisition.

A landmark hypothesis that can be classified under the FT/NA view is the Fundamental Difference Hypothesis (henceforth, FDH) proposed by (Bley-Vroman, 1990/2009). Bley-Vroman argues that L1 acquisition is characterized by reliability and convergence while adult L2 acquisition is characterized by unreliability and nonconvergence. Reliability is defined as L1 "children always succeed at language learning" while convergence is defined as L1 "children end up with systems that are so similar to those of others in the same speech community." (Bley-vroman, 2009: 177). Against these two important properties of L1 acquisition, Bley-Vroman points out that research reported about adult L2 acquisition showed that adult L2ers do not always succeed at reaching a native-like grammar and their interlanguage grammar is different from other peers in the same community. Bley-Vroman argues that such claims are confirmed by the general failure of adult L2ers to show clustering of properties that are usually associated with a parameter setting (see Clahsen and Hong, 1995 above). Bley-Vroman (2009) attributes such difference between L1 acquisition and adult L2 acquisition to the lack of full access to UG in the case of the latter. Instead of UG, adult L2ers, according to the FDH, take the target property of L2 to be the same of the counterpart property of their native language, if found. In the case where the adult L2ers cannot derive the target grammar from the available data that they

have, they, according to the FDH, develop a patch or data processing techniques to bridge the gap between their native language and the target language. Bley-Vroman (2009) argues that patches have two characteristics with regards to adult L2 acquisition. First, there is an obvious diversity in the interlanguage grammar of L2ers. Second, the interlanguage grammar of adult L2ers is characterized by uncertainty.

In the discussion of the results of the studies mentioned above, Schachter (1990) and Clahsen and Hong (1995), two points arise. First, both studies did not test the proficiency level of the L2ers, but the experimenters depended on the institutional status of the L2ers to judge their proficiency level in the target language. Thomas (1994) argues that institutional tests are not reliable because institutions vary in the rigidity and standards they maintain to give an institutional status to their applicants. Second, we do not expect the interlanguage grammar of L2ers to converge on the grammar of native speakers, but what is meant by access to UG is that the interlanguage representation is still constrained by UG (White, 2003). As for the FDH, results of the Full Transfer/Full Access model and comparisons in child/adult L2 research represent a big challenge to the hypothesis, as was argued in the previous chapter.

4.2.2 Full Transfer/Full Access

Proponents of the Full Transfer/Full Access (henceforth, FT/FA) model (Schwartz and Sprouse, 1994/1996) support the view that the starting point of L2 acquisition is the entirety of L1 grammar "excluding the phonetic matrices of lexical morphological items." (p. 41). This means that UG principles and the parameter settings of the L1 are imposed on the initial state of L2 acquisition (Full Transfer). Upon failure to accommodate the L2 input, L2ers will be forced to restructure their interlanguage grammar, and this restructuring will depend on options available by UG. Moreover, unused properties of UG are reactivated if the existing grammar cannot accommodate the input. This situation may arise when the input exhibits constructions that go against the parameter value as realized in the L1, or when the input motivates positing a functional category or UG principle lacking in the grammar of the mother tongue (Full Access). However, rapid/slow development of interlanguage grammar is determined by many factors such as the initial state and amount and type of input.

Schwartz and Sprouse based their claims on a case study of a Turkish man, Cevdet, who was acquiring German as a second language. The study was concerned with the basics of word order. Table (4.5) shows the results of preverbal vs. post-verbal subjects where the former is allowed in Turkish while the latter is not.

Table 4.5 Cevdet's declarative main clauses with two or more nonverbal constituents (Schwartz and Sprouse, 1994: 339)

Pronominal subjects				
	Pre-verbal		Post-verbal	
stage	SVX	XSV	...VS	total
1	18 86%	3 14%	0 0%	21 100%
2	109 50%	38 18%	69 32%	216 100%
3	48 41%	2 2%	67 57%	117 100%
Non-pronominal subjects				
	Pre-verbal		Post-verbal	
stage	SVX	XSV	...VS	total
1	11 92%	1 8%	0 0%	12 100%
2	93 78%	26 21%	1 1%	120 100%
3	46 75%	7 11%	8 13%	61 100%

As is shown in the table above, Cevdet's interlanguage grammar does not allow post-verbal subjects at stage one of acquisition. However, post-verbal subjects were permitted at stage two if they were pronominal. Schwartz and Sprouse (1994: 354) accounted for this by claiming that "a learning procedure respecting conservatism was the cause underlying the acquirers' hypothesis that the subject pronouns are clitics which can satisfy the Case Filter by incorporating into a c-commanding finite verb." At stage three, Cevdet's interlanguage grammar allowed both pronominal and non-pronominal subjects in the post-verbal position which is in accordance with German L2. Based on these results, Schwartz and Sprouse (1994/1996) argue that their adult participants had access to UG in the acquisition of German. That is, Cevdet approached the German word order with his Turkish grammar, but he found that his Turkish grammar of word order could not accommodate the input, so he was forced to reset all the values related to Turkish word-order parameter to that of German as is shown in table (4.6).

Table 4.6 Parametric differences between Turkish and German (Schwartz and Sprouse, 1994: 332)

	Turkish	German
SOV	+	+
VP-AGR	+	+
C-AGRP as possible order	+	+
Nominative checked under agreement	+	+
Obligatory movement of finite verb to empty COMP	-	+
Left-Adjunction to CP possible	-	-
Spec-CP as landing site for topics	-	+
Nominative clitics	-	+
Nominative checked under corporation	-	?
Nominative checked under government	-	+

As the input is impoverished with regards above shown facts about German and Cevdet showed knowledge of them, Schwartz and Sprouse (1994) argue that UG was operative and Cevdet had access to UG in the advanced stage of German acquisition.

Although the results of Schwartz and Sprouse (1994/1996) support the FT/FA model, there is a debate about the type of transfer involved in the initial stage of adult L2 acquisition. Some linguists, as shown below, argue against the transfer of the entirety of L1 grammar to the initial stages of adult L2 acquisition. The following section shows that L1 transfer is partial, not full.

4.2.3 Partial Transfer/Full Access

Proponents of the Partial Transfer/Full Access (henceforth, PT/NA) model can be classified into two categories: Minimal Trees (Vainikka and Young-Scholten, 1994/1996) which was developed into Organic Grammar (Vainikka and Young-Scholten, 2006/2007) and Valueless Features (Eubank, 1993/1994). To start with Minimal Trees (henceforth, MT), it argues that language acquirers start the acquisition of their mother tongue with a minimal syntactic tree that contains only X˚ categories, and then complete heads are acquired based on input analysis. Vainikka and Young-Scholten (1994) argue that it is very important to keep the tree minimal because only few positions and projections in the tree are required to enable the language learner analyse the input. In the case of L2 acquisition, MT agrees with the FT/FA model that adult L2ers will have full access to UG in the advanced stages of their development. However, proponents of MT argue against 'the entirety of L1' being transferred to the initial state of L2 acquisition. On the contrary, L2ers, according to MT, transfer only lexical projections, namely VP, to the initial state of L2 acquisition and there is no possibility of transferring functional projections initially or subsequently in the development of L2 acquisition. Thus, L2ers starts with a VP transferred from the L1 and they implicationally pass through developmental stages until they achieve native-like acquisition of L2. This view is summarized by Vainikka and Young-Scholten (1994: 295):

> The development of phrase structure in second language acquisition follows a pattern noted in first language acquisition, where the language learner appears to start off with a bare lexical projection, then posits an underspecified function projection, and finally specifies the features of the functional projection. That is, in both first and second language acquisition, the learner posits minimal trees based on the input, using principles of UG as a guideline.

These predictions were verified by Vainikka and Young-Scholten (1994/1996) and Vainikka and Young-Scholten (2011) in studies they conducted on a variety of L2ers (Korean, Turkish, Italian, Spanish and English) acquiring German as their second language. The target property was the head-parameter where German, Turkish and Korean are head-final languages while Spanish and Italian are head initial languages. Table (4.7) presents their results at the VP-stage.

Table 4.7 Verb position in German VP for learners at VP-stage (Vainikka and Young-Scholten, 1996: 15)

Learner's L1	VP headedness in L1	Proportion of head-final VPs
Korean/Turkish (n=3)	Final	98%
Italian/Spanish I (n=4)	Initial	19%
Italian/Spanish II (n=4)	Initial	64%

As is obvious in table (4.7), the Korean and Turkish learners started off with head-final VPs which is the same in German, while the Italians and Spanish started off with head-initial VPs which is different from German. However, the second group of Italian and Spanish learners supplied a high proportion of head-final VPs (64%) which Vainikka and Young-Scholten (1996) attributed to a switch of their VPs from head-initial to head- final so they are further developing their interlanguage grammar.

The MT hypothesis was developed by Vainikka and Young-Scholten (2006/2007) and Vainikka and Young-Scholten (2011) into an Organic Grammar (henceforth, OG). According to the assumptions of OG, any language acquirer, L1 or L2, starts language acquisition with a Master Tree which includes all the possible projections that might occur in a natural language. The function of UG here is to provide the necessary tools to acquire the Master Tree by depending on positive input (Vainikka and Young-Scholten, 2006). Importantly, the acquisition of Master Tree works in bottom-up pattern which means that the language learner starts the initial state of acquisition with a lexical projection (VP), and then they move in implicational stages until they reach a full tree with a CP. Vainikka and Young-Scholten (2006/2007) argue that the account of OG acquisition works for both L1 acquisition and L2 acquisition. However, in the case of L1 acquisition, there is no prior knowledge of a previous language so that they start their initial state of acquisition with the principles and constraints of UG that apply to all natural languages. The L2er, on the other hand, starts L2A with a previous linguistic knowledge of his/her L1 so they start with L1-based MT. To put it differently, the L2er starts with transferring the VP-headedness of his/her L1 to the initial state of L2, and then after exposure to the L2 input, they start to reset the headedness of the VP according to the L2 input if there is any difference between the two languages involved. Gradually, the L2er will build the L2 tree according to the L2 positive input (Vainikka and Young-Scholten, 2006/2007).

The assumptions of OG were empirically supported by Mobaraki and Mohammadpour (2011) who conducted a longitudinal study on ten Farsi-speaking children acquiring English as their L2. Unfortunately, there is not much information available about this study, but I will try to describe the study as the authors did in their (2011) conference paper. According to Mobaraki and Mohammadpour (2011), Farsi is a head-final language with a SOV word order. However, when prepositions occur, they come between the subject and object, therefore, the constituent word order of Farsi is S PP O V (Mobaraki and Mohammadpour, 2011). Also, Farsi is marked for tense and aspect, and the subject agrees with the verb in person and number. Sentences are negated in Farsi by attaching the negative prefix *næ-/ne-* to the left of the main verb or copula. Farsi also allows null subjects. The target language, English, is different from the children's L1 because English has a SVO word order. However, English is similar to Farsi in the fact that the agreement between the subject and the verb is marked on the verb and negation prefix is attached to the left of the main verb. Unlike Farsi, English does not allow null subjects.

The L2 children ranged in age between 4 and 6 years. Oral data was collected 50 days after the children's first exposure into English in class. Here, it is important to mention that this study is one of the few studies that we can confidently say is about the initial stage of L2 development. During the English classes, the teacher gave children some pictures to describe and ask questions. Data collection lasted for 9 months where audio-recording were made typically every week. The experimenter usually started recording after approximately 5 to 10 minutes of greetings and warming-up in the class. 41 samples were collected each one was from 90 to 120 minutes in length. In the results, the experimenters found that there was high suppliance of copulas in the form (*It's a* or *It is a*). However, an analysis of this suppliance shows that the L2 children have not acquired copulas and the majority of their suppliance was out of context as is shown in their categorization of copula supliance in (4.8):

(4.8) Correct suppliance: How many are they? – They are two horses.
Incorrect suppliance: What are they? – Its are animals.
Missing: Where is the monkey? The monkey on the lap.
(Mobaraki and Mohammadpour, 2011)

As for the correct suppliance, Mobaraki and Mohammadpour (2011) argue that children memorized copulas as chunks because copulas were missing in constructions where the subject was lexical, oblique or null. As for negation, Mobaraki and Mohammadpour (2011) found that their L2ers produced negation markers that violated the headedness of NegP in both Farsi and English because they did not show any specific order and the position of negative markers for the children was determined by the type of the verb rather than the syntactic position of the verb. In this regard, Mobaraki and Mohammadpour (2011: 6) point out:

> This can be especially noticed in Farsi compound verbs which consist of an element (noun, adjective or preposition) followed by a light verb such as the verbs *do, give or hit* among others. In these structures, the verb loses its original meaning and joins the preverbal element to form a new verb. In all early negative compound verbs, the negative marker follows the verb, which shows that these verbs have not been identified by the learners as verbs.

Taking all of these results into account, Vainikka and Young-Scholten (1994/1996), Vainikka and Young-Scholten (2006/2007) and Mobaraki and Mohammadpour (2011), proponents of MT and OG argue that their participants did not show any acquisition of functional categories in the initial stage of the acquisition of English. On the contrary, the initial stage of L2 acquisition was lexical and only the lexical meaning of the verb plays an important role in the distribution of other elements in the sentence. All in all, proponents of MT and OG argue that their results support the view that L2ers will have access to UG through developmental stages. That is, they started with the values of L1-VP settings which in the case of Italian and Spanish contradicted with the target grammar. Those learners found that their grammars could not accommodate the input of the target language, so they were forced to reset the values of head-parameter to accommodate the target grammar. Since the L2ers involved in the studies did not show knowledge of inflectional heads, their

results supported the view that L2ers start acquisition with a VP stage and develop their grammar until they achieve native-like acquisition of the target grammar.

Eubank's (1993/1994) Valueless Features approach seems to partially contradict the MT's claim. Eubank supports the view that native language transfer to the target language can be limited so he argues that "lexical as well as functional projections transfer, as do the directionality characteristics of those projections, but morphology-driven information like the strength of inflection does not transfer." (1993: 183). Under the claims of this hypothesis, the L2 initial state comprises all the L1 lexical and functional categories. However, the inflectional strength of the native language does not transfer to the initial state of the target language, nor does the L2er initially acquire the inflectional strength of the target language. What the L2er initially assumes is underspecified values are inert with regards to inflectional strength and head movement. Consequently, optionality is predicted at the initial state of L2ers.

Despite the empirical evidence of PT/FA model, it was criticized for its emphasis on partial transfer. For example, White (2003) criticizes MT and wonders if L2ers already have a steady-state grammar (L1) with its functional categories, why should we assume that these functional categories will be absent in the initial stage of L2? Similarly, Schwartz and Sprouse (1996: 66) say that, 'It is difficult to imagine what sort of cognitive mechanism would be involved in extracting a proper subpart of the L1 grammar and using that proper subsystem as the basis for a new cognitive state.' The following section advocates a view opposite to the PT/FA model where the claim, as is shown below, is that in the initial stage of adult L2 acquisition there will be full transfer but partial access to UG.

4.2.4 Full Transfer/Partial Access

Proponents of this model (Smith and Tsimpli, 1995; Hawkins and Chan, 1997) argue that UG is available via the full transfer of L1-instantiated features and constraints to the L2, but L2ers will not have full access to subparts of UG (features associated with functional categories).

Smith and Tsimpli (1995) claim that adult L2ers do not have full access to UG because some subparts of UG, such as features associated with functional categories, become inaccessible in adult L2 acquisition. According to their argument, the language faculty is modular in the sense that it consists of many interacting modules. Hence, the principles of UG are located in a separate component while there is a functional component (they called it UG Lexicon) which is responsible for parametric variation between languages. Smith and Tsimpli (1995) explain that the UG Lexicon contains the functional categories such as complementizers (C), agreement (Agr), determiners (D) and others. Importantly, parametric values are encoded in the lexical entries of functional lexical items (e.g. -s, that, the, etc.) that contain these features. In other words, any of these lexical items consists of a pairing that includes both the morphological form and the functional features. As for L1 acquisition, Smith and Tsimpli (1995) argue that L1 children have full access to all components of UG so

that they can have access to the UG lexicon and set the values of their parameters according to input. However, after childhood (puberty), access to UG will be restricted to the principles of UG but not the UG Lexicon. Hence, adult L2ers will transfer UG-instantiations from their L1 and access to UG in the L2 will be restricted to UG principles, but not UG lexicon.

Similar to the claims of Smith and Tsimpli (1995) and Hawkins and Chan (1997) propose the Failed Functional Features Hypothesis which supports the view that adult L2ers will not be able to reset their parameters if there is difference between the L1 and the L2 target grammar. This inability to reset L2 parameters goes back to the reason that adult L2ers do not have access to the UG Lexicon. However, adult L2ers will transfer their L1 grammar to the L2 when there is difference between the two languages, they will develop solutions that are neither L1-like nor L2-like, but their interlanguage grammar will stay UG-constrained because they still have access to the Principles component of UG. Hawkins and Chan (1997) empirically tested their hypothesis in a study they conducted on adult L1-Chinese speakers acquiring English as their second language. The target property of their study was English restrictive relative clauses (RRCs). According to Hawkins and Chan (1997), the two languages differ in their parameter values with regard to RRCs; in English, the head of the relative clause precedes the relative clause and there is a wh-operator movement involved as is shown in (4.9):

(4.9) a. The girl$_i$ [$_{CP}$ e [I like *wh*-$_i$]] is here
b. The girl$_i$ [$_{CP}$ who$_i$ e [I like t$_i$]] is here

(Hawkins and Chan, 1997: 190)

In (3.9a-b), the operator wh-phrase moves to the specifier position of CP and leaves behind a trace *t* that is properly bound by the moved operator. Hawkins and Chan (1997) point out that, in English, wh-operators might be overt or null. When it is null, the complementizer might be either *that* or null as is shown in (4.10):

(4.10) a. The girl$_i$ [Op$_i$ that [I like t$_i$]] is here
b. The girl$_i$ [Op$_i$ e [I like t$_i$]] is here

(Hawkins and Chan, 1997: 190)

Compared to English RRCs, Mandarin Chinese RCCs do not involve movement but a topic is generated in situ in CP, and that topic is coindexed with the head of the RRC and binds a pronominal (which can be null, e.g. *pro*) in the embedded clause as is illustrated in (4.11):

(4.11) [$_{CP}$ Top$_i$ [$_{IP}$ wo xihuan pro$_i$/ta$_i$] de] neige nuhai$_i$
null topic I like pro/her C the girl
The girl who I like

(Hawkins and Chan, 1997: 195)

Hawkins and Chan (1997) summarize the difference between Chinese and English with regards to RRCs in two parameters: first, English is head-initial language so that the head of the relative clause precedes the clause while Chinese is a head-final language so that the head of the relative clause follows the clause. Second, English RRCs involves wh-operator movement while Chinese RRCs lack such movement. Hawkins and Chan (1997) take the second different as the main concern of their study, and they argue that the trigger of wh-operator movement is a functional feature of predictive C. The category C has a cluster of unspecified parametric options which are [predictive], [wh] and [Agr(eement)]. Based on this assumption, the [wh] feature in English is strong and requires wh-operator movement and [Agr] relation. In Chinese, in contrast, the [wh] and [Agr] features are unspecified. Also, Hawkins and Chan (1997) assume these features of functional categories are associated with overt morpholophonological realizations. As far as predicative C in English and Chinese is concerned, Hawkins and Chan (1997: 198) assume the following:

(4.12) *That* [C, +pred, –wh, +Agr, . . .] (English)
Ø [C, +pred, +wh, –Agr, . . .] (English)
de/*ge* [C, +pred, . . .] (Chinese)

Hawkins and Chan (1997) wondered whether it was possible for the L1-Chinese speakers, L2ers of English, to reset their parameters and specify the [wh] and [Agr] features for English RRCs. In other words, they wanted to investigate whether L2ers have full access to UG.

Seven groups of participants were involved in the study and they were divided as follows: Chinese elementary (n= 47), Chinese intermediate (n= 46), Chinese advanced (n= 54), French elementary (n= 33), French intermediate (n= 40), French advanced (n= 40), and English control group (n= 32). All of the L2 participants were living and learning English at Hong Kong at the time of testing. The Chinese participants were native speakers of Cantonese while French L2 participants were from France and other European countries. Participants in the control group were also living in Hong Kong and they were from different nationalities: British, American and Australian. Hawkins and Chan (1997) included the French participants in the study to provide reliability and control for the test instruments used in the study. As far as RRCs concerned, French and English share the same grammar.

After one week of sitting the Oxford Placement Test, a Grammaticality-Judgment-Task was used to investigate L2ers' knowledge of English RRCs. Each test item was presented orally and verbally to the participants with a nine-second gap between each item. Participants were asked to choose 'A' if they think the sentence was correct, 'B' if the sentence was probably correct, 'C' if the sentence was probably incorrect and 'D' if the sentence was definitely incorrect. Also, participants were asked to make corrections for parts of sentences they thought probably or definitely incorrect. 101 items were included in test and the focus was on four aspects of RRCs as is shown in (4.13):

(4.13)

i. Sentences displaying the grammatical and ungrammatical use of operators and complementizers

The actor who performs well wins a lot of prizes.
*The girl who that lost her way cried.

ii. Sentences involving ungrammatical resumptive pronouns in simple relative clauses

*The man who(m) she admires *him* is an artist.

iii. Sentences violating the Subjacency condition

*This is the man who(m) Mary told me when she will visit.

iv. Sentences involving ungrammatical null subjects in embedded Clauses

*The girl cried when lost her way.

(Hawkins and Chan, 1997: 224-226)

Hawkins and Chan (1997) found that their results, as shown below, confirm the predictions of the Failed Functional Features Hypothesis.

Table 4.8 Participants' accurate judgments in the grammaticality judgment task (Hawkins and Chan, 1997)

Group	Proficiency Level	Grammatical sentences	Ungrammatical sentences		
			Double CP	Resumptive	Subjacency
L1-Chinese	Elementary (n= 47)	56%	50%	38%	71%
	Intermediate (n= 46)	67%	68%	55%	61%
	Advanced (n= 54)	79%	83%	90%	38%
L1-French	Elementary (n= 33)	81%	91%	81%	72%
	Intermediate (n= 40)	88%	95%	90%	79%
	Advanced (n= 40)	92%	98%	96%	90%
Native speakers	(n= 32)	96%	99%	98%	85%

Hawkins and Chan (1997) argue that the Chinese participants in the initial state started with mapping the morphophonological forms from English onto the Chinese feature specifications. Thus, they displayed an interlanguage grammar with L1-syntax and L2-lexical items. With increased proficiency in English, Chinese participants became more accurate about English predicative CP and some aspects of English RRCs (e.g. double CP and resumptive). However, their interlanguage grammar did not involve wh-operator movement so they were not accurate about Subjacency items. Although the performance of Chinese participants was not native-like, their interlanguage grammar was still UG-constrained because they rejected [wh-phrase….gap] constructions (e.g. The girl cried when *e* lost her way) prohibited by UG (Hawkins and Chan, 1997). The

French participants, as expected, behaved native-like from the early stages. All in all, Hawkins and Chan (1997) argue that their results support the partial access to UG in adult L2 acquisition.

Although the results of Hawkins and Chan (1997) support the views of FT/PA model, some other studies (White and Juffs, 1998) showed that adult Chinese-L2 speakers, advanced L2ers of English, perform native-like with regards to Subjacency violations in English. In her comments on the Failed Functional Features Hypothesis, White (2003) argues that if the predictions of this hypothesis are correct, then English speakers L2ers of Chinese would not allow in situ wh-questions in Chinese and they would mistakenly allow wh-movement in Chinese. In other words, such hypothetical English speakers, L2ers of Chinese, would transfer the feature values of their mother tongue to Chinese. White (2003) points out such predictions need to be empirically confirmed; otherwise, the Failed Functional Features Hypothesis will not be supported.

4.2.5 No Transfer/Full Access

Proponents of the No Transfer/Full Access (henceforth, NT/FA) model (Flynn and Martohardjono, 1994; Platzack, 1996) support the view that L2ers do not transfer the lexical or functional properties of their native language to the initial state of their L2 acquisition. On the contrary, L2ers have full direct access to UG and its principles from the early stages of L2 acquisition. Thus, the initial state of L2 acquisition is identical to the initial state of L1 acquisition.

Flynn and Martohardjono (1994) argue that when we discuss language acquisition, two hypotheses are possible: The Identity Hypothesis and The Separation Hypothesis. The former assumes that UG itself becomes the core grammar of the acquired language, while the latter assumes that "UG constrains core-grammar construction but remains constant." (p. 321). Flynn and Martohardjono (1994) discuss many examples which support the Separation Hypothesis and reject the Identity Hypothesis in the course of L1 acquisition. One of these examples is the case of bilingual children and the head-parameter. For example, when we have bilingual children who speak English (head-initial language) and Japanese (head-final language) such a difference between the headedness of the two languages supports the Separation Hypothesis. Flynn and Martohardjono (1994) also investigated whether the Separation Hypothesis is possible in the case of L2 acquisition. They studied 21 adult Japanese participants acquiring English as their second language (ESL placement: high score 42 [range 0-50]). Using an elicited production task, Flynn and Martohardjono (1994) investigated whether Japanese-speaking English L2ers preferred preposed structures more than postposed structures as is shown in example (4.14):

(4.14) **Pre- and postposed subordinate adverbial clauses**

a. Preposed: When the actor finished the book, the woman called the professor.
b. Postposed: the worker called the owner when the engineer finished the plans.

(Flynn and Martohardjono, 1994: 323)

Under the assumption that head-final structures correspond to postposed structures and head-initial structures correspond to preposed structures, Flynn and Martohardjono (1994) argue that if L2ers have access to UG via L1 transfer, they will prefer preposed structures rather than postposed structures. However, if UG is not the core grammar of L1 and it is still accessible in L2 acquisition, L2ers will prefer postposed structures rather than preposed structures. Flynn and Martohardjono's (1994) results indicated that the Japanese L2ers did not find preposed structures easier than postposed structures in the early stages of their L2 acquisition. On the contrary, they preferred the postposed structures over the preposed ones. Flynn and Martohardjono (1994) argue that such results strongly support that UG and language-specific properties remain constant, and the principles and parameters of UG are instantaneously accessible in L2 acquisition.

In the same vein, Platzack (1996) argues that language acquisition, whether it is L1 or L2 acquisition, starts with the Initial Hypothesis of Syntax (henceforth, IHS) and if the target language is not compatible with the IHS, the language acquirer resorts to UG as the only option available. Platzack (1996: 376) states the IHS as follows:

(4.15) **Initial Hypothesis of Syntax (IHS)**

All instances of feature checking take place after spell-out.

Platzack (1996) points out that the IHS makes some predictions that a language learner starts the acquisition of any language with these predictions in mind. These predictions are based on the markedness of language features, such as pro-drop and the SVC word order. Thus, the language learner approaches language acquisition with these predictions in mind, if there is any tension between the target input and the predictions of IHS, s/he will resort to UG and set the value of the parameter according to the target input. Under this perspective, Platzack (1996) argues that language acquisition, L1 or L2, is a gradual adjustment of the IHS to make it accommodate the target grammar. In other words, the language learner should only know what aspects of the target grammar deviates from the IHS.

It can be noticed that the claims of the IHS seems similar to the views of MT/OG because in the IHS, the language learner, L1 or L2, starts with fixed assumptions (e.g. SVC word order), and then they change these assumptions according to the input. Similarly, MT/OG supports the view that a language learner, L1 or L2, starts with a VP, and then they start building this structure according to the input. However, the FA/NT model in general rejects any type of transfer and considers that the adult L2ers have full direct access to UG form the initial state which contradicts with the views of MT/OG and other models of UG access in L2 acquisition (e.g. FT/FA and PT/FA). As for the views of Flynn and Martohardjono (1994), the proficiency level of their participant is high (ESL placement: high score 42 [range 0-50]) so they are not in the initial state; they are probably in advanced stages of L2 acquisition and we do not know whether there was any transfer involved in the initial stage of their L2 acquisition. The FA/NT model is not the only extreme view as we will see in the

following section where L2ers do not transfer their L1 grammar nor do they have any access to UG in adult L2 acquisition.

4.2.6 No Transfer/No Access

Proponents of the No Transfer/No Access (henceforth, NT/NA) model (Clahsen and Muysken, 1986/1989; Meisel, 1997; Bley-Vroman, 1990/2009) argue that UG is not operative at all in adult second language acquisition. This extreme claim is against any type of UG access to L2ers, whether this access is indirect via the transfer of L1 properties or direct access via full access to UG principles and parameters in the course of adult L2A. Importantly, proponents of this model do not argue against UG-access in first language acquisition, but they argue that UG is replaced with learning strategies in adult L2 acquisition (Bley-Vroman, 1990/2009).

Meisel (1997) based his claims on a study he conducted on a group of Italians, Portuguese and Spanish acquiring French and German as their second languages. The target property which the study addressed is NEG which is placed after finite and before non-finite verbs in the target languages while NEG is placed preverbally in the mother tongues. Meisel (1997) found that L2ers developed a learning strategy so that they placed NEG post-verbally irrespective of the verb- whether it was finite or non-finite. Mesiel also found that the acquisition of NEG placement was independent of the acquisition of finiteness or agreement. Thus, Meisel (1997) argues that UG is inoperative in the interlanguage grammar of L2ers and they resort to learning strategies in order to learn the target language.

It can be noticed that, according to the views discussed above, the NT/NA model is not supported. The majority of views differ whether there is full/partial transfer or full/partial access. Thus, the growing evidence in adult L2 acquisition literature seems to contradict the views of the NT/NA model.

4.2.7 Conclusion

UG availability in adult L2 acquisition has been the subject of debate among generative L2 researchers for several decades. In this regard, two opinions can be summarized: the first opinion supports the view that UG is not operative in the interlanguage grammar of adult L2ers so that they cannot reset their parameters to accommodate the L2 input. Instead, L2ers will interpret L2 input according to the values of their L1-parameters. If there is similarity between the target property and its counterpart in the L1, adult L2ers are expected to achieve native-like acquisition of the target grammar. However, if there is dissimilarity in the target property between the two languages in question, L2ers are expected to fail in the acquisition of the L2 target grammar and variation is expected to prevail. The second opinion supports the view that UG is operative in the interlanguage grammar of adult L2ers. If there is dissimilarity between the L2 target grammar and its counterpart in the L1, transfer is restricted to the initial state of L2 acquisition, and then L2ers are expected to realize that the values of their L1 parameters cannot accommodate the L2 target grammar so that

they will be forced to restructure their interlanguage grammar and consequently reset their parameters to the values of the L2 target grammar. These two positions are discussed in the following sections with regards to binding of reflexives in L2 acquisition.

4.3 Access to UG in the L2 Acquisition of Reflexives

4.3 .1 Access to UG in Adult L2 Acquisition of Reflexives

A substantial number of studies have looked at the interpretation of reflexives by adult L2ers, for example, Finer and Broselow, 1986; Thomas, 1989, 1995; Bennett, 1994; Maclaughlin, 1998; Yip and Tang, 1998; Yuan, 1998; Al-kafri, 2008; among others. Unlike the L1 studies on the interpretation of reflexives, these studies reported contradictory results about the interpretation of reflexives by adult L2ers. For example, Bennett (1994), Thomas (1995) and Yip and Tang (1998) support the view that adult L2ers have full access to UG in advanced stages of L2 acquisition. In contrast, Yuan (1998) and Al-Kafri (2008) support the view that adult L2ers have indirect access to UG via the transfer of L1-instantiated properties. Different from these two views, Finer and Broselow (1986), Hirakawa (1990) and Maclaughlin (1998) claim that adult L2ers develop a kind of intermediate binding which is neither L1-like nor L2-like, yet it is still UG-constrained.

To start with the full access view, Thomas (1995) conducted her study on 58 adult L2ers of Japanese. Japanese allows long distance binding of reflexives as is shown in (4.16):

(4.16) Takasi$_i$-ga [Kenji$_j$-ga zibun$_{i/j}$-o suisenshita-to] omotta
Takasi-NOM Kenji-NOM self-ACC recommended-COMP thought
`Takasi thought that Kenji recommended self'

(Motomura, 2001: 319)

As is shown in (4.16), the Japanese reflexive *zibun* 'self' can be bound by the subject of the main clause *Takasi* or the subject of the subordinate clause *Kenji*. L2ers were of different L1s: English, Spanish, French, German, Korean, Chinese and Thai. English, Spanish, French and German allow local binding of reflexives while Chinese, Korean and Thai, like Japanese, allow long distance binding of reflexives. In addition to the L2ers, 34 Japanese native speakers participated in the study as a control group. L2ers were divided into two proficiency groups, low (n= 34) and high (n= 24), based on their enrolment in different institutions. The test battery was a truth-value-judgment task which consisted of 16 stories which were illustrated by pictures followed by a statement containing *zibun*. The participant had to decide whether the statement made any sense with regards to the story by circling YES or NO. Participants were tested individually or in groups where the experimenter ran first a practice session to make them familiar with the notion of appropriate vs. inappropriate with regards to the relation between a story and a statement. Group results showed strong evidence for L1 transfer as is shown in table (4.9) below:

Table 4.9 Responses of acceptance of every type of antecedents (Thomas, 1995)

Experimental groups	LD subject (n= 4)	*LD object (n= 4)	Local subject (n= 4)	*Local object (n= 4)
Low (n= 34)	55 %	54%	85%	47%
Advanced (n=24)	57%	14%	96%	17%
NS (n= 34)	89%	18%	93%	13%

* means ungrammatical binding

As is shown in this table, both low and advanced proficiency groups allowed local subject antecedents more than long-distance subject antecedents. However, in the individual analysis of the participants' performances, Thomas (1995) found that 10 participants constantly allowed long-distance binding of *zibun*. Hence, some L2ers in her study achieved native-like binding of the Japanese reflexive. Based on the individual performance of participants, Thomas concluded that L2ers have full access to UG in the acquisition of reflexives.

Although Thomas's (1995) results support the view of full access to UG in adult L2 acquisition, her study and results are problematic for three reasons: first, we do not know about the L1 of the 10 L2 participants who achieved native-like performance because 20 out of the 58 L2 participants were native speakers of Chinese, Korean and Thai which allow long-distance binding. Thus, it is highly possible that the majority of the 10 participants who achieved native-like performance were from these L1s. Second, Thomas (1995) determined the proficiency level of participants according to their institutional status although she criticized in her (1994) article the use of institutional status to determine the proficiency level of L2ers. Third, the high allowance of binding *zibun* to long-distance object antecedents raises questions about the validity of the task used because such a type of binding is prohibited by UG. Thomas (1995) attributed such performance to misinterpretation of reflexives as pronouns so they allowed *zibun* to be bound by long-distance objects. However, if such account was logical, we do not expect native speakers of Japanese to allow such type of binding at 18% of the time. It is highly possible that there is something wrong in the task used in the study.

Another study which supports the view of adult L2ers' full access to UG was by Yip and Tang (1998) who conducted a study on the interpretation of English reflexives by L1-Chinese speakers. 268 Cantonese speakers learning English as their L2 participated in the study. Based on the results of a standardized cloze test, L2ers were divided into three proficiency groups: level 1(score 15-30), level 2 (score 31-45) and level 3 (score 46-75). The proficiency test which was developed by Criper (1981) consisted of 12 cloze passages with a total of 72 to 88 words for each passage. The total proficiency score of the test was 100 which was divided into eight levels of proficiency (See Yip and Tang, 1998). In addition to the L2 groups, 30 native speakers of American English participated as a control group. To elicit participants' interpretation of English reflexives, Yip and Tang (1998) used two versions of sentence judgment task: an English judgment version to test English and Cantonese participants, and a Cantonese version to test Cantonese participants only. A sample of the test items used in the test is shown in (4.17):

(4.17) John thought that Bill praised himself.

Can 'himself' refer to John? Yes No

Can 'himself' refer to Bill? Yes No

Can 'himself' refer to somebody else? Yes No

(Yip and Tang, 1998: 175)

The English version was administered first, and then on a different occasion the Cantonese one was used to obtain information about the understanding of Cantonese participants of reflexives in their own language. In the results, Yip and Tang found that the Cantonese participants showed gradual improvement in the acquisition of English reflexives with increased proficiency level as shown in the results of the sentence judgment task (English version):

Table 4.10 Percentages of correct responses on interpretation of English reflexives (Yip and Tang (1998)

Binding type	Level 1 (n= 82)	Level 2 (n= 85)	Level 3 (n= 101)	NS (n= 30)
Finite clauses (only local antecedent)	18.3 %	58.8%	75.2%	93.3%
Non-finite clauses (only local antecedent)	23.2%	58.8%	77.2%	93.3%

As for the Cantonese version, they unexpectedly found that the Cantonese participants allowed long-distance binding of the local Cantonese reflexive *taziji*. Yip and Tang accounted for this ungrammatical binding by claiming that the Chinese reflexive *taziji* can sometimes have a pronominal interpretation (pronoun + emphatic reflexive) for emphatic purposes. Conclusively, Yip and Tang (1998) argue that their results support the view that Cantonese L2ers can achieve native-like performance in the acquisition of English reflexives in advanced stages of L2 acquisition.

Different from the view of full access to UG in L2 acquisition, Yuan (1998) supports an extreme version of L1 transfer as he argues against the possibility of access to UG in adult L2 acquisition. He conducted a study on L1-Japanese speakers (n= 24) and L1-English speakers (n= 57) acquiring Chinese as their L2. The choice of L1s and L2 was for comparative reasons because Japanese and Chinese allow long-distance binding of reflexives while English allows only local binding of reflexives. According to the results of a Chinese proficiency test, the English participants were divided into an intermediate group (proficiency score 65.4) and an advanced group (proficiency score 85.0) and the Japanese group score (70.9) in the test. Yuan also ran a one-way ANOVA test on the proficiency scores and found that the Japanese participants were significantly different to the English advanced, but there was no significant difference between the Japanese participants and the English intermediate ones. In addition to the L2 participants, 24 native speakers of Chinese

participated as a control group. The test battery was a multiple choice comprehension test that included biclausal and mono-clausal reflexive sentences. Example (4.18) is one of the biclausal sentences used in the test:

(4.18) Wang$_i$ Ming bu gaoxing de shuo Li Dong$_j$ jingchang bu xiangxin ziji$_{i/j}$
Wang Ming unhappily Adv-P say Li Dong often not trust self
'Wang Ming said unhappily that Li Dong often does not trust self'

As is shown in the example, the Chinese reflexive *ziji* can be bound be either the subordinate subject *Li Dong* or the matrix subject *Wang Ming*. As said before, such binding is the same in Japanese and different in English which allows only local binding of reflexives.

In the results, Yuan found that the Japanese participants achieved native-like binding of *ziji* because they considered *ziji* as a counterpart to *zibun* which has the same binding properties as *ziji*. The English participants, in contrast, could not acquire the binding properties of *ziji* because it is different from what they have in English. These results are illustrated in table (4.11) below:

Table 4.11 Acceptance of long-distance antecedents from embedded finite clauses (Yuan, 1998)

Groups	Percentage %
Japanese (n= 24)	92
English intermediate (n= 32)	53
English Advanced (n= 25)	71
Native Speakers (n= 24)	94

Yuan argues his results clearly supported L1 transfer because the Japanese participants, who were statistically similar to the English intermediate participants, achieved native-like performance of Chinese reflexives, whereas the English advanced participants could not achieve native-like performance. However, Yuan found the subject orientation of *ziji* was problematic for all L2ers. He accounted for this problem by claiming that it is a natural result of developmental stage in the acquisition of *ziji.* That is, Chinese children were reported to pass through a developmental stage where they allow free orientation of *ziji*. Unexpectedly, Yuan found that three of the English intermediate group ungrammatically allowed *ziji* to be bound by long-distance object antecedents. He, as Thomas (1995) did, accounted for such a violation of UG by claiming that these learners misinterpreted *ziji* as a pronoun so they allowed it to be bound by long-distance object antecedents. All in all, Yuan (1998) concluded that his results support the view that adult L2ers have only indirect access to UG, via the L1.

Al-Kafri (2008) also supports the view that adult L2ers have indirect access to UG via L1 transfer. He reported a study on the acquisition of English reflexives by L1-Arabic speaking and L1-Chinese speaking adult L2ers of English. 20 adult L2ers and 5 British natives participated in the study. According to the results of the Oxford Quick Placement Test, L2ers were divided into different proficiency groups: Arab intermediate (range of proficiency score 27-33), Arab advanced (range of proficiency score 49-54), Chinese intermediate (range of proficiency score 26-30) and Chinese advanced (range of proficiency score 48-52). The placement test consists of two parts that address general grammar and comprehension questions, such as matching and fill in the gaps: part one contains forty questions while part two contains twenty questions. The overall time of the test was thirty minutes.

As explained before, Arabic and English share the same grammar of local reflexive binding while English and Chinese differ where Chinese allows long-distance binding. Thus, the study investigated whether adult L2ers have full access to UG in adult L2 acquisition or whether they have indirect access via the L1. In other words, if Chinese and Arabic-speaking participants achieve native-like acquisition of English reflexives this supports the view that adult L2ers have full access to UG in L2 acquisition. However, if Arabic-speaking participants achieve native-like acquisition of English reflexives, but Chinese do not, this supports the view that adults L2ers have only indirect access to UG via the L1. The test battery consisted of two tasks: first, a truth value judgment task (22 items) that involved the local binding of English reflexives in biclausal finite sentences, biclausal infinitival sentences, long-distance object antecedents and complex picture-noun phrases. Example (4.19) is one of the test items used in the study:

(4.19) A man was looking for someone to work in his restaurant, so he put an advertisement in the newspaper. Bill sent the man a letter about his experience and qualifications.

Bill sent the man a letter about himself.

TRUE FALSE

As is shown in (4.19), upon understanding the story, the participant had to judge the statement as TRUE. Second, a grammaticality judgment task (10 items) was used in the study to investigate whether L2ers considered English reflexives as complex reflexives (locally bound) or simple reflexives (non-locally bound). Example (4.20) below is one of the test items used in the study:

(4.20) a. The smart student thinks that the teacher likes himself.
b. *The man thinks the boy does not like that stupid himself.

Following Hermon (1992), Al-Kafri (2008) argues that L2 participants would judge (4.20a) as grammatical if they considered English reflexives complex, but they would judge (4.20b) grammatical if they considered English reflexives simple, because in Chinese, it is possible to separate between a simple reflexive and a verb with an adjective or adverb. The two tests were sat at one session with a ten minute break between the two. In the results, Al-Kafri (2008) found out Arabic-speaking participants achieved native-like acquisition of English reflexives but Chinese participants did not, as is shown in table (4.12) below:

Table 4.12 Percentages for the acceptance of every type of binding in the truth-value-judgment task (Al-Kafri, 2008)

Binding Type	**NS (n=5)**	**AI (n=5)**	**AA (n=5)**	**CHI (n=5)**	**CHA (n=5)**
Long-distance binding	**0%**	**27.5%**	**10%**	**55 %**	**35 %**
Biclausal finite	0 %	25 %	5 %	50 %	30 %
Biclausal infinitival	0 %	30 %	15 %	60 %	40 %
Linear order strategy	**0 %**	**20 %**	**15 %**	**25 %**	**40 %**
Long-distance object antecedents	**0%**	**10%**	**0%**	**10%**	**0%**

NS = Native Speakers, AI= Arab Intermediate, AA= Arab Advanced, CHI= Chinese Intermediate, CHA= Chinese Advanced.

As is shown in table (4.12), Chinese intermediate participants accepted long-distance binding of English reflexives at a high rate (50%). Although this high percentage of acceptance decreased with advanced Chinese participants (35%), it was not because they acquired the local binding of English reflexives, but because they developed a linear order strategy (the closest noun is the antecedent) at a high rate (40%). Such findings were also confirmed by the results of the grammaticality judgment task which showed that Chinese participants considered English reflexives as simple reflexives (non-locally bound) at a high rate as is shown in table (4.13) below:

Table 4.13 Correct judgments[8] of participants in the grammaticality-judgment-task (Al-Kafri, 2008)

	NS (n=5)	**AI (n=5)**	**AA (n=5)**	**CHI (n=5)**	**CHA (n=5)**
Total Mean	**96%**	**82%**	**92%**	**46%**	**68%**
Yes	92%	80%	92%	56%	72%
No	100%	84%	92%	48%	64%

NS = Native Speakers, AI= Arab Intermediate, AA= Arab Advanced, CHI= Chinese Intermediate, CHA= Chinese Advanced.

Based on these results, Al-Kafri (2008) argued that the Arabic-speaking participants were successful at the acquisition of English reflexives because Arabic and English share the same grammar of reflexive binding in terms of domain and orientation. The Chinese participants, on the other hand, could not achieve native-like

[8] YES here refers to the percentage of those who accepted grammatical sentences in English (3.20a) while NO refers to the percentage of those who rejected the ungrammatical sentences (3.20b) in English.

acquisition of English reflexives because the properties of reflexives are instantiated differently in these two languages. Hence, adult L2ers have indirect access to UG, via the L1.

Unlike the studies reported above, Bennett (1994) strikes a compromise between the full access view and L1 transfer view by claiming that adult L2ers will transfer their L1 grammar to L2 acquisition if the target property is a counterpart of the L1 grammar. However, if the target property has no counterpart in the L1, adult L2ers will draw on their full access to UG. Bennett (1994) based this view on a study she conducted on 40 L1-Serbo Croatian speakers acquiring English as their L2. The choice of these two languages is very important because Serbo-Croatian, unlike Chinese and Korean, allows only long-distance reflexives which can be bound outside infinitival clause, but not finite ones as is shown in (4.21):

(4.21) Jan kazal Piotrowi zbudować dom dla siebie
Jan$_i$ ordered Peter$_j$ [PRO$_j$ to-build house for self$_{i/j}$]
Jan ordered Peter to build a house for himself.

(Bennett, 1994: 131)

English, as explained before, allows only local reflexives. According to a set of proficiency tasks which focused on syntactic structures, knowledge of reflexives and pronouns, and vocabulary, L2ers were divided into two groups: intermediate (n= 20) and advanced (n= 20). In addition, 20 native speakers of English participated in the study as a control group. The test battery was a picture identification task and a multiple choice comprehension task which focused on a variety of structures as shown in (4.22):

(4.22)

a. Complex noun phrase in biclausal finite:
John$_k$ said that Peter$_j$ heard Jack$_i$'s criticisms of himself$_{i/*j/*k}$.
b. Local complex noun phrase:
Bobby$_j$ likes Peter$_i$'s song about himself$_{i/*j}$.
c. Exceptional Case Marking verbs:
Alex$_j$ forced John$_i$ to listen to himself$_{i/*j}$.
d. Complex noun phrase in biclausal finite:
Michael$_k$ says that Peter$_j$ read John$_i$'s letter about himself$_{i/*j/*k}$.
e. Complex noun phrase in biclausal infinitival:
Nina$_j$ wants to read Kristina$_i$'s book about herself$_{i/*j}$.
f. Tensed Biclausal Sentences:
Kristina$_j$ says Vera$_i$ talks about herself$_{i/*j}$ all the time.

In the results, Bennett (1994) found obvious transfer of L1 binding properties to the target grammar as is shown in tables (4.14) and (4.15), respectively:

Table 4.14 Correct acceptance of local binding in picture-identification-task (Bennett, 1994)

Binding type	Native speakers (n=20)	Intermediate group (n= 20)	Advanced group (n= 20)
Local complex NP	83%	63%	63%
Exceptional Case Marking	96%	85%	90%
Tensed biclausal sentences	86 %	88%	90%

Table 4.15 Correct acceptance of local binding in multiple choice comprehension task (Bennett, 1994)

Binding type	Native speakers (n=20)	Intermediate group (n= 20)	Advanced group (n= 20)
Local complex NP	95%	65%	62.5%
Exceptional Case Marking	87.5%	63.8%	80%
Tensed biclausal sentences	96.3 %	86.3%	93.8%
CPNP in biclausal finite	77.5%	55%	55%
CPNP in biclausal infinitival	80%	62.5%	55%

CPNP= Complex Noun Phrase.

However, Bennett found suppliance in the case of Exceptional Case Marking (ECM), such as (4.22c) above, was native-like in her study. Since ECM verbs are not present in Serbo-Croatian, Bennett concluded that L2ers will resort to UG in case their grammar does not have a grammar similar to the target one. If the properties of the target grammar are present in L1, transfer is highly predicted.

Different from the views of L1 transfer and L2 access to UG in adult L2 acquisition, some linguists have conducted studies on the interpretation of English reflexives by adult L2ers (Finer and Broselow, 1986; Hirakawa, 1990; Maclaughlin, 1998). All the results of these studies have shown that adult L2ers develop a kind of grammar which is different from mother tongue binding and target binding. Because of the special importance of these studies, I will discuss them in detail.

Finer and Broselow (1986) conducted a pilot study on the interpretation of English reflexives by six adult L1-Korean speakers. The researchers were interested in investigating the degree of UG availability to adult L2ers. In other words, they wanted to see whether adult L2ers have full direct access to UG parameters and principles when they acquire a second language, or whether UG is only available to adult L2ers via transferring the instantiated parameters which are already present in L1. According to the results of an English proficiency test, the Korean subjects were of intermediate and advanced levels. The test battery was a picture-

identification-task which consisted of sixteen biclausal sentences: finite and infinitival. Table (4.16) shows group results of the participants.

Table 4.16 Percentages of participants' acceptance of local/long distance antecedents in biclausal sentences (Finer and Broselow, 1986)

	Local	Nonlocal	Either
Tensed clause	91.7%	8.3%	0
Infinitival clause	58.3%	37.5%	4.2%

Contrary to expectations, Finer and Broselow (1986) found that their participants developed a kind of intermediate grammar which was neither L1-like nor L2-like. The Korean participants unexpectedly reset their parameter to an intermediate setting between English and Korean. In this setting, domain for a reflexive overlooks infinitival clauses and closes off with the first finite clause. Although this binding is different from both L1 and L2 binding, it is still UG constrained; Finer and Broselow note that it is a Russian-like binding. They could not find a logical explanation for their results, and they concluded that adult L2ers can develop a type of intermediate grammar which is different from the native and the target grammar, yet is a grammar constrained by UG sanctions.

However, it is difficult to propose an explanation based on such results because of two important reasons; first, the study was a pilot study and the number of participants was limited, i.e. only six. Second, Finer and Broselow reported group results not individual results, therefore, the overall results might be influenced by individual performance.

Hirakawa (1990) also carried out a study on the interpretation of English reflexives by 65 L1-Japanese speakers, ranging in age from 15 to 19. The general proficiency of participants was based on their school years so they did not sit any proficiency test. The study also included 20 English controls and 22 Japanese controls. The test battery consisted of a multiple-choice-grammaticality task which contained 4 types of test items: triclausal finite, biclausal finite, biclausal infinitival, and monoclausal. Example (4.23a-b) below is one of the biclausal finite and infinitival test items used in the study:

(4.23) a. biclausal finite
John$_j$ said that Paul$_i$ hit himself$_{i/*j}$.
b. biclausal infinitival
Mary$_j$ asked Anne$_i$ to introduce herself$_{i/*j}$.

(Hirakawa, 1990: 70)

The group results of the study showed that adult L2ers were different from both the English control group and the Japanese control group. Table (4.17) below provides group results on biclausal finite and infinitival sentences.

Table 4.17 L2ers' responses on finite and infinitival domains (Hirakawa, 1990)

Binding type	English controls (n=20)	Japanese learners of English(n=65)	Japanese controls (n=22)
Finite local	98%	72.5%	18%
Finite long	2%	27.5%	82%
Infinitival local	98%	55%	15%
Infinitival long	2%	45%	85%

As is obvious in the results above, Japanese learners of English made a finite/infinitival distinction in their acquisition of English reflexives. This type of binding is unexpected because both languages in question, Japanese and English, do not make such distinctions. Therefore, such type of binding cannot be accounted for by L1 transfer because the native language does not have this distinction. Moreover, if L2ers had full access to the target language binding parameter, they were not expected to have such a grammar because the target language does not make this distinction either.

It is worth noting here that acceptance of local binding in infinitival clauses in Hirakawa's study (55%) was similar to the acceptance (58.3%) found in Finer and Broselow (1986). However, Hirakawa's results are questionable for two methodological issues. First, using years in school to determine L2 proficiency is not reliable because schools are usually not rigid and lack standards when they assign a status to their students (Thomas, 1994). Second, participants in this study might have interpreted reflexives as pronouns so they allowed long-distance binding outside infinitival clauses. To test such a possibility, Hirakawa (1990) should have included some pronoun items to see if participants knew they were dealing with reflexives and pronouns as distinct categories. Moreover, she should have reported individual results to see if group results were indicative of individual results.

Similar to the results of Finer and Broselow (1986) and Hirakawa (1990), assuming that adult L2ers do set parameters at intermediate value, Maclaughlin (1998) also found that adult L2ers can develop intermediate binding of reflexives. Maclaughlin wanted to investigate possible binding domains that can be developed by adult L2ers so she conducted a study on 15 Chinese and Japanese natives acquiring English as their second language. In addition, 18 native speakers of English were recruited in the study as a control group. Maclaughlin (1998) did not use an independent English proficiency test to determine the L2ers' proficiency level in English, but she only said participants as being in ESL classes, in writing classes or described working in the USA. The test battery consisted of a pre-test to know whether L2ers understood the structure of binding and a multiple-choice-comprehension task. Test items, as shown in (4.24), were of four types: biclausal finite, biclausal infinitival/object control, biclausal infinitival/subject control with matrix object, and infinitival clause with pronoun.

(4.24)

a. biclausal finite (5 tokens)

- no matrix object (3 tokens)

  $Barbara_j$ thinks that $Lisa_i$ is proud of $herself_{i/*j}$.

- matrix object (2 tokens)

  $Mary_k$ asked $Susan_j$ if Ann_i blames $herself_{i/*j/*k}$.

b. Biclausal infinitival, object control (5 tokens)

$Michael_j$ forced $Peter_i$ to help $himself_{i/*j}$.

c. Biclausal infinitival, subject control with matrix object (2 tokens)

$Bill_j$ promised $Michael_i$ to send a picture of $himself_{i/j}$.

d. 3-clause infinitival with pronoun (4 tokens)

$Peter_k$ knows that $Michael_j$ forced $John_i$ to give $him_{*i/j/k}$ the key.

Maclaughlin was mainly interested in investigating the interlanguage grammar of L2ers against three types of binding: type1 in which reflexive binding is restricted to local domains; Type2 binding in which domain closes off with the first finite clause; and Type3 binding in which a reflexive takes the entire sentence as a domain. Table (4.18) below provides detailed information about L2ers' performance with regards to the three types of binding.

Table 4.18 Participants' classification according to the three types of binding (Maclaughlin, 1998)

Groups	Type 1	Type 2	Type 3	Other
Controls (n=18)	18	0	0	0
Chinese (n=5)	3	1	1	0
Japanese (n=10)	3	6	1	0

Although the native language of participants was of Type3 binding and the target binding was Type1, 7 participants out of 15 developed Type2 binding. Maclaughlin (1998) found such a type of acquisition unexplainable. However, she argues that whatever type of binding L2ers develop, it is still UG constrained because all of the three types of binding discussed above are UG-constrained, and none of her participants allowed English reflexives to be bound outside these three domains.

If we consider the primary linguistic input a trigger for re/setting any parameter, what is the linguistic trigger that leads to such an intermediate grammar? In the discussions of reflexive binding and intermediate grammar, for example, Finer and Broselow (1986) discuss the possibility that their learners mis-analyzed biclausal infinitival sentences as in (4.25a) as monoclausal sentences so they considered the local antecedent as an object as in (4.25b). Since their learners were from a language that does not allow coreference between a long-

distance reflexive and a local object antecedent, they then allow long-distance binding of the reflexive to a subject antecedent in the matrix clause.

(4.25) a. Jack$_i$ advised John$_j$ [*PRO$_j$ to protect himself$_{*i/j}$*].
b. Jack$_i$ advised [*John$_j$ to protect himself$_{i/*j}$*].

Yuan (1994) also supports this view but he argues that intermediate binding is the result of direct transfer of L1 binding properties to L2. According to Yuan, it is possible that L2 learners have not recognized the big *PRO* in the sentences discussed above; they do not realize that *PRO* is controlled by *John*, since they think the overt NP *John* is case-marked by the matrix verb; therefore, the L2ers ruled out any correlation between a long-distance reflexive and an object antecedent. However, Maclaughlin (1995) refutes such claims and she points out such a view is against the theory of syntax. Moreover, if Yuan's claim was true, L2ers will reject any correlation between the matrix subject and a pronoun in the place of the reflexive in (4.25a) above. Maclaughlin (1995, 1998) found that adult L2ers allowed a pronoun in the place of the reflexive to be coindexed with the matrix subject which means L2ers know that they have biclausal sentence. Thomas (1989) also conducted a study on the interpretation of English reflexives by Chinese and Spanish speakers. Unexpectedly, she found the Spanish speakers developed the same sort of intermediate grammar although the binding properties of reflexives are similarly instantiated in English and Spanish. Thus, transfer alone cannot give a conclusive explanation for this type of intermediate binding.

To sum up, research on the interpretation of reflexives by adult L2ers has rendered contradictory results. Some researchers, on one hand, support the view that adult L2ers have full access to UG in the acquisition of reflexives while other researchers support the view that adult L2ers have indirect access to UG only via the L1. In keeping with the first, some researchers have found that adult L2ers develop a kind of interlanguage grammar which is different from the L1 and L2 binding grammars. However, there are methodological issues that prompt us to question these results.

It can also be noticed that the majority of the above mentioned positions based their judgments on a comparison between the performance of native speakers and adult L2ers, and they ignored a more fruitful field of comparison which is child/adult L2 acquisition that can show whether UG is operative in the interlanguage grammar of adult L2ers (Schwartz, 2003/2004). That is, if child and adult L2ers of the same L1, say Chinese, follow the same path of development in the acquisition of English reflexives, this indicates that UG is operative in the interlanguage grammar of adult Chinese-speakers L2ers of English.

The subsequent section will focus on the age factor in L2 acquisition of reflexives where comparisons between L2 children and L2 adults are highlighted. Although the discussion of the acquisition of reflexives by L2 children should have preceded that by adults, I reversed the order of discussion for two reasons: first, the

acquisition of reflexives by L2 children, as shown below, is under-researched in the literature. Second, this topic is the focus of my study so discussing it here leads to research questions and hypotheses.

4.3.2 Reflexive Binding and the Age factor in Second Language Acquisition

Although the topic of reflexive binding has undergone extensive investigation in adult L2 acquisition, it is under-researched in child L2 acquisition. According to my knowledge, as shown below, there are only two studies comparing the performance of child and adult L2ers in the acquisition of reflexives. If that is correct, this indicates that there is a research gap that needs to be bridged to reach conclusive results about access to UG in adult L2 acquisition. That is, if child and adult L2ers of the same L1 were found to follow the same path of development in the acquisition of reflexives, this indicates that all adult L2ers still have access to UG and the L1-L2 differences are due to L1 influence. This is because L2 children are assumed to still have access to UG (Schwartz, 2003). On the contrary, if child and adult L2ers of the same L1 were found to follow different paths of development in the acquisition of reflexives, with, for example, children scoring significantly higher than L2 adults, this indicates that child L2ers have access to UG while L2 adults do not. This section reviews the two studies which compared the performance of child and adult L2ers in the acquisition of reflexives.

The first study was conducted by Lee and Schachter (1997) who studied the acquisition of binding principles A and B from a maturational point of view. They conducted their study on a group of child and adult L2ers to investigate if there were sensitive periods for the principles and parameters of UG, namely Principles A and B of the Standard Binding Theory (Chomsky, 1986). They were mainly interested in three types of L2ers: (a) those whose sensitive periods are still open while acquiring the binding principles, (b) those whose sensitive periods are still open but have not reached the peak, and (c) those who have passed the sensitive period. 76 L1-Korean speakers acquiring English as their L2 participated in the study; participants who were divided into age groups ranged in age from 6;0 to 24;11 as shown in table (4.19) below:

Table 4.19 Age groups and number of participants (Lee and Schachter, 1997: 348)

	Number of participants in the group	Age range
A	16	6-7
B	15	8-10
	17	11-13
C	14	14-16
	14	17-24

All of the participants in the study, except the (6-7) group, had lived in the USA for a period of at least 3 years of constant residence by the time of the test. 12 out of 16 of the younger group (6-7) were born in the USA. However, they were not exposed to English until they went to school, namely at age 3. In addition, Korean

was the main means of communication for everyday life. 12 adults were recruited as a control group in the study.

The test battery was a truth-value-judgment-task adopted from Chien and Wexler (1990) where participants were shown a picture followed by a reflexive/pronoun statement as is shown in figure (4.1) below. Depending on their understanding of the picture, L2ers had to decide whether the statement was correct (choose YES) or not (choose NO). As for reflexives, the test included 36 items which were divided into 18 biclausal finite sentences and 18 biclausal infinitival sentences. In each subpart there were also three subparts: 6 items referring to local antecedent, 6 items referring to long-distance antecedents, and 6 items referring to external antecedents:

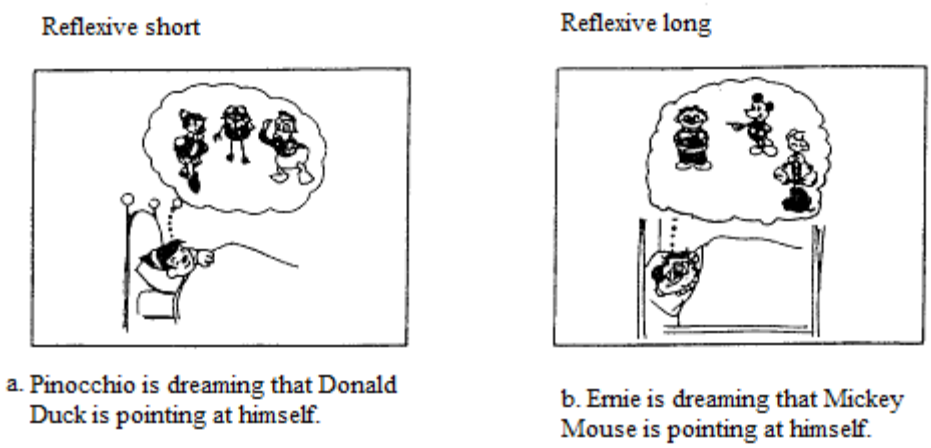


Figure 4.1 A sample of reflexive items used in Lee and Schachter (1997)

After a training session, most participants were met individually for one time only. However, participants in the (6-7) group who were tested in a series of two sessions to avoid fatigue. In the results, there was no significant difference between the types of clause (t =0.60, p>0.53). Table (4.20) below provides detailed information about different group responses.

Table 4.20 Correct responses of participants to test items (Lee and Schachter, 1997: 352)

Age Group	Local antecedent	Long-distance antecedent	Extrasentential antecedent
6-7	88.8	81.6	97.4
8-10	96.7	91.9	99.4
11-13	98.0	97.5	98.5
14-16	95.8	81.8	96.9
17-24	87.5	64.9	95.2
Control	100	99.3	99.3

These results, as Schachter and Lee (1997) argue, are contradictory to Johnson and Newport's (1990) results in which they found that a Critical Period for L2ers was characterized by a gradual decline in the ability to

acquire the locality of English reflexives with increased AoA. Figure (4.2) shows a curve line rather than a linear decline in the performance of Lee and Schachter's participants.

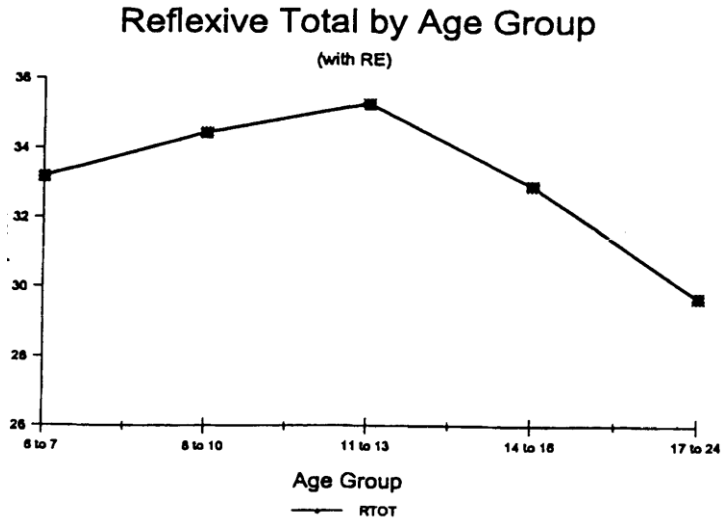


Figure 4.2 The relation between age of arrival (with equivalent exposure) and total correct scores on reflexives. (Lee and Schachter, 1997: 353)

Total results of trend analysis to the data for reflexive was significant ($F(1,73)=12.99$, $p<.001$). Thus the performance of middle learners, particularly (11-13) group, was better than the early and later learners. Based on these results, Lee and Schachter (1997) claimed that a sensitive period for principle A does exist between the ages 5 and 13. After that age, there will be a gradual decline in the ability to acquire the local binding of English reflexives.

However, we should be cautious in interpreting Lee and Schachter's (1997) results because of some methodological problems. Firstly, they did not use any proficiency test to compare the performance of different groups. Instead, they chose their participants on the condition of three-year continuous stay in the USA which does not entail the same exposure to the target language across individuals (Thomas, 1994), and consequently they might have compared the performance of participants of different proficiency levels. Secondly, the relatively low performance of the early participants could have been a result of the task used. It is highly possible that those children found the task difficult or uninteresting so their performance was lower than the middle arrivals. Lee and Schachter (1997) should have used a task, as will be discussed in chapter five, that takes into account the difference in working memory capacity between L2 children and adults (Unsworth, 2008). As such, if a suitable task was used, such as a game, it is highly possible that the gradual decline of the performance of their participants would have been similar to the one in Johnson and Newport's (1990) study. Finally, Lee and Schachter (1997) did not report on any individual results to see whether the overall performance of L2 participants was affected by the performance of individual cases or not.

Another important study that compared the performance of child and adult L2ers in the acquisition of L2 reflexives was by Lee (2005) who investigated the development of the acquisition of English reflexives by adult and child L1-Korean speakers L2ers of English. The main objective of the research was to test the assumptions of the Governing Category Parameter (Wexler and Manzini, 1987), particularly the claim that moving from a superset domain (Korean) to a subset one (English) causes a learnability problem. In other words, moving from a language that allows long-distance binding to a language that allows local binding causes a learnability problem because there is no evidence in the input to tell L2ers that the L2 does not allow long-distance binding. Also, the researcher investigated whether child and adult L1-Korean L2ers of English follow the same path of development in the acquisition of English reflexives. Korean is different from English in the fact that it allows both local long-distance reflexives such as *caki* 'self' in (4.26a) and local reflexives such as *caki-casin* 'himself' as in (4.26b):

(4.26) a. Tom$_i$-un [$_{IP}$ Peter$_j$-ka caki$_{i/j}$ lul cicihay-ssat]-ko malhay-ss-ta.
Tom-Top Peter-Nom self-Acc support-Pst-Comp say-Pst-Decl
"Tom said that Peter supported him/himself.

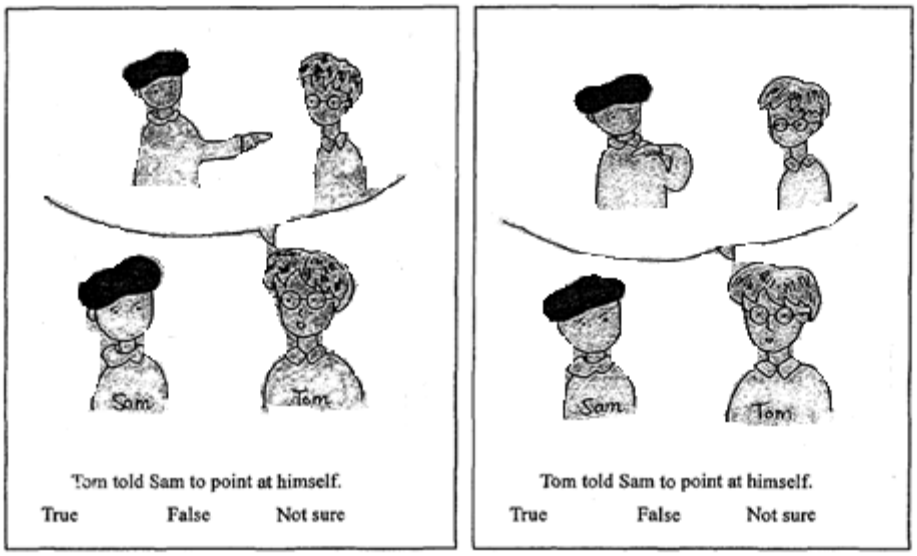
b. Tom$_i$-un [$_{IP}$ Peter$_j$-ka caki-casin$_{*i/j}$-ul cicihay-ssat]-ko malhay-ss-ta.
Tom-Top Peter-Nom self-Acc support-Pst-Comp say-Pst-Decl
"Tom said that Peter supported himself.

(Lee, 2005: 8)

As is shown in (4.26a), *caki* 'self' is a long-distance reflexive that can be bound by both *Peter* and *Tom*. However, *caki-casin* 'himself' in (4.26b) can be locally bound by only the local antecedent *Peter*, but not the matrix subject *Tom*. Lee (2005) conducted the study on 49 L1-Korean adults, 26 L1-Korean children and six native speakers of English as a control group. According to the results of a cloze proficiency test which was adopted from Brown (1980), adult L2ers were divided into three groups: low[9] (n= 16, proficiency score= 5-11), intermediate (n= 17, proficiency score= 12-24) and advanced (n=16, proficiency score= 25-46). As for children, a word-based Mean Length of Utterance proficiency test was administered to them and they were, as adults, divided into three groups: low (n= 17), intermediate (n= 16) and advanced (n= 16). Two versions of a picture truth-value-judgment task were administered to participants. The adult version was a booklet with different pictures of Sam and Tom (4.27) and three types of sentences (3 tokens each) is shown in (4.28):

[9] Top score was 50.

(4.27)



(Lee, 2005: 37)

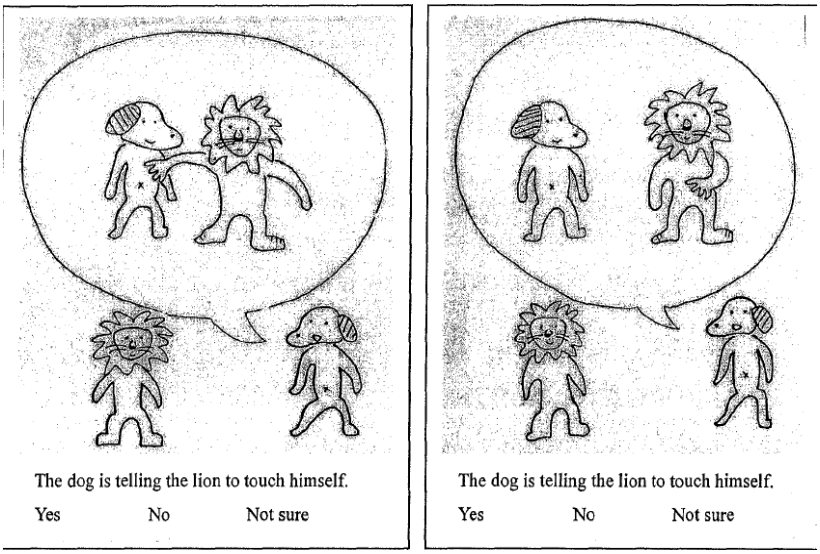
(4.28) **Type 1**. a reflexive in an embedded finite clause.
e.g., Tom_j said that Sam_i pointed at $himself_{i/*j}$.

Type 2. a reflexive in an embedded non-finite clause.
e.g., Tom_j told Sam_i to point at $himself_{i/*j}$.

Type 3. a reflexive with two possible NP antecedents.
e.g., Tom_j showed Sam_i a photograph for $himself_{i/j}$.

A total of eighteen items and twelve distractors (sentences with pronouns, e.g. Tom said that Sam talked about him.) were used in the adult version. As for the child version, the same sentence types were used, but the two characters werewere replaced with animals to make children more excited, as shown in (4.29). Also, the number of test items and distractors increased to 24 for each (48 in total):

(4.29)



(Lee, 2005: 37)

Adult participants were tested in groups where the experimenter conducted the test, which lasted 30-40 minutes. The children were tested individually, and the experimenter familiarized them with the test and the characters. Also, test items were shown to them in the booklet and read to them one-by-one by the experimenter. Before the actual test, one test item was tried with each child to see if they understood the test. During the test, the experimenter sometimes repeated and breaks were given when the need arose. The test lasted for about 20 to 60 minutes, depending on the child's cooperation. Table (4.21) shows the overall results of participants.

Table 4.21 Group results of accuracy from a picture-truth-value-judgment task (Lee, 2005)

		Type 1 %		**Type 2 %**		**Type 3 %**	
Groups	**Prof. level**	**Loc (Yes)**	**LD (No)**	**Loc (Yes)**	**LD (No)**	**Object (Yes)**	**Subject (Yes)**
Children	Low (n=17)	63	48	66.67	55.67	37	77.67
	Intermediate (n=16)	96	75	83.33	58.33	37.67	96
	High (16)	92.67	81.33	89	70.33	33.33	77.67
Adults	Low (n= 16)	85.33	35.33	29.33	21	52	48
	Intermediate (n= 17)	84.33	45	47	13.67	49	45
	High (n= 16)	81.33	52	58.33	33.33	29.33	68.66
Natives	NS (n= 6)	100	100	100	100	44.33	89

As shown in table (4.21), child participants at an advanced stage behaved native-like in type 1 and type 2. However, their performance in orientation[10] (type 3) was more L1-like (subject only) rather than like English which accepts both subject and object antecedents. Adult Korean participants, on the other hand, performed less native-like than child participants in type 1 sentences. Also, they unexpectedly, as Finer and Broselow's (1986) participants did, made a distinction between reflexives in finite and non-finite clauses which is different from the grammar of reflexive binding in both Korean and English, although it is still licensed by UG. Similar to Korean children, Korean adults preferred subject antecedents over object ones, which can be attributed to L1 influence. As for native speakers, they behaved as was expected in type 1 and type 2 sentences. However, three of them unexpectedly preferred subject antecedents over object ones while they were expected to accept both at the same level. Different from the majority of previous studies which ignored individual performance of participants; Lee (2005) looked at individual results and found out that individual performance of participants confirmed the group results. To start with adults, 27 participants showed native-like performance in locality, but 12 participants made finite/non-finite distinction and 38 participants showed L1-like performance in orientation. Similarly, the individual performance of child participants showed that the majority of them behaved native-like in locality, only three made finite/non-finite distinctions, and the these

[10] Orientation refers to the type of the antecedent whether it is a subject or an object.

children showed strong inclination to subject antecedents. Importantly, these three children were in the low proficiency level.

As for L2 acquisition development, Lee (2005) found that the results of adult participants support the Full Transfer/Full Access Model (Schwartz and Sprouse, 1994/96). That is, the low proficiency adults transferred the binding grammar of their L1-Korean to English; the intermediate adults passed through an intermediate interlanguage grammar where they made finite/non-finite distinction; and the advanced adults achieved native-like L2 performance. The developmental pattern of child participants, in contrast, did not match that of adults. Advanced children, as advanced adults, achieved native-like binding, but those who made finite/non-finite distinctions were in the low proficiency group, not the intermediate one. As far as orientation is concerned, no development was noticed on the part of L2 adults or children.

Despite the importance of Lee's (2005) study, many methodological problems can be noticed. First, two totally different versions of proficiency tests were used with participants. That is, a cloze proficiency test with adults and a word-based Mean Length of Utterance test with children, which means that Lee very likely did not compare the right children with the right adults. For example, advanced children were not comparable to advanced adults because the advanced learners in the adults' test were advanced according to the criteria of the test used, while the advanced children in the children's test means advanced according to the sample chosen. Second, Lee claimed that she was interested in testing whether L2ers have access to UG or not, but what she tested was the acquisition of local binding rather than access to UG in L2 acquisition. In other words, if we want to know whether L2ers have access to UG in the acquisition of reflexives, we should investigate whether L2ers allow grammars that UG prohibits. That is, we should investigate whether L2ers have knowledge of c-command as a requirement for reflexive binding, and whether they disallow binding of reflexives by long-distance object antecedents. In fact, it is difficult to include test items for these two properties in the task that Lee used. Instead, she should have used another type of task, say a game, which allows inclusion of such test items. Third, we do not know whether Lee's participants, especially L2 adults, allowed long-distance binding of reflexives because they transferred the grammar of the L1, or because they misinterpreted English reflexives as pronouns. Lee included pronoun sentences in the task as distractors, but she did not report on any results about the pronoun items. Fourth, Lee used more items (48) in the children task than adults' version (30).

To conclude this section, two views can be summarized. The first view supports the claim that there is a sensitive period for the acquisition of L2 reflexives; that child L2ers are better than adult L2ers in the acquisition of reflexives. The second view supports the claim that L2 children are different from L2 adults in that adult L2ers pass through developmental stages in the acquisition of reflexives while child L2ers do not. However, both studies have some methodological problems that need to be avoided in any future research on the topic.

4.3.3 Conclusion

Regarding all the L1 and L2 reflexive studies which have been discussed in this chapter and the previous one, we can summarize them as follows:

L1 Acquisition:

- L1 children usually demonstrate early knowledge of principle A. In studies on English, this knowledge normally starts to become apparent at age 2;6, and then it passes through developmental stages till children approach adult-like grammar at age 6;6 (Wexler and Chien, 1985; Chien and Wexler, 1990; McKee, 1992; McDaniel *et al*, 1990).
- For L1 children's acquisition of domain, tensed embedded clauses are easier than infinitival clauses. Thus, children may make tensed/infinitival distinction which is related to processibility issues (Solan, 1987).
- L1 children might confuse reflexives with pronouns and allow long-distance binding until they know that the lexical item is an anaphor or a pronoun (Wexler and Chien, 1985; Chien and Wexler, 1990; McKee, 1992; McDaniel *et al*, 1990).

L2 Acquisition:

- In the acquisition of reflexives, adult L2ers appear either to acquire the binding of the target grammar, transfer the L1 binding, or develop an intermediate grammar (Finer and Broselow, 1986; Thomas, 1989, 1995; Bennett, 1994; Maclaughlin, 1998; Yip and Tang, 1998; Yuan, 1998; Al Kafri, 2008; among others).
- There is a sensitive period for the acquisition of reflexives in L2 acquisition. L2 children (age range 11-16) demonstrate good knowledge of binding principle A. This knowledge passes through developmental stages and reaches the peak at age range 11-13, and then this ability is negatively correlated with increasing age (Lee and Schachter, 1997).
- Child and adult L2ers do not follow the same path of development in the acquisition of reflexives although both of them have access to UG. Also, some aspects of L1 (orientation) might have a strong effect on the acquisition of L2 reflexives (Lee, 2005).

The majority of L2 research on the acquisition of reflexives has mainly been conducted on L2 adults. Only two studies, according to my knowledge, have compared the performance of child and adult L2ers in the acquisition of reflexives. However, there are various methodological problems in these two studies and others, showing that one should be cautious in drawing any conclusions. I have shown that there was a problem in the proficiency tests and tasks used in the two child-adult studies. Also, neither of them investigated three very important issues in the acquisition of reflexives: namely the c-command constraint, prohibition of long-distance object antecedents and syntactic difference between reflexives and pronouns. Hence, they did not

investigate whether child and adult L2ers' binding grammar was UG-constrained. What researchers did was that they investigated if their participants were able to reset their parameters and acquire the local binding domain of English reflexives.

Conducting a study that compares the performance of child and adult L2ers in the acquisition of reflexives is very important because findings of such a study can cast new light on the on-going debate of adults' access to UG. That is, if child and adult L2ers of the same L1 were found to follow the same path of acquisition, such findings would support the view that adults have access to UG in L2 acquisition. However, if child L2 learners outperform adult L2ers in the acquisitions of reflexives, such results would support the view that adult L2ers do not have access to UG.

Under the assumptions of Domain-by-Age-Model (Schwartz, 2003) discussed in chapter two, child and adult L2ers of the same mother tongue are expected to follow the same line in the acquisition of syntax. As such, child and adult L2ers are expected to follow the same path in the acquisition of reflexives. To test the predictions of Domain-by-Age-Model, we will look at the results of a study of the interpretation of English reflexives by child and adult L1-Chinese and L1-Arabic speakers acquiring English as their L2. The choice of L1s is based on very important considerations; first, properties of reflexives are similarly instantiated in English and Arabic in terms of local domain and subject/object orientation while properties of Chinese reflexives are different, in that, Chinese allows both local and long-distance reflexives and subject orientation only for long-reflexives.

The study was conducted on learners who were immersed in English at the time of testing. All of the participants in my study had been living in the United Kingdom for at least two years when they were tested. Issues related to participants' selection will be discussed in detail in chapter five.

4.4 Research Questions and Hypotheses

Based on the results of the studies discussed above, this study addressed the following research questions:

(4.30)

1- Will L2ers apply UG constraints in second language acquisition?

2- Will L2ers reset their binding parameter to the values of the local binding of English reflexives?

3- Will L2ers differentiate between the syntactic properties of lexical items?

4- Will there be any difference between child and adult L2ers in the acquisition of English reflexives? (With respect to 1, 2 and 3.)

According to these research questions, we have the following hypotheses formulated:

(4.31)

- **Research question 1**:

  All L2ers will apply UG constraints when they acquire English reflexives so they:

  a. Will apply c-command as a constraint on reflexive binding.
  b. Will not allow English reflexives to be bound by long-distance object antecedents.

  If not:

  All L2ers will not apply UG constraints when they acquire English reflexives so they:

  a. Will not apply c-command as a constraint on reflexive binding, and they develop a linear order strategy.
  b. Will allow English reflexives to be bound by long-distance object antecedents.

- **Research Question 2:**

  L2ers will reset their binding parameter to the values of the local binding of English reflexives so they allow only local binding of reflexives in biclausal finite and non-finite sentences.

  If not:

  L2ers will not reset their binding parameter to the values of the local binding of English reflexives and they either allow English reflexives to be bound by long-distance antecedents in biclausal finite and non-finite sentences, or they make finite/non-finite distinction between domains.

- **Research Question 3:**

  L2ers will differentiate between the syntactic properties of English reflexives and pronouns.

  If not:

  L2ers will not differentiate between the syntactic properties of English reflexives and pronouns.

- **Research Question 4**:

  There will be no difference between child and adult L2ers in the acquisition of the local binding of English reflexives.

If not:

Child L2ers will outperform adult L2ers in the acquisition of the local binding of English reflexives.

The following chapter discusses the methodology of the study.

Chapter 5. Methodology

5.1 Introduction

This chapter provides detailed information about the experimental design of this study which aims to investigate the interpretation of English reflexives by non-native speakers. The order of subsequent sections is as follows: section one presents detailed information about the participants involved in the experiment. Section two provides information about the materials used in the study: a proficiency level test and a Simon-Says game. The third section describes the procedure of the study, showing how the experiment was carried out. Finally, the fourth section provides information about scoring and data analysis for both the proficiency level test and Simon-Says game. Before we proceed, we will remind the reader of the four research questions that were posed at the end of the chapter three:

(5.1)

1- Will L2ers apply UG constraints in second language acquisition?

2- Will L2ers reset their binding parameter to the values of the local binding of English reflexives?

3- Will L2ers differentiate between the syntactic properties of lexical items?

4- Will there be any difference between child and adult L2ers in the acquisition of English reflexives? (With respect to 1, 2 and 3.)

5.2 Participants

The participants in this study were from two mother tongues, Arabic and Chinese, and learners in both groups were acquiring English as their second language. The choice of these two languages was very important for comparative reasons. As was discussed in previous chapters, Arabic and English have the same grammar of reflexive binding in terms of domain and orientation. Chinese, in contrast, differs from English in the choice of domain and antecedents. Thus, the results of the present study will present a possible answer to the question of UG access in second language acquisition. That is, if L2ers whose mother tongue is Arabic achieve native-like acquisition of English reflexives while the Chinese participants do not. Such hypothetical results support the view that L2ers have indirect access to UG via the transfer of L1 instantiated parameters of UG. However, if both L2ers, Arabic and Chinese, achieve native-like acquisition of English reflexives, such results will support the view that L2ers have full access to UG irrespective of their L1.

In addition to L1-based differences between the experimental groups, there is the age difference as well. Participants of this study are of two age groups: children and adults. Figure (5.1) is an outline of the distribution of participants according to age, L1 and L2:

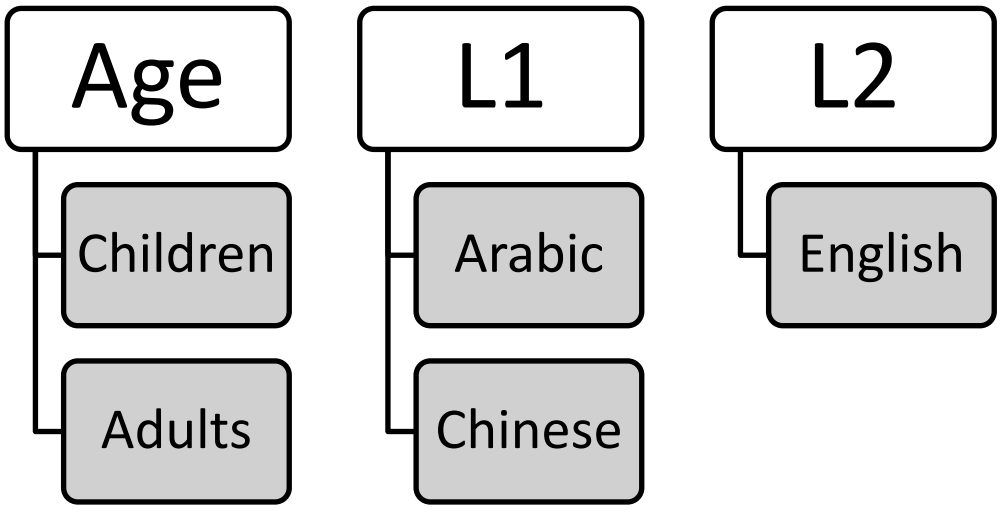


Figure 5.1an outline of participants according to their age, L1 and L2

Child L2 acquisition, as discussed in chapter two, is a subject of controversy in the field of L2 acquisition. There exist many views on how to define L2 children, and these definitions are based on the starting point of decline in ultimate acquisition. According to various researchers, decline starts at 5 years (Krashen 1973), 7 years (Dekeyser, 2000; Johnson and Newport, 1989), 8 years (Bialystok and Miller 1999), and puberty (Lenneberg 1967). In this study, the definition of L2 children and L2 adults proposed by Unsworth (2005: 7) is adopted[11]:

(5.2)

> **L2 Child:** A non-native acquirer whose initial exposure to the target language is between the ages of four and seven years.
> **L2 adult:** A non-native acquirer whose initial exposure to the target language is at an age eight or older.

The age difference within each experimental group is as important as the mother tongue difference. Since there is general consensus on the availability of UG to L2 children (Schwartz, 1992/2004; Unsworth, 2005/2008), a comparison between child and adult participants might cast new light on the on-going debate of UG availability to adult L2ers (Schwartz, 1992). As far as this study is concerned, similarities/differences between Arabic-speaking children and adults on one hand, and Chinese-speaking child and adult participants on the other hand, would be informative.

[11] The reason for this choice goes back to Unsworth's (2005) discussion which shows that most grammatical principles of the L1 are in place by the age of four, and children who started L2 acquisition before the age of eight were found to be in the range of native-speakers.

This study involved 90 participants who were divided into six experimental groups: Arabic-speaking children (n= 15), Arabic-speaking adults (n= 15), Chinese-speaking children (n= 15), Chinese-speaking adults (n= 15), a control group of child native speakers of English (n= 15), and a control group of adult native speakers of English (n= 15). All of the participants were living in the United Kingdom at the time they were tested. As is shown in table (5.1) below, child L2 participants were still children when they started acquiring English as their second language because their age of onset (5 to 7) is within the age range posed in that definition mentioned above. All of these children were living in different parts of the UK (Newcastle upon Tyne, Colchester and Leeds), and they were having formal English instruction at school. Adult L2 participants were also from these parts of the UK, and all of them were university students pursuing their university degrees. All of them were adults (older than 16 years) when they started acquiring English as their second language. English control participants were also living in Newcastle upon Tyne at the time of test. Participants of the child control group were receiving formal education at school by the time of test. Thirteen participants of the adult control group were students at Newcastle University while the other two English adults were students at Newcastle College. Table (5.1) presents background information on participants with regards to age, years of English instruction and length of residence (henceforth, LOR) in the UK.

Table 5.1 Background information on participants

L1	Group	Mean Age (years) (SD)	Mean Years of English instruction, (SD)	Mean Length of Residence (LOR) (years) (SD)
Arabic	Adults (n=15)	24.40 (5.72)	12.96 (4.68)	2.06 (.46)
	Children (n=15)	9.39 (1.51)	2.67 (.78)	2.51 (.45)
Chinese	Adults (n=15)	23.68 (2.55)	10.60 (3.24)	2.33 (.48)
	Children (n=15)	9.40 (1.08)	4.36 (1.23)	2.76 (.41)
English	Adults (n=15)	22.75 (3.46)	N/A	N/A
	Children (n=15)	9.60 (1.19)	N/A	N/A

As is shown in table (5.1), child groups are of the same mean age and adult groups are of the same mean age too. The mean age of English children (9.60 years) is close to the mean age of Arabic-speaking children (9.39 years) and Chinese-speaking children (9.40 years). An independent t-test shows that there is no significant difference between the mean ages of Arabic-speaking children, Chinese-speaking children and English children (t = .177, df(2), p > .915). Table (5.1) also shows that Adult participants have also a close mean age (24.40 years for Arabic-speaking adults, 23.68 years for Chinese-speaking adults and 22.75 for English adults). Such closeness is confirmed by the results of an independent t-test which shows that there is no significant difference between the mean ages of Arabic-speaking adults, Chinese-speaking adults and English adults (t = 1.141, df(2), p > .565).

Table (5.1) also shows that the years of English instruction that L2 groups received vary. While the mean years of English instruction for Arabic-speaking children is (2.67 years), nearly the double of this mean can be found in the case of Chinese-speaking children (4.36 years). Results of an independent t-test show that

there is significant difference between the mean of English instruction for Arab-speaking children and that for Chinese-speaking children (t = 4.479, df(28), p < .001). Such a significant difference will be discussed in the results chapter to see if there is any correlation between the performance of child L2 groups and the English instruction they received. Adult L2 groups, on the other hand, do not have such large difference (12.96 years for Arab adults and 10.60 years for Chinese adults), where results of an independent t-test show that this difference is not significant (t = 1.253, df(28), p > .220). As for mean length of residence (LOR) in the UK, all L2 groups have nearly the same LOR (around 2 years) in the UK. In this regard, results of an independent t-test show that there is no significant difference between the mean LOR for Arabic-speaking children and Chinese-speaking children (t = 1.612, df(28), p > .118), and there is also no significant difference between the mean of LOR for Arabic-speaking adults and Chinese-speaking adults (t = 1.725, df(28), p > .095).

To conclude this section, the mean age of child groups is nearly identical as is the case with the mean age of adult groups. Also, mean LOR in the UK for all L2 groups is nearly identical. While the mean years of English instruction is identical for adult L2ers, it varies for child L2ers. Overall, L2 participants in this study are comparable in terms of age and mean LOR in the UK. These observations will be discussed in the light of proficiency scores in chapter six.

5.3 Materials

Two types of materials were used in this study. The first one was to determine participants' proficiency level of English, and the second was a Simon-Says game which was used to test participants' interpretation of English reflexives.

5.3.1 Proficiency Level Test

One of the main difficulties in this study was to decide the proficiency level of child participants. According to Thomas (1994), L2ers' proficiency level is usually measured in four different ways: impressionistic judgment, institutional status, standardized tests, and in-house assessment instruments. Impressionistic judgment is a subjective judgment which depends on the impression that the researcher has about the participant's proficiency level (Thomas, 1994). Such a test cannot be applied in this study because we have different participants of different age groups: children and adults. Moreover, length of residence cannot equate to similar exposure to the target language because people vary in their exposure to the target language (Thomas, 1994). Institutional status cannot also be used to decide the proficiency level of the participants because we have two different age groups at different types of institutions. If we had had either children or adults in this study, it would have been possible to use this way of deciding proficiency. Although institutional status saves time and effort when it is used to determine proficiency, one should be cautious because "institutions greatly differ in the standards by which they assign a given status to individuals, and with the rigidity with which those standards are maintained" (Thomas, 1994: 417). For these reasons, standardized tests, such as the Oxford Quick Placement Test, are commonly used to determine the proficiency level of participants in L2

acquisition. Such tests have gained high validity and reliability in second language research, as they allow researchers to generalize their results to people outside the sample. Despite the obvious advantages of standardized tests, they are criticized for their emphasis on the learner's application of rules and metalinguistic knowledge (Unsworth, 2008), for example, the majority of standardized tests focus on inflectional morphology which triggers metalinguistic knowledge on the part of adults. Also, standardized tests always measure L2ers' proficiency against "a typical native speaker knowledge" and they do not consider Interlanguage Grammar which has gained a general consensus in second language acquisition as discussed in chapter two (Thomas, 1994). Due to these disadvantages, standardized tests cannot be applied when we measure children's proficiency level because they focus on metalinguistic knowledge, and children differ from adults in this regard (Unsworth, 2008). The only option left to use is in-house assessment instruments. Thomas (1994: 322) argues that an in-house test "has the advantages that if all participants are tested uniformly, proficiency within the sample may at least have internal consistency and subgroups may be compared with respect to proficiency on some rational basis." To ensure that the proficiency level is highly controlled and the right children are compared with the right adults, an in-house assessment instrument was felt to be the best proficiency measure test in this study. This type of test can indicate L2ers' implicit knowledge irrespective of their age, native language, education, type of exposure and their educational background because L2ers usually follow the same route of development in their acquisition of the target language (Hawkins, 2001).

As an in-house test was the most suitable proficiency measurement test in the present study, a picture description task was adopted from Lee (2005) who adopted it from Whong-Barr and Schwartz (2002). This task is based on the accuracy and complexity of the L2ers' language during their description of set of pictures. L2 participants were shown six pictures of the Simpsons Television Family, and they were asked to describe these pictures (See Appendix E). Analysis of proficiency results will discussed in detail in (5.5.1).

5.3.2 Simon-Says Game (see Appendix A)

Choosing a suitable task to study reflexives was another difficulty facing the progress of this study. The majority of studies that reported on the interpretation of reflexives in L2 acquisition have been, according to my knowledge, conducted on adult participants (Finer and Broselow, 1986; Bennett, 1994; Thomas, 1995; Maclaughlin, 1998; Yip and Tang, 1998; Yuan, 1998; Al-Kafri, 2008). If this claim is true, this study will be one of the few studies in the literature of reflexive interpretation in L2 acquisition conducted on child and adult L2ers. Therefore, finding a task which suits both age groups was a great challenge. As Unsworth (2008: 8) points out "the chosen experimental methods should not be too cognitively challenging for the younger subject, nor, on the other hand, should they be too easy for the older subjects." Unsworth argues that two options are available in this case. The first one is to tailor particular tasks based on the cognitive abilities of L2ers. This means having two different versions of the same task: the child version which considers the memory capacity and metalinguistic knowledge of children, and an adult version which also considers these

factors as well. The second option "would be to ensure that the target grammar (henceforth, TL) property which is being tested is sufficiently sophisticated to ensure that metalinguistic knowledge cannot be applied." (Unsworth, 2008: 9).

If we choose the first option, it would be problematic for many reasons. First of all, such a procedure needs careful piloting and validation because different factors can play a role in the results of each task. Second, if we have two versions of the same task, it adds another variable to the comparison of results which in turn makes the interpretation of results difficult (Unsworth, 2008). In contrast to the first option, the second option seems reasonable, at least in this study. The target property which is being investigated in this study meets the condition that Unsworth assumed. Reflexive interpretation is a sophisticated property because it does not involve obvious grammatical rules or metalinguistic knowledge. Reflexive binding, as discussed in previous chapters, is one instance of the poverty of stimulus which is a central argument in the field of L2 acquisition. Thus, using an easy task with adults will be less problematic in this study. Importantly, the task should not be test-like nor similar to quizzes neither should it involve any writing or reading when children are tested. It should avoid the application of metalinguistic knowledge as much as possible. Also, it should attract children and engage their interest in the task.

Taking the aforementioned points into account, I started to look for a workable task in the literature of reflexive interpretation in second language acquisition. A truth-value-judgment task was used first. This task was designed by White, Bruhn-Garavito, Kawasaki, Pater and Prévost (1997) in a study which they conducted on adult L2ers. The task battery is a booklet with 48 pictures. Each page contains a picture and the picture is followed by a sentence about the picture. The participants were asked to say whether the sentence was TRUE or FALSE, depending on his/her understanding of the picture. The task contained a variety of different structures, such as biclausal finite sentences, biclausal non-finite sentences and mono-clausal sentences. Figure (5.2) below is an example of the pictures used in the test.

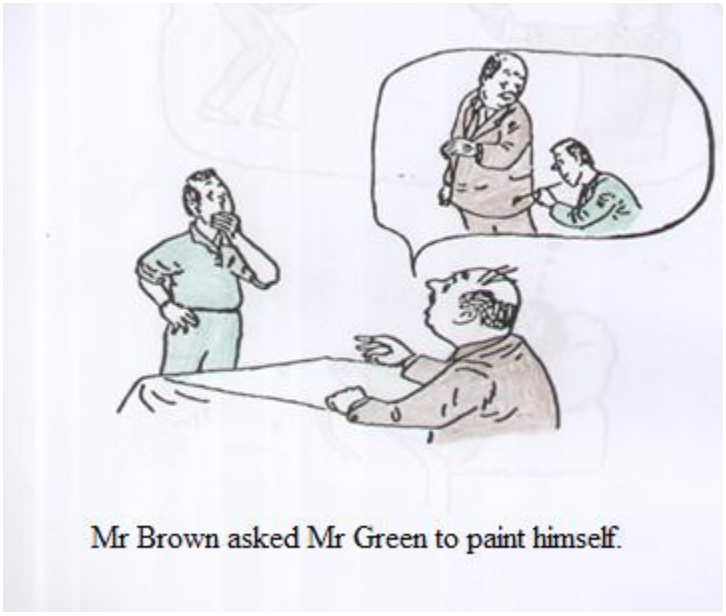


Figure 5.2 Truth value judgment task (White *et al.*, 1997)

As is clear in figure (5.2), the task mainly involved two characters: Mr. Green and Mr. Brown. Each character was coloured accordingly. So if the participant understands the picture, s/he will say the sentence is FALSE because *Mr. Brown asked Mr. Green to paint him* is the correct answer. In addition to the 48 pictures in the booklet, there were three practice pictures in the first three pages of the booklet.

I piloted the test on two Arabic-speaking children who were not included in the main study group. The first one was 8 years old, and she had 3 years of exposure to English in the UK. The second child was 7 years old, and he had 2 years of exposure to English in the UK. Surprisingly, I got a bias in the children's responses. The first child answered all of the sentences as TRUE, while the second child answered all of them as FALSE. Also, during the test, I noticed that the children were not interested in the test at all, and they were trying to go and play in the middle of the test.

Having got these results, I decided to look for another test which would engage children. I then came across a study conducted by Chien and Wexler (1990) who used a Simon-Says game to investigate the interpretation of English reflexives by L1 children. I found the idea appealing and developed a similar game which I called the *Simon-Says Game* (see Appendix A). What I exactly adopted from Chien and Wexler (1990) was the idea of the experimenter and participants play a game, but all the test sentences were original. The game was a Simon-Says-Act-out task that involved three people: the main participant, one of his/her parents[12], and the researcher. It involved 48 sentences which investigated sentence structures as example (5.3) shows:

[12] When the participant was a child, one of the parents participated in the experiment. In the case of adults, one of my colleagues took over the role.

(5.3)

1. Biclausal Finite:

a. Biclausal finite reflexive
   $Simon_j$ says $Jack_i$ should point to $himself_{i/*j}$.
b. Biclausal finite pronoun
   $Simon_j$ says $Jack_i$ should point to $him_{*i/j}$.

2. Biclausal non-finite:

a. Biclausal non-finite reflexives
   $Simon_j$ wants $Jack_i$ to give $himself_{i/*j}$ a car.
b. Biclausal non-finite pronouns
   $Simon_j$ wants $Jack_i$ to give $him_{*i/j}$ a car.

3. Long-distance object antecedents:

a. Long-distance object antecedent reflexive
   $Simon_k$ tells $John_j$ that $Jack_i$ should give $himself_{i/*j/*k}$ a cookie.
b. Long-distance object antecedent pronoun
   $Simon_k$ tells $John_j$ that $Jack_i$ should give $him_{*i/j/k}$ a cookie.

4. Possessive structures:

a. Possessive structure 1
   $Simon_k$ says Sam_j's son_i should give $himself_{i/*/*k}$ a ball.
b. Possessive structure 2
   $Simon_k$ says the son_j of Sam_i should give $himself_{*i/j/*k}$ a ball.

Participants were expected to respond according to their understanding of the game. For example, when the experimenter said a sentence such as (2a), if the participant had knowledge of reflexives, s/he was expected to give the car to himself/herself, not to *Simon* (more details are discussed in 5.4).

As shown (5.3), the expressions used in the task were very simple (e.g. *give*, *touch*, *point to*, *cookie*, *ball* and *car*) to avoid any misunderstanding and ambiguity on the part of L2ers. The task consists of four types of structures: (1) biclausal finite sentences, (2) biclausal non-finite sentences, (3) long-distance object antecedents and (4) possessive structures. Figure (5.2) is an outline of the structures used in the Simon-Says game:

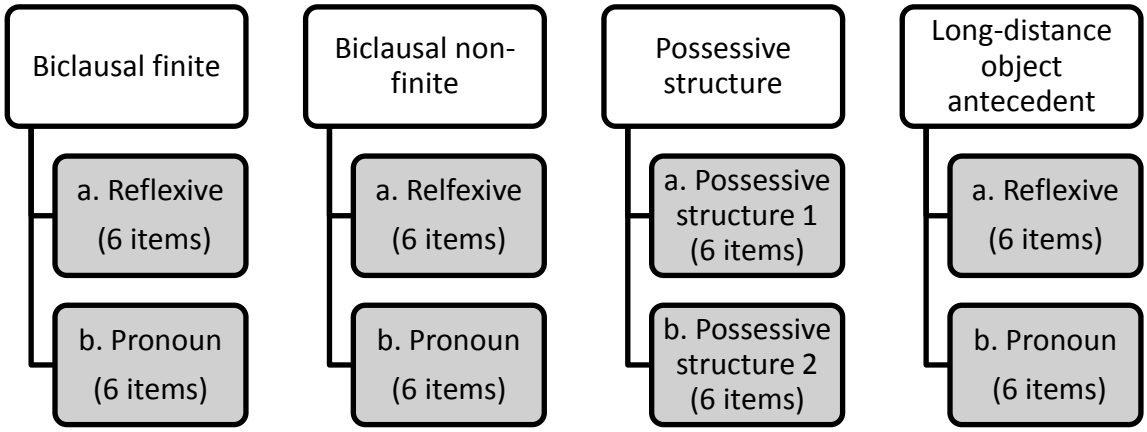


Figure 5.3 an outline of the Simon-Says game

As is shown in the figure, each structure has two conditions (*a* and *b*). Condition (a) of biclausal finite structure, biclausal non-finite structure and long-distance object antecedent structure addresses a reflexive sentence, while condition (b) addresses a pronoun sentence. There were six items of each condition which means that there were 36 items comprising of three structures. The test included pronoun sentences to see whether L2ers knew that they were dealing with reflexives and if they knew the difference between the lexical properties of the two items. Also, the pronoun sentences were incorporated to the task to test the claim proposed by Yuan (1994) who claimed that L2ers allow long-distance binding of English reflexives because they misinterpret reflexives as pronouns. In addition to these three structures, the task also includes six items of possessive structure 1 and six items of possessive structure 2 to see whether L2ers had knowledge of c-command as a constraint on reflexive binding. The Simon-Says game in total included 48 test items.

The structures and conditions in the task were carefully chosen to address the four research questions mentioned in (5.1) above. To start with research question (1), long-distance object antecedents (reflexives), possessive structure 1 and possessive structure 2 were used to see whether L2ers obeyed UG constraints on reflexive binding or not. In other words, the aim of including these structures was to see whether L2ers show knowledge of c-command and prohibit binding of reflexives by long-distance object antecedents. As for research question (2), biclausal finite reflexive structures and biclausal non-finite reflexive structures were used to see whether L2ers know that English allows only local binding of English reflexives. Research question (3) was answered by comparing between the performance of all groups in biclausal finite reflexive structures, biclausal non-finite reflexive structures and long-distance object antecedent (reflexive) structures with their performance in biclausal finite pronoun structures, biclausal non-finite pronoun structures and long-distance object antecedent (pronoun) structures, respectively. To put it differently, the aim was to know

whether L2ers knew that they were dealing with both reflexives and pronouns. Finally, research question (4) can be answered by comparing between the performances of child and adult groups of the same L1 in all structures. The aim behind such a comparison was to see whether child and adult L2ers of the same L1 were at the same stage of acquisition.

This task was piloted on 10 participants[13] who were divided into five groups in total: one Arabic-speaking child group (n=2), one Chinese-speaking child group (n= 2), one Arabic-speaking adult group (n=2), one Chinese-speaking adult group (n=2), and one English control group (n=2). As the game proceeded, all participants, children and adults, showed interest in the game and did not find any difficulty in understanding the items of the task. Therefore, the task was used as the main task for data collection from both child and adult groups.

5.4 Procedure

The study was conducted via individual meetings with the participants. The majority of meetings were held at participants' homes. However, some meetings were held at Newcastle University, Essex University and Leeds University. The researcher was careful to have a quiet environment while the experiment was going on. Once the parties involved met, the project was described to the participants (or his/her parents), and they were handed a copy of the project description (see Appendix B). Upon their agreement to participate in the study, a written consent form was signed by both the researcher and the participant or one of his/her parents (see Appendix C), and background information was taken from the participant by filling in a participant profile form (see Appendix D).

The test started with about 8 to 10 minutes recording for each participant to decide his/her proficiency level in English. Using an Olympus digital voice recorder, each participant was shown six pictures of the Simpson Family cartoon (see Appendix E), and the conversation concentrated on what they could tell about those pictures. The choice of pictures was very important to engage children in all stages of the study and not make the study look like a traditional test. Since the Simpsons is a popular TV show, children were very interested in talking about the characters and what they were doing in the pictures. During their description of the pictures, children sometimes were excited and they started to sing some of the songs of the Simpsons. The researcher tried to discuss various topics with the participants when they were describing pictures of the Simpsons. For example, when a participant was shown the picnic picture, there was a discussion about when and where was the last picnic that the participant made. Another example was when the participant was shown the birthday party picture, there were questions about the participant's culture and the traditions of a birthday party there.

[13] The results of these participants were not included in the results of the main study.

Once the proficiency test finished, the Simon-Says game started. First, five practice sentences were tried out to avoid any misunderstandings during the game and to make sure that the participants were familiar with what they were going to do in the game. Example (5.4) shows the five practice sentences used in the test.

(5.4)

a. Simon says Jack should touch John.
b. Simon wants Jack to touch John.
c. Simon tells Jack that John should point to Simon.
d. Simon says Sam's son should point to Simon.
e. Simon says the son of Jack should touch Simon.

As is shown in (5.4), the practice sentences cover all types of structures which were used in the study. Importantly, the practice sentences did not include anything related to the target of the study, reflexive interpretation, to avoid any linguistic awareness on the part of the participant. If the participant did not understand any structure in the practice sentences, they were explained to him/her.

In the game, three participants (the main participant, one of his/her parents, and the researcher) needed to be present depending on the gender of the main participant to avoid gender cues in the questions. In other words, the participant could simply figure out the antecedent of the reflexive by relating the gender of the reflexive (e.g. himself, herself) to the gender of the antecedent (John, Mary, he, she). Therefore, if the main participant was female, the other two characters needed to be female, too. On the other hand, if the main participant was male, the other two characters should be male too. Also, one of the two secondary participants needed to be one of the parents of the main participant because parents were involved in possessive structures 1 and possessive structures 2. However, in the case of adult participants, their parents were usually not present so one participant took over that role. All the materials which were required for the game, such as cars, balls, cookies, were on a table in front of the three participants.

Since the game was a comprehension act-out task, responses of the participants were considered correct if they behaved correctly in the game. For example, once the participant hears a sentence such as in (5.5), he should point to himself, not to *Simon* (i.e. the researcher). If the participant pointed to *Simon*, his/her response was considered incorrect.

(5.5) Simon_j says Jack_i should point to $\text{himself}_{i/*j}$.

Responses were either correct or incorrect. However, there was more than one possibility for correct/incorrect responses as is shown in (5.6):

(5.6) a. Simon_k tells John_j that Jack_i should give $\text{himself}_{i/*j/*k}$ a cookie
b. Simon_k tells John_j that Jack_i should give $\text{him}_{*i/j/k}$ a cookie

As is shown in (5.6a), the incorrect response can be either Simon or John. Therefore, if the participant in a structure such as (5.6a) gave the cookie to *Simon* or *John*, his/her response was considered incorrect. However, if the participant in (5.6b) gave the cookie to *Simon* or J*ohn*, his/her response was considered correct. Answers were written down one-by-one by the researcher on a separate answer sheet (see Appendix F).

5.5 Scoring and Data Analysis

This section provides information about the scoring and analysis of materials used in the test. There will be an analysis of the picture description data first, and then, there will be an analysis of the data of the Simon-Says game.

5.5.1 Analysis of the Level Proficiency Test

L2ers' proficiency was mainly determined by the analysis of the accuracy and complexity of their language during the description of the aforementioned Simpson pictures. As noted above, the proficiency test was adapted from Lee (2005)[14]. The test depends on an analysis of the utterances produced by L2ers. The definition of an utterance adapted in Whong-Barr and Schwartz (2002) was adapted in this thesis. That is, an utterance is "a clause with a 'unified' predicate (unified in that it expresses a single activity, event, or state)" (Whong-Barr and Schwartz, 2002: 610)[15]. In this test, the complexity measure is a word-based Mean Length of Utterance (henceforth, MLU) which is calculated by dividing the total number of words by the total number of utterances. The accuracy measure, on the other hand, was calculated by dividing the total number of utterances to the total number of error-free utterances. As Whong-Barr and Schwartz (2002) point out, errors are of three types: syntactic, morphological and lexical. For example, in (5.7) Chinese adult 10 (CA10) had a lexical error where s/he said *learning* instead of *teaching*. Chinese child 8 (CC8), in contrast, produced an error-free utterance.

(5.7) a. CA10: The mother is learning her daughter how to swim.
b. CC8: The mum is teaching her daughter how to swim.

If any utterance contained any of the three errors mentioned above, it was not counted as an error-free utterance. However, child and adult participants sometimes produced clauses with ellipsis such as (5.8) that were produced in response to a question: *what do you see in the picture*?

(5.8) Arab Child 2 (AC2): a river.

Following Whong-Barr and Schwartz (2002), such clauses without a predicate were considered an utterance.

[14] Lee (2005) adopted the test from Whong-Barr and Schwartz (2002) who argue that the accuracy and complexity of L2ers' language is the best indicator of their proficiency level
[15] Whong-Barr and Schwartz (2002) adapted this definition from Slobin (1993).

To make the accuracy and complexity measures comparable, the accuracy measure was multiplied by 10, and the two measures were normalized by multiplying the complexity measure by the ratio of ranges which was calculated by dividing the range of accuracy measure to the range of complexity measure (Lee, 2005). Following these mathematical steps, the proficiency score was obtained by the following formula:

(5.9) Proficiency Score (P) = Accuracy Measure + (Complexity Measure *Ratio of ranges)

The proficiency score of Arab Adult 1 (AA1) is explained here as an example. First, the total number of words, total number of utterances and total number of error-free utterances were (402), (55) and (30), respectively. The complexity measure was calculated by dividing the total number of words to the total number of utterances (402/55= 7.31), and then the accuracy (percentage %) was calculated by dividing the total number of error-free utterances by the total number of utterances [(30/55)*100) = 54.55]. The accuracy is then normalized by multiplying it by 10 to derive the accuracy measure (54.55*10= 5.45). Since the ratio of ranges in this study was (1.117), proficiency score for this participant was [5.45 + (7.31*1.117) = 13.62). Statistical analysis was applied to the proficiency scores of the L2ers. If there was no significant difference between them, this means that L2 participants in this study were at the same proficiency level in the acquisition of English as a second language. Discussion of proficiency results will be presented in chapter six.

5.5.2 Analysis of Simon Says Game

The responses of each participant were analysed as a mean percentage for each structure type. For example, if a participant responded correctly five out of six items in biclausal finite reflexives, his/her score in that structure type would be 83.33%. In this case, every participant had a mean percentage for each of the following structures: biclausal finite reflexive, biclausal finite pronoun, biclausal non-finite reflexive, biclausal non-finite pronoun, possessive structure 1, possessive structure 2, long-distance object antecedent reflexive and long-distance object antecedent pronoun.

Data was analysed into group results and individual results. The statistic package used to analyse group results in this study was SPSS. As the conditions of the task were carefully chosen to address the four research questions, data for each research question was quantitatively analysed and reported as group results first. The group results of L2ers were analysed against the group results of control groups to see if there was any significant difference between them. For example, to answer research question(1): whether L2ers obey UG constraints in terms of showing knowledge of c-command and prohibiting long-distance object antecedents from binding English reflexives; the performance of L2ers in long-distance object antecedents (reflexives) structures, possessive structures 1 and possessive structures 2 was statistically analysed against the performance of the native speakers. During the statistical analysis, the performance of L2 child groups was

analysed against the performance of the English child group while the performance of L2 adult groups was analysed against the performance of the English adult group. As for research question (2), the results of L2 groups in biclausal finite reflexive structures and biclausal infinitival reflexive structures was compared with the results of control groups in these structures to see whether L2ers knew that English allows only local binding. Research question (3) was answered by comparing between the performance of all L2 groups in biclausal finite reflexive structures, biclausal infinitival reflexive structures and long-distance object antecedents (reflexives) structures with their performance in biclausal finite pronoun structures, biclausal infinitival pronoun structures and long-distance object antecedents (pronouns) structures, respectively. In other words, the aim was to understand whether L2ers knew that they were dealing with both reflexives and pronouns. To answer research question (4), the performance of all L2 groups in all structures was compared.

As the Domain-by-Age-Model stresses that the L1 should be constant in any comparison between child and adult L2ers (Schwartz, 2003), the main focus in this study was in two types of comparison: first, the performance of all groups of L2ers was compared with the performance of native speakers, and second the performance of child L2ers was compared with the performance of adult L2ers of the same L1. Therefore, the performance of Arabic-speaking child participants was compared with the performance Arabic-speaking adult participants, and the performance of Chinese-speaking child participants was compared with the performance of Chinese-speaking adult participants.

In addition to group results, it is important to consider the individual performance of participants to see whether the overall performance of participants is indicative of individual performance of participants. As was the case with group results, individual results will be discussed as answers to the main research questions. To decide whether L2ers have acquired the target grammar, the main criterion applied was that each participant should correctly answer five items out of six in each structure type. For example, to answer research question (1) and say that a participant obeys UG constraints with regards to reflexive binding, the participant should correctly answer five items out of six in each of long-distance object antecedents (reflexives) structures, possessive structures 1 and possessive structures 2. The identity of participants will be kept anonymous in this discussion, and an acronym plus a number will be used to referred to them as follows: AC*n* (Arab child), AA*n* (Arab adult), CC*n* (Chinese child) and CA*n* (Chinese adult).

5.6 Conclusion

The challenge of design and testing has been addressed in this chapter. Piloting showed that the Simon-Says game was workable with both children and adults. Importantly, structures of the task were carefully chosen to address the main research questions of the study. Also, it was shown that child groups and adult groups were comparable in many aspects. Data was collected and statistically analysed. The following chapter reports a general discussion of the results.

Chapter 6. Results

6.1 Introduction

This chapter presents the results of participants' interpretation of English reflexives. First, results of the proficiency test are presented, and then results of the Simon-Says game. Results of the Simon-Says game will be presented as answers to the four research questions. Results for each research question will be presented first as group results, and then as individual results. Finally, correlation test results are presented to see if there was any significant correlation between age, education or length of residence and the results of the participants in the Simon-Says game.

6.2 Proficiency Test Results

Proficiency data of the word-based Mean Length of Utterance test was analysed according to the formula mentioned in the previous chapter, and proficiency scores ranged between 13.7 and 16.3 (see Appendix G for proficiency results). According to a Shapiro-Wilk test, proficiency scores were found to be normally distributed (p>.676):

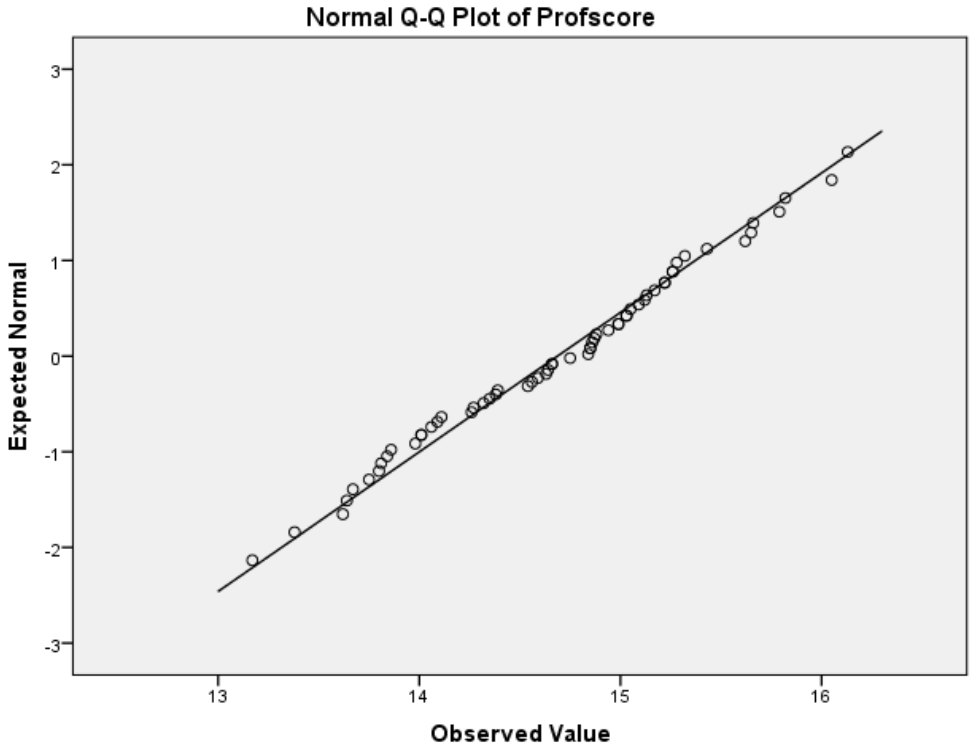


Figure 6.1 Normality distribution of all participants' proficiency scores

As the proficiency scores were normally distributed, a One Way ANOVA test was applied to see if there was any significant difference between the proficiency scores of all L2 groups. Results of the ANOVA test revealed that there was no significant difference between the proficiency scores of all L2 groups (F(3)= 1.402,

p>.252) which indicates that L2 participants were at the same developmental stage in the acquisition of English[16].

The above proficiency results were expected because of the homogeneity noted in the participants' background information which was mentioned in the methodology chapter and is repeated here for convenience:

Table 6.1Background information on participants

L1	Group	Mean Age (years) (SD)	Mean Years of English instruction, (SD)	Mean Length of Residence (LOR) (years) (SD)
Arabic	Adults (n=15)	24.40 (5.72)	12.96 (4.68)	2.06 (.46)
	Children (n=15)	9.39 (1.51)	2.67 (.78)	2.51 (.45)
Chinese	Adults (n=15)	23.68 (2.55)	10.60 (3.24)	2.33 (.48)
	Children (n=15)	9.40 (1.08)	4.36 (1.23)	2.76 (.41)
English	Adults (n=15)	22.75 (3.46)	N/A	N/A
	Children (n=15)	9.60 (1.19)	N/A	N/A

As is shown in the table, the mean ages and LOR of participants are similar. Such similarity was confirmed by an independent t-test which showed that there was no significant difference between the mean ages (t = 1.612, df(28), p > .118) of Arabic-speaking children, Chinese-speaking children and English children. Also, there was no significant difference between the mean LOR of Arabic-speaking children and Chinese-speaking children (t = .177, df(2), p > .915). As for adult participants, similarity was also confirmed by the results of an independent t-test which showed that there was no significant difference between the mean ages (t = 1.141, df(2), p > .565) and LOR (t = 1.725, df(28), p > .095) of Arabic-speaking adults and Chinese-speaking adults. However, results of an independent t-test showed that there was significant difference between the mean of English instruction for Arabic-speaking children and that for Chinese-speaking children (t = 4.479, df(28), p < .001)[17]. Such a significant difference will be discussed at the end of this chapter to see if there was any correlation between the performance of child L2 groups and the English instruction they received. Adult L2 groups on the other hand, did not have such significant difference (t = 1.253, df(28), p > .220) (see section 5.2 for discussion of background information).

Based on the insignificant difference found in the participants' proficiency scores, I conclude that all the L2 participants involved in this study were at the same developmental stage in the acquisition of English, yet we do not know their specific proficiency level (elementary, intermediate or advanced).

[16] For detailed statistical analysis of proficiency scores, see Appendix G.
[17] English instruction is not a very important variable in my study because I am comparing children with adults, so the significant difference in English instruction was expected. In addition, the target property is not explicitly taught at schools.

6.3 Simon-Says Game Results (see Appendix H)

Results of this study are presented as answers to each research question mentioned at the end of chapter three and repeated here to remind the reader:

(6.1)

1- Will L2ers apply UG constraints in second language acquisition?

2- Will L2ers reset their binding parameter to the values of the local binding of English reflexives?

3- Will L2ers differentiate between the syntactic properties of lexical items?

4- Will there be any difference between child and adult L2ers in the acquisition of English reflexives? (With respect to 1, 2 and 3.)

The answer to each of these four questions will be presented as group results first, and then the individual performance of participants is presented to see whether the overall performance of participants was affected by the performance of individual participants. As for the group results, an acquisition threshold (83.33%) was applied to say that L2ers acquired any property of English reflexives. The choice of 83.33% was not arbitrary, but it was linked to the criterion adopted in the analysis of individual results. That is, each participant should have correctly answered five items out of six (83.33%) in each structure type. According to this value/criterion (83.33% or 5/6), group and individual performance was analysed. That is, any group of participants was considered to have acquired the target property of English reflexives if they satisfied the acquisition threshold and were native-like in their performance. I consider the acquisition threshold important in the analysis of group results because native speakers, as was the case in this study, might sometimes show ceiling effects whilst L2 participants are not expected to. For example, suppose that native speakers correctly answered a test item 95% of the time while L2 participants answered it correctly 85% of the time, and statistical analysis showed that there was significant difference between the two. In such a case, we cannot claim that L2ers have not acquired the target grammar, but we can claim that they have acquired the target grammar and their performance was not exactly the same as native-speakers. For this reason, I applied the acquisition threshold in the analysis of group results.

Finally, the identity of participants will be kept anonymous throughout the presentation of individual results, and it will be referred to them using an acronym plus a number as follows: Arabic-speaking child (AC*n*), Arabic-speaking adult (AA*n*), Chinese-speaking child (CC*n*) and Chinese-speaking adult (CA*n*).

6.3.1 Will L2ers Apply UG Constraints in Second Language Acquisition?

As far as UG constraints are concerned, a hypothesis mentioned in (3.4) is repeated here to remind the reader:

(6.2)

All L2ers will apply UG constraints when they acquire English reflexives so they:

a. Will apply c-command as a constraint on reflexive binding.
b. Will not allow English reflexives to be bound by long-distance object antecedents.

If not:

All L2ers will not apply UG constraints when they acquire English reflexives so they:

a. Will not apply c-command as a constraint on reflexive binding, and they develop a linear order strategy.
b. Will allow English reflexives to be bound by long-distance object antecedents.

If participants have knowledge of c-command as a constraint on reflexive binding in English, they should show native-like acquisition of possessive structure 1 and possessive structure 2 where the antecedent *son* c-commands the reflexive *himself* in (6.3a), and the antecedent *son* c-commands the reflexive *himself* in (6.3b), but is not the closest noun. Also, participants are expected to show no significant difference between their performance in possessive structure 1 and possessive structure 2.

(6.3) a. Simon_k says Jack_j's son_i should point to $\text{himself}_{i/*j/*k}$ (Possessive structure 1).
b. Simon_k wants the son_j of Jack_i to point to $\text{himself}_{*i/j/*k}$ (Possessive structure 2).

The aim behind such a test was to investigate whether it was possible for L2 participants to develop a linear order learning strategy where they take the closest noun as an antecedent. If such a strategy was applied, participants would ungrammatically choose *Jack* as the antecedent in (6.3b). All L2 participants in this study were expected to obey the c-command requirement for reflexive binding.

As for prohibition of long-distance object antecedents, L2ers should not allow the reflexive *himself* in (6.4) to be bound by the long-distance object *Jack* because UG prohibits such a coreferential relation:

(6.4) Simon_k tells Jack_j that John_i should point to $\text{himself}_{i/*j/*k}$.

All L2ers in this study were expected to obey UG constraints and prohibit long-distance object antecedents.

6.3.1.1 Group Results

Figure (6.2) shows the overall performance of child experimental groups and the control group in possessive structure 1 and possessive structure 2.

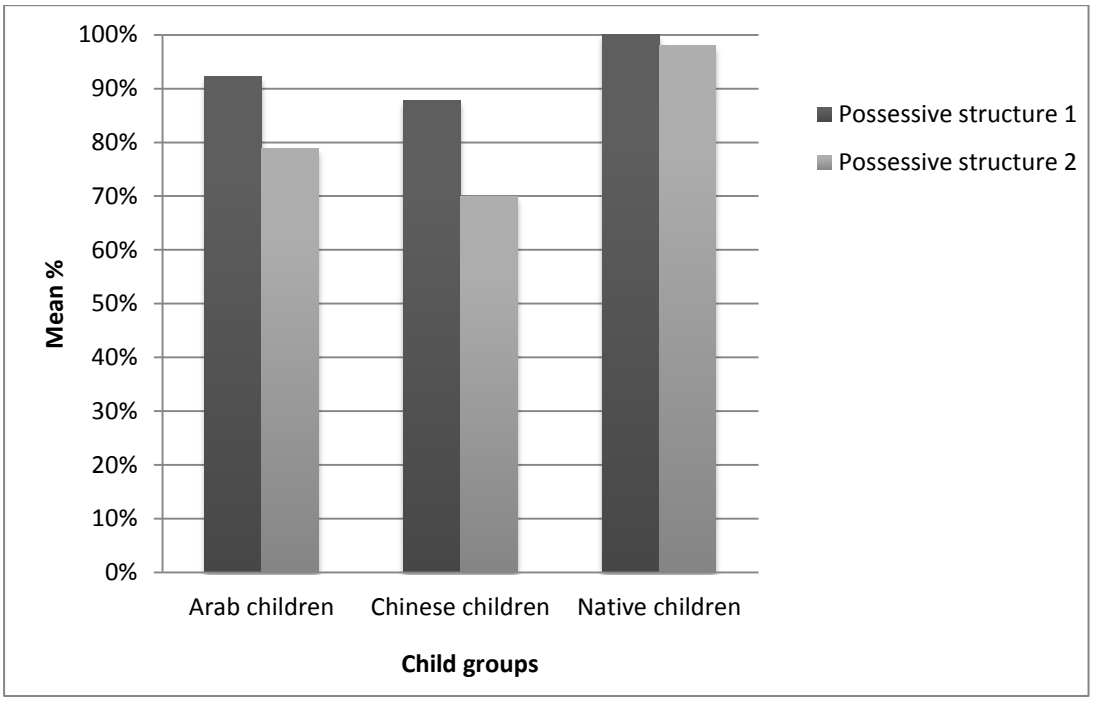


Figure 6.2 Correct means of child groups in possessive structure 1 and possessive structure 2

Taking the criteria of 83.33% correct performance as an acquisition threshold, figure (6.2) shows that all of the child L2 groups were performing above this threshold for possessive structure 1. However, the performance of child L2 groups in the acquisition of possessive structure 2 was below 83.33%. Child native speakers, as was expected, showed ceiling effects in the acquisition of both of possessive structure 1 and possessive structure 2.

The above observations were statistically confirmed, using non-parametric tests as the data was not normally distributed. Concerning the performance of child groups in possessive structure 1, between-group comparisons showed that there was a significant difference in possessive structures 1 (Kruskal Wallis: H(2)= 14.244, p<.001). This was followed-up by Mann Whitney tests (Bonferroni correction applied, significance accepted at *p*=0.016) which revealed that child native speakers were significantly different from Arabic-speaking children (U= 67.500, p< .007, r= 0.49) and Chinese-speaking children (U= 37.500, p<.001, r= 0.69).

Concerning the performance of child groups in possessive structure 2, there were significant differences between the groups (Kruskal Wallis: H(2)= 21.166, p< .001). This was followed-up by Mann Whitney tests (Bonferroni correction applied, significance accepted at p=0.016) which revealed that child native speakers were significantly different from Arabic-speaking children (U= 28.00, p< .001, r= 0.71) and Chinese-speaking children (U=23.00, p<.001, r=0.73).

Results of child groups on possessive structure 1 indicate that they acquired the local binding of English reflexives, but their performance was not identical to native-speakers. On the other hand, their results in possessive structure 2 indicate that they had not applied the c-command knowledge as a constraint on reflexive

binding. Such preliminary view can be supported by a within-group comparison to see if child L2 learners distinguished between possessive structure 1 and possessive structure 2. Wilcoxon Signed Ranks Tests (Bonferroni correction applied, significance accepted at p=0.016) showed that Arabic-speaking children (z= 2.178, p< .029, r=0.56), Chinese-speaking children (z=2.142, p<.032, r= 0.55) and child native speakers did not distinguish between reflexives in possessive structure 1 and possessive structure 2. Although these differences do not survive the Bonferroni correction (p= 0.016), a difference can be noticed in the performance of child L2 groups in possessive structure 1 and possessive structure 2. Such differences can be confirmed by the individual performance of L2 learners as will be discussed later.

Now, we turn to see the performance of adult groups in possessive structure 1 and possessive structure 2.

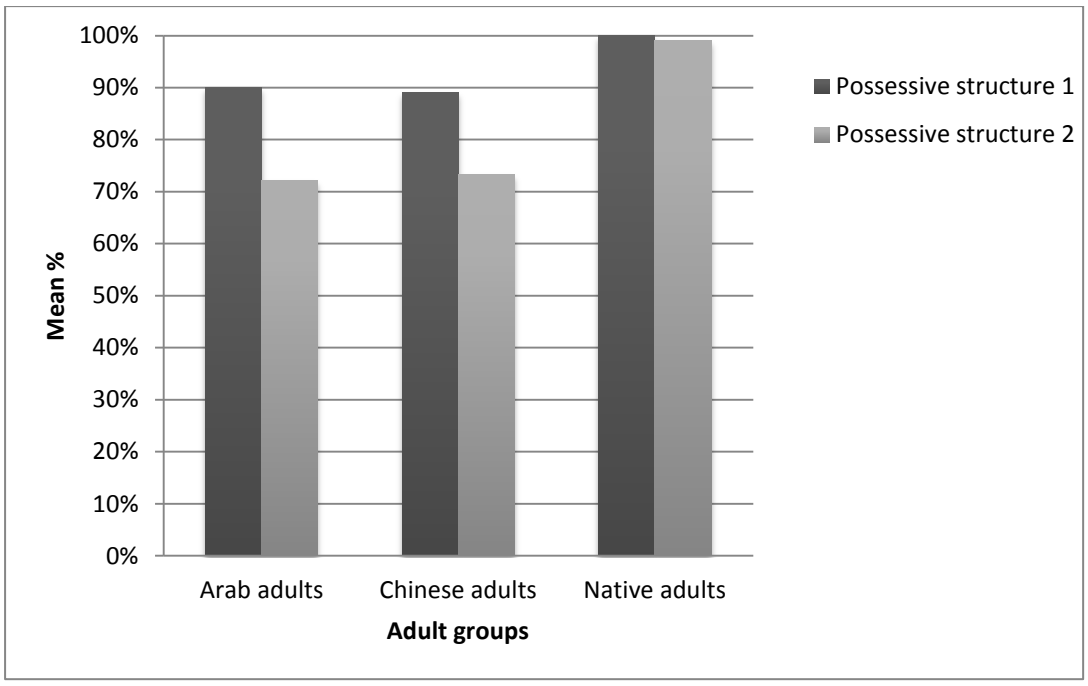


Figure 6.3 Correct means of adult groups in possessive structure 1 and possessive structure 2

Similar to the results of child groups, figure (6.3) shows that adult L2 groups performed above the acquisition threshold (83.33%) for possessive structure 1. However, their performance in the acquisition of reflexives in possessive structure 2 was below the acquisition threshold. Adult native speakers, similar to child native speakers in this study, showed ceiling effects in the acquisition of both of possessive structure 1 and possessive structure 2.

These observations on adults' performance were also confirmed by using non-parametric tests as the data was not normally distributed. As for possessive structure 1, there was a significant difference between the groups (Kruskal-Wallis, H(2)=11.929, p<.003). This was followed up with Mann-Whitney tests (Bonferroni correction applied, significance accepted at p=0.016), which revealed significant differences between native speakers and each of Arabic-speaking adults (U=60.00, p<.003, r=0.54) and Chinese-speaking adults (U=45.00, p<.001, r=0.64).

Similar results were also found with the performance of adult groups in possessive structure 2 (Kruskal Wallis: $H(2)=24.147$, $p<.001$). On follow-up Mann-Whitney tests (Bonferroni correction applied, significance accepted at $p=0.016$), adult native speakers were found to be significantly different from Arabic-speaking adults ($U=12.00$, $p<.001$, $r=0.83$) and Chinese-speaking adults ($U=19.00$, $p<.001$, $r=0.78$).

Similar to the performance of child groups, results of adult groups in possessive structure 1 indicate that they had acquired the local binding of English reflexives in this structure, yet their performance was not identical to that of a native speaker. However, results of adult groups in possessive structure 2 indicate that, similar to child groups, they had not applied c-command as a constraint on reflexive binding. As was the case with child groups, such a preliminary view of the adults' results can be supported by a within group comparison to see if adult L2 learners distinguished between reflexives in possessive structure 1 and possessive structure 2. Using a Wilcoxon Signed Ranks Test (Bonferroni correction applied, significance accepted at $p=0.016$), results showed that adult native speakers, as was expected, did not show any distinction between reflexives in possessive structure 1 and possessive structure 2. However, Arabic-speaking adults ($z= 2.488$, $p<.013$) and Chinese-speaking adults ($z=2.512$, $p<.012$) distinguished between reflexives in possessive structure 1 and possessive structure 2. Such results indicate that it was possible that adult L2 groups, like the L2 children, had developed a linear order learning strategy where they considered the closest NP as a possible antecedent for the reflexive although it might not c-command it.

In addition to their knowledge of c-command as constraint on reflexive binding, L2ers will be shown to obey UG constraints if they do not allow English reflexives to be bound by long-distance object antecedents. Figure (6.4) shows the overall performance of experimental groups in prohibiting English reflexives to be bound by long-distance object antecedents.

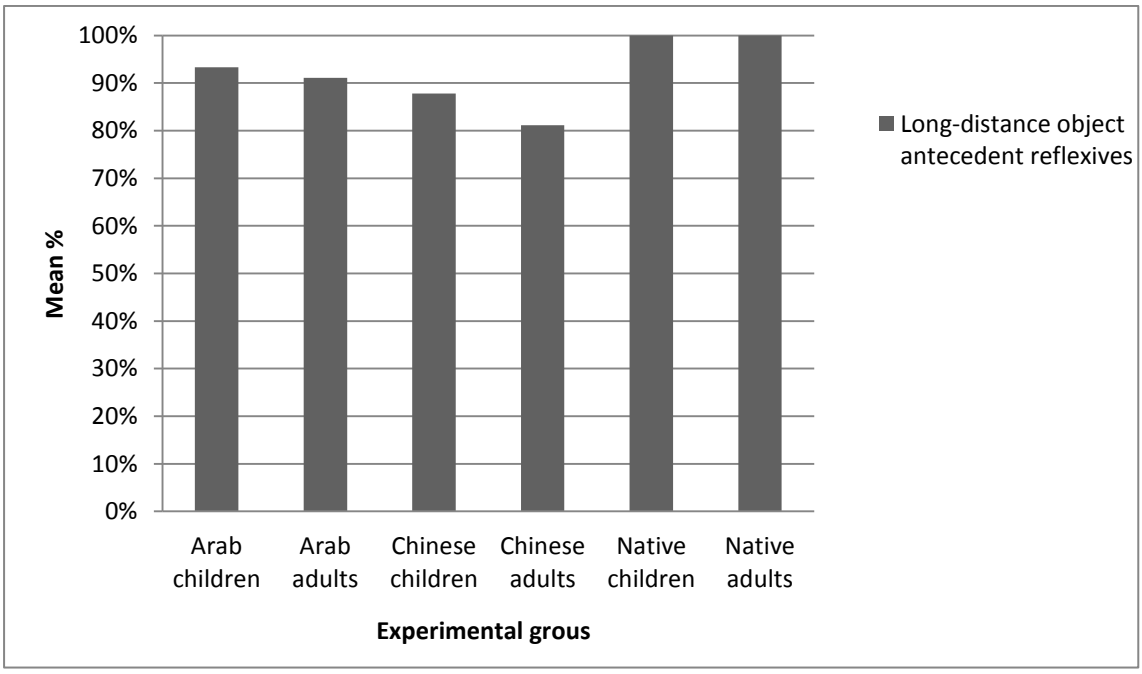


Figure 6.4 Correct means of participants on prohibiting English reflexives to be bound by long-distance object antecedents

As is obvious in figure (6.4), all of the L2 groups scored higher than the acquisition threshold (83.33%). Yet there was significant difference between child groups in prohibiting English reflexives to be bound by long-distance object antecedents (Kruskal Wallis, H(2)= 10.278, p< .006) on one hand, and adult groups (Kruskal Wallis, H(2)= 14.521, p< .001) on the other hand. Follow-up Mann Whitney Tests (Bonferroni correction applied, significance accepted at p=0.016) showed that there was no significant difference between the performance of Arabic-speaking children and child native speakers in the interpretation of reflexives in long-distance object antecedent sentences, but the difference between Chinese-speaking children and child native speakers was significant (U= 52.500, p<.001, r= 0.59). Also, follow-up Mann Whitney Tests (Bonferroni correction applied, significance accepted at *p*=0.016) showed that there was significant difference between the performance of adult native speakers and both of Arabic-speaking adults (U= 60.00, p<.003, r= 0.54) and Chinese-speaking adults (U= 37.500, p<.001, r= 0.68).

The above findings mean that L2 learners in this study correctly applied UG constraints in prohibiting English reflexives to be bound by long-distance object antecedents because they scored higher than the acquisition threshold, but just for Arabic-speaking children their performance was identical to the native speakers.

In summation, L2 learners did not apply the c-command constraint on reflexive binding so that their performance was under the acquisition threshold (83.33%) and their performance was significantly different from the performance of native speakers. On the other hand, although the performance of L2 groups, except for Arabic-speaking children, was significantly different from the performance of native speakers in prohibiting English reflexives to be bound by long-distance object antecedents, L2 groups scored higher than the acquisition threshold but were still not identical to native speakers.

6.3.1.2 Individual Results

As was said in the discussion of group results, the answer to this question involves two questions: the first is whether L2ers had applied the c-command constraint on reflexive binding. The second question is whether L2ers prohibit English reflexives to be bound by long-distance object antecedents. In this regard, a participant was said to obey UG constraints if they correctly answered five out of six items in each of possessive structure 1, possessive structure 2 and long-distance object antecedent structures. Table (6.2) shows the individual performance of L2 participants in the three structures:

Table 6.2 Individual performance of participants in possessive structure 1, possessive structure 2 and long-distance object antecedent reflexive.

Group	# Correct items	# Possessive structure 1	# Possessive structure 2	# Long-distance object antecedent reflexive
Arabic-speaking children (n=15)	0/6		1	
	1/6			
	2/6			
	3/6			
	4/6	1	1	1
	5/6	***5***	***11***	***4***
	6/6	***9***	***2***	***10***
Arabic-speaking adults (n=15)	0/6		1	
	1/6			
	2/6			
	3/6		1	
	4/6	2	4	1
	5/6	***5***	***8***	***6***
	6/6	***8***	***1***	***8***
Chinese-speaking children (n=15)	0/6			
	1/6			
	2/6		3	
	3/6		1	1
	4/6	1	3	1
	5/6	***9***	***6***	***6***
	6/6	***5***	***2***	***7***
Chinese-speaking adults (n=15)	0/6			
	1/6			1
	2/6		1	
	3/6		2	1
	4/6	1	4	1
	5/6	***8***	***6***	***7***
	6/6	***6***	***2***	*5*

Table (6.2) shows the individual performance of L2 participants in possessive structure 1, possessive structure 2 and long-distance object antecedent reflexives. The first column from the left represents the groups involved in the study, and the second column represents all the possible correct answers. As there were six items for

each structure, correct answers by L2 participants ranged between 0/6 and 6/6. The last three right columns represent the number of participants who achieved the specified correct items for the labelled structures. Empty cells indicate that no one of the L2 participants was in the specified range. For example, in the first block of Arabic-speaking children, there was one Arabic-speaking child who answered correctly four out of six items in possessive structure 1, five Arabic-speaking children who answered correctly five out of six items in possessive structure 1 and nine Arabic-speaking children who answered correctly six out of six items in possessive structure 1. This template will be applied in the discussion of all of the individual results in this study.

As can be noticed from the table, individual results of the majority of Arabic-speaking children show that they satisfied the criterion; only three of them (AC1, AC3 and AC9) did not satisfy the criterion. Also, only one Arabic-speaking child (AC1) did not satisfy the criterion and allowed English reflexives to be bound by long-distance object antecedents. It is worth mentioning here that the suppliance of this child was 66.66% correct which is still above the chance level.

Concerning the individual performance of Arabic-speaking adults, seven of them out of fifteen[18] satisfied the criterion. The other Arabic-speaking adults (AA1, AA3, AA5, AA6, AA9, AA10 and AA15) did not satisfy the criterion. However, the suppliance of four of them in possessive structure 2, as is shown in the table, was (4/6) which is still above the chance level. Yet, the suppliance of (AA1 and AA6) in possessive structures 2 was low (≤ 50%). Also, only one Arabic-speaking adult participant (AA7) allowed English reflexives to be bound by long-distance object antecedents.

Such individual results of Arabic-speaking children indicate that their performance with regards to c-command was better than the performance of Arabic-speaking adults since approximately half of the adults failed the criterion. Concerning binding reflexives by long-distance object antecedents, group results of Arabic-speaking participants were indicative of their individual performance where only one child and one adult failed the criterion. Thus, the majority of Arabic-speaking participants obeyed UG in prohibiting reflexives to be bound by long-distance object antecedents.

Different from Arabic-speaking children, only seven Chinese-speaking children out of fifteen satisfied the criterion. The other eight Chinese-speaking children (CC3, CC5, CC6, CC8, CC9, CC11, CC12 and CC13) did not satisfy the criterion. Importantly, the suppliance of four of them (CC3, CC4, CC8 and CC11) in possessive structure 2 was low (less than 50%). Also, two Chinese-speaking children (CC2 and CC14) allowed English reflexives to be bound by long-distance object antecedents.

[18] In table (6.2) above, eight Arabic-speaking adults out of fifteen did not satisfy the acquisition criterion in possessive structure 1 and possessive structure 2.

Similar to Chinese-speaking children, eight Chinese-speaking adults out of fifteen satisfied the acquisition criterion. The other seven Chinese-speaking adults (CA1, CA2, CA5, CA7, CA10, CA13 and CA15) did not satisfy the criterion. Three of them (CA1, CA7 and CA15) showed low suppliance (less than 50%) in possessive structure 2. In addition, three Chinese-speaking adults (CA1, CA3 and CA7) allowed English reflexives to be bound by long-distance object antecedents.

Individual performance of Chinese-speaking participants shows that group results of Chinese-speaking participants with regards to the c-command constraint and long-distance object antecedents were indicative of the individual performance of Chinese-speaking participants. About half of each group failed the criterion of c-command knowledge while only less than three of each group failed the criterion with regards to long-distance object antecedents. Such results can be taken to claim, as argued in the discussion chapter, that UG is operative in the interlanguage grammar of Chinese-speaking participants.

6.3.1.3 Conclusion

The results of this section show that L2 learners have knowledge of UG constraints in prohibiting English reflexives to be bound by long-distance object antecedents. However, the c-command requirement seems to be challenging for the majority of L2 participants. The individual results of Arabic-speaking children were indicative of their group results, i.e. they obeyed UG constraints and applied the knowledge of c-command as a constraint on reflexive binding. On the other hand, the individual results of Arabic-speaking adults, Chinese children and Chinese adults showed that only half of each group obeyed UG constraints in showing knowledge that c-command constrains reflexive binding. Results of L2 participants in the c-command requirement on reflexive binding indicate that it is possible for L2 learners to develop a linear order learning strategy to bind English reflexives. However, another possibility arises as will be shown in the discussion chapter.

6.3.2 Will L2ers Reset their Binding Parameter to the Values of the Local Binding of English Reflexives?

If all L2ers have full direct access to UG, this means that the L2ers in this study should have been able to reset their parameters to the value of English which allows only local binding of reflexives in biclausal finite and biclausal non-finite sentences, as is illustrated in (6.5):

(6.5) a. Simon_i says Jack_j should point to $\text{himself}_{*i/j}$.
b. Simon_i wants Jack_j to point to $\text{himself}_{*i/j}$.

If L2ers do not have access to UG, they are expected only to transfer their grammar of binding to English, resulting in Arabic-speaking participants acquiring the local binding of English reflexives because it is similar

to the binding values in Arabic, and Chinese-speaking participants transferring their long-distance binding to English so that they allow long-distance binding of English reflexives. As far as this question is concerned, a hypothesis mentioned in (3.4) is repeated here to remind the reader:

(6.6)

L2ers will reset their binding parameter to the values of the local binding of English reflexives so they allow only local binding of reflexives in biclausal finite and non-finite sentences.

If not:

L2ers will not reset their binding parameter to the values of the local binding of English reflexives and they either allow English reflexives to be bound by long-distance antecedents in biclausal finite and non-finite sentences, or they make finite/non-finite distinction between domains.

6.3.2.1 Group Results

As the acquisition threshold is 83.33%, L2ers will acquire the local binding of English reflexives if they score higher than the threshold and achieve native-like performance. Figure (6.5) presents the overall performance of child groups in biclausal finite and non-finite sentences.

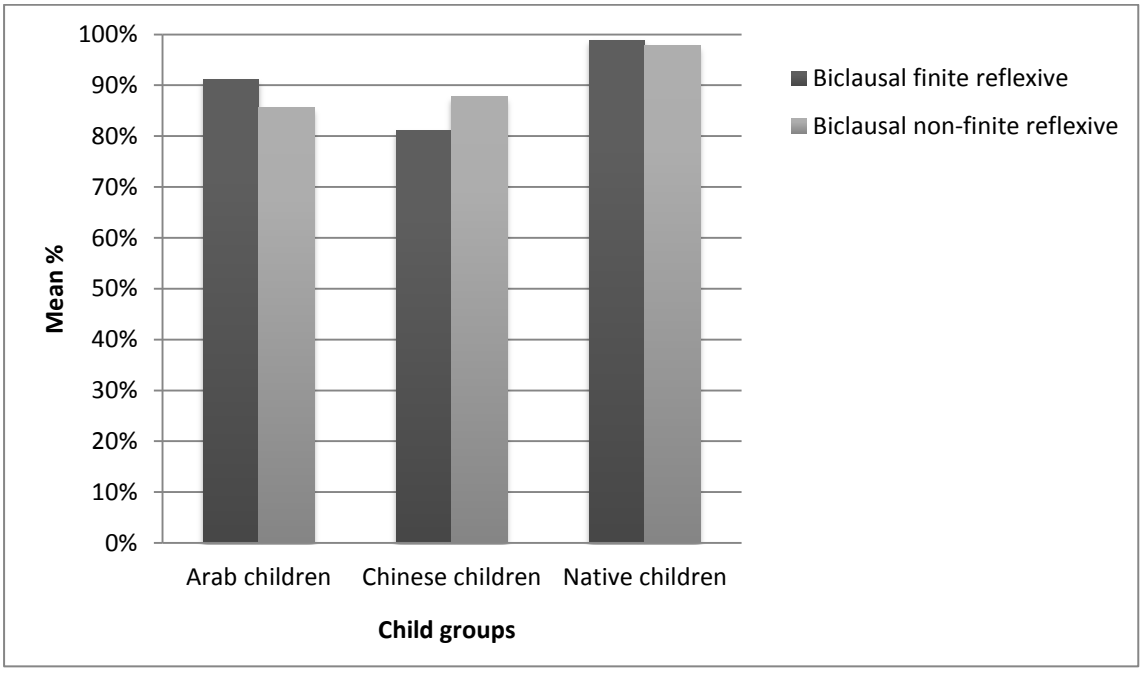


Figure 6.5 Correct means of child groups in biclausal finite and biclausal non-finite sentences

As is shown in figure (6.5), Arabic-speaking children scored higher than the acquisition threshold (83.33%) in biclausal finite and biclausal non-finite sentences. As for Chinese-speaking children, they scored higher than

the acquisition threshold in biclausal non-finite sentences, and they were very close to it in biclausal finite sentences. Child native speakers, as was expected, showed ceiling effects in both structures.

However, a between-group comparison revealed that there was significant difference in biclausal finite reflexive sentences (Kruskal Wallis, H(2)=19.610, p<001) and biclausal non-finite reflexive sentences (H(2)=12.434, p<.002). This was followed-up by Mann Whitney Tests (Bonferroni correction applied, significance accepted at *p*=0.016) which showed that there was no significant difference between the performance of Arabic-speaking children and child English native speakers in biclausal finite reflexive sentences. However, there was significant difference between Arabic-speaking children and child English native speakers on biclausal non-finite reflexive sentences (U=50.500, p<.003, r=0.54). Conversely, there was significant difference between the performance of Chinese-speaking children and child English native speakers in biclausal finite reflexive sentences (U= 20.500, p<.001, r=0.77) and biclausal non-finite reflexive sentences (U= 45.000, p<.001, r= 0.59).

The above results indicate that the L1 affects child L2 acquisition. That is, Arabic-speaking children acquired the local binding of English reflexives and they were native-like in biclausal finite sentences, yet their performance was not identical to that of native speakers in biclausal non-finite sentences. However, the performance of Chinese-speaking children in both structures differed from that of native speakers. They acquired the local binding in biclausal non-finite sentences, but were only close to the acquisition threshold in biclausal finite sentences.

The native-like performance of Arabic-speaking children in biclausal finite clauses and the non-native-like performance in biclausal non-finite sentences raise the possibility of Arabic-speaking children holding a distinction between finite and non-finite clauses. To test this possibility, the performance of child groups in biclausal finite sentences was compared to their performance in biclausal non-finite sentences. A Wilcoxon Signed Ranks Test (Bonferroni correction applied, significance accepted at *p*=0.016) showed that child English native speakers, Arabic-speaking children and Chinese-speaking children did not make a distinction between biclausal finite reflexive sentences and biclausal infinitival reflexive sentences.

Now, we turn to the results of adult groups in the acquisition of English reflexives in biclausal finite and biclausal non-finite sentences. Figure (6.6) shows the performance of adult groups.

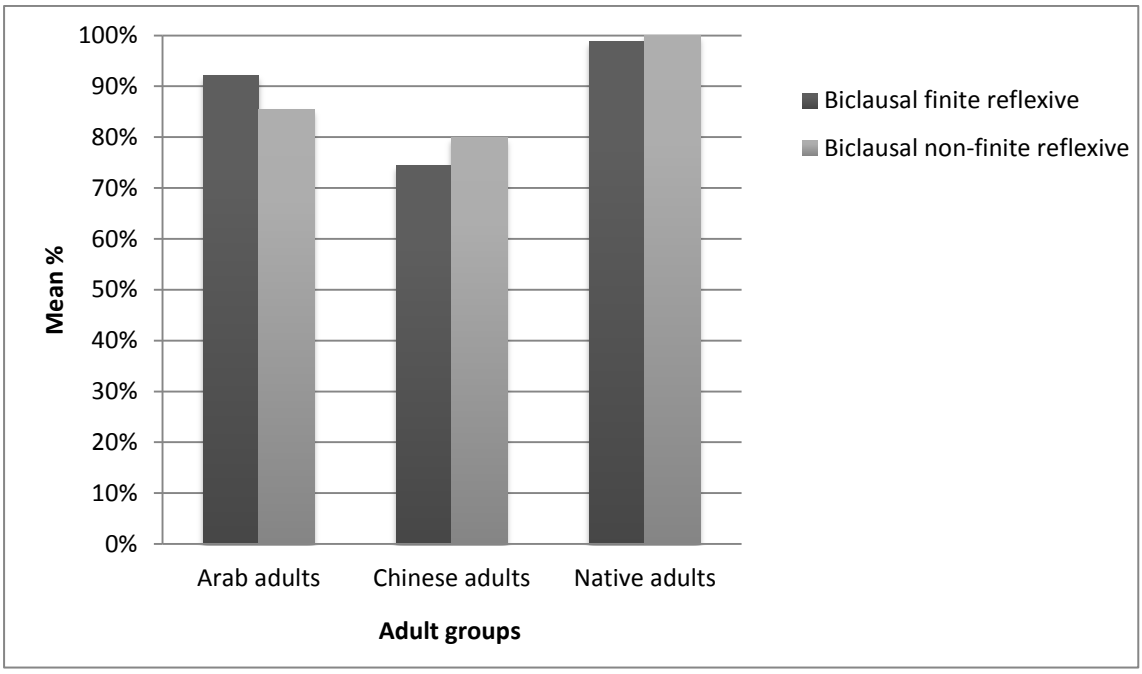


Figure 6.6 Correct means of adult groups on reflexives in biclausal finite and non-finite sentences

As is shown in figure (6.6), Arabic-speaking adults scored higher than the acquisition threshold (83.33%) in biclausal finite and biclausal non-finite sentences. Chinese-speaking adults, in contrast, were somewhat below the acquisition threshold in biclausal non-finite sentences and biclausal finite sentences. Adult native speakers, as child native speakers, showed ceiling effects in both biclausal finite and biclausal non-finite sentences.

These observations were statistically confirmed. Concerning the acquisition of reflexives in biclausal finite sentences, there was significant difference between the groups (Kruskal-Wallis, $H(2)=24.884$, $p<.001$). This was followed up with Mann-Whitney tests (Bonferroni correction applied, significance accepted at $p=0.016$), which revealed that there was no significant differences between adult native speakers and Arabic-speaking adults while adult native speakers were significantly different to Chinese-speaking adults ($U=11.00$, $p<.001$, $r=0.83$).

The above results support the view of L1 effect on the acquisition of English reflexives by adult L2 learners; the knowledge that Arabic-speaking adults have in their L1 facilitated the acquisition of English reflexives in biclausal finite sentences while the knowledge of long-distance binding that Chinese-speaking adults have in their L1, made it difficult to achieve native-like performance with respect to English reflexives.

Concerning the acquisition of reflexives in biclausal non-finite sentences, there was significant difference between the groups (Kruskal-Wallis, $H(2)=21.930$, $p<.001$). This was followed up with Mann-Whitney tests (Bonferroni correction applied, significance accepted at $p=0.016$), which revealed native speakers were found to be significantly different to Arabic-speaking adults ($U=37.500$, $p<.001$, $r=0.55$) and Chinese-speaking adults ($U=15.00$, $p<.001$, $r=0.83$). Such results support the view of L1 effect. That is, Arabic-speaking adults in this study acquired the local binding of English reflexives in biclausal non-finite sentences because they

scored higher than the acquisition threshold (83.33%). Similarly, Chinese-speaking adults were affected by their L1 so they scored less than the acquisition threshold.

If the performance of Arabic-speaking adults was native-like in biclausal finite sentences, but it was not native-like in biclausal non-finite sentences, there is a possibility that they made a distinction between finite and non-finite clauses. To test such a possibility, a Wilcoxon Signed Ranks Test was used, taking into account the Bonferroni correction applied to the *p* value ($p > .016$). Results showed that there was no significant difference in the performance of adult English native speakers, Arabic-speaking adults and Chinese-speaking adults with regards to the acquisition of English reflexives in biclausal finite and non-finite sentences.

To sum up, the performance of L2ers in the acquisition of English reflexives in biclausal finite and non-finite sentences supports the view that L1 facilitates the acquisition of English reflexives. Therefore, the performance of Arabic-speaking groups was native-like in biclausal finite sentences while their performance was not native-like in biclausal not-finite sentences. The performance of Chinese-speaking groups, on the other hand, was significantly different from the performance of native speakers in both structures. Chinese-speaking participants acquired the local binding of English reflexives in biclausal non-finite sentences, but they did not acquire the local binding in biclausal finite sentences. However, they were close to the acquisition threshold in biclausal finite sentences. Thus, when there is difference between the L1 and the target grammar of the L2, acquisition of L2 will be difficult but not impossible.

6.3.2.2 Individual Results

If L2ers in this study acquired the local binding of English reflexives, they should satisfy the acquisition criterion where they should correctly allow the local binding of five reflexives out of six in each of biclausal finite sentences and biclausal non-finite sentences. Table (6.3) shows the individual performance of L2 participants in biclausal finite and biclausal non-finite sentences[19].

[19] Empty cells indicate that no one of the participants was in the specified range.

Table 6.3 Individual performance of L2 participants in biclausal finite and biclausal non-finite reflexive sentences

Group	# Correct items	# Biclausal finite reflexive	# Biclausal non-finite reflexive
Arabic-speaking children (n=15)	0/6		
	1/6		
	2/6		
	3/6		1
	4/6	1	1
	5/6	***6***	***8***
	6/6	***8***	***5***
Arabic-speaking adults (n=15)	0/6		
	1/6		
	2/6		
	3/6		
	4/6	1	3
	5/6	***5***	***7***
	6/6	***9***	***5***
Chinese-speaking children (n=15)	0/6		
	1/6		
	2/6		
	3/6		
	4/6	4	1
	5/6	***9***	***11***
	6/6	***2***	***3***
Chinese-speaking adults (n=15)	0/6		
	1/6		
	2/6		
	3/6	1	
	4/6	7	5
	5/6	***6***	***8***
	6/6	***1***	***2***

As is shown in table (6.3) above, the individual results of Arabic-speaking participants show that group results are indicative of individual results. Twelve Arabic-speaking children[20] and eleven Arabic-speaking adults[21] satisfied the acquisition criterion, and they allowed the local binding of five of reflexive items out of six in biclausal finite and non-finite sentences. The majority of non-local binding was in biclausal non-finite sentences where (AC2, AC6, AA4, AA6, AA7 and AA10) allowed non-local binding of English reflexives while only (AC9) allowed the non-local binding of English reflexives in biclausal finite sentences. Although these participants failed to satisfy the acquisition criterion, they allowed local binding of English reflexives at high rate of (66.66%) or four out of six items.

[20] One Arabic-speaking child did not satisfy the acquisition criterion in biclausal finite reflexive sentences, and two Arabic-speaking children did not satisfy the acquisition criterion in biclausal non-finite reflexive sentences.

[21] One Arabic-speaking adult did not satisfy the acquisition criterion in biclausal finite reflexive sentences, and three Arabic-speaking adults did not satisfy the acquisition criterion in biclausal non-finite reflexive sentences.

Individual results of Chinese-speaking participants were also indicative of group results. Ten Chinese-speaking children out of fifteen satisfied the acquisition criterion, and they allowed the local of English reflexives in biclausal finite and biclausal non-finite sentences. It can be noticed that the majority of the five Chinese-speaking children (CC1, CC6, CC11, CC13 and CC15) who allowed non-local binding of English reflexives did that in biclausal finite sentences. On the other hand, only three Chinese-speaking adults (CA1, CA12 and CA15) satisfied the acquisition criterion, and they allowed the local binding of English reflexives in biclausal finite and biclausal non-finite sentences. The other thirteen Chinese-speaking adults (CA2, CA3, CA4, CA5, CA6, CA7, CA8, CA9, CA10, CA11, CA13 and CA14) failed the acquisition criterion and allowed English reflexives to be bound by long-distance antecedents. Also, it can be noticed that eight of Chinese-speaking adults (CA2, CA3, CA5, CA7, CA8, CA10, CA13 and CA14) failed the acquisition criterion in biclausal finite sentences while only five of them (CA4, CA6, CA7, CA9 and CA11) failed the acquisition criterion in biclausal non-finite sentences. It can be noticed that although the majority of Chinese-speaking adults did not satisfy the criterion (5/6), they answered correctly four out of six reflexive items in biclausal finite and biclausal non-finite sentences.

6.3.2.3 Conclusion

The results of this question support the view that L1 influence facilitates/hardens L2 acquisition. That is, when there is similarity between the L1 grammar and the target grammar, L1 influence facilitates the process of L2 acquisition and L2ers are expected to achieve native-like performance in the target grammar, as was the case Arabic-speaking participants. However, when there is difference between the L1 and the target grammar, L2 acquisition will be difficult but not impossible. Therefore, some of the Chinese-speaking participants satisfied the acquisition criterion and acquired the target grammar although their L1 grammar is different from the target grammar.

6.3.3 Will L2ers Differentiate Between the Syntactic Properties of Lexical Items?

According to the lexical learning of reflexives (Wexler and Manzini, 1987), L2ers learn reflexives as lexical items without considering their syntactic properties. This means that they might confuse reflexives with pronouns. Specifically, there are three possibilities: (a) L2ers constantly misinterpret reflexives as pronouns, (b) L2ers constantly misinterpret pronouns as reflexives, and (c) L2ers arbitrarily confuse reflexives with pronouns without favouring one over another. Later on, children know that they are dealing with reflexives and pronouns, so they make a syntactic distinction between the two. If such a view is correct, there will be a significant difference between the performance of L2ers in the acquisition of reflexives and pronouns. In this study, a hypothesis mentioned in (3.4) is repeated here to remind the reader:

(6.7)

L2ers will differentiate between the syntactic properties of English reflexives and pronouns.

If not:

L2ers will not differentiate between the syntactic properties of English reflexives and pronouns.

6.3.3.1 Group Results

As seen below, Figure (6.7) illustrates the overall performance of experimental groups with regards to reflexives and pronouns.

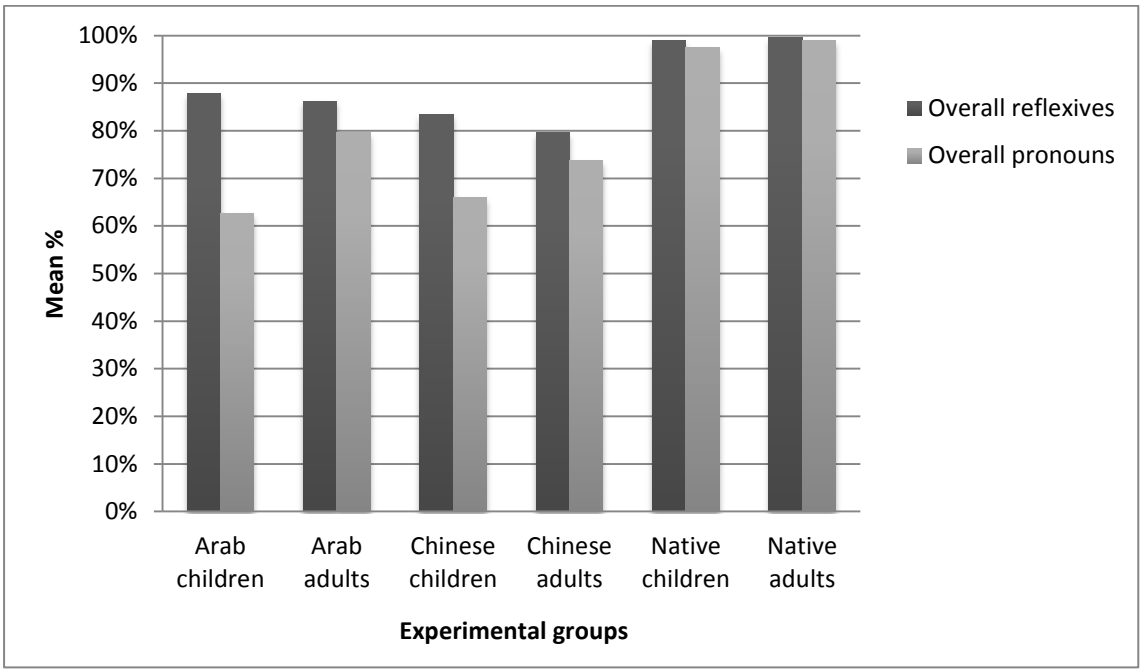


Figure 6.7 Correct means of experimental groups on reflexives and pronouns

Using a Wilcoxon Signed Ranks Test to compare the performance of each group with regards to reflexives and pronouns (Bonferroni correction applied, significance accepted at p=.01), results showed that Arabic-speaking children, Arabic-speaking adults, Chinese-speaking children, Chinese-speaking adults and English native speakers distinguished the syntactic properties of reflexives and pronouns. Although the differences in the performance of Arabic-speaking children ($z = 2.073$, $p < .038$, $r = .53$) and Chinese children ($z = 2.797$, $p < .05$, $r = .72$) did not survive the Bonferroni correction, a difference in their performance can be noticed. Individual performance of child participants in this regard will highlight this difference.

6.3.3.2 Individual Results

As was said in the discussion of group results, lexical learning of English reflexives means that L2ers do not learn an English reflexive with its full syntactic properties which distinguish it from a pronoun. In contrast, L2ers confuse reflexives with pronouns. Later on, they come to know the syntactic difference between reflexives and pronouns and can make a clear distinction between them in the acquisition process. If L2ers in

this study acquired the knowledge of syntactic difference between reflexive and pronouns, they should satisfy the acquisition criterion and correctly answer five out of six items in each type of reflexive structure and their pronoun counterparts. In other words, L2ers should score five out of six items in biclausal finite, biclausal non-finite and long-distance object antecedent reflexive structures and their pronoun counterparts. Table (6.4) shows the individual performance of L2 participants in reflexive and pronoun sentences.

Table 6.4 Individual performance of L2 participants in reflexive and pronoun sentences.

Group	#Correct items	# Biclausal finite		# Biclausal non-finite		# Long-distance object antecedent	
		reflexive	pronoun	reflexive	pronoun	reflexive	pronoun
Arabic-speaking children (n=15)	0/6		1				3
	1/6		3		2		1
	2/6		1		2		
	3/6		1	1			
	4/6	1	2	1	5	1	1
	5/6	***6***	***4***	***8***	***4***	***4***	***8***
	6/6	***8***	***3***	***5***	***2***	***10***	***2***
Arabic-speaking adults (n=15)	0/6						
	1/6						1
	2/6						
	3/6		1		1		
	4/6	1	1	3	6	1	4
	5/6	***5***	***10***	***7***	***6***	***6***	***3***
	6/6	***9***	***3***	***5***	***2***	***8***	***7***
Chinese-speaking children (n=15)	0/6						
	1/6				1		
	2/6		2		1		3
	3/6				3	1	
	4/6	4	6	1	2	1	6
	5/6	***9***	***6***	***11***	***6***	***6***	***5***
	6/6	***2***	***1***	***3***	***2***	***7***	***1***
Chinese-speaking adults (n=15)	0/6						
	1/6		2			1	
	2/6						1
	3/6	1	1		3	1	1
	4/6	7	4	5	3	1	3
	5/6	***6***	***8***	***8***	***8***	***7***	***6***
	6/6	***1***		***2***	***1***	***5***	***4***

Although group results showed that L2 participants differentiated between the syntactic properties of English reflexives and pronouns, individual results unexpectedly show that the majority of L2 participants did not differentiate between the syntactic properties of reflexives and pronouns. The individual results of Arabic speaking participants and Chinese-speaking children show that they, in the majority of structures, misinterpreted pronouns as reflexives. In the case of adult Chinese-speaking participants, it seems that they arbitrarily confused reflexive with pronouns without favouring one over another. Actually, such individual

results in pronoun sentences raise an important question on the participants' responses in reflexive sentences. That is, the performance of participants, especially Arabic-speaking ones, in reflexive sentences was good, not because they acquired the local properties of English reflexives, but because they considered the majority of test items as reflexives. To see whether such a view is supported, we will consider L2 participants who achieved the acquisition criterion (five out of six items) in reflexive and pronoun sentences.

Table 6.5 Participants who achieved the acquisition criterion in reflexive and pronoun sentences

Participants	#Reflexives	#Pronouns
Arabic-speaking children (n=15)	AC3, AC4, ***AC5***, AC7, AC8, AC10, ***AC11***, AC12, AC13, AC14, AC15	***AC5***, AC6, ***AC11***
Arabic-speaking adults (n=15)	AA1, AA2, ***AA3***, ***AA5***, AA8, AA9, AA11, ***AA12***, ***AA13***, AA14, AA15.	***AA3***, AA4, ***AA5***, ***AA12***, ***AA13***
Chinese-speaking children (n=15)	CC3, ***CC4***, CC5, CC7, CC8, CC9, CC10, CC12, CC13, CC14	CC2, ***CC4***
Chinese-speaking adults (n=15)	CA12, CA15	CA1, CA4, CA6, CA9, CA14

Table (6.5) shows the L2 participants who achieved the acquisition criterion in reflexive and pronoun sentences (displayed in bold italics). The Reflexives column represents those who achieved the criterion in the three reflexive structures: biclausal finite reflexives, biclausal non-finite reflexives and long-distance object antecedent reflexives. The Pronouns column, on the other hand, represents those who achieved the acquisition criterion in the three pronoun sentences: biclausal finite pronouns, biclausal non-finite pronouns and long-distance object antecedent pronouns. As can be seen, a low number of participants achieved the acquisition criterion in both reflexive and pronoun sentences. In particular, only two Arabic-speaking children (AC5 and AC11), four Arabic-speaking adults (AA3, AA5, AA12 and AA13), and one Chinese-speaking child (CC4), but no Chinese-speaking adults, achieved the acquisition criterion in reflexive and pronoun sentences. Such individual results, contrary to group results, support the view that the majority of L2 participants had not fully distinguished between the syntactic properties of reflexives and pronouns at the time they were tested.

6.3.3.3 Conclusion

The results of this section support a lexical learning of English reflexives and pronouns. That is, the majority of L2 participants confused English reflexives with pronouns, so that a difference can be noticed in their performance. While the individual analysis of Arabic-speaking participants and Chinese-speaking children

showed that the majority of them misinterpreted pronouns as reflexives, the individual analysis of Chinese-speaking adults showed that the majority of them confused reflexives with pronouns, scoring higher in reflexives. A maturational account, as will be discussed in the next chapter, might account for delay in the acquisition of pronouns.

6.3.4 Will There be Any Difference Between Child and Adult L2ers in the Acquisition of English Reflexives?

In addition to the comparison between the performance of native speakers and L2 groups, it is important to compare between the performance of Arabic children and adults, and the performance of Chinese children and adults, separately. The results of such a comparison would address the question whether adult L2ers have access to UG or not, and whether the earlier one acquires a second language the better. Also, it is necessary to compare between the performance of child groups and adult groups to see whether L2ers from different L1s are at the same stage of L2 acquisition or not. In this study, a hypothesis mentioned in (3.4) is repeated here to remind the reader:

(6.8)

There will be no difference between child and adult L2ers in the acquisition of the local binding of English reflexives.

If not:

Child L2ers will outperform adult L2ers in the acquisition of the local binding of English reflexives.

6.3.4.1 Group Results

Figures (6.8 and 6.9) show the performance of Arabic-speaking groups and Chinese groups in reflexive sentences, respectively.

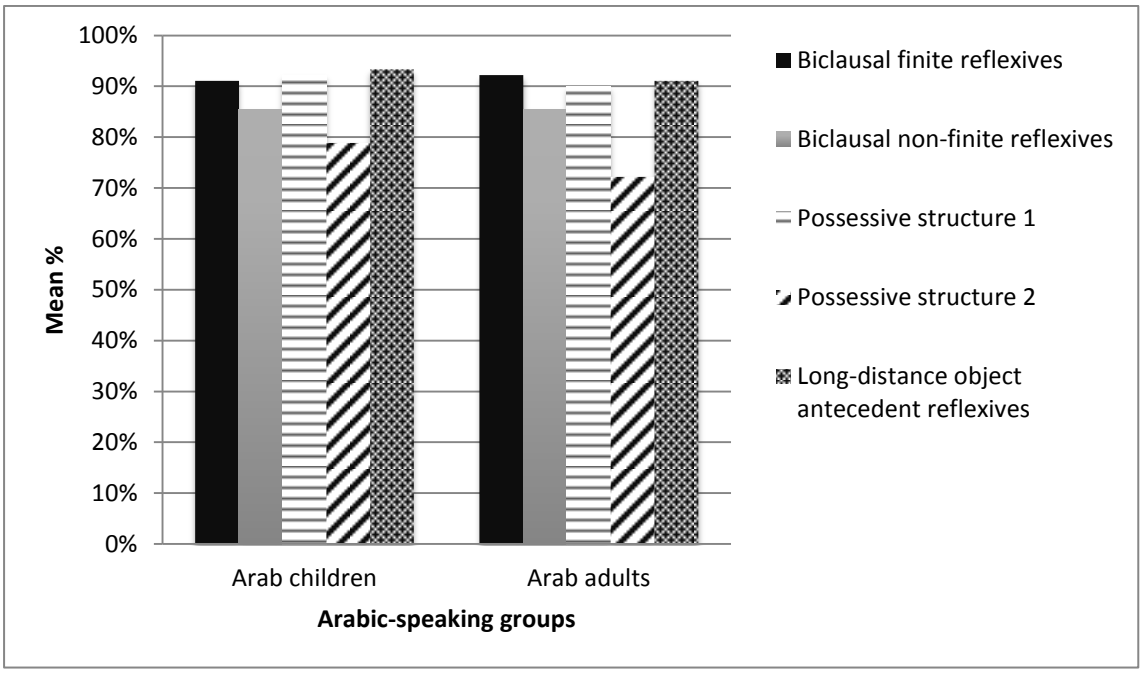


Figure 6.8 Correct means of Arabic-speaking groups in reflexive sentences

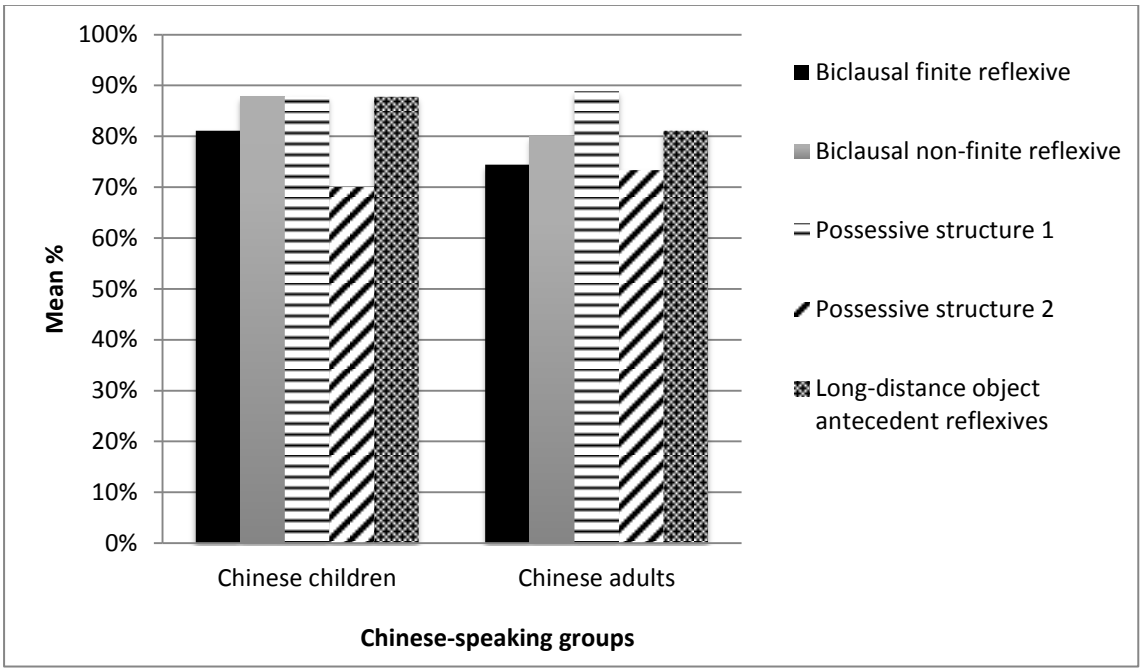


Figure 6.9 Correct means of Chinese-speaking groups in reflexive sentences

As is shown in figure (6.8) above, the performance of Arabic-speaking adults was very close to that of Arabic-speaking children in all structures types, scoring higher than the acquisition threshold (83.33%) in all structures except possessive structures 2. Similarly, figure (6.9) shows the performance of Chinese-speaking adults was close to the performance of Chinese-speaking children.

Such observations were statistically confirmed. Results of between-group comparisons, using Kruskal-Wallis test, showed that there was no significant difference between the performance of L2 groups in the acquisition of English reflexives in long-distance object structures, possessive structure 1, possessive structure 2, and

biclausal non-finite sentences. However, there was a significant difference in biclausal finite sentences ($H(3) = 19.447$, $p < .001$). Follow up with Mann-Whitney tests (Bonferroni correction applied, significance accepted at $p=.0125$) revealed no significant differences within the L1s, that is, between Arabic-speaking adults and Arabic-speaking children, on one hand, and Chinese-speaking adults and Chinese-speaking children, on the other hand. However, Arabic-speaking children were significantly different to Chinese-speaking children ($U = 55.50$, $p < .011$, $r = .46$), and Arabic-speaking adults were significantly different to Chinese-speaking adults ($U= 35.00$, $p<.001$, $r= .62$) in the acquisition of English reflexives in biclausal finite sentences.

The above findings indicate that the L1 affects the interpretation of reflexives by Chinese-speaking participants and Arabic-speaking participants, so that the performance of Arabic-speaking participants in biclausal finite sentences was better than the performance of Chinese-speaking participants due to the similarity in binding between English and Arabic on one hand, and dissimilarity between Chinese and English on the other hand. However, such view needs to be confirmed by the individual performance of L2 participants.

6.3.4.2 Individual Results

If the individual performance of L2 participants of the same L1 in this study was similar, they were expected to show the same pattern in the acquisition of reflexives, with minimum variation in their results. To put it differently, they were expected to show the same pattern whether they achieved the acquisition criterion (five out of six items) or violated it. Table (6.6) shows the individual performance of L2 participants in reflexive sentences.

Table 6.6 Individual performance of L2 participants in reflexive sentences

Group	# Correct items	#BFR	#BNR	# PS1	# PS2	# LODOAR
Arabic-speaking children (n=15)	0/6				1	
	1/6					
	2/6					
	3/6		1			
	4/6	1	1	1	1	1
	5/6	***6***	***8***	***5***	***11***	***4***
	6/6	***8***	***5***	***9***	***2***	***10***
Arabic-speaking adults (n=15)	0/6				1	
	1/6					
	2/6					
	3/6				1	
	4/6	1	3	2	4	1
	5/6	***5***	***7***	***5***	***8***	***6***
	6/6	***9***	***5***	***8***	***1***	***8***
Chinese-speaking children (n=15)	0/6					
	1/6					
	2/6				3	
	3/6				1	1
	4/6	4	1	1	3	1
	5/6	***9***	***11***	***9***	***6***	***6***
	6/6	***2***	***3***	***5***	***2***	***7***
Chinese-speaking adults (n=15)	0/6					
	1/6					1
	2/6				1	
	3/6	1			2	1
	4/6	7	5	1	4	1
	5/6	***6***	***8***	***8***	***6***	***7***
	6/6	***1***	***2***	***6***	***2***	*5*

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structure 1, PS2= possessive structure 2, LODOAR= long-distance object antecedent reflexive, n= number.

As can be noticed, Arabic-speaking participants seemed to nearly follow the same pattern in their correct and incorrect answers. As was shown in group results, they were native-like in their performance in biclausal finite reflexive sentences and close to native-like in the majority of other structures. Similarly, Chinese-speaking participants were, to some extent, similar in the pattern of their answers. However, Arabic-speaking child and adult participants seemed to be more identical than their Chinese counterparts. Also, it can be noticed that the individual performance of Chinese-speaking children was close to the individual performance of Arabic-speaking participants.

6.3.4.3 Conclusion

As was expected, the results of this section support the experimental hypothesis. Therefore, group and individual results of this section showed that L2 learners of the same L1 were at the same stage of the acquisition of English reflexives in the majority of L2 target structures.

6.4 Age, Years of English Instruction and LOR

Having discussed the group and individual performance of L2ers, it is important to see whether their performance was affected by age, years of English instruction or length of residence in the UK. Statistics discussed in (6.2) showed that there was no significant difference between Arabic-speaking adults and Chinese-speaking adults in age, years of English instruction and length of residence. Similarly, results revealed that there was no significant difference between Arabic-speaking children and Chinese-speaking children in age or length of residence. However, there was a significant difference between the two groups in years of English instruction where Chinese-speaking children (mean 4.36) received nearly double the years of English instruction than Arabic-speaking children (mean 2.67) received.

A Kandall's tau-b correlation analysis between the overall performances of L2 groups in reflexive sentences and their age, length of residence and education showed that there was no significant correlation between the performance in reflexive sentences and each of age ($r=.73$, $p>.34$), length of residence ($r=.05$, $p>.65$) and years of English instruction($r=.16$, $p>.11$). Such findings support the view that age, education and length of residence did not affect the acquisition of English reflexives by the L2 participants.

6.5 Conclusion

This chapter has presented the group and individual performance of participants in the interpretation of English reflexives. It was shown L2 participants who were at the same developmental stage in English acquired the local binding of English reflexives in the majority of the structures, yet their performance was not native-like in that native speakers showed ceiling effects in their performance and the L2 learners did not.

The majority of Arabic-speaking participants had acquired the local binding of English reflexives in biclausal finite and non-finite sentences, and their performance was native-like in the case of reflexives in biclausal finite sentences. While the majority of Arabic-speaking participants obeyed UG constraints and disallowed English reflexives to be bound by long-distance object antecedents, Arabic-speaking adults found the c-command constraint challenging, so about half of them did not obey it. However, the performance of those adults was above chance (66.66%) which indicates that they are heading towards the acquisition of this requirement. Overall, the similarity in the binding grammar between English and Arabic, as was expected, helped Arabic-speaking participants and facilitated the acquisition of English reflexives.

Although the performance of Chinese-speaking participants was not native-like, the performance of Chinese-speaking children was better than the performance of Chinese-speaking adults in the acquisition of the local binding of English reflexives. While ten Chinese-speaking children had acquired the local binding of English reflexives, only three Chinese-speaking adults had acquired the local binding of English reflexives in biclausal finite and non-finite sentences. However, the majority of the Chinese-speaking children and adults who did not acquire the local binding of English reflexives scored higher than chance (66.66%) which indicates that they will acquire the local binding of English reflexives in advanced stages of L2 acquisition. As for UG constraints, the majority of Chinese-speaking participants obeyed UG constraints and disallowed binding of English reflexives by long-distance object antecedents. However, about half of the Chinese-speaking participants found the c-command constraint challenging so they applied a linear order learning strategy where they took the closest NP as an antecedent for the reflexive. Such results indicate that when there is difference between the L1 and the target grammar, acquisition of L2 will be difficult and L2 learners might develop learning strategies.

Results also showed that there was no significant difference between Arabic-speaking children and adults, on the one hand, and Chinese-speaking children and adults, on the other hand, in the acquisition of English reflexives. Such findings support the view that both child adult L2 learners have access to UG in L2 acquisition. However, access to UG in L2 acquisition is affected by the L1 influence. In this case when there is similarity between the two languages, learners' performance, as with Arabic-speaking participants, is better than when there is a difference, as with the Chinese-speaking participants.

Although the results of reflexive sentences showed that the majority of L2 learners acquired the local binding of English reflexives, we should be cautious in drawing any conclusions based on these results. That is because the majority of L2 learners could not differentiate between the syntactic properties of reflexives and pronouns, always scoring higher in reflexives. Hence, it is possible that L2 learners applied a rule where they considered the majority of items as reflexives, so that they scored higher in reflexives.

Chapter 7. Discussion and Conclusion

7.1 UG Constraints in the L2 Acquisition of English Reflexives

Previous studies on access to UG in the adult L2 acquisition of reflexives have rendered contradictory results. However, the majority of these studies have not tested what UG prohibits in the acquisition of reflexives (Finer and Broselow, 1986; Thomas, 1989; Bennett, 1994; Lee and Schachter, 1997; Yip and Tang, 1998; Lee, 2005). That is, UG requires respect of the c-command constraint and prohibition of binding reflexives by long-distance object antecedents. Other studies which tested binding reflexives by long-distance object antecedents found that adult L2ers violated UG constraints and allowed reflexives to be bound by long-distance object antecedents (Thomas, 1995; Maclaughlin, 1998; Yuan, 1998). Researchers in these studies accounted for UG violations by claiming that adult L2ers misanalysed reflexives as pronouns, so they allowed long-distance object antecedents. As mentioned before, such a claim is problematic because these researchers did not include pronoun items in their tests. As for the c-command constraint, it has been under-researched in L2 studies on the acquisition of reflexives, but researched in L1 acquisition, showing that it was problematic for children younger than 5;6 years, who developed a linear order learning strategy to overcome the problem of c-command. However, L1 children older than 5;6 years showed good knowledge of the c-command constraint on reflexive binding (Wexler and Chien, 1985).

This study addressed the above-mentioned UG constraints in the L2 acquisition of English reflexives. Overall results showed that L2ers obeyed UG constraints where long-distance object antecedents were concerned while the c-command constraint on reflexive binding was problematic. L2ers rejected binding of English reflexives by long-distance object antecedents at a high score (above 80%). Sometimes, there was no significant difference between the performance of native speakers and that of L2ers in prohibiting binding of reflexives by long-distance object antecedents as was the case with Arabic-speaking children. Such results indicate that UG is operative in the grammar of L2ers irrespective of the age and the mother tongue of the L2er.

Individual results for participants' performance showed that L2ers might sometimes confuse reflexives with pronouns and allow reflexives to be bound by long-distance object antecedents. That is, AC1, AA7, CC2, CC14, CA1, CA3 and CA7 allowed English reflexives to be bound by long-distance object antecedents at a relatively high score. However, the individual and group performance of AA7, CC14, CA1, CA3 and CA7 showed that they confused reflexives with pronouns so it was possible that they misinterpreted reflexives as pronouns as was claimed by Thomas (1995) and Yuan (1998).

The c-command constraint on reflexive binding seems to be problematic for L2ers. Such a view was supported by the individual performance of L2ers. That is, two Arabic-speaking children and about half the participants

in each group of Arabic-speaking adults, Chinese-speaking children and Chinese-speaking adults could not pass the acquisition criterion in the c-command constraint. Similar to the findings of Wexler and Chien (1985), L2 participants who found the c-command constraint problematic developed a linear order learning strategy where they considered the closest NP as an antecedent. It is worth mentioning that such observations were more common among Chinese-speaking participants than Arabic-speaking participants. That is, two Arabic-speaking children and six Arabic-speaking adults developed a linear order learning strategy, while six Chinese-speaking children and seven Chinese-speaking adults developed a linear order strategy in the acquisition of English reflexives. It might be possible that the c-command constraint is acquired at advanced stages of L2 acquisition.

Another possibility is that L2ers in this study did not have a problem with the c-command constraint on reflexive binding, but the lexical item itself. That is, they misinterpreted the reflexive *himself* in (7.1) as a pronoun *him* so they allowed the reflexive to be bound the non-c-commanding antecedent *Jack* while it should be bound by the c-commanding antecedent *The son*.

(7.1) The son_j of Jack_i pointed to $\text{himself}_{*i/j}$/$\text{him}_{i/*j}$.

Unfortunately, the task did not test these two possibilities, but it tested the reflexive/pronoun distinction in other structures, such as biclausal finite sentences, biclausal non-finite sentences and long-distance object antecedents. However, the overall results of participants in the reflexive/pronoun distinction showed that they confused reflexives with pronouns. If this interpretation was correct, the participants in this study did not have a problem with the c-command constraint, and they did not develop a linear order learning strategy, but they had not acquired the reflexive/pronoun distinction at the time they were tested. Therefore, the problem would not be in the c-command constraint, but the lexical item itself.

In conclusion, L2ers obey UG constraints in prohibiting English reflexives to be bound by long-distance object antecedents. Some of them might misinterpret English reflexives as pronouns, but in the advanced stages of acquisition, it is expected that all L2ers will show full distinction between reflexives and pronouns. Such observations were attested in L1 studies (Wexler and Chien, 1985; Chien and Wexler, 1990; McKee, 1992; McDaniel *et al*, 1990), but are under-researched in L2 studies. As for the c-command constraint on reflexive binding, two possibilities arise: first, L2ers might develop a linear order strategy in the earlier developmental stages of the acquisition of English reflexives. Once they find such a strategy is not always successful, they will be forced to change the values of the L1-binding parameter and obey the c-command constraint. Second, L2ers do not have any problem with the c-command constraint, but instead with the reflexive/pronoun distinction so they might seem to be developing a linear order learning strategy while in reality they misinterpret reflexives as pronouns. Once the reflexive/pronoun distinction is acquired in advanced stages of L2 acquisition, the c-command problem will disappear.

7.2 Access to UG in the L2 Acquisition of English Reflexives

Previous studies on access to UG in the L2 acquisition of reflexives have rendered contradictory results. For example, Bennett (1994), Thomas (1995) and Yip and Tang (1998) support the view that adult L2ers have full access to UG in advanced stages of L2 acquisition of reflexives. In contrast, Yuan (1998) and Al-Kafri (2008) support the view that adult L2ers have indirect access to UG via the transfer of L1-instantiated properties. Different from these two views, Finer and Broselow (1986), Hirakawa (1990) and Maclaughlin (1998) claim that adult L2ers develop a kind of intermediate binding system which is neither L1-like nor L2-like, yet it is still UG-constrained.

Results of this study showed that L1 influence facilitates the acquisition of the L2 target grammar if there is similarity between the L1 and the target grammar. This conclusion is based on the evidence that there was no significant difference between the performance of native speakers and Arabic-speaking participants in the acquisition of English reflexives in biclausal finite sentences while there was significant difference between the performance of Chinese-speaking participants and that of English native speakers. Such results can be attributed to the L1 influence where there is similarity between Arabic and English in the grammar of binding and dissimilarity between English and Chinese. However, dissimilarity between the L1 and the target grammar of L2 does not mean that L2ers will not be able to acquire the target grammar because results showed that there was no significant difference between the performance of L2ers in the majority of L2 structures. The only difference was in the performance of L2ers in the acquisition of English reflexives in biclausal finite sentences, where the performance of Arabic-speaking participants was better than the performance of Chinese participants.

The overall performance of L2ers in biclausal finite and non-finite sentences was confirmed by the individual performance of L2 participants. That is, the majority of Arabic-speaking participants, twelve Arabic-speaking children and twelve Arabic-speaking adults, satisfied the acquisition criterion in biclausal finite and non-finite sentences, whilst individual results of Chinese-speaking participants were also indicative of group results. Only four Chinese-speaking children did not satisfy the acquisition criterion in biclausal finite sentences while all of the Chinese-speaking children satisfied the criterion in biclausal non-finite sentences. The individual performance of Chinese-speaking adults was the worse where eight of them failed the criterion in biclausal finite sentences whilst five Chinese-speaking adults failed the criterion in biclausal non-finite sentences. Individual performance of Chinese-speaking participants supports the view that the earlier one starts L2 acquisition the better, especially if the target grammar is different from the L1 grammar.

Although this study looked at the performance of L2ers at an intermediate developmental stage, the results of this study support the Full Transfer/Full Access Model (Schwartz and Sprouse, 1994/1996). That is, the results

of L2ers in biclausal finite sentences and biclausal non-finite sentences showed that Arabic-speaking participants were better than Chinese-speaking participants in the acquisition of English reflexives. However, thirteen Chinese-speaking participants (ten children and three adults) achieved the criterion (5/6 correct items) and acquired the local binding of English reflexives in biclausal finite and biclausal non-finite sentences. Such findings can be explained as follows: in the elementary stage, L2ers are expected to transfer the binding properties of their L1 to interpret English reflexives so that Arabic-speaking participants transferred the local binding of Arabic reflexives while the Chinese-speaking participants transferred the long-distance binding of Chinese reflexives. At the developmental stage, which this study looked at, Arabic-speaking participants were successful in the acquisition of English reflexives in biclausal finite sentences and biclausal non-finite sentences so that twenty-three Arabic-speaking participants out of thirty achieved the criterion and showed native-like performance of English reflexives. The other Arabic-speaking participants who did not achieve native-like performance are expected to have a problem with the lexical status of the item as will be discussed in (7.3). As for Chinese-speaking participants, only thirteen (ten children and three adults) at this stage could overcome their L1 influence and acquire the local binding of English reflexives in biclausal finite and biclausal non-finite sentences. However, in advance stages of L2 acquisition, Chinese-speaking participants are expected to restructure their L1-based interlanguage grammar and acquire the local binding of English reflexives. As Schwartz and Sprouse (1996: 41) argue "failure to assign a representation to input data will force some sort of restructuring of the system ('grammar'), this restructuring drawing from options of UG." In the case of Chinese-speaking participants, triggers to apply local binding of English reflexives can be the subject/object orientation of English reflexives and the complex morphological status of English reflexives[22] (White, 1995).

According to the results outlined above, the non-UG access views were not supported, that is Full Transfer/No Access Model (Schachter, 1990; Bley-Vroman, 1990/2009; Tsimpli and Roussou, 1991; and Clahsen and Hong, 1995), Full Transfer/Partial Access Model (Smith and Tsimpli, 1995; Hawkins and Chan, 1997), No Transfer/Full Access Model (Flynn and Martohardjono, 1994; Platzack, 1996) and No Transfer/No Access Model (Clahsen and muysken, 1986/1989; Meisel, 1997; Bley-Vroman, 1990/2009). For example, the views of Full Transfer/No Access Model, Full Transfer/Partial Access Model and No Transfer/No Access Model cannot account for the finding that thirteen Chinese-speaking participants could reset the values of their L1-binding parameter to the values of the binding parameter for English reflexives. Similarly, the views of No Transfer/Full Access Model cannot account for the finding that seventeen Chinese-speaking participants out of thirty transferred the values of Chinese long-distance binding and applied them to English reflexives. As for the assumptions of Partial Transfer/Full Access Model (Vainikka and Young-Scholten, 1994/1996; Vainikka and Young-Scholten, 2006/2007; Eubank, 1993/1994), it is difficult to accept or refute their assumptions in this study because of two reasons: first, it is not clear what can be partial transfer in the case of reflexives.

[22] Long-distance reflexives can be bound by only subject antecedents, and they are morphologically simple (For more details, see chapter four).

Second, if the characteristics of partial transfer in the case of reflexives are identified, L2ers need to be tested in elementary stages to see if there is any partial transfer involved in the acquisition of L2 reflexives.

As a conclusion to this section, child and adult L2ers can have access to UG in the acquisition of English reflexives. L1 facilitates the acquisition of the L2 if there is similarity between the two languages in question. However, if there is difference between the L1 grammar and the target grammar, acquisition will be difficult but not impossible.

7.3 Syntactic Difference between Reflexives and Pronouns

If we say that L2ers acquired have reflexives in a language, they should show knowledge of the syntactic difference between reflexives and pronouns. In other words, L2ers should show knowledge of the fact that reflexives in English, for example, are locally bound by c-commanding antecedents, whereas pronouns are bound by non-local antecedents. In the case of L1 acquisition, previous studies showed that L1 children (younger than 5;6) allowed long-distance binding of English reflexive, and then they realized that they were dealing with reflexives not pronouns, so that they allowed only local binding of reflexives (Wexler and Chien, 1985; Chien and Wexler, 1990; McKee, 1992; McDaniel *et al*, 1990). In other words, children at early stages of L1 acquisition misinterpret reflexives as pronouns until they reach a stage where they differentiate between the syntactic properties of reflexives and pronouns. In L2 studies on the acquisition of reflexives, this issue is under-researched.

Overall results of this study showed that child L2 participants confused reflexives with pronouns while adult participants did not. Results from child L2ers showed that they did not distinguish between reflexives and pronouns. This means that child L2ers did not have full knowledge of the syntactic difference between pronouns and reflexives, and they dealt with the majority of items as reflexives. Such an observation was obvious in the case of Arabic-speaking children who scored less than 70% in the majority of pronoun sentences. On the contrary, adult participants showed knowledge of this syntactic difference so that there was no significant difference between their performance in reflexive sentences and pronoun sentences.

Individual performance of child participants confirmed the findings of group results that children confused reflexives with pronouns, and that they acquired English reflexives in terms of lexical learning. Only two Arabic-speaking children out of twelve who passed the reflexive acquisition criterion passed the pronoun acquisition criterion. Also, only one Chinese child out of nine, who passed the reflexive acquisition criterion, passed the pronoun acquisition criterion. However, individual performance of adult participants was opposite to group results because individual performance of adult participants showed that they confused reflexives with pronouns. Similar to the individual performance of Arabic-speaking children, only five Arabic-speaking adults out of the twelve who passed the reflexive acquisition criterion passed the pronoun acquisition criterion.

Surprisingly, neither of the two Chinese-speaking adults, who passed the reflexive acquisition criterion, passed the pronoun acquisition criterion.

In conclusion, the performance of L2ers in reflexive sentences outweighed their performance in pronoun sentences. Such results support the view that the majority of L2ers in developmental stages develop lexical learning of English reflexives.

7.4 Differences and Similarities between Child and Adult L2 Learners

Different theories and hypotheses in second language acquisition, as discussed above, support different views of access to UG by adult L2ers. For example, the Critical Period Hypothesis supports the view that the ability to acquire a first language is confined in time, particularly between the age range of 2 and 12. After that, there is a sudden cut-off and the language faculty is not sensitive to the linguistic input (Lenneberg, 1967). However, in second language acquisition, Johnson and Newport (1989) and Seol (2005) showed that the performance of post-puberty L2ers varies according to the rule type. More specifically, late arrivals found some grammatical structures, such as determiners, plurals, 3rd person singular and past tense to be problematic while they found word order and particle movement less problematic. However, the Fundamental Difference Hypothesis supports the view that pre-puberty language acquisition depends on UG as an innate linguistic knowledge base in addition to domain-specific learning procedures whilst post-puberty or adult L2 acquisition relies on the knowledge of L1 as a linguistic knowledge base and a set of domain-general learning procedures (Bley-Vroman, 1989/2009). This view is challenged by the Domain-by-Age-Model which supports the view that child and adult L2ers of the same L1 follow the same path of acquisition in the realm of L2 syntax while they differ in inflectional morphology and phonology (Schwartz, 2003). Thus, age differences are in phonology and morphology, not syntax.

As said before, only two studies were conducted to compare the performance of adult and child L2ers in the acquisition of reflexives. The first study supports the view that a sensitive period for principle A does exist between the ages 5 and 13. After that age, there will be a gradual decline in the ability to acquire the local binding of English reflexives (Lee and Schachter, 1997). However, the second study supports that L2 children are different from L2 adults in that adult L2ers pass through developmental stages in the acquisition of reflexives while the developmental path of child L2ers was not clearly determined (Lee, 2005). However, both studies had, as discussed above, serious methodological problems that might have affected their results. Therefore, this study attempts to avoid these methodological problems and present better understanding of child-adult L2 differences and similarities in the acquisition of English reflexives.

The results of this study showed that adult and child L2ers who were at the same proficiency level in English were at the same developmental stage in the acquisition of English reflexives. That is, there was no significant

difference between the performance of child and adult Arabic-speaking participants in the majority of the structures tested, on the one hand, and there was no significant difference between the performance of Chinese-speaking child and adult participants in the majority of structures tested, on the other hand. However, since Arabic and English share the local binding of reflexives while Chinese and English do not, the performance of Arabic-speaking participants was better than the performance of Chinese-speaking participants, especially adults.

The results of this study mainly support the assumptions of the Domain-by-Age-Model in the case of Syntax (Schwartz, 2003). Schwartz argues that child and adult L2ers of the same L1 will follow the same path of development in the acquisition of L2 syntax while they will differ in L2 morphology and phonology, with child L2ers performing better than adults in morphology and phonology. As this study was about L2 syntax, there was no significant difference between performances of Arabic-speaking children and adults, on the one hand, and there was no significant difference between the performances of Chinese-speaking children and adults, on the other hand. Hence, the Domain-by-Model is supported in the acquisition of L2 syntax.

7.5 Limitations and recommendations for further Research

Although the researcher in this study tried to avoid methodological criticism of previous studies on the acquisition of reflexives by L2ers, this study too can be criticized for the limited number of participants that were involved. That is, only sixty L2ers from one stage participated. However, time limitations restricted the researcher to one stage because it was not easy to recruit more L2ers, especially child participants. To give more conclusive results and evidence, future research should consider more than one stage and more participants in each stage. Also, conducting a study on both child and adult L2ers was a big challenge, but the Simon-Says game proved to be successful. Any future research on both child and adult L2ers is advised to consider games as means of data collection, especially if the target property is sophisticated.

7.6 Conclusion

The main aim of this study was to address the on-going debate on access to UG by adult L2 learners. Different from the majority of previous studies on this topic, this study addressed the issue by comparing between the performance of adult and child L2 learners of the same L1 in the acquisition of English reflexives. The results of such a comparison, as discussed above, are very important because there is a kind of general agreement that child L2 learners still have access to UG (Schwartz, 2003/2004). Previous studies on the acquisition of reflexives by adult L2 learners have rendered contradictory views which can be summarized as follows: adult L2 learners have full direct access to UG, adult L2 learners have indirect access to UG via the L1; and adult L2 learners can a develop an intermediate binding grammar different from the L1 and L2 binding, but UG-constrained.

In accordance with previous research (Johnson and Newport, 1989; Seol, 2005; Schwartz, 2004), this study has shown that the issue of access to UG in L2 acquisition is related to UG differences rather than age differences. That is, child and adult L2 learners of the same L1 follow the same path in the acquisition of L2 syntax, while they differ in the acquisition of L2 inflectional morphology and phonology (Schwartz, 2004).Therefore, adult and child L2 learners of the same L1 showed operation of UG in the acquisition of English reflexives. Thus, the results of this study support the assumptions of the Domain-by-Age-Model (Schwartz, 2004) and the Full Transfer/Full Access Model (Schwartz and Sprouse, 1994/1996).

Based on the results of this study, both Chinese-speaking participants and Arabic-speaking participants in developmental stages did not know the syntactic status of the item that they dealt with, so that they confused reflexives with pronouns and developed learning strategies, such as a linear order strategy. At this stage, the L1 influence will be noticed in the performance of L2 learners, so that the performance of Arabic-speaker participants will be better than the Chinese-speaking participants. However, some of the Chinese-speaking participants might overcome the L1 influence and show native-like performance in the acquisition of English reflexives. At advanced stages of L2 acquisition, L2 learners are expected to realize that they are dealing with two distinct syntactic items with different syntactic properties and a linear order strategy cannot always help them to acquire the local binding of English reflexives. Therefore, they become forced to change the values of their L1-binding parameter to that of English.

Appendices:

Appendix A: Simon Says Game

Practice Sentences:

1- Simon says Jack should touch John.
2- Simon wants Jack to touch John.
3- Simon tells Jack that John should touch Simon
4- Simon says Jack's son should point to Simon.
5- Simon says the son of Jack should touch Simon.

The Task:

1- Simon wants Jack to point to himself.
2- Simon wants Jack to give him a ball.
3- Simon says Jack should give himself a book.
4- Simon says Jack should point to him.
5- Simon says Jack should give himself a cookie.
6- Simon says Jack should give himself a ball.
7- Simon wants Jack to give him a watch.
8- Simon wants Jack to give him a car.
9- Simon tells John that Jack should point to himself.
10- Simon says Jack should give himself a car.
11- Simon says Jack should give him a book.
12- Simon tells John that Jack should give himself a cookie.
13- Simon says Jack's son should point to himself.
14- Simon wants Jack to give him a book.
15- Simon says Jack should point to himself.
16- Simon says the son of Jack should give himself a book.
17- Simon tells John that Jack should give himself a book.
18- Simon says Jack's son should give himself a car.
19- Simon tells John that Jack should point to him.
20- Simon wants Jack to give himself a cookie.
21- Simon says Jack should give him a car.
22- Simon says Jack should give himself a watch.
23- Simon says that the son of Jack should give himself a cookie.
24- Simon wants Jack to point to him.
25- Simon tells John that Jack should give himself a car.
26- Simon says Jack's son should give himself a watch.

27- Simon says Jack should give him a cookie.

28- Simon says Jack’s son should give himself a book.

29- Simon tells John that Jack should give him a watch.

30- Simon wants Jack to give himself a watch.

31- Simon says that the son of Jack should point to himself.

32- Simon wants Jack to give himself a car.

33- Simon tells John that Jack should give him a ball.

34- Simon says Jack should give him a ball.

35- Simon tells John that Jack should give him a cookie.

36- Simon wants Jack to give himself a ball.

37- Simon tells John that Jack should give him a book.

38- Simon says Jack should give him a watch.

39- Simon says Jack’s son should give himself a cookie.

40- Simon wants Jack to give him a cookie.

41- Simon says the son of Jack should give himself a watch.

42- Simon tells John that Jack should give himself a ball.

43- Simon says that the son of Jack should give himself a ball.

44- Simon tells John that Jack should give him a car.

45- Simon says that the son of Jack should give himself a car.

46- Simon wants Jack to give himself a book.

47- Simon tells John that Jack should give himself a watch.

48- Simon says Jack’s son should give himself a ball.

NEWCASTLE UNIVERSITY

Project Description/ participant's copy

Project title: Interpretation of English Reflexives by Non-Native Speakers.

This project investigates learning of English by non-native speakers. In this project, non-native speakers of English will be of two languages: Arabic and Chinese. More specifically, learning of English grammar by non-native speakers will be the point of interest in the project.

Participants will be of two age groups: adult and children. Hence, there will be two child groups and two adult groups in the project. All of the participants are expected to be living in the United Kingdom and they learn English as their second language. In addition to these groups, there will be a group of native speakers of English.

The project consists of two tasks. The first task will decide the proficiency level of the non-native speakers. This means that non-native speakers, children and adult, will have a test to decide their command of English as a second language. The second task will be the main focus of the project. Participants and the study administrator will play a game which does not take more than 45 minutes. The study in total takes about 60 minutes.

The importance of this project lies in understanding the nature of the grammar that non-native speakers develop when they learn English. The study is expected to be risk-free because it does not involve anything that can affect the participants. The only risk in the study is the participants' privacy and confidentiality. This matter will be highly considered and participants' information and data will be anonymous.

Your participation in the study is highly appreciated and it will help the researcher to achieve the aim of the study.

NEWCASTLE UNIVERSITY

FORM OF CONSENT TO TAKE PART IN A RESEARCH PROJECT

CONFIDENTIAL

Project title: Interpretation of English reflexives by non-native speakers.

I, the undersigned participant, agree to take part in the above named project / investigation, the details of which have been fully explained to me. The researcher explained to me all of what is required from me in this study, and he clarified anything that might affect me as a participant in this project. The researcher provided me with a project description copy which fully explains the project and my contribution to the study. Also, the researcher took the full responsibility to keep data confidential and my identity anonymous in the study.

Name…… Signature…… Date……
(Participant's full name[23])

I, the undersigned researcher, certify that the details of this project / investigation have been fully explained and described in writing to the subject named above and have been understood by him / her. I also take the full responsibility to keep data confidential and the participant's identity anonymous. The participant's privacy and safety is my top responsibility in this project.

Name..AMER AL KAFRI…… Signature……Date……
(Researcher's full name)

[23] If the participant is a child, one of his/her parents is to sign this form on his/her behalf.

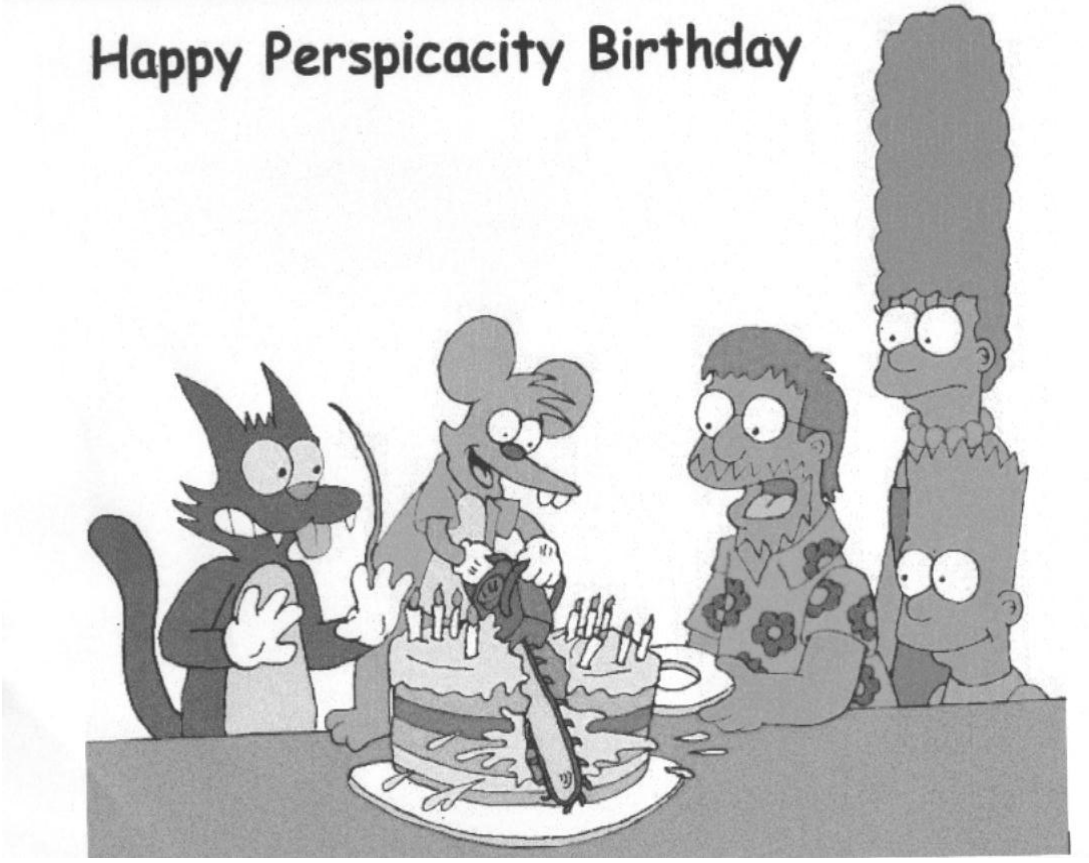
Participant Profile

The information you give will be treated as confidential and will only be used in data analysis. Your anonymity will be retained in the presentation of results from the study.

1. Your name:
2. Your native language(s):
3. Are you: (a) female (b) male (tick one)
4. Your date of birth:
5. Age at which you first started learning English (write native if you are a native speaker, and go to question 8)
6. Number of years you have attended English classes:
7. Have you lived in an English-speaking community? (a) yes (b) no (tick one)
   If your answer is 'yes', how long in months:
8. Other languages you speak fluently:
9. other languages you speak moderately:
10. Are you:
    An undergraduate student?
    A postgraduate student?
    Other (please specify):

Appendix E: Simpson pictures used in the proficiency test.


POLICE
MATT GROENING


Happy Perspicacity Birthday


THE SIMPSONS

Appendix F: Answer Sheet in Simon-Says-Task

Participant's Name..... Date.....

Item Number	Condition type	First antecedent	Second antecedent	Third antecedent
- 1	BIR	Ant 1	Ant 2	
-2	BIP	Ant 1	Ant 2	
-3	BFR	Ant 1	Ant 2	
-4	BFP	Ant 1	Ant 2	
-5	BFR	Ant 1	Ant 2	
-6	BFR	Ant 1	Ant 2	
-7	BIP	Ant 1	Ant 2	
-8	BIP	Ant 1	Ant 2	
-9	LDOAR	Ant 1	Ant 2	Ant 3
-10	BFR	Ant 1	Ant 2	
-11	BFP	Ant 1	Ant 2	
-12	LDOAR	Ant 1	Ant 2	Ant 3
-13	PS1	Ant 1	Ant 2	Ant 3
-14	BIP	Ant 1	Ant 2	
-15	BFR	Ant 1	Ant 2	
-16	PS2	Ant 1	Ant 2	Ant 3
-17	LDOAR	Ant 1	Ant 2	Ant 3
-18	PS1	Ant 1	Ant 2	Ant 3
-19	LDOAP	Ant 1	Ant 2	Ant 3
-20	BIR	Ant 1	Ant 2	
-21	BFP	Ant 1	Ant 2	
-22	BFR	Ant 1	Ant 2	
-23	PS2	Ant 1	Ant 2	Ant 3
-24	BIP	Ant 1	Ant 2	
-25	LDOAR	Ant 1	Ant 2	Ant 3
-26	PS1	Ant 1	Ant 2	Ant 3
-27	BFP	Ant 1	Ant 2	
-28	PS1	Ant 1	Ant 2	Ant 3
-29	LDOAP	Ant 1	Ant 2	Ant 3
-30	BIR	Ant 1	Ant 2	
-31	PS2	Ant 1	Ant 2	Ant 3
-32	BIR	Ant 1	Ant 2	
-33	LDOAP	Ant 1	Ant 2	Ant 3
-34	BFP	Ant 1	Ant 2	
-35	LDOAP	Ant 1	Ant 2	Ant 3
-36	BIR	Ant 1	Ant 2	
-37	LDOAP	Ant 1	Ant 2	Ant 3
-38	BFP	Ant 1	Ant 2	
-39	PS1	Ant 1	Ant 2	Ant 3
-40	BIP	Ant 1	Ant 2	
-41	PS2	Ant 1	Ant 2	Ant 3
-42	LDOAR	Ant 1	Ant 2	Ant 3
-43	PS2	Ant 1	Ant 2	Ant 3
-44	LDOAP	Ant 1	Ant 2	Ant 3
-45	PS2	Ant 1	Ant 2	Ant 3
-46	BIR	Ant 1	Ant 2	
-47	LDOAR	Ant 1	Ant 2	Ant 3
-48	PS1	Ant 1	Ant 2	Ant 3

Appendix G: Proficiency score results

Proficiency scores for Arabic-speaking adults

Participant	Total of words (A)	Total of utterances (B)	Total of error-free Utterances (C)	Complexity measure (D)=A/B	Accuracy % (E)=C/B	Accuracy Measure (F)=Ex10	Prof. score	T score
AA1	402	55	30	7.31	54.55	5.45	13.62	30.97
AA2	441	53	27	8.32	50.94	5.09	14.39	42.74
AA3	541	64	37	8.45	57.81	5.78	15.22	60.89
AA4	422	54	32	7.81	59.26	5.93	14.66	51.60
AA5	494	57	34	8.67	59.65	5.96	15.65	69.25
AA6	398	45	23	8.84	51.11	5.11	14.99	53.43
AA7	492	57	37	8.63	64.91	6.49	16.13	80.47
AA8	387	44	24	8.80	54.55	5.45	15.28	60.24
AA9	515	61	39	8.44	63.93	6.39	15.82	74.54
AA10	421	47	25	8.96	53.19	5.32	15.32	60.36
AA11	390	44	23	8.86	52.27	5.23	15.13	56.43
AA12	439	53	27	8.28	50.94	5.09	14.35	41.99
AA13	459	52	26	8.83	50.00	5.00	14.86	50.57
AA14	435	55	29	7.91	52.73	5.27	14.11	38.67
AA15	420	55	30	7.64	54.55	5.45	13.98	37.41

Proficiency scores for Arabic-speaking children

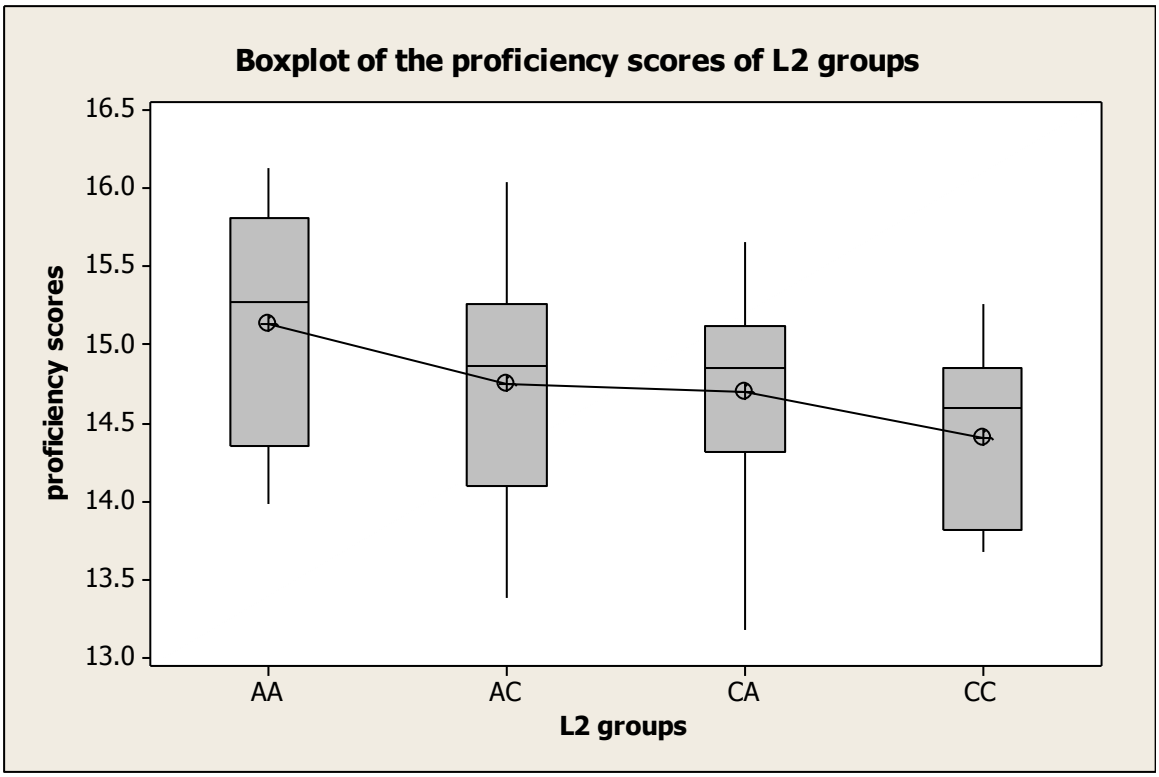
Participant	Total of words (A)	Total of utterances (B)	Total of error-free Utterances (C)	Complexity measure (D)=A/B	Accuracy % (E)=C/B	Accuracy Measure (F)=Ex10	Prof. score	T score
AC1	391	54	30	7.24	55.56	5.56	13.64	31.91
AC2	450	55	38	8.18	69.09	6.91	16.05	81.08
AC3	477	54	32	8.83	59.26	5.93	15.79	71.65
AC4	402	56	34	7.18	60.71	6.07	14.09	42.36
AC5	488	58	35	8.41	60.34	6.03	15.43	65.85
AC6	397	48	26	8.27	54.17	5.42	14.66	49.04
AC7	483	55	30	8.78	54.55	5.45	15.26	59.97
AC8	503	62	37	8.11	59.68	5.97	15.03	58.41
AC9	400	50	28	8.00	56.00	5.60	14.54	47.87
AC10	399	55	29	7.25	52.72	5.27	13.38	25.78
AC11	423	53	27	7.98	50.94	5.09	14.01	36.05
AC12	492	56	30	8.79	53.57	5.36	15.17	57.84
AC13	408	53	30	7.70	56.60	5.66	14.26	43.29
AC14	456	52	27	8.77	51.92	5.19	14.99	53.78
AC15	477	56	30	8.52	53.57	5.36	14.87	52.57

Proficiency scores for Chinese-speaking adults

Participant	Total of words (A)	Total of utterances (B)	Total of error-free Utterances (C)	Complexity measure (D)=A/B	Accuracy % (E)=C/B	Accuracy Measure (F)=Ex10	Prof. score	T score
CA1	403	48	24	8.40	50.00	5.00	14.38	42.08
CA2	456	55	35	8.29	63.64	6.36	15.62	70.88
CA3	471	57	29	8.26	50.88	5.09	14.32	41.45
CA4	389	55	29	7.07	52.73	5.27	13.17	22.20
CA5	455	55	31	8.27	56.36	5.64	14.88	54.06
CA6	423	53	27	7.98	50.94	5.09	14.01	36.05
CA7	477	54	28	8.83	51.85	5.19	15.05	54.88
CA8	467	54	30	8.65	55.56	5.56	15.22	59.62
CA9	439	60	34	7.32	56.67	5.67	13.84	35.92
CA10	485	55	28	8.82	50.91	5.09	14.94	52.45
CA11	431	53	29	8.13	54.72	5.47	14.56	47.56
CA12	449	54	30	8.31	55.56	5.56	14.84	53.06
CA13	458	56	32	8.18	57.14	5.71	14.85	53.97
CA14	503	57	30	8.82	52.63	5.26	15.12	56.48
CA15	463	56	36	8.27	64.29	6.43	15.66	71.89

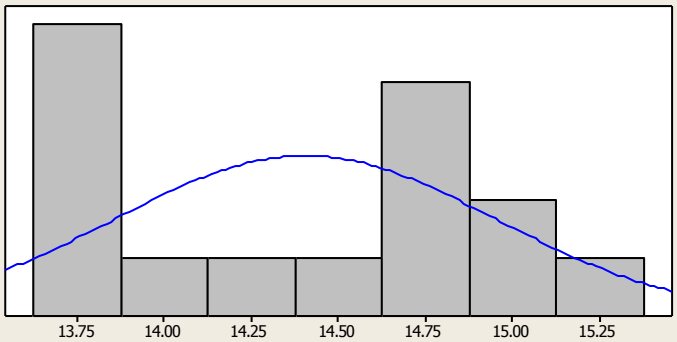
Proficiency scores for Chinese-speaking children

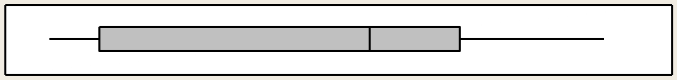
Participant	Total of words (A)	Total of utterances (B)	Total of error-free Utterances (C)	Complexity measure (D)=A/B	Accuracy % (E)=C/B	Accuracy Measure (F)=Ex10	Prof. score	T score
CC1	422	52	26	8.12	50.00	5.00	14.06	36.56
CC2	476	54	28	8.81	51.85	5.19	15.03	54.52
CC3	398	53	29	7.51	54.72	5.47	13.86	35.30
CC4	443	55	31	8.05	56.36	5.64	14.63	49.76
CC5	423	54	27	7.83	50.00	5.00	13.75	31.00
CC6	463	53	27	8.74	50.94	5.09	14.85	50.91
CC7	502	61	36	8.23	59.02	5.90	15.09	59.21
CC8	409	52	31	7.87	59.62	5.96	14.75	53.40
CC9	453	53	27	8.55	50.94	5.09	14.64	47.19
CC10	467	57	31	8.19	54.39	5.44	14.59	48.01
CC11	389	53	29	7.34	54.72	5.47	13.67	31.96
CC12	422	53	26	7.96	49.06	4.91	13.80	31.41
CC13	419	52	25	8.06	48.08	4.81	13.81	31.07
CC14	455	51	27	8.92	52.94	5.29	15.26	59.09
CC15	439	54	28	8.13	51.85	5.19	14.27	41.03

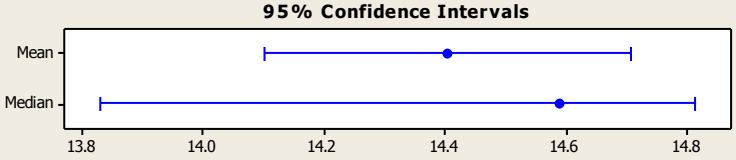


AA= Arabic-speaking adults; AC= Arabic-speaking children; CA= Chinese-speaking adults; CC= Chinese-speaking children

Summary for Chinese-speaking children

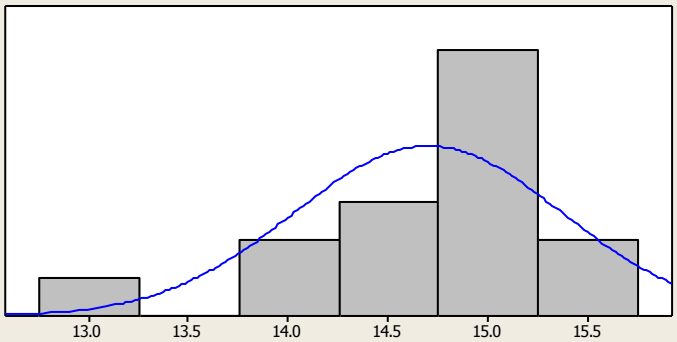


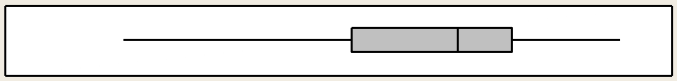


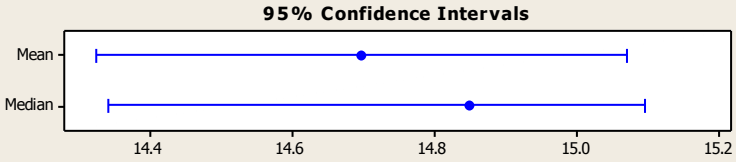


Anderson-Darling Normality Test	
A-Squared	0.51
P-Value	0.162
Mean	14.404
StDev	0.546
Variance	0.298
Skewness	0.02403
Kurtosis	-1.53465
N	15
Minimum	13.670
1st Quartile	13.810
Median	14.590
3rd Quartile	14.850
Maximum	15.260
95% Confidence Interval for Mean	
14.102	14.706
95% Confidence Interval for Median	
13.829	14.813
95% Confidence Interval for StDev	
0.400	0.861

Summary for Chinese-speaking adults

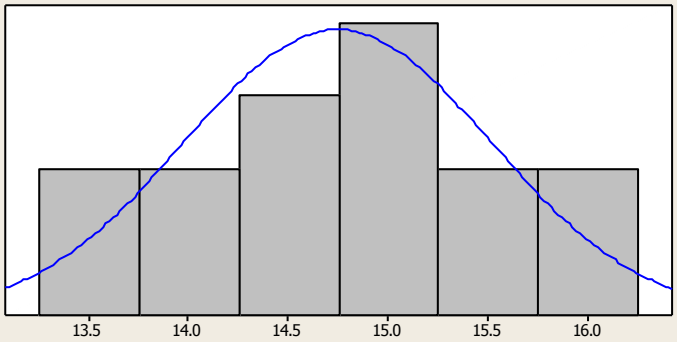


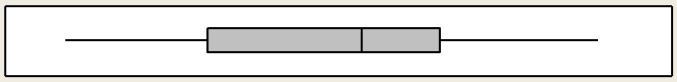


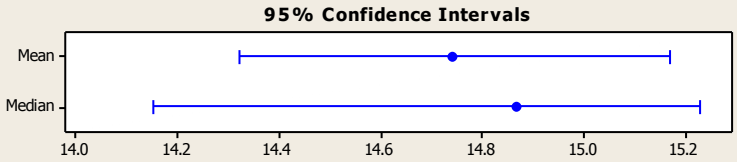


Anderson-Darling Normality Test	
A-Squared	0.30
P-Value	0.535
Mean	14.697
StDev	0.670
Variance	0.449
Skewness	-0.721949
Kurtosis	0.553931
N	15
Minimum	13.170
1st Quartile	14.320
Median	14.850
3rd Quartile	15.120
Maximum	15.660
95% Confidence Interval for Mean	
14.326	15.069
95% Confidence Interval for Median	
14.342	15.094
95% Confidence Interval for StDev	
0.491	1.057

Summary for Arabic-speaking children

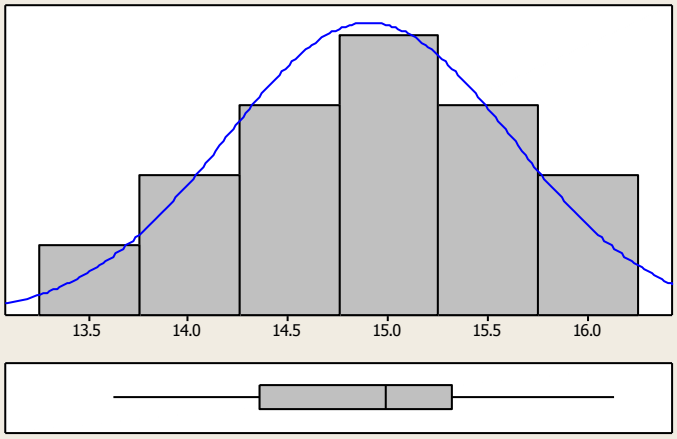


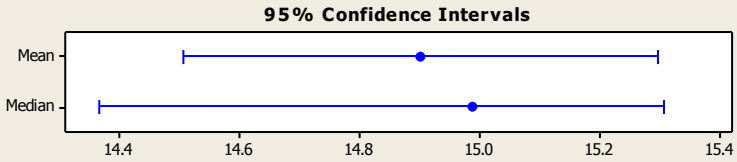




Anderson-Darling Normality Test	
A-Squared	0.13
P-Value	0.979
Mean	14.745
StDev	0.766
Variance	0.586
Skewness	-0.137316
Kurtosis	-0.595178
N	15
Minimum	13.380
1st Quartile	14.090
Median	14.870
3rd Quartile	15.260
Maximum	16.050
95% Confidence Interval for Mean	
14.321	15.169
95% Confidence Interval for Median	
14.153	15.226
95% Confidence Interval for StDev	

Summary for Arabic-speaking adults





Anderson-Darling Normality Test	
A-Squared	0.14
P-Value	0.963
Mean	14.901
StDev	0.714
Variance	0.510
Skewness	-0.104168
Kurtosis	-0.664878
N	15
Minimum	13.620
1st Quartile	14.350
Median	14.990
3rd Quartile	15.320
Maximum	16.130
95% Confidence Interval for Mean	
14.505	15.296
95% Confidence Interval for Median	
14.365	15.305
95% Confidence Interval for StDev	
0.523	1.126

Appendix H: Raw results of the participants in Simon-Says-Game

Results of Arabic-speaking children

Participant	BFR	BNR	LDOAR	PS1	PS2	BFP	BNP	LDOAP
AC1	83.33	100	66.66	83.33	66.66	83.33	66.66	100
AC2	100	50.00	83.33	100	83.33	83.33	100	66.66
AC3	100	100	100	100	0	83.33	66.66	83.33
AC4	83.33	83.33	100	83.33	83.33	0	66.66	83.33
AC5	100	100	100	100	83.33	100	83.33	83.33
AC6	83.33	66.66	83.33	100	83.33	100	83.33	83.33
AC7	100	83.33	100	100	83.33	16.66	33.33	0
AC8	100	83.33	83.33	83.33	100	83.33	66.66	83.33
AC9	66.66	83.33	83.33	66.66	83.33	66.66	83.33	100
AC10	83.33	83.33	100	83.33	83.33	66.66	100	83.33
AC11	100	83.33	100	83.33	83.33	100	83.33	83.33
AC12	100	100	100	100	83.33	16.66	66.66	83.33
AC13	83.33	83.33	100	100	100	16.66	16.66	0
AC14	100	83.33	100	100	83.33	33.33	16.66	0
AC15	83.33	100	100	100	83.33	50.00	33.33	16.66

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structures 1, PS2= possessive structures 2, LDOAR= long-distance object antecedent reflexive, BFP= biclausal finite pronoun, BNP= biclausal non-finite pronoun, LDOAP= long-distance object antecedent pronoun.

Results of Arabic-speaking adults

Participant	BFR	BNR	LDOAR	PS1	PS2	BFP	BNP	LDOAP
AA1	100	100	100	100	0	83.33	66.66	100
AA2	100	83.33	100	83.33	83.33	83.33	66.66	100
AA3	100	83.33	100	66.66	83.33	100	83.33	83.33
AA4	66.66	100	100	100	83.33	100	100	100
AA5	100	83.33	83.33	100	66.66	83.33	100	100
AA6	83.33	66.66	83.33	100	50.00	83.33	66.66	83.33
AA7	83.33	66.66	66.66	83.33	83.33	83.33	66.66	66.66
AA8	83.33	83.33	100	100	83.33	83.33	83.33	66.66
AA9	100	83.33	100	83.33	66.66	83.33	83.33	66.66
AA10	83.33	66.66	83.33	66.66	66.66	83.33	50.00	66.66
AA11	100	100	100	100	100	50.00	66.66	16.66
AA12	100	83.33	100	83.33	83.33	83.33	83.33	100
AA13	100	83.33	83.33	100	83.33	100	83.33	100
AA14	100	100	83.33	100	83.33	66.66	83.33	100
AA15	83.33	100	83.33	83.33	66.66	83.33	66.66	83.33

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structures 1, PS2= possessive structures 2, LDOAR= long-distance object antecedent reflexive, BFP= biclausal finite pronoun, BNP= biclausal non-finite pronoun, LDOAP= long-distance object antecedent pronoun.

Results of Chinese-speaking children

Participant	BFR	BNR	LDOAR	PS1	PS2	BFP	BNP	LDOAP
CC1	66.66	83.33	83.33	83.33	83.33	83.33	33.33	83.33
CC2	83.33	100	50.00	83.33	83.33	83.33	83.33	100
CC3	83.33	100	83.33	100	33.33	66.66	50.00	66.66
CC4	83.33	100	83.33	83.33	100	83.33	100	83.33
CC5	83.33	83.33	100	83.33	66.66	83.33	100	66.66
CC6	66.66	83.33	100	66.66	83.33	66.66	83.33	66.66
CC7	83.33	83.33	100	83.33	83.33	66.66	83.33	83.33
CC8	100	83.33	100	83.33	33.33	33.33	50.00	33.33
CC9	83.33	83.33	100	83.33	66.66	66.66	83.33	66.66
CC10	83.33	83.33	100	100	83.33	33.33	.1600	33.33
CC11	66.66	83.33	83.33	100	33.33	83.33	66.66	83.33
CC12	83.33	83.33	100	83.33	66.66	66.66	83.33	83.33
CC13	100	100	83.33	100	50.00	66.66	50.00	33.33
CC14	83.33	83.33	66.66	83.33	83.33	83.33	66.66	66.66
CC15	66.66	83.33	83.33	100	100	100	83.33	66.66

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structures 1, PS2= possessive structures 2, LDOAR= long-distance object antecedent reflexive, BFP= biclausal finite pronoun, BNP= biclausal non-finite pronoun, LDOAP= long-distance object antecedent pronoun.

Results of Chinese-speaking adults

Participant	BFR	BNR	LDOAR	PS1	PS2	BFP	BNP	LDOAP
CA1	83.33	83.33	16.66	66.66	33.33	83.33	100	83.33
CA2	66.66	83.33	83.33	100	66.66	83.33	66.66	83.33
CA3	66.66	83.33	50.00	83.33	83.33	66.66	50.00	50.00
CA4	83.33	66.66	83.33	83.33	100	83.33	83.33	100
CA5	66.66	83.33	83.33	100	66.66	83.33	83.33	66.66
CA6	83.33	66.66	100	83.33	83.33	83.33	83.33	100
CA7	50.00	66.66	66.66	83.33	50.00	16.66	66.66	83.33
CA8	66.66	83.33	100	83.33	83.33	50.00	83.33	66.66
CA9	83.33	66.66	83.33	100	83.33	83.33	83.33	100
CA10	66.66	83.33	83.33	100	66.66	83.33	66.66	83.33
CA11	83.33	66.66	83.33	83.33	83.33	66.66	83.33	66.66
CA12	100	100	100	100	100	16.66	50.00	33.33
CA13	66.66	83.33	100	83.33	66.66	66.66	83.33	83.33
CA14	66.66	83.33	100	83.33	83.33	83.33	83.33	100
CA15	83.33	100	83.33	100	50.00	66.66	50.00	83.33

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structures 1, PS2= possessive structures 2, LDOAR= long-distance object antecedent reflexive, BFP= biclausal finite pronoun, BNP= biclausal non-finite pronoun, LDOAP= long-distance object antecedent pronoun.

Results of native English speakers- adults

Participant	BFR	BNR	LDOAR	PS1	PS2	BFP	BNP	LDOAP
ANS1	100	100	100	100	100	100	100	100
ANS2	100	100	100	100	100	100	100	100
ANS3	100	100	100	100	100	100	100	100
ANS4	100	100	100	100	100	100	100	100
ANS5	100	100	100	100	100	83.33	100	100
ANS6	100	100	100	100	100	100	100	100
ANS7	100	100	100	100	100	100	100	100
ANS8	100	100	100	100	100	100	100	83.33
ANS9	100	100	100	100	100	100	100	100
ANS10	100	100	100	100	100	100	83.33	100
ANS11	100	100	100	100	83.33	100	100	100
ANS12	100	100	100	100	100	100	100	100
ANS13	83.33	100	100	100	100	100	100	100
ANS14	100	100	100	100	100	100	100	100
ANS15	100	100	100	100	100	100	100	100

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structures 1, PS2= possessive structures 2, LDOAR= long-distance object antecedent reflexive, BFP= biclausal finite pronoun, BNP= biclausal non-finite pronoun, LDOAP= long-distance object antecedent pronoun.

Results of native English speakers- children

Participant	BFR	BNR	LDOAR	PS1	PS2	BFP	BNP	LDOAP
CNS1	100	100	100	100	83.33	100	100	83.33
CNS2	100	83.33	100	100	100	100	83.33	100
CNS3	100	83.33	100	100	100	100	83.33	100
CNS4	100	100	100	100	100	100	100	100
CNS5	100	100	100	100	100	100	100	83.33
CNS6	100	100	100	100	100	100	100	100
CNS7	100	100	100	100	100	100	100	100
CNS8	83.33	100	100	100	100	83.33	100	100
CNS9	100	100	100	100	100	100	100	100
CNS10	100	100	100	100	83.33	100	100	100
CNS11	100	100	100	100	100	100	100	83.33
CNS12	100	100	100	100	100	100	100	100
CNS13	100	100	100	100	100	100	100	100
CNS14	100	100	100	100	100	100	83.33	100
CNS15	100	100	100	100	100	100	100	100

BFR= biclausal finite reflexives, BNR= biclausal non-finite reflexives, PS1= possessive structures 1, PS2= possessive structures 2, LDOAR= long-distance object antecedent reflexive, BFP= biclausal finite pronoun, BNP= biclausal non-finite pronoun, LDOAP= long-distance object antecedent pronoun.

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