

THE ACQUISITION AND PROCESSING OF WH-MOVEMENT
BY NAJDI LEARNERS OF ENGLISH

BY

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Abstract

This dissertation examines the acquisition of relative clauses and wh-questions by Najdi learners of English. We investigated whether or not Najdi learners of English can acquire wh-movement, a property that is not instantiated in the native language. Previous research has argued that L2 learners cannot acquire the wh-feature in the L2 if this feature is not instantiated in L1 (Hawkins and Chan, 1997).

We conducted two experiments: a grammaticality judgment task and a self-paced reading task. The results of the grammaticality judgment task showed that some Najdi advanced learners of English have acquired wh-movement. The results of the self-paced reading study show similar results.

These results of both studies suggest that L2 learners whose L1 lacks certain features are able to acquire these new features in the L2. In this dissertation, we argue against the Representational Deficit Hypothesis (Hawkins and Chan, 1997) and the Shallow Structure Hypothesis (Clahsen and Felser, 2006), and argue in support of the Full Transfer/Full Access theory (Schwartz and Sprouse, 1994).

Dedication

To my parents: Nasser Aldwayan and Norah Alomairi

رَبِّ اغْفِرْ لِيَّ وَلِوَالِدَيَّ رَبِّ ارْحَمْهُمَا كَمَا رَبَّيَانِي صَغِيرًا
الْحَمْدُ لِلَّهِ الَّذِي بِنِعْمَتِهِ تَتِمُّ الصَّالِحَاتُ

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CHAPTER 1

INTRODUCTION

1. Introduction

This dissertation examines the acquisition of wh-movement in L2 English from two different perspectives. The first study, to be reported in chapter three, is an extension of Hawkins and Chan's (1997) study and reports on the results of a grammaticality judgment task. This study tests whether or not L2 learners are able to acquire the constraints on wh-movement in English relative clauses. The second study, to be reported in chapter four, is based on Stowe's (1986) study but extends the investigation for L2 learners and reports on the results of a self-paced reading task. This study examines whether or not L2 learners are able to process wh-questions similar to native speakers and whether or not their processing is constrained by

syntax. These two studies will enable us to evaluate different theories in the Second Language Acquisition (SLA) research.

2. Second language acquisition theories

Different theories of second language acquisition make different predictions with respect to both the role of transfer and the ultimate attainment (that is, whether or not the acquisition of the L2 syntactic properties, i.e., wh-movement, is possible for L2 learners). The dissertation will evaluate two main issues addressed in the second language acquisition research, namely, L1 transfer (Corder, 1983, 1992; Kellerman & Sharwood-Smith, 1986) and the Critical Period (Long, 1990; Johnson & Newport, 1991). The first issue, transfer, is concerned with the question of to what extent the properties of the L1 grammar influence L2 acquisition (White, 2003). Two theories which posit L1 transfer are Full Transfer/Full Access theory (FT/FA) (Schwartz & Sprouse, 1996) and the Representational Deficit Hypothesis (RDH), formally known as the Failed Functional Feature Hypothesis (FFFH) (Hawkins & Chan 1997). Both theories consider the L1 grammar to be the starting point for the acquisition of L2. On the other hand, Direct Access theory (Epstein, Flynn, & Martohardjono, 1996) considers the Universal Grammar (UG) to be the starting point for the acquisition of L2.

A group of researchers in the generative framework formulated the question of the Critical Period Hypothesis; whether or not adult L2 learners have access to Universal Grammar (UG) beyond a certain age (White, 2003). The Representational Deficit Hypothesis proposed by Hawkins and Chan (1997) argues that there is a critical period for the acquisition of functional features (like *wh*-feature or agreement) that differ between the L1 and L2. That is, adult L2 learners cannot acquire a feature if this feature is not instantiated in their L1, and L2 learners are limited to the inventory of syntactic features of their L1. On the other hand, recall that Full Transfer/Full Access (Schwartz & Sprouse, 1996) predicts that there will be a transfer in the early stages of learning; however, for the advanced L2 learners, this theory (Full Transfer/Full Access) and Direct Access theory (Epstein, Flynn, & Martohardjono, 1996) argue that advanced second language learners can acquire L2 structures (such as *wh*-movement), even if L2 structures are different from their L1. In other words, there is no Critical Period for the acquisition of advanced adult L2 learners with respect to syntax, and they can perform like native speakers.

Furthermore, a recent theory that deals specifically with second language processing is the Shallow Structure Hypothesis (SSH). Clahsen and Felser (2006) proposed the Shallow Structure Hypothesis, which argues that while native speakers use syntactic and lexical information to process *wh*-movement, L2 learners only use a lexically driven strategy, and they underuse syntactic structure in their processing of *wh*-movement regardless of the status of *wh*-movement in the L1. The predictions of the Full Transfer/Full Access and Direct Access theories, on the one hand, and the

Representational Deficit and Shallow Structure Hypotheses, on the other, can be tested with respect to the Critical Period by looking at the performance of the L2 learners with a high level of proficiency to see what can be acquired at advanced levels.

3. Structures under investigation

3.1 Relative clauses and wh-questions

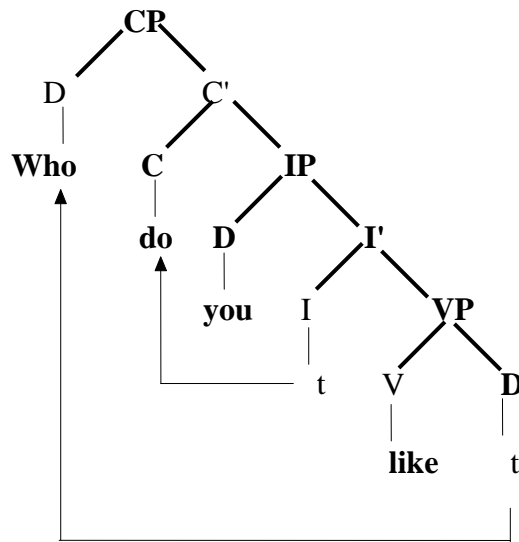
This dissertation investigates whether Najdi speakers' processing of wh-movement in English relative clauses and wh-questions is constrained by syntax. Previous linguistics research on this area (Chomsky, 1981) has argued that English relative clauses and wh-questions involve wh-movement. The surface word order in relative clauses and wh-questions in English, as in examples (1a) and (1b), contains a gap position, and the underlying word order for the same examples, as in (1c) and (1d), involves wh-movement (Chomsky 1981).

(1) a. The girl [_{CP} who [_I like _]] is here. (Relative clause)

b. [_{CP} Who do [_{IP} you like ____?]] (Question)

- c. The girl_i [_{CP} who_i [_{IP} I like *t_i*]] is here. (Relative clause)
- d. [_{CP} Who_i do [_{IP} you like *t_i*?]] (Question)

Figure 1.1 Wh-movement and its trace in a wh-question structure



In examples (1a) and (1b), the wh-phrase moved from its original position, after the verb (*like*), to the complementizer phrase (CP) node leaving its original place empty. The empty position in the underlying word order has a trace, as in examples (1c) and (1d), and the wh-phrase must cross only one bounding node (which is an IP or a DP in English) in a single movement (Chomsky 1981).

The wh-movement in Figure 1.1 represents the movement inside questions as in examples (1b) and (1d) to show how the wh-phrase moved from a node (the original position) to another (the landing site).

3.2 Investigating the acquisition of wh-movement in L2 English

This dissertation investigates how L2 learners from a different language background, namely, Najdi Arabic, process wh-movement in English. While the surface word order of relative clauses in English is argued to involve a gap position, Najdi Arabic arguably does not have a gap; instead, it requires a resumptive pronoun as shown in (2). This structure will be discussed in detail in chapter two.

(2) a. al-walad alli 9atai-t-**ih** at-tufahah (Relative clause)
the-boy C give.perf-1sg-**him** the-apple
“The boy that I gave him the apple.”

b. min alli 9atai-t-ih at-tufahah (Question)
who C give.perf-1sg-**him** the-apple
“Who that you give him the apple”

In English relative clauses, the underlying word order of the gap is a trace as a result of wh-movement; in contrast, Najdi Arabic does not have this type of movement and it requires an overt filler (resumptive pronoun *-ih*) in that position as shown in example (2) (Shlonsky 1992).

The second language acquisition theories have different predictions on the Najdi Arabic speakers' acquisition of wh-movement in English relative clauses and wh-questions. The Representational Deficit Hypothesis predicts that advanced Najdi learners of English will not acquire the underlying word order of English wh-movement, which involves a trace in the empty position, because this structure is not instantiated in their L1. In contrast, Direct Access and Full Transfer/Full Access theories predict that Najdi learners of English have access to the Universal Grammar (UG) and thus they are able to acquire L2 properties. In addition, within the body of work in the second language acquisition research that investigate the processing of the filled-gap position, the Shallow Structure Hypothesis predicts that L2 learners will not be able to acquire wh-movement in English regardless of their L1 structure, i.e. whether their L1 properties are similar or different from the L2, they will not be able to acquire L2 structure.

4. Organization of the dissertation

This dissertation is organized as follows. In the second chapter, we present the first comprehensive description on the relative clause and wh-question structures in Najdi and then show the similarities and the differences between English relative clause structures and Najdi relative clause structures. The third chapter represents our first experiment, which is an extension of Hawkins and Chan's (1997) grammaticality judgment task (off-line task). Chapter three also includes the literature review on the off-line task studies. In chapter four, we shift perspective to examine the real-time processing of these structures by L2 learners, adapting a sentence processing paradigm from the L1 literature. In chapter four, we present our second experiment that is based on Stowe's (1986) on-line task but extends to the L2 learners. We present the research questions, methodology, predictions, and our findings of the on-line task. Moreover, chapter four presents previous research on the on-line studies. Chapter five, the final chapter, presents the general conclusions we draw from both experiments in this dissertation. In addition, we suggest some recommendations for future research.

CHAPTER 2

THE STRUCTURE OF RELATIVE CLAUSES AND WH-QUESTIONS IN NAJDI ARABIC AND ENGLISH

1. Introduction

The goal of this chapter is to outline some fundamental characteristics of wh-structures in Najdi Arabic and English. Because this is one of the first descriptive studies of the wh-structures in this Najdi dialect, we discuss comprehensive descriptive data that goes beyond the scope of the structures tested in the studies we conducted and reported in chapters three and four. Since there are no syntactic studies on restrictive relative clauses in this subdialect of Najdi so far, this chapter will provide a useful initial dataset for researchers to investigate some behaviors of Najdi restrictive relative clauses.

This chapter is divided into eight sections. Section two provides a brief overview of the Najdi dialect in general. Section three shows the word order in Najdi dialect compared to Arabic language. In section four, we provide a basic description of the relative clauses in Najdi. Section five shows the word order in relative clause structures in Najdi. Section six presents the status of the relative marker *alli* in the Najdi dialect. In section seven, we provide an overview of the structure of wh-sentences and the differences and similarities between the Najdi dialect and English with respect to wh-movement. The comparative discussion in section seven is crucial for understanding the logic behind the L2 English studies to be reported in chapter three and four. Section eight concludes chapter two by summarizing the main discussion points.

2. An overview of the Najdi dialect

Najdi Arabic is mainly spoken in the Najd “highland” region, which is located in the middle of Saudi Arabia. According to Gordon (2005), the population of Najdi speakers in Saudi Arabia is eight million. I will investigate in this section a subdialect of Najdi that is mainly spoken in the city of Dawadami and its surrounding villages, which are situated about 200 miles to the west of the capital city, Riyadh.

Najdi is a spoken language which is not used in a written form. Although it is not allowed to be used in schools during the teaching sessions, students use it after school. This dialect is used by high, middle, and low social classes in the Saudi community in Najd. Najdi is used informally in daily life conversations and commercial dealings among people. In addition, it is the most common form used in poetry among the nomads. Dawadami and its surrounding areas, where this subdialect of Najdi is spoken, are going through very rapid social, economic, and cultural changes resulting in some changes in the dialect. New vocabulary might be added to this subdialect from time to time due to the fact that it is used among the new generation in Najd and due to the influence of the media.

The present study is one of the first attempts to investigate the syntactic structures of restrictive relative clauses in a subdialect of Najdi. In fact, the Najdi subdialect, which is spoken in the city of Dawadami, is the least known of all Saudi dialects. There are some studies on Najdi dialects in different areas in Najd but not on this particular subdialect.

Abboud (1964) wrote the first published work on the Najdi dialect, titled *The Syntax of Najdi Arabic*. He investigates the Najdi subdialect that is spoken in Hail, which is located about 300 miles to the north of Riyadh. He discusses various syntactic properties of Najdi dialect such as types of phrases, parts of speech, definiteness, and aspect.

Alsweel (1981) highlights the verbal system of the Onizah subdialect of Najdi spoken in the Arabian Desert about 200 miles to the northwest of Riyadh. He

analyzes morphological and phonological aspects of the verbal structure in the Onizah dialect. He investigates trilateral and non-trilateral strong and weak verbs with respect to their derivations in the ten derivational classes in Classical Arabic.

Ingham (1994) “Najdi Arabic: Central Arabia” investigates temporal and conditional clauses, aspect, agreement, transitivity, and some texts from the literature. The study is based on three sources of data: spoken historical narrative texts from nomad speakers; plays or talk shows presented on the radio; and data that were collected in conversations with native speakers of this dialect. Ingham examines data from different locations in Najd: some areas in North Najd, Sudair (Central Najd), Riyadh (Central Najd), and Al Murrah (Southern Najd).

Alrumaih (2002) discusses Najdi perceptions of Saudi regional speech. Specifically, he studies the attitudes and perceptions of Najdi residents towards the other dialects in Saudi Arabia. Alrumaih examines Najdi speakers’ attitudes towards their dialect in terms of correctness or degree of differences between their dialects and Modern Standard Arabic. The results of his study show that although Najdi speakers rated other regional dialects in Saudi Arabia to be less correct than Najdi, when Najdi speakers compare their dialect to Modern Standard Arabic, they rate Modern Standard Arabic as more correct than their dialect. While the above studies in this section looked at different aspects of different dialects in Saudi Arabia, in the following sections I turn to the structure of relative clauses in Najdi.

3. Word order of Najdi compared to Arabic language

3.1 The word order in Najdi

The focus in this section is to provide a general description of basic word order and agreement variation in Najdi. By understanding the word order in the simple sentence in Najdi, we are going to understand what the sentence structure in Najdi relative clauses is like. Word order in Najdi has basically two main types of formations, verb-subject-object (VSO) and subject-verb-object (SVO) as in examples (1a) and (1b):

- (1) a. akal al-walad at-tufahah VSO
eat.perf.3sg.masc the-boy the-apple
“The boy ate the apple”
- b. al-walad akal at-tufahah SVO
the-boy eat.perf.3sg.masc the-apple
“The boy ate the apple”

There is another word order in Najdi which is not commonly used. This word order is object-verb-subject (OVS), which focuses on the object as in example (2):

- (2) at-tufahah, akal-ha al-walad OVS
the-apple eat.perf.3sg.masc-it the-boy
“The boy ate the apple”

In example (2), when pronouncing the word *at-tufahah* (*the apple*), the intonation of the speaker's voice has more stress and there is a short pause after saying the word. A resumptive pronoun *ha* (3sg.fem) must be attached to the verb in these types of sentences. This resumptive pronoun refers to the object of the sentence. Other constructions have these resumptive pronouns and will be discussed in the following sections.

3.2 Agreement and word order in Najdi

Najdi exhibits full and partial agreement on the verb. Full agreement is an agreement in gender, number, and person between the subject and the verb, and the full agreement is possible in both SVO and VSO word orders in Najdi. The following examples in (3a) and (3b) show these types of agreement:

- | | | | |
|--------|-----------------------------|-----------------------------|--------------------|
| (3) a. | al-9yaal
the-boys | ja-uu
come.perf-3pl.masc | S+V full agreement |
| | | "The boys came" | |
| b. | ja-uu
come.perf-3pl.masc | al-9yaal
the-boys | V+S full agreement |
| | | "The boys came" | |

In (3a), the sentence begins with the subject *al-9yaal* (*the-boys*), which is third person, plural, and masculine, and followed by the verb which fully agrees with the subject in person, gender, and number. The same description applies to (3b), which begins with a verb followed by a subject. In addition to full agreement in both VSO and SVO word orders with a masculine subject as in (3), full agreement is also possible with a feminine subject in both word orders as in (4a) and (4b):

- | | | | |
|--------|---------------------------|---------------------------|--------------------|
| (4) a. | al-banaat
the-girls | ja-n
come.perf-3pl.fem | S+V full agreement |
| | | “The girls came” | |
| b. | ja-n
come.perf-3pl.fem | al-banaat
the-girls | V+S full agreement |
| | | “The girls came” | |

In (4a) and (4b) the verb agrees with the subject in person, number, and gender. Full agreement happens regardless of the word order.

However, partial agreement in Najdi is sensitive to the word order. Partial agreement is possible in VSO word order only if the subject and the verb are both masculine as in (5a); however, partial agreement is prohibited in SVO structure, even if the verb and the subject are in masculine forms as in example (5b):

(5) a. ja-a al-9yaal V+S partial agreement
 come.perf-3sg.masc the-boys
 “The boys came”

 b. *al-9yaal ja-a S+V partial agreement
 the-boys come.perf-3sg.masc
 “The boys came”

The verb in (5a) only agrees with the subject in person and gender, but not in number. This partial agreement in (5a) is acceptable alongside with full agreement for the same structure as in (5b). On the other hand, partial agreement in (5b) is not grammatical in Najdi, since the subject precedes the verb, which requires full agreement with the subject. Although partial agreement happens in VSO word order when the verb and the subject are in masculine forms as in example (5a), Najdi does not allow partial agreement if the verb and the subject in VSO word order are in feminine form as in (6a) and (6b):

(6) a. *ja-t al-banaat V+S partial agreement
 come.perf-3sg.fem the-girls
 “The girls came”

 b. * ja-a al-banaat V+S partial agreement
 come.perf-3sg.masc the-girls
 “The girls came”

The examples in (6a) and (6b) do not allow partial agreement, which suggests that agreement between the verb and the subject in Najdi is sensitive to gender. In example (6a), the verb *jat* (*came*) is third person, singular, and feminine, whereas the subject *al-banaat* (*the girls*) is third person, plural, and feminine. The verb agrees with the subject only in gender and person, which results in partial agreement. On the other hand, in (6b), the verb *jaa* (*came*) is third person, singular, and masculine, while the subject *al-banaat* (*the girls*) is third person, plural, and feminine. Although partial agreement in number as in (6a) and partial agreement in number and gender as in (6b) are not allowed, partial agreement in gender is acceptable only if the verb is in a masculine form as in (7):

(7)	ja-uu come.perf-3pl.masc “The girls came”	al-banaat the-girls	V+S partial agreement
-----	---	------------------------	-----------------------

The verb *jauu* (*came*) (3pl.masc) in (7) agrees in number and person; however, it does not agree with the subject in gender since the subject is feminine and the verb is masculine. There are two kinds of partial agreement in Najdi; partial agreement in gender as we have seen in (7) and partial agreement in number as in (5). However, partial agreement in Najdi depends on the word order; therefore, partial agreement in number is prohibited in SVO word order as in (5b). However, partial agreement in gender is acceptable if there is an agreement in number as in (7).

Although Modern Standard Arabic is not the main focus of this section, it is worth mentioning how the word order in Najdi differs from Modern Standard Arabic since Najdi speakers are exposed to this type of language every day through the media and through written texts. Like Najdi, Modern Standard Arabic exhibits both SVO and VSO word orders (Benmamoun 2000). Both word orders exhibit different types of agreement. The first type of agreement, which is represented in SVO word order, is full agreement as in example (8):

- (8) al-awlaad-u ja-uu S+V full agreement
the-boys-nom come.perf-3pl.masc
“The boys came”

In example (8), *al-awlaad* (*the-boy*) is the subject in this sentence, and the clitic *-u* indicates the nominative case on the subject. The subject is third person, plural, and masculine, and the verb *jaa* (*came*) is also third person, plural, and masculine.

In the other type of agreement, the verb agrees partially with the subject. The verb agrees in gender and person only. This type of agreement can be found in VSO word order in Modern Standard Arabic as in example (9):

- (9) a. ja-a al-awlaad-u V+S partial agreement
 come.perf-3sg.masc the-boys-nom
 “The boys came”
- b. ja-t al-banat-u V+S partial agreement
 come.perf-3sg.fem the-girls-nom
 “The girls came”

In example (9a), *jaa* (*come*) agrees with the subject *al-awlaad* (*the boys*) in gender and person, but it does not agree in number. Although the verb *jaa* (*come*) is third person and masculine that agrees in person and gender with the subject, it has a singular form, while the subject *al-awlaad* (*the boys*) is plural, so there is no agreement in number. In example (9b), unlike Najdi, Modern Standard Arabic exhibits partial agreement in number with a feminine subject.

Agreement in Modern Standard Arabic also exists in relative clauses. The agreement in relative clauses in Modern Standard Arabic is between the relativized position and the complementizer (*alla-*) as in example (10):

- (10) a. al-awlaad-u alla-thiin dharab-uu al-fatiaat
the-boys-nom C-3pl.masc hit.perf-3pl.masc the-girls
“The boys who hit the girls”
- b. al-fatiaat-u alla-tii dharab-na al-awlaad
the-girls-nom C-3pl.fem hit.perf-3pl.fem the boys
“The girls who hit the boys”

In example (10), agreement is between the head noun of the relative clause *al-awlaad* (*the boys*), the subject, and the complementizer *alla-thiin*. The complementizer shows full agreement in person, gender, and number with the relativized noun *al-awlaad* (*the boys*).

On the other hand, Najdi does not have this kind of agreement between the head noun of the relative clause and the complementizer. The only relative clause

complementizer in Najdi is the word *alli*. Table 2.1 shows the complementizer in Modern Standard Arabic and Najdi with respect to their agreement with the head noun of the relative clause.

Table 2.1 The complementizer in Najdi and Modern Standard Arabic

		Agreement	
Number	Gender	Standard Arabic	Najdi dialect
Singular	Masculine	alla-thi	alli
	Feminine	alla-ti	alli
Dual	Masculine	alla-thaani	alli
	Feminine	alla-taani	alli
Plural	Masculine	alla-thiina	alli
	Feminine	alla-waati	alli
			alla-tii

To conclude, although both Najdi and Modern Standard Arabic are used in the Najd area, Najdi is not like Modern Standard Arabic with respect to agreement. Whereas Modern Standard Arabic exhibits full agreement in SVO word order and partial agreement in VSO word order, Najdi has full agreement in both SVO and VSO word orders. On the other hand, Najdi, like Modern Standard Arabic, has partial agreement in VSO word order; however, Najdi, unlike Modern Standard Arabic, has partial agreement in person and number but not in gender in SVO word order. The complementizer *alli* does not show any type of agreement in Najdi. On the other hand, the complementizer in Modern Standard Arabic agrees with the head noun in gender and number. Up to this point, we have looked at the word order in Najdi sentences. The following section discusses the word order inside the relative clauses in Najdi.

4. Basic description of the relative clause in Najdi

4.1 Introduction

This section presents the relative clauses of one of the subdialects spoken in Saudi Arabia, specifically, Najdi, which is spoken in Najd. In this section, my main emphasis is on Najdi restrictive relative clauses, which are interesting because of the distinct type they fall into. This type of restrictive relative clause has an obligatory resumptive pronoun to refer to the head noun as shown in example (11):

- (11) *hatha* al-kitab *alli* (ana) garee-t-*(*ih*)
this the-book C¹ I read.perf-1sg-it
“This is the book that I read”

Because of the lack of recent studies on the syntactic properties of the restrictive relative clauses of this subdialect, I provide a comprehensive, descriptive study of these properties in this section.

¹ C : complementizer, DEF : definite, fem : feminine, imper : imperfect, IND : indefinite, masc : masculine, Neg : negative, Nom : nominative, RRCs : restrictive relative clauses, RP : resumptive pronoun, sg : singular, perf : perfect, pl : plural.

4.2 Relative clause types in Najdi

There are different types of relative clauses in Najdi, and the most common types are restrictive relative clauses as in (12), non-restrictive relative clauses as in (14), headless relative clauses as in (15) and (16), and generic relative clauses as in (17). Consider first a restrictive relative clause type as in (12):

(12) al-walad alli sarag moter-ii
the-boy C steal.perf.3sg.masc car -my
“The boy who stole my car”

In example (12), *al-walad* (*the-boy*) refers to a specific boy in the speaker’s mind.

Restrictive relative clauses restrict the set to one boy if there are multiple boys in that situation. Furthermore, the head noun before the complementizer *alli* should appear in definite form. On the other hand, if the head noun appears as an indefinite noun as in (13), the relative marker *alli* is ungrammatical:

(13) walad-in (*alli) sarag moter-ii
boy-IND C steal.perf.3sg.masc car -my
“A boy who stole my car”

An interesting fact about restrictive and nonrestrictive relative clauses in Najdi is that the complementizer *alli* cannot occur with indefinite nouns as in example (13), which suggests that the indefinite head noun *walad-in* (*a boy*) is in complementary distribution with the complementizer *alli* in Najdi.

The second type of relative clauses in Najdi is non-restrictive relative clauses, which are shown in examples (14a) and (14b). The examples in (14a) and (14b) show that the relativized head noun is in the object position in (14a), whereas the relativized head noun in example (14b) is in the subject position:

(14) a. Ahmed shaaf al-walad, [alli hikee-t ma9-ih]
 Ahmed see.perf.3sg.masc the-boy, [C talk.perf-1sg with-him]
 “Ahmed saw the-boy, who I talked with”

b. dharab-t Saad, [alli sarag as-syarah]
 hit.perf-1sg Saad [C steal.perf.3sg.masc the-car]
 “I hit Saad, who stole the car”

I have introduced two main types of relative clauses which are distinguished by whether the relative clauses restrict the set to the head noun they modify (restrictive relative clauses) as we saw in (12), or whether they give descriptions or facts about the head noun (non restrictive relative clauses) as in (14). The relative clauses in (14) are non-restrictive clauses because they do not identify their

references, but they give extra information describing them. Furthermore, the main clauses in (14) could stand by themselves and still have meaning.

Another difference between restrictive relative clauses and non-restrictive relative clauses depends on the reference in the speaker's mind. In example (14a), for instance, if the speaker and the hearer know that there is only one boy in the room and they are talking about him, then the relative clause is non-restrictive, because they both know the head noun of the relative clause. On the other hand, if there are multiple boys in the speaker's mind or in the room and the speaker wants to restrict the set to one specific boy, then the speaker will use a restrictive relative clause. We can also differentiate between restrictive relative clauses and non-restrictive ones by the intonation of speaker's voice. In restrictive relative clauses, the intonation of all phrases carries the same pitch to the ear while in non-restrictive relative clauses, as in example (14b), the speakers should make a louder pitch at the beginning of the relative clause sentence *dharab-t Saad (I hit Saad)*.

The examples in (15a) and (15b) represent headless relative clauses in Najdi:

(15) a. *dharab-t* [DP_{[CP} *alli sarag moter-ii*]]
 hit.perf-1sg C steal.perf.3sg.masc car-my
 "I hit the one who stole my car"

b. *Saad tubakh* [DP_{[CP} *alli akal-t-ih*]]
 Saad cook.perf.3sg.masc C eat.perf-1sg-it
 "Saad cooked what I ate"

The head nouns in examples (15a) and (15b) which are modified by the relative clauses are silent. Headless relative clauses in (16a) can be a question in (16b), affirmative or negative form as in (16c):

- (16) a. shif-t [DP [CP alli fi as-suug]] declarative
 see.perf-1sg C in the-market
 “I saw who was in the market”
- b. min alli shif-t-*(ih) fi as-suug question
 who C see.perf-1sg-him in the-market
 “Who did I see in the market?”
- c. min alli ma shif-t-*(ih) fi as-suug negative question
 who C Neg see.perf-1sg-him in the-market
 “Who didn’t I see in the market?”

The examples in (16) are different types of headless relative clauses in Najdi.

Example (16a) is a declarative sentence that gives information about the fact that “*I saw someone at the market*”. In example (16b), the sentence is a question about who I saw at the market, whereas example (16c) shows a negative question in Najdi.

The last type of restrictive relative clauses is the generic type. Example (17) shows that *al-walad alli ma-yakel* (*the-boy that does not eat*) does not refer to a specific *walad* (*boy*) in the context.

5. The word order in relative clause structures in Najdi

5.1 Introduction

Najdi restrictive relative clause word order exhibits three types of the word order; namely, SVO, OVS, and OSV orders, but not VOS.

- (18) a. al-beet [alli Ahmed dharab al-banaat fi-ih] SVO
the-house C Ahmed hit.perf.3sg.masc the-girls in-it
“The house that Ahmed hit the girls in”
- b. al-beet [alli dharab Ahmed al-banaat fi-ih] VSO
the-house C hit.perf.3sg.masc Ahmed the-girls in-it
“The house that the girls were hit by Ahmed in”
- c. al-beet [alli al-banat dharab-hin Ahmed fi-ih] OVS
the-house C the-girls hit.perf.3sg.masc-them Ahmed in-it
“The house that Ahmed hit the girls in”
- d. *al-beet [alli dharab-(**hin*) al-banaat Ahmed fi-ih] VOS
the-house C hit.perf.3sg.masc-them the-girls Ahmed in-it
“The house that the girls were hit by Ahmed in”

When the object *al-banat* (*the girls*) is topicalized, a resumptive pronoun *-hin* appears at the end of the verb in this type as in example (18c). In addition, example (18a) has different word order but has the same basic meaning as examples (18b) and (18c).

The resumptive pronoun *-hin* in example (18c) is not allowed in VOS word order in

Najdi relative clauses as in example (18d). In sum, Najdi exhibits three different word orders inside relative clauses; SVO, VSO, and OVS.

In Najdi, there are two different kinds of resumptive pronouns in relative clauses; one is that resumes the relativized DP and one that resumes a topic DP. The verb in OVS order has a resumptive pronoun which refers to the topicalized DP, whereas in SVO and VSO the resumptive pronoun refers to a relativized DP. In the next section, the distribution of these types of resumptive pronouns appears in relation to the position that can be relativized.

5.2 The relativized positions in Najdi relative clauses and the positions of resumptive pronouns

5.2.1 The relativized positions in Najdi relative clauses and wh-questions

- The relativized position in Najdi relative clauses

Most DPs in Najdi restrictive relative clauses can be relativized. Example (19a) is the basic form of example (19b) before the subject is relativized.

(19) a. al-bint ja-t base sentence
the-girl come.perf-3sg.fem
“The girl came”

b. al-bint [alli ja-t] relativized subject
the-girl C come.perf-3sg.fem
“The girl that came”

Example (20a) represents the structure of the sentence before relativizing the object.

However, when the object is relativized, a resumptive pronoun *-ha* (3sg.fem) appears, as shown in example (20b), and refers to the relativized object. This resumptive pronoun does not appear in example (19b) when the subject position is relativized.

(20) a. al-9yal shaf-uu al-bint
the-boys see.perf-3pl.masc the-girl
“The boys saw the girl”

b. al-bint [alli shaf-uu-**ha** al-9yal]
the-girl C see.perf-3pl.masc-her the-boys
“The girl who the boys saw”

It is also possible to relativize an indirect object in Najdi; however, it is obligatory to have a resumptive pronoun that refers to the relativized noun as in example (21b) and (21)d. The original forms of these sentences are presented in examples (21a) and (21c):

- (21) a. hina kitab-na ar-rsalah li al-bint
 we write.perf-1pl.masc the-letter to the-girl
 “We wrote the letter to the girl”
- b. al-bint alli kitab-na ar-rsalah li-*(ha)
 the-girl C write.perf-1pl.masc the-letter to-her
 “The girl that we wrote a letter to”
- c. 9aṭee-na al-bint ar-rsalah
 give.perf-1pl.masc the-girl the-letter
 “We gave the letter to the girl”
- d. al-bint alli 9aṭee-na-*(ha) ar-rsalah
 the-girl C give.perf-1pl.masc-her the-letter
 “The girl that we gave a letter”

In example (21b), the indirect object in the original position is preceded by a preposition *li* (*for*), whereas in example (21c), the indirect object in the original position is preceded by the verb *9aṭi-na* (*we give*). However, after the indirect object is relativized, a resumptive pronoun appears in the original position of the indirect object in both examples.

The relativization of the object of a preposition in Najdi is possible as in (22b). The basic form of the sentence before relativizing it is represented in (22a):

- (22) a. hina jalas-na jamb al-bint
 we sit.perf-1pl.masc next.to the-girl
 “We sat next to the girl”
- b. al-bint alli jalas-na jamb-**ha**
 the-girl C sit.perf-1pl.masc next.to-her
 “The girl that we sat next to”

Example (22b) involves a resumptive pronoun that appears in all relativized positions in Najdi relative clauses that we have seen so far except for the subject position.

Najdi allows the relativization of the possessor noun phrase position as in (23b). The possessed NP *al-bint* (*the girl*) in the sentence before being relativized can be seen in example (23a):

- (23) a. maat abu al-bint
 died.perf.3sg.masc father the-girl
 “The girl’s father died”
- b. al-bint alli abu-**ha** maat
 the-girl C father-her died.perf.3sg.masc
 “The girl whose father died”
- c. al-bint alli maat abu-**ha**
 the-girl C died.perf.3sg.masc father-her
 “The girl whose father died”
- d. *abu [alli ___ al-bint] maat]
 father C ___ the-girl died.perf.3sg.masc
 “*The father whose the girl died”

In Najdi, a possessor DP *al-bint* (*the-girl*) can be relativized as in (23a).

Moreover, in examples (23b) and (23c) an obligatory resumptive pronoun appears after the possessed NP and it is optional to change the order between the verb and the possessed NP and still carries the same meaning. However, the possessed NP cannot be relativized as in (23d).

Example (24a) represents a basic possessive sentence in Najdi where the possessed NP *kitab* (*book*) must be in indefinite form and the possessor NP *al-bint* (*the-girl*) must be in definite form. Another way to make a possessive DP is by using the word *hagg*² as in example (24b). In addition, Najdi can use the word *hagg* in relative clauses with an obligatory resumptive pronoun following the word *hagg* as in (24c).

Example (24a) represents that the definite article *al-* (*the*) is prohibited with the word *kitab* (*book*), whereas it is obligatory with *al-bint* (*the-girl*). However, in example (24b) both *al-* with *kitab* and *al-* with *bint* are obligatory.

- (24) a. *al-kitab al-bint
the-book the-girl
“The girl’s book”
- b. al-kitab hagg al-bint
the-book hagg the-girl
“The girl’s book”
- c. al-bint alli al-kitab hagg-*(**ha**)
the-girl C the-book hers
“The girl that the book is hers”
- d. *al-kitab alli Faris sarag hagg al-bint
the-book C Faris steal.perf.3sg.masc belong the-girl
“The book that Faris stole belongs to the girl”

² It means “belongings” in Najdi.

- e. *al-kitab alli Faris sarag (***hu**) hagg al-bint
 the-book C Faris steal.perf.3sg.masc it belong the-girl
 “The book that Faris stole belongs to the girl”

Example (24d) shows that Najdi does not relativize *al-kitab* (*the book*) which is possessed by *al-bint* (*the-girl*). In example (24e), the strong pronoun *hu* “he” is not acceptable after *alli*.

Finally, the object of comparison position can be relativized in Najdi as in example (25b). The original sentence before the object of comparison being relativized can be seen in example (25a). When we relativize a DP, the original position of the object of comparison position is occupied by a resumptive pronoun.

- (25) a. al-9yal athka min al-bint
 the-boys smarter than the-girl
 “The boys are smarter than the girl”
- b. al-bint alli al-9yal athka min-*(**ha**)
 the-girl C the-boys smarter than-her
 “The girl that the boys are smarter than”

- The relativized positions in Najdi wh-questions

Wh-questions in Najdi Arabic, similar to relative clause structure, exhibit resumptive pronouns in most positions. As shown in example (26a) the subject position does not allow a resumptive pronoun as in relative clauses, while other

positions including object (46b), indirect object (46c), and object of preposition (46d) require these resumptive pronouns. These relativized questions can be in embedded sentences as in example (46e):

- (26) a. min [alli dharab-t] subject position
 who C come.perf.3sg.masc
 “Who came?”
- b. min [alli dharab-**ha**] object position
 who C hit.perf.3sg.fem-her
 “Who did you hit?”
- c. min [alli 9aṭiit-**ha** al-kitaab] double object
 who C give.perf.3sg.fem-them the-book
 “*Whom did you give him the book?”
- d. min [alli arsal-t ar-rasalah li-**ih**] object of preposition
 who C send.perf.3sg.masc the-letter to-him
 “who did you send the letter to?”
- e. akaw-i saal min alli Ahmed
 brother-my ask.perf.3sg.masc who C Ahmed
 ab-ysawr-ni mi9-ih fi al-9azimah
 will-film.imper.3sg.masc-me with-him in the-party
 “My brother asked who Ahmed will film me with at the party”

Example (26b) represents a resumptive pronoun **-ha** that occupies the object position. The double object as shown in example (26c) and object of preposition positions as in example (26d) can be relativized and obligatory resumptive pronouns will appear in

these positions. Resumptive pronouns are divided into two main categories, the next section will explain in details what are these categories and what types of resumptive pronouns can be used in the sentences.

5.2.2 Resumptive pronouns in Najdi relative clauses

A resumptive pronoun is a pronoun which appears in a relativized head noun position that is bound by a wh-phrase or a preceding DP. The example in (27b) shows an obligatory position for resumptive pronoun *ih* (*him*) in a relative clause in Najdi, whereas example (27c) shows prohibited use of resumptive pronoun when the argument *arrjal* (*the man*) is in situ.

- (27) a. shif-t ar-rjal
 see.perf-1sg.masc the-man
 “I met the man”
- b. ar-rjal [alli shif-t-*(**ih**)]
 the-man C see.perf-1sg.masc-him
 “The man who I met”
- c. shif-t-*(**ih**) ar-rjal
 see.perf-1sg.masc-him the-man
 “I met him the man”

In example (27a), which is the original form of the sentence before relativization, there is no resumptive pronoun. However, when the direct object is relativized, the resumptive pronoun *ih* (*him*) becomes obligatory to refer to *ar-rajal* (*the-man*) as in (27b). Resumptive pronouns are clitics, which cannot stand by themselves, so they must attach to a word as in (28):

(28) ar-rjal alli shif-t-**ih**
the-man C see.perf-1sg.masc- him
“The man that I saw”

Najdi has resumptive pronouns that attached to the end of a verb to refer to the DP that has been relativized in (28a). Table 2.2 shows the paradigm of these resumptive pronouns in Najdi.

Table 2.2 Weak pronouns in Najdi.

Person	Gender	Sg.	Pl.
1	Masc.	ni	na
	Fem.		
2	Masc.	ik	kum
	Fem.	its	tsin
3	Masc.	ih	hum
	Fem.	ha	hin

Resumptive pronouns in Najdi can be found in different positions: object of comparison, topicalized DP, object of preposition, possessive DP, after certain adverbs, and as a reference for indefinite noun.

- (29) athka min-**ha** object of comparison
 smarter than-her
 “Smarter than her”
- (30) al-bint shaf-uu-**ha** al-9yal Topicalized DP
 the-girl see.perf-3pl.masc-her the-boys
 “The girl, the boys saw her.”
- (31) jalas ma9-**ha** Object of preposition
 sit.perf.3sg.masc with-her
 “He sat with her.”
- (32) beet-**ha** kibeer Possessive DP
 house-her big
 “Her house is big”
- (33) al-bint taww-**ha** ma- ja-t After certain adverbs
 the-girl still-her Neg-come.perf-3sg.fem
 “The girl still did not come”
- (34) a. 9araf-t-**ih** mudarris Reference for an
 know.perf-1sg.masc-him teacher indefinite noun
 “I know he is a teacher”
- b. *9araf-t-**ih** al-mudarris
 know.perf-1sg.masc-him the-teacher
 “I know he is the teacher”

Najdi allows the use of resumptive pronouns when the DP is indefinite in a copular construction as in (34a); however, Najdi does not allow this resumptive pronoun as reference for definite nouns as in (34b).

To conclude this section, as shown in Table 2.3, there are six positions which can be relativized in Najdi restrictive relative clauses; subject, object, indirect object, object of a preposition, possessive of NP, and object of comparison. All of these positions exhibit obligatory resumptive pronouns, except the subject position, which does not allow the appearance of weak resumptive pronouns as in example (35):

(35) ar-rajal_i alli shaf-(*ih_i) al-9yaal
 the-man C see.perf.3sg.masc-him the-boys
 “The man who saw the boys”

Table 2.3. Possible relativized positions and obligatory resumptive pronouns.

Position	Relativized	Resumptive pronoun
Subject	YES	NO
Object	YES	YES
Indirect object	YES	YES
Object of a preposition	YES	YES
Possessive of NP	YES	YES
Object of comparison	YES	YES

It is not surprising that the relativization of all of these positions is found in Najdi Arabic, since it is expected by the Accessibility Hierarchy. Comrie and Keenan (1979) propose the Noun Phrase Accessibility Hierarchy Hypothesis, which assumes that any language that allows relativization of any position in the hierarchy must allow relativization of all higher positions on the hierarchy.

SU>DO>IO>OBL>GEN>OCOMP

In the above hierarchy, “>” indicates that if a language relativizes direct object (DO) position, then it also allows relativization of the subject position (SU). The hierarchy shows that if a language relativizes the indirect object position (IO), the subject (S) and direct object positions in this language are relativized but the oblique and object of comparison positions may not. English is an example that shows this hierarchy in the examples in (36):

- | | |
|---|--------------------|
| (36) a. The house which ___ belonged to her. | “Subject” |
| b. The house which she liked ____ | “Direct object” |
| c. The girl that he gave a gift to ___ was delighted. | “Indirect object” |
| d. The house which she lives in _____ | “Oblique position” |

e. The house which she liked the style of _____ “Genitive”

f. The man whom Saad runs faster than ___ is a teacher. “Obj Compl”

On the other hand, Malagasy is another example which represents part of the Keenan and Comrie’s accessibility hierarchy. Malagasy relativizes only the subject position, which is considered in the hierarchy the most accessible position. The examples in (37b) and (37c) represent grammatical relativization of the subject position and ungrammatical relativization of the object position, whereas (37a) is the original form of the sentence before relativization (Examples are from Keenan and Comrie 1979).

(37) a. nahita ny vehivavy ny mpianatra.
saw the woman the student
“The student saw the woman.”

b. ny mpianatra [izay nahita ny vehivavy]
the student that saw the woman
“The student that saw the woman”

c. *ny vehivavy [izay nahita ny mpianatra]
the woman that saw the student
“The woman that the student saw”

In both English and Najdi restrictive relative clauses, all positions in Comrie and Keenan’s accessibility hierarchy can be relativized; however, Najdi and English differ with respect to resumptive pronouns in relative clauses, which will be discussed later.

6. The status of the relative clause marker *alli* in Najdi

The main purpose of this section is to show some evidence that *alli* is a complementizer. In order to present this evidence, the paper will show how the complementizer *in* behaves in relative clauses and then compare its behavior to *alli*, since typical relative clauses in Najdi Arabic are marked by these markers *in* or *alli*. Example (38a) represents the original structure of the sentences before being embedded in (38b) and (38c).

(38) a. Ahmed dharab al-walad
 Ahmed hit.perf.3sg.masc the-boy
 ‘‘Ahmed hit the boy’’

b. a9tiqid [CP *(in) Ahmed dharab al-walad]
 think.perf.1sg C Ahmed hit.perf.3sg.masc the-boy
 ‘‘I think that Ahmed hit the boy’’

- c. a9tiqid [CP*(alli) Ahmed dharab al-walad]
 think.perf.1sg C Ahmed hit.perf.3sg.masc the-boy
 “I think that Ahmed hit the boy”

Example (38b) shows that the verb *a9tiqid* (*think*) requires a CP complement which is introduced by an obligatory complementizer *in*. Example (38c) represents the same sentence except the use of *alli*, which suggests that *alli* behaves like the complementizer *in*. In addition to some kinds of verbs that require a CP complement, such as *a9tiqid* (*think*), some types of adjectives such as *zeen* (*good*) require a CP complement as in (39a) and (39b); however, it is ungrammatical to have a DP complement after this adjective as in (39c), which implies that *in* and *alli* behave as complementizers at the beginning of CP complements³.

- (39) a. zeen [**(in)* Saad shaf-ha]
 good C Saad see.perf.3sg.masc -her
 “It is good that Saad saw her”
- b. zeen [**(alli)* Saad shaf-ha]
 good C Saad see.perf.3sg.masc -her
 “It is good that Saad saw her”
- c. *zeen Saad shaf-ha
 good Saad see.perf.3sg.masc -her
 “It is good Saad saw her”

³ Many thanks to Khalaf Alshammary, who shared with me his major paper about Turaif’s relative clauses, from which these examples were taken.

Other evidence that *alli* is a complementizer is the fact that *alli* cannot occur with another complementizer. Examples (40a) and (40b) represent the grammatical use of the complementizers *in* and *alli*:

(40) a. *zeen [**alli in** Saad shaf-ha]
 good C C Saad see.perf.3sg.masc-her
 “It is good that Saad saw her”

b. *zeen [**in alli** Saad shaf-ha]
 good C C Saad see.perf.3sg.masc-her
 “It is good that Saad saw her”

In example (40a) and (40b), both complementizers *alli* and *in* are used in the beginning of the CP complement resulting in an ungrammatical sentence, which indicates that both complementizers cannot be used together.

This evidence, which shows that *alli* is a complementizer, goes hand in hand with the idea that *alli* is not a relative pronoun, since it does not agree with the relativized head noun in gender or number as in example (41), whereas ordinary relative pronouns agree with their head noun.

(41) a. al-awlaad alli gara-uu ad-darss mumtaz-iin plural masculine
 the-boys C read.perf-3pl.masc the-lesson excellent-3pl.masc
 “The boys that read the lesson are excellent”

b. al-waladeen alli gara-uu ad-darss mumtaz-iin dual masculine
 the-two boys C read.perf-3pl.masc the-lesson excellent-3pl.masc
 “The two boys that read the lesson are excellent”

c. al-walad alli garaa ad-darss mumtaz singular masculine
 the-boy C read.perf.3sg.masc the-lesson excellent
 “The boy that read the lesson is excellent”

d. al-banaat alli gara-in ad-darss mumtaz-at feminine
 the-girls C read.perf.3pl.fem the-lesson excellent-3pl.fem
 “The girls who read the lesson are excellent”

In this section, we have seen evidence that *alli* is a complementizer in Najdi relative clauses; the following section represents the common differences between Najdi Arabic and English with respect to restrictive relative clause structure.

7. Syntactic differences and similarities between English and Najdi wh-structure

The goal of this section is to outline the important fundamental syntactic characteristics of wh-structure in English and Najdi. Throughout this dissertation, we are going to use the information provided in this section to help us understand the differences and the similarities, between English and Najdi wh-sentences. We will discuss, in this section, how English and Najdi vary in their formation of relative clauses and wh-questions.

Relative clauses and wh-questions formation in English and Najdi appears to be similar in some constructions; however, there are certain aspects which are

different. I will present these points of similarities and differences with respect to wh-structure.

7.1 Similarities between Najdi and English wh-questions and relative clauses

The similarity between English and Najdi is that the position of the relative clause is postnominal in both languages; the relative clause always follows the head noun as in (42a) and (42b):

(42) a. The boy [who [plays soccer]

b. al-walad [alli [ya-l9ab al-kuurah]
the-boy [C 3sg.masc-play.imperf the-soccer]
“The boy who plays soccer”

By comparing the examples of both languages in (42a) and (42b), we see that the relativized NP is on the left edge of the DP followed by the relative clause that begins with a relative clause marker.

The second similarity is that English and Najdi relativize most positions in relative clauses and wh-questions including subject, object, indirect object, and object of preposition as we discussed in section 2.2.1.

7.2 Differences between Najdi and English wh-questions and relative clauses

There are some differences between the two languages in their relative clauses, one of which is the presence of resumptive pronouns in Najdi as in (43a), which is prohibited in English relative clauses as in (43b):

(43) a. *al-bint alli shafat-ha Lina*
 the girl C see.perf.3sg.fem-her Lina
 “The girl who Lina saw”

b. *The boy [(whom) you gave **him** some money yesterday]

A resumptive pronoun is a pronoun which appears in the position that is bound by a preceding NP. For example, *ha* is a resumptive pronoun bound by *al-bint* “the girl” as in (43a). The resumptive pronouns in Najdi agree with the relativized head noun in number and gender. Table 2.4 shows the different positions of the resumptive pronouns in Najdi restrictive relative clauses.

Table 2.4 Obligatory and possible positions of weak resumptive pronouns in Najdi.

	Subject	DO	IO	Genitive	Ocomp
English	No RP	No RP	No RP	No RP	No RP
Najdi	No RP	RP	RP	RP	RP

Recall that we have discussed this paradigm of having resumptive pronouns in the relativized positions in Section Three; this paradigm also is represented with examples to show these positions including the possibility of having a strong resumptive pronoun in the subject position. No resumptive pronouns are allowed in the subject position as in (44a), whereas resumptive pronouns are obligatory in the direct object position as in (44b), indirect object as in (44c), object of comparison as in (44d), object of preposition as in (44e), and genitive positions as in (44f):

- (44) a. al-bint [alli ja-t] No RP in subject position
 the girl C come.perf-3sg.fem
 “The girl who came”
- b. al-bint [alli shaf-t-**ha** Lina] RP in direct object
 the girl C see.perf-3sg.fem-her Lina
 “The girl who Lina saw”
- c. al-bint [alli kitab-t ar-rsalah li-**ha**] RP in indirect object
 the girl C write.perf-3sg.fem the-letter to-her
 “The girl that I wrote a letter to”
- d. al-bint [alli Lina a**ḥ**ka min-**ha**] RP in object of comparison
 the girl C Lina smarter than-her
 “The girl that Lina is smarter than”
- e. al-bint alli jalas-t janb-**ha** RP in object of a preposition
 the girl C sit.perf-1sg.masc next.to-her
 “The girl that I sat next to”
- f. al-bint alli abu-**ha** maat RP in possessive NP
 the girl C father-her died.perf.3sg.masc
 “The girl whose father died”

What underlies these differences between these two languages has been argued to be the presence or absence of *wh*-movement. It has been argued that English relative clauses and *wh*-questions involve *wh*-movement (Chomsky 1981). For example, the surface word order in relative clauses and *wh*-questions in English has a gap position as a result of the *wh*-phrase movement as in example (45a) and (45b).

- (45) a. The girl who I like _____ is here. Relative clause
 b. who do you like ___? Wh-question

This *wh*-movement in relative clauses and *wh*-questions is argued to involve a trace in the place of the gap position as in example (46a) and (46b).

- (46) a. The girl_i [_{CP} who_i [_{IP} I like t_i]] is here. Relative clause
 b. Who_i do you like t_i? Wh-question
-

Example (46) shows how a *wh*-phrase moves from its original position (after the verb *like*) to the beginning of the sentence leaving an empty category (gap) behind. The gap contains a trace that is coindexed with the head noun (*the-girl*) and cannot be filled by a resumptive pronoun in English.

Wh-movement in English must obey syntactic constraints. For example, if more than one bounding node is crossed in a single movement (an IP node or a DP node in English), the wh-movement will violate Subjacency (Chomsky 1981), as in example (47a) for relative clauses and (47b) for wh-questions:

(47) a. *This is the boy_i [_{CP} who_i [_{IP#} Mary described [_{DP#} the way [_{CP} t_i that [_{IP} Bill attacked t_i]]]]]

b. * [_{CP} How [_C do [_{IP#} you wonder [_{CP} whether [_{IP#} John said [_{CP} t' [_C that [_{IP} Mary solved the problem t_i]]]]]]]

Subjacency is violated in example (47a) because the moved wh-element (*who*) crossed more than one bounding node, which are DP and IP, in order to land in spec CP position. This kind of movement is crucial in English, but if it violates Subjacency, then the sentence will be ungrammatical.

In contrast, Najdi is argued to not involve this type of movement as in example (48a) (Shlonsky 1992). For example, as we see from example (48b) the ungrammaticality of this sentence in English and the grammaticality of the same sentence in Najdi suggest that no such operation takes place:

(48) a. al-walad alli 9atai-t-**ih** at-tufahah
 the-boy C give.perf-1sg-**him** the-apple
 “The boy that I gave him the apple.”

b. *hatha ar-rjal alli Mary 9alima-t-ni mita ib-ti zor-ih*
 this the-man C Mary tell.perf-3sg-me when will-she visit-him
 “This is the man who Mary told me when she will visit him.”

The examples in (48) suggest that Najdi does not involve this type of movement since there is an obligatory resumptive pronoun in the position that coindexes with the head noun. Moreover, the sentence is grammatical and there is no Subjacency violation, which suggests also that there is no movement in Najdi. To conclude, Table 2.5 is a summary of the differences between the two languages.

Table 2.5. Summary of a comparison between Najdi and English restrictive relative clauses.

	English	Najdi
Relative pronoun	YES	NO
Relative complementizer	YES	YES
Resumptive pronoun	NO	YES
Subjacency violation	NO	YES

Table 2.5 shows that both Najdi and English have a relative complementizer to introduce relative clauses; however, Najdi does not have relative pronouns (e.g. *who*, *which*, etc.) to introduce the relative clauses while English does. The two languages are also different in allowing resumptive pronouns in their relative clauses.

Furthermore, English is arguably does not allow ungrammatical wh-movement (i.e., Subjacency violations), whereas Najdi is arguably does not have wh-movement in relative clauses and thus there is no such violation in Najdi relative clause.

8. Conclusion

In this chapter, we have introduced an overview of the Najdi dialect and we have shown previous studies that investigate different Najdi subdialects but none of these studies have investigated this particular subdialect, specifically, Najdi restrictive relative clauses. The basic descriptions of the relative clauses in Najdi with respect to possible relativized positions in the language show that most position in Najd can be relativized (e.g. subject, object, indirect object, object of preposition, etc.). Furthermore, when these positions are relativized, an obligatory resumptive pronoun occupies the place of the original position of the relativized noun (e.g. *ih*, *ha*, *hum*, etc.) except in the relativized subject position. Finally, we show how English is different from Najdi in some aspects such as in not allowing resumptive pronouns and Subjacency violation in their restrictive relative clauses.

CHAPTER 3

THE ACQUISITION OF RELATIVE CLAUSES IN A SECOND LANGUAGE

1. Introduction

This chapter will present the results of our first study which investigates the acquisition of relative clauses and constraints on wh-movement. This chapter is divided into four sections. The second section presents briefly previous research on the acquisition of relative clauses and constraints on wh-movement in different languages. In the third section, we provide our first study which an extension of Hawkins and Chan's (1997) study. Finally, section four presents the discussion of the results.

2. Research on the acquisition of relative clauses and constraints on wh-movement

2.1 Studies on resumptive pronouns

Hyltenstam (1984) investigates the use of resumptive pronouns in relative clauses that are produced by advanced adult learners of Swedish from four different languages; Finnish, Spanish, Greek and Persian. Swedish, Finnish, and Spanish do not allow resumptive pronouns in any positions in their relative clauses, whereas Greek and Persian have obligatory resumptive pronouns in the indirect object (IO), oblique (Obl), genitive (Gen), and object of comparison (Ocomp) positions. In addition, Persian allows such pronouns in direct object (DO) positions in restrictive relative clauses as shown in Table 3.1.

Table 3.1 The positions of resumptive pronouns in Swedish, Finnish, Spanish, Greek, and Persian relative clauses.

Participants	DO	IO	Obl	Gen	Ocomp
Swedish	No RP	No RP	No RP	No RP	No RP
Finnish	No RP	No RP	No RP	No RP	No RP
Spanish	No RP	No RP	No RP	No RP	No RP
Greek	No RP	RP	RP	RP	RP
Persian	RP	RP	RP	RP	RP

The results show that the frequent use of resumptive pronouns in the L2 is based on the influence of the L1. The subjects' production of resumptive pronouns in Swedish sentences is as follows: Persian group is 240, Greek 205, Spanish 144, and Finnish 27 times. These findings indicate that the difference between the Finnish and Spanish groups is significantly large, which implies that Spanish subjects produced resumptive pronouns in their interlanguage more frequently than Finnish subjects. However, Greek and Persian subjects frequently produced resumptive pronouns in their interlanguage in the same positions that they are used in their L1. Surprisingly, they produced resumptive pronouns in some positions that are not allowed in their L1 or L2. Hyltenstam (1994) argued that the relativized head nouns which are far from their reference in the restrictive relative clauses are hard to process; therefore, resumptive pronouns are used as a simplification strategy to reduce the processing difficulty of these relative clauses. Hyltenstam's findings support transfer, since subjects who are from languages that allow resumptive pronouns transfer them into the L2, which does not allow resumptive pronouns. The results of this study go hand-in-hand with the findings of Yuan and Zhao's (2005) study, which also looked at the status of resumptive pronouns in the learners' interlanguage grammar.

Yuan and Zhao's (2005) study investigates whether Palestinian speakers who allow resumptive pronouns in L1 will acquire resumptive pronouns in Chinese better than English speakers whose L1 does not allow resumptive pronouns. Chinese, like Palestinian, arguably does not allow wh-movement but does allow resumptive pronouns. However, Palestinian and Chinese differ in relative clause structures:

Chinese allows the use of resumptive pronouns in indirect object (IO) and genitive positions (Gen) but not in subject (S) and direct object (DO) positions. In contrast, Palestinian allows the use of resumptive pronouns in indirect object (IO), genitive (Gen) and direct object (DO) positions but not in the subject (S) position, as shown in Table 3.2.

Table 3.2 The differences in the use of resumptive pronouns in different positions in English, Palestinian, and Chinese relative clauses.

Participants	Subject	DO	IO	Genitive
English	No RP	No RP	No RP	No RP
Palestinian	No RP	RP	RP	RP
Chinese	No RP	No RP	RP/GAP	RP/GAP

Yuan and Zhao (2005) conducted a grammaticality judgment task on Palestinian and English subjects and Chinese native speakers as a control group. Although Yuan and Zhao predicted that the Palestinian subjects would perform better than English subjects on sentences with resumptive pronouns, the results of their study in Table 3.3 did not demonstrate that.

Table 3.3 Percentage (%) of accepting resumptive pronouns for the three groups.

Position	L1 English	L1 Palestinian	Native Chinese
Subject RP	15	61	8
Object RP	7	74	19
Indirect Object RP	65	83	85
Genitive RP	62	90	89

The results show that the English participants correctly accepted resumptive pronouns in indirect object and genitive positions and accurately rejected resumptive pronouns in subject and object positions. On the other hand, the Palestinian participants correctly accepted resumptive pronouns in indirect object and genitive positions, but they incorrectly accepted resumptive pronouns in the subject and object positions.

Yuan and Zhao (2005) argue that English participants perform well in indirect object and in genitive positions because they are exposed to positive evidence telling them that resumptive pronouns are allowed in these positions. In addition, their accurate judgment on rejecting subject and object positions is attributed to the similarity between English and Chinese, as both languages do not allow resumptive pronouns in these positions.

On the other hand, Yuan and Zhao (2005) argue that Palestinian subjects make correct judgments as expected on the resumptive pronouns in indirect object and genitive positions because Chinese is similar to their L1 in this respect. In addition, they are exposed to positive evidence telling them that resumptive pronouns and gaps can alternate freely in these positions. However, they incorrectly accepted resumptive pronouns in subject and direct object positions. Yuan and Zhao attributed the ungrammatical acceptance of resumptive pronouns in the direct object position to the fact that Palestinians are exposed to Chinese relative clauses with gaps in direct object position but there is no negative evidence telling them that Chinese does not allow free alternation of gaps and resumptive pronouns in direct object position as it

does in indirect object and genitive positions. Yuan and Zhao argue that the presence of gaps in object, indirect object, and genitive positions in Chinese can lead Palestinian subjects to the wrong assumption by making them treat these positions as they alternate gaps and resumptive pronouns freely. Recall that Palestinian treats these positions the same in allowing resumptive pronouns; therefore, Yuan and Zhao argue that Palestinian judgment of the object position can be attributed to the influence of L1. This L1 transfer can cause an overgeneralization for the subject position and this overgeneralization will cause a learnability problem for Palestinian subjects, which makes them allow both gaps and resumptive pronouns in all positions in Chinese relative clauses.

In summary, the two studies, Hyltenstam (1984) and Yuan and Zhao (2005), on resumptive pronouns show that the L2 learners' performance on the test sentences suggests that they have transferred the resumptive pronoun structure into L2 structure. Next, other studies that look at the *wh*-movement in English relative clauses will be reviewed.

2.2 Studies on wh-movement

There is a stream of second language research that investigates the acquisition of wh-movement, which generally uses behavioral tasks, i.e., off-line, that asks for learners' judgments on the grammaticality of the test sentences. In this body of work, researchers test both relative clauses and the wh-question as both are argued to involve wh-movement in languages like English. The main question in these bodies of work examines whether there is a role for L1 transfer and whether native-like attainment is possible. There are contradictory results among these bodies of work; some studies such as Johnson and Newport (1991) support the Critical Period Hypothesis, whereas the findings of Martohardjono (1993) and Li (1998) are against that hypothesis but support access to Universal Grammar (UG).

Johnson and Newport (1991) investigates the critical period hypothesis, but focuses specifically on learners' knowledge of wh-movement in L2 English and their ability to detect Subjacency violations in English. They test Chinese adult learners of English, whose age of arrival in the United States is from 18 to 38 years. They use a grammaticality judgment task which includes Subjacency violation sentences in three different structures: the noun phrase complements as in (1a), relative clauses as in (1b), and wh-complements as in (1c):

(1) a.*What did the teacher know the fact that Janet liked? NP-complement

b.*Who should the policeman who found get a reward? Relative clause

c.*What did Sally watch how Mrs. Gomez makes? Wh-complement

The results show that subjects' judgment of Subjacency violation declines as their age increases. The English control group scores 35 correct responses out of 36 sentences that test Subjacency violation, whereas adult Chinese score only 22.

Johnson and Newport (1991) argue that adult Chinese subjects' performance on Subjacency is affected by a critical period, since they perform below English native speakers. However, Johnson and Newport suggest that adult Chinese subjects have a tendency to obey Subjacency constraints since they differentiate between the grammatical wh-movement and the Subjacency sentences by rejecting Subjacency violation more than rejecting the grammatical wh-movement sentences.

Johnson and Newport (1991) argue that the performance of the adult Chinese subjects on the three structures - noun phrase complements, wh- complements, and relative clauses - are subject to the critical period. In addition, Johnson and Newport argue that Universal Grammar (UG) is not fully accessible for adult Chinese learners of English.

In contrast, Martohardjono (1993) addresses the same issue with native speakers of Italian, Indonesian and Chinese and finds different results. Martohardjono argues that if L2 learners reject Subjacency violation as in (2), they have access to UG.

(2) *What did the girl [who bought ____] introduce the boy to the clerk?

Martohardjono investigates both Subjacency violation and the empty category principle (ECP), each of which has constraints on wh-movement in relative clauses. It is argued that some Subjacency violations are worse than others, with respect to the type of bounding nodes that a wh-phrase may cross and thus easier to be rejected by native speakers than other violations (Chomsky, 1986 and Cinque, 1990). In order to test whether learners' judgment on Subjacency is derived from their knowledge of UG principles, Martohardjono investigates the learners' sensitivity to subjacency violations in wh-movement sentences.

In her study, Martohardjono (1993) uses a grammaticality judgment task that involves a wh-movement from the subject and object positions of relative clauses. The extraction from subject position in relative clauses exhibits two violations, Subjacency and empty category principle, as in example (3a), whereas the extraction of object position involves a Subjacency violation only as in (3b):

(3) a. *Which neighbor did John spread [NP the rumor [CP that ____ stole a car]]

b. ??Which car did John spread [NP the rumor [CP that the neighbor stole ____]]

Martohardjono (1993) argues that if the participants in this study accept grammatical wh-movement and reject Subjacency violations on the one hand, and differentiate between the two types of violations on the other, their knowledge would be derived from access to UG principles. As in Table 3.4, Martohardjono finds that all subjects performed above the chance level when rejecting Subjacency violations.

Table 3.4 The percentage (%) of rejecting Subjacency violation sentences.

Language	Correct judgment
Chinese	65%
Indonesian	74%
Italian	82%
English	92%

Martohardjono (1993) argues that, although Indonesian and Chinese subjects do not have wh-movement in their L1, they perform above the chance level when judging wh-movement violations in English relative clauses. The results show that subject-extraction, which involves two violations (Subjacency and ECP), is rejected more than object-extraction that has only one violation (Subjacency). The performance of L2 learners in this experiment shows that they are able to differentiate

between the two types of Subjacency violation, which is similar to English native speakers' performance, which is arguably triggered by UG principles.

Martohardjono (1993) argues that although the sentences in the test that violate Subjacency constraints are grammatical in the Indonesian and Chinese languages, subjects do not depend on their L1 when judging Subjacency violation in English sentences; therefore, they are considered to have access to UG. Furthermore, Martohardjono argues that all subjects perform above the chance level when rejecting Subjacency violation that involves two violations (Subjacency and ECP) more than Subjacency violation sentences that involves one violation (Subjacency), which suggests that they have the knowledge of wh-movement in English.

Martohardjono (1993) argues that the participants not only acquire wh-movement in English but also differentiate between the two types of Subjacency violations, which suggest that they have acquired wh-movement in English. Martohardjono's claim about L2 adult learners' access to UG is also supported by Li (1998), who proposes that UG is fully accessible to L2 learners with high proficiency.

Li (1998) uses a grammaticality judgment task to investigate whether Chinese subjects, who do not have wh-movement in their L1, obey the constraints on Subjacency. She tests whether UG principles are accessible for adult Chinese subjects when acquiring wh-movement in English relative clauses. Li predicts that Chinese subjects will accept grammatical long wh-movement as native speakers and they will reject Subjacency violation. Li tested two groups of Chinese speakers: subjects who

live in China (the China group) and subjects who live in the United States (the US group). English native speakers were used as a control group.

The results show that the China group rejects most of the sentences that violate Subjacency, and their performance is above the chance level. In addition, there is no significant difference between the US group and English native speakers on judging Subjacency violation. Li (1998) argues that, although Chinese speakers do not have wh-movement in their L1, and they do not study Subjacency in classrooms, they process wh-movement like native speakers of English do. Li argues that the results of the study suggest the availability of UG. Li argues that UG is available to adult L2 learners when they reach a high proficiency level in the target language. She proposes that the native-like performance of the US group is attributed to a high language proficiency that helps learners fully access UG and is not attributed to the age of the learners.

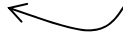
The L2 learners in Li's (1998) study are adults, and their performance is native-like, which goes hand-in-hand with Martohardjono's (1993), since both studies claim that access to UG is possible not only for children but also for adult learners; however, Li's findings contradict the proposals of Johnson and Newport (1991) and Hawkins and Chan (1997), which will be discussed in the next section.

2.3 Studies on wh-movement and resumptive pronouns

There are two studies that have investigated both properties outlined above. However, these two studies present contradictory results. In the first study, Hawkins and Chan (1997) tested what they call the Representational Deficit Hypothesis, formally known as the Failed Functional Feature Hypothesis (FFFH). Representational Deficit Hypothesis states that certain functional features are inaccessible after puberty. Their proposal is based on the work of Smith and Tsimpli (1995), which claims that features of the functional categories are subject to a critical period. Hawkins and Chan test their proposal by investigating the acquisition of English restrictive relative clauses by Chinese and French speakers. French and English restrictive relative clause structures are almost the same, whereas Chinese and English restrictive relative clause structures are different in that Chinese allows resumptive pronouns and does not involve wh-movement.

Both Chinese and French speakers were tested on judging the surface structure of English relative clauses which require a gap and disallow resumptive pronouns as in (4a). Also, they were tested on the underlying structure of wh-movement, which may involve a Subjacency violation as in example (4b):

(4) a. The girl_i [_{CP} who_i e [_I like t_i]] is here



b. *This is the boy [_{CP} who_i [_{IP} Mary described [_{NP} the way [_{CP} t_i that [_{IP} Bill attached t_i]]]]



Hawkins and Chan (1997) adopted Chomsky's (1986) analysis of English restrictive relative clauses. Under this analysis, the formation of a restrictive relative clause involves movement. The *wh*-element leaves a trace (*t_i*) when it moves to specifier of CP. A *wh*-phrase can cross one bounding node when it moves, as in example (4a), but it violates *wh*-movement constraints if it crosses more than two bounding nodes, as in example (4b). The movement of the *wh*-phrase in the English restrictive relative clause in example (4b) violates the Subjacency principle, because *who* crosses more than two bounding nodes, NP and IP. On the other hand, in Chinese restrictive relative clauses, there is no such violation, as in example (5):

(5) Zheben shui [_{NP#} [_{IP#} du guo pro_i de] ren] bu duo
 this book_i read ASP pro_i 'that' man not many
 "This book, the people who read (it) aren't many"

Another property on which both Chinese and French speakers were tested is the ungrammaticality of resumptive pronouns in English relative clauses as in (6):

(6) * The boy [who he came] is ill.

Unlike English, Chinese allows resumptive pronouns in the restrictive relative clauses as in (7)¹:

(7) [_{CP} [_{IP} Wo sung liwu gei ta _{IP}] de _{CP}] neige nuhai
I gave present to **her** 'that' the girl
"The girl that I gave a present to"

Hawkins and Chan (1997) argue that if Chinese learners have acquired wh-movement in English, they will be able to know the constraints and the properties of English relative clauses, which require gaps but not resumptive pronouns in wh-structures and prohibit Subjacency violations in wh-movement.

Hawkins and Chan (1997) predict that Chinese learners will not be able to acquire this knowledge, as they do not have wh-movement in their L1; on the other hand, French learners can acquire this structure because French has almost the same structures of relative clauses as English. Hawkins and Chan test their predictions by conducting two tests using a grammaticality judgment task: the surface structure test involves 20 grammatical restrictive relative clause sentences as in (8a) and 17

¹ Examples (4)-(7) are from Hawkins and Chan (1997)

ungrammatical resumptive pronoun sentences as in (8b), and the underlying structure test involves eight Subjacency violation sentences which test two types of Subjacency violations: Wh-island as in (9a) and NP-constraints as in (9b):

- | | |
|--|----------------|
| (8) a. The boy who I hit __ broke the window. | Gap |
| b. *The patient that I visited him was very sick. | Resumptives |
| (9) a. *This is the man who Mary told me when she will visit. | Wh-island |
| b. *This is the boy who Mary described the way that Bill attacked. | NP-constraints |

The results in Table 3.5 show that, first, the French group in all levels of proficiency performs native-like in judging the surface structure sentences. The elementary French group accepts the grammatical gap as in (8a) at 81% and the advanced French group scores 92% on accepting the same sentences. In addition, the elementary French group rejects ungrammatical resumptive pronouns as in (8b) at 81%, whereas the advanced French group is able to reject 96% of the sentences. The performance of the French subjects suggests that they have acquired the surface structure of English restrictive relative clauses.

Table 3.5 The percentage (%) of judging the surface structure of English relative clauses.

Subjects	The surface structure	
	Grammatical (no RP)	Ungrammatical (RP)
Chinese elementary	56	38
Chinese intermediate	67	55
Chinese advanced	79	90
French elementary	81	81
French intermediate	88	90
French advanced	92	96
English controls	96	98

The performance of the Chinese group indicates that as proficiency increases, their ability to judge the surface structure sentences increases. While the elementary Chinese group performs poorly in only accepting 56% of the grammatical gap sentences and in only rejecting 38% of the resumptive pronoun sentences, the advanced group is able to reject 90% of the resumptive pronoun sentences and to accept the gap 79% in the grammatical sentences.

Next, Table 3.6 shows the results on the underlying test, which involves Subjacency violations. The elementary French group rejects 59% of wh-island sentences as in (9a); however, the advanced French group rejects the same sentences at 85%. As for Complex-NP sentences as in (9b), the elementary French group rejects them at 72%, whereas the advanced French group rejects these sentences at 90%. As the proficiency of French subjects increases, their accuracy in rejecting both Subjacency violations increases.

The results suggest that the advanced French subjects are able to acquire the underlying structure of wh-movement in English since they know the wh-movement constraints².

Table 3.6 The percentage (%) of judging the underlying structure of English relative clauses.

Subjects	The underlying structure	
	Wh-island	Complex NP
Chinese elementary	63	71
Chinese intermediate	54	61
Chinese advanced	41	38
French elementary	59	72
French intermediate	66	79
French advanced	85	90
English controls	98	85

The Chinese groups show an interesting pattern. The elementary Chinese group, surprisingly, performs better than the advanced Chinese group in the underlying test. While the elementary Chinese group rejects wh-island at 63%, unexpectedly the advanced Chinese group scores only 41% in rejecting the same sentences. In addition, the elementary Chinese group rejects Complex-NP sentences at 71%, whereas the advanced Chinese group scores only 38% when rejecting these

² The results show that the advanced French subjects' performance on the wh-island sentences where the bounding nodes are NP and IP, was native-like. The bounding nodes in French restrictive relative clauses are different from English; instead of NP and IP, French bounding nodes are NP and CP (Sportiche 1981), which suggests that IP node is fine to be crossed several times in French without violating Subjacency. According to the Representational Deficit Hypothesis, if bounding nodes are different, French subjects will perform differently from English speakers. Surprisingly, the results show that they behave native-like in the test, which suggests that they have acquired a new structure that is not available in their L1, which contradicts Hawkins and Chan's Representational Deficit Hypothesis. Although Hawkins and Chan acknowledge this, they do not discuss it further.

sentences. The results show that accuracy declines as proficiency increases, which suggests that the advanced Chinese group does not acquire the underlying structure of *wh*-movement in English.

Recall that the elementary Chinese subjects performed poorly in the surface structure test by rejecting only half of the grammatical gap sentences and accepting only half of the resumptive pronoun sentences in English relative clauses, which suggests that they do not acquire the surface structure of English relative clauses. However, when they judge the underlying structure by rejecting Subjacency violation sentences, surprisingly, they do better than the advanced Chinese subjects. Hawkins and Chan (1997) suggest that the elementary Chinese subjects do not reject Subjacency sentences because they know the constraints on *wh*-movement, but because these sentences do not have resumptive pronouns.

The advanced Chinese subjects, on the other hand, become gradually aware that English does not have resumptive pronouns, since they perform well on the surface structure test, which suggests that they successfully acquire the surface structure of English restrictive relative clauses. However, they performed badly on judging Subjacency violation sentences, which suggests that they do not acquire the same underlying structure of *wh*-movement in English, which is a fronted *wh*-phrase followed by its trace in the embedded clause, as in example (10):

(10) [*wh*-phrase.....trace]

Hawkins and Chan (1997) argue that the underlying structure of the gap in the advanced Chinese subjects' minds is a null resumptive pronoun coindexed with a preceding wh-phrase, as in example (11):

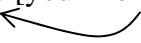
(11)[wh-phrase..... null resumptive pronoun]

Hawkins and Chan argue that this structure is not new for the Chinese subjects, since they have an obligatory null resumptive pronoun in the subject position in the Chinese restrictive relative clauses, as in (12):

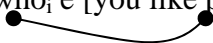
(12)*pro*_i gongzuo qinglao de neige nuhai_i
 null RP work hard C the girl
 "The girl who works hard"

Hawkins and Chan propose that advanced Chinese subjects do not acquire the underlying structure of the gap in wh-movement. Instead of associating the head noun with its trace, as the structure in English in (13a), they link the head noun with a null resumptive pronoun (*pro*), as in (13b):

(13)a. The girl [_{CP} who_i e [you like t_i]] is here.



b. The girl_i [_{CP} who_i e [you like *pro*_i]] is here.



Hawkins and Chan (1997) argue that this structure helped advanced Chinese subjects to judge resumptive pronoun sentences, but it fails them when they judge Subjacency. As for the advanced French group, they perform native like in all tests. They acquire the gap in simple wh-movement sentences and they reject ungrammatical resumptive pronoun sentences like native speakers do, which suggests that since they have these features already in their L1, it is possible to acquire them in the L2.

Hawkins and Chan (1997) have investigated both wh-movement and resumptive pronoun structures in order to test their hypothesis. By comparing the results of Chinese and French groups, Hawkins and Chan argue that these findings support the Representational Deficit Hypothesis that if a feature is not instantiated in the L1, it cannot be acquired in the L2.

However, a study by Bolotin (1996) shows a different pattern of results. She tests whether speakers of Arabic, which like Chinese has resumptive pronouns and arguably does not involve wh-movement, can acquire a new syntactic structure that is not available in their L1. The participants in her experiment were adult Arab students in the advanced level of English. They took a grammaticality judgment task that tested grammatical and ungrammatical wh-movement with and without resumptive pronouns. Examples (14a) and (14b) represent Subjacency violations with and

without resumptive pronouns, whereas example (15a) involves only a resumptive pronoun and example (15b) involves a gap in a grammatical sentence³.

(14)a. *This is the water that Ahmed owns the camel that drinks **it**. Subjacency/RP

b. *This is the woman that Hanan cooked the food that she eats. Subjacency/Gap

(15)a. *This is the man that **he** owns the camel that drinks the water. RP

b. This is the man that holds the ladder that the woman climbs. Gap

The results of this study are presented in Table 3.7, and show that Arabic speakers perform at chance level when judging Subjacency violation with resumptive pronouns as in (14a), and they perform below chance level when judging wh-movement with ungrammatical resumptive pronouns as in (15a). However, they perform well when rejecting Subjacency violation sentences without resumptive pronouns as in (14b) and in accepting the gap positions in grammatical wh-sentences as in (15b). The results suggest that Arabic learners of English allow resumptive pronouns in the test sentences but, nevertheless, they know that the gap is possible in English wh-movement.

³ Examples (14) and (15) are Bolotin's test sentences.

Table 3.7 Mean percent correct in judging grammatical sentences and ungrammatical wh-sentences.

Sentence structure type	Grammatical/Ungrammatical	Ex. Number	% correct
Subjacency/ RP	Reject	14a	49.2%
Subjacency/ Gap	Reject	14b	88.9%
RP	Reject	15a	19.8%
Gap	Accept	15b	88.1%

Bolotin argues that although Arabic learners of English show L1 transfer on the resumptive pronoun sentence' test, they show knowledge of the constraints on wh-movement in English relative clauses. Bolotin argues that adult Arabic speakers can acquire wh-movement, even though they do not have it in their L1.

Recall that Hawkins and Chan's (1997) advanced Chinese subjects, as shown in Table 3.8, correctly reject resumptive pronoun sentences 90%, while Bolotin's (1996) advanced Arabic subjects correctly reject resumptive pronoun sentences only 19%, which suggests that the advanced Arabic subjects are influenced by their L1 setting, whereas the advanced Chinese subjects acquire the surface structure of gaps in English restrictive relative clauses.

Table 3.8 Comparison between subjects' performance in Hawkins and Chan's study (Chinese) and Bolotin's study (Arabic) and their accuracy of rejecting both resumptive pronouns and Subjacency.

Study	RP	Subjacency
Hawkins and Chan (1997)	90%	41%
Bolotin (1996)	19%	88%

However, when comparing the results of the two studies on Subjacency violations, Hawkins and Chan's (1997) advanced subjects reject Subjacency only 41% of the time, whereas Arabic subjects in Bolotin's (1996) study correctly reject Subjacency 88% of the time, which suggests that Arabic subjects have knowledge about the constraints of wh-movement in English, whereas Chinese subjects do not.

Bolotin's (1996) study on the Arabic subjects and Hawkins and Chan's (1997) study on the French subjects have investigated both wh-movement and resumptive pronouns in the learners' interlanguage grammar and whether the acquisition of new structures is possible. Interestingly, as shown in Table 3.9, the performance of the Arabic and French participants is the same on rejecting ungrammatical wh-movement which violates Subjacency and accepting grammatical wh-movement in English.

Table 3.9 Comparison between subjects' performance in Hawkins and Chan's study (French) and Bolotin's study (Arabic) and their accuracy of accepting wh-movement without RP and rejecting Subjacency.

Study	Wh-movement	Subjacency
Hawkins and Chan (1997)	92%	85%
Bolotin (1996)	88.1%	88.9%

Whereas Hawkins and Chan propose that access to a new syntactic feature is impossible for adult learners if it is not instantiated in the L1, Bolotin argues that new structures are available to adult second language learners. This contradiction between the two results leaves an open question for new research on whether adult second language learners are subject to a critical period when they acquire new structures in L2.

2.4 Summary of previous studies

The researchers in this literature review have tested whether it is possible for L2 learners to acquire new structures in relative clauses. The results of these studies are contradictory; some researchers support the notion of a Critical Period and L1 transfer (Hawkins & Chan, 1997; Johnson & Newport, 1991; Hyltenstam, 1984; Yuan & Zhao, 2005), whereas other researchers do not (Bolotin, 1996; Martohardjono, 1993; Li, 1998).

Hawkins and Chan (1997) argue that adult Chinese learners of English are not able to acquire new features that are not instantiated in their L1; however, a similar study by Bolotin (1996) contradicts their findings by investigating the same structure. She argues that Arabic speakers are able to acquire wh-movement in English, even though Arabic arguably does not have wh-movement. The fact that these two studies,

which investigate the same properties - wh-movement and resumptive pronouns - are contradictory in their results -on the performance of Arabic and Chinese but not on the performance of Arabic and French- leads us to look at the research which investigates each property separately. The findings of this research show that some researchers support L1 transfer (Hyltenstam, 1984; Yuan & Zhao, 2005), whereas others do not (Martohardjono, 1993; Li, 1998).

Hyltenstam (1984) and Yuan and Zhao (2005) find that subjects who have resumptive pronouns in L1 transfer them into L2. Both studies share the assumption that L1 influences the learners' ability to acquire a new structure in the target language. However, Martohardjono (1993) and Li (1998) investigate wh-movement and find that adult learners of L2 are not subject to the Critical Period or to the L1 transfer and their access to UG is possible. In the next section, we report the first study, in this dissertation, on Najdi and English, which is based on Hawkins and Chan (1997).

3. The Grammaticality Judgment Task (The first study)

3.1 Introduction

The main goal of this paper is to evaluate the predictions of the three theories, namely Full Transfer/Full Access, Direct Access and the Representational Deficit Hypothesis with respect to L1 transfer and the Critical Period by looking at the acquisition of English restrictive relative clauses by Najdi subjects. If we follow Hawkins and Chan's (1997) line of argumentation, then advanced learners may perform well on the sentences that target the surface properties of restrictive relative clauses; however, the advanced learners will not be able to acquire constraints on wh-movement and thus will not acquire the underlying structure in English relative clauses. On the other hand, Direct Access and Full Transfer/Full Access argue that with a high level of proficiency, L2 learners will acquire both the surface and underlying structures in English restrictive relative clauses.

If the Representational Deficit Hypothesis is right, Najdi subjects at the elementary level of proficiency will show L1 transfer when judging the surface structure of restrictive relative clauses. Hawkins and Chan (1997) argue that the L2 learners will not overcome L1 transfer when judging the underlying structure of wh-movement because the wh-feature is not instantiated in their L1. On the other hand,

Full Transfer/Full Access argues that with more input, transfer can be overcome and native-like performance can be achieved. In addition, Direct Access would predict that Najdi subjects could perform well on both the surface and the underlying structures.

3.2 Participants

The study consists of 19 volunteer male Saudi students who have studied English for at least six months in the Applied English Center at The University of Kansas. Before coming to the United States, the 18 to 33 year old subjects studied English in Saudi Arabia for six years in public schools, four hours a week. Najdi subjects were given the Michigan test to assess proficiency and they were divided into three groups based on their mean score in the proficiency test as shown in Table 3.10.

Table 3.10 Proficiency test score, age, and number of Najdi participants.

Group	Number of subjects	Michigan test		Age and time of learning English	
		range	mean	Age range	Years of Eng.
Elementary	4	15-26	21.0	18-20	1.2
Intermediate	11	29-37	32.9	18-22	1.5
Advanced	4	41-43	41.5	25-33	4.3

3.3 The grammaticality judgment task

The same Grammaticality Judgment Task (GJT) that Hawkins and Chan (1997) used on the Chinese and French subjects was replicated. It was decided to adopt the grammaticality judgment task from Hawkins and Chan's study because Chinese is similar to Najdi Arabic with respect to the formation of restrictive relative clauses. In addition, this particular test covered and evaluates most potential difficult areas that Najdi learners of English may encounter in their acquisition of English relative clauses.

The grammaticality judgment task consists of 78 sentences divided as follows: 59 test sentences which are taken from Hawkins and Chan's (1997) grammaticality judgment task and 19 filler sentences which we have added to the test in order to balance the number of grammatical and ungrammatical sentences. The 59 sentences are divided into three categories. In the first category, Hawkins and Chan have twenty simple grammatical relative clause sentences as in (16) to (19). The main purpose of the 20 sentences is to see whether Najdi subjects know the grammaticality of the gap in English restrictive relative clauses, which is not grammatical in their L1. In Najdi, the sentences in (16)-(19) would all have resumptive pronouns in the positions of the gap.

(16) The actor who ___ performs well wins a lot of prizes.

(17) The lady that I met ___ yesterday was my former teacher.

(18) The man whom I have borrowed money from ___ has a big house.

(19) The girl we sing better than ___ is in the choir.

In the second category, a group of 17 ungrammatical resumptive pronoun sentences are given to test whether the participants know that resumptive pronouns are ungrammatical in English. Resumptive pronouns are obligatory in all positions in Najdi Arabic except the subject position. The motivation for this test is to understand whether Najdi learners of English are influenced by the existing properties in their L1 or not. Examples (20)-(23) present resumptive pronoun sentences.

(20) *The man who he lives next door has left.

(21) *The patient that I visited him was very sick.

(22) *The uncle Mary sent the letter to him moved to a new house.

(23) *The writer David became more famous than him lives in England.

These two categories are considered to investigate the surface structure of wh-movement in English relative clauses, i.e., gap is obligatory and resumptive pronouns are not allowed.

The third category targets the underlying representation of wh-movement in English. A group of 8 restrictive relative clause sentences which involve ungrammatical wh-movement (Subjacency) as in examples (24) to (27) were used to test whether Najdi Arabic subjects are sensitive to movement constraints in English. Najdi subjects cannot be sensitive to Subjacency violations if they have not already acquired wh-feature. This category involves two types of Subjacency violations: wh-island extraction, which represents strong violation and NP extraction, which represents weak violation (Chomsky, 1986; Cinque, 1990).

- **Violation of the wh-island**

(24) *This is the book which John met a friend who had read.

(25) *This is the clerk who Lily told Peter when she will employ.

- **Violation of the complex NP constraint**

(26)*?This is the book which John heard a rumor that you had read.

(27)*?This is the boy who Mary described the way that Bill attacked.

Finally, a group of 19 grammatical filler sentences were included in this test to balance the acceptable and unacceptable sentences in the test and to distract the subjects' attention from the phenomena that we are investigating. Furthermore, these fillers in (28) to (30) show us whether or not subjects are paying attention to the test since most of the filler sentences are simple and easy to be answered by the elementary level subjects. Filler sentences are made to match the number of words and syllables in Hawkins and Chan's (1997) test sentences.

(28) Ali and Abdullah are here at the hospital to see Fahad.

(29) Which rain coat do you like better, the red one or the blue one?

(30) Mohammed likes his math teacher because he is very helpful.

3.4 Research questions and predictions

The aim of this study is to investigate the predictions of the second language theories namely; Full Transfer/Full Access, Direct Access and the Representational Deficit Hypothesis, with respect to L1 transfer and the Critical Period by looking at the performance of Najdi subjects when judging grammatical and ungrammatical English relative clause sentences. The predictions of the Najdi subjects' performance are divided into two sections as shown in Table 3.11: the surface properties and underlying properties. Recall that the test of the surface properties of English relative clauses involves sentences that contain grammatical gap positions and ungrammatical resumptive pronouns in the gap positions. Also, remember that the test of the underlying properties involves ungrammatical sentences, which do not obey syntactic constraints on wh-movement and thus result in Subjacency violations.

Table 3.11 The predictions of the three theories (Representational Deficit Hypothesis RDH, Full Transfer/Full Access FT/FA, and Direct Access Hypothesis DAH) on the performance of the advanced participants.

Theories	Surface structure		Underlying structure
	Resumptive	No resumptive	Subjacency
RDH	Reject	Accept	Accept
FT/FA	Reject	Accept	Reject
DAH	Reject	Accept	Reject

As for the surface properties of relative clauses, the Representational Deficit Hypothesis and Full Transfer/Full Access predict transfer in the performance of the elementary Najdi subjects. Their prediction suggests that elementary Najdi subjects will transfer resumptive pronouns into the gap positions in English relative clauses, which will affect their judgment on the surface structure sentences in that they will accept ungrammatical resumptive pronouns and reject grammatical gap positions in English relative clauses. However, Direct Access hypothesis predicts that elementary Najdi subjects' judgment on the surface structure sentences will not be affected by the existing properties of their L1, which suggests that elementary Najdi subjects are not restricted to their L1 grammar and may perform on these sentences similar to native speaker by an advanced level. On the other hand, all theories⁴ predict that at higher levels of proficiency the acquisition of the surface structure is possible for advanced Najdi subjects, which suggests that the advanced Najdi subjects will be able to reject resumptive pronoun sentences and accept gap positions in English relative clauses.

As for the underlying structure of English relative clauses, with respect to transfer, the Representational Deficit Hypothesis and Full Transfer/Full Access predict that the elementary Najdi subjects will be influenced by their L1 which allows resumptive pronouns and thus will reject these sentences because they do not involve

⁴ Although the Representational Deficit Hypothesis states that certain functional features are not accessible for adult L2 learners if these features are not instantiated in L1, the results of their advanced Chinese subjects show that they have knowledge of the surface structure in English relative clauses. However, Hawkins and Chan argue that the advanced Najdi subjects' performance on the surface structure does not necessarily mean that they have acquired the surface structure; instead, advanced Chinese subjects interpret the gap position in the English relative clauses as a null resumptive pronoun. Hawkins and Chan argue that since the Chinese language has an obligatory null resumptive pronoun in the subject position of relative clauses, advanced Chinese subjects transfer the null resumptive pronoun structure from their L1 into English.

resumptive pronouns. Direct Access hypothesis, on the other hand, predicts that elementary Najdi subjects' grammars are constrained by UG and thus they may be able to acquire this knowledge even if it is not instantiated in their L1. With respect to the Critical Period, the Representational Deficit Hypothesis predicts that the acquisition of wh-movement is impossible for the advanced Najdi subjects. In other words, the knowledge of wh-movement constraints, which are not instantiated in Najdi, is not accessible for both advanced adult Najdi subjects. However, Full Transfer / Full Access and Direct Access hypothesis predict that by the advanced level of proficiency, adult Najdi subjects are able to acquire new structures even if these structures are different from Najdi. The research question of the study is whether adult Najdi Arabic subjects are able to acquire both the surface and the underlying structures in wh-movement in English restrictive relative clauses.

3.5 Procedures

Before we conducted the experiment, the subjects were asked to fill in a background questionnaire, and then they took an English proficiency test (the Michigan proficiency test). A grammaticality judgment task was conducted in the Budig computer Lab at the University of Kansas, three weeks after the English proficiency test. Before the test, subjects were given a translated list of difficult words

to make sure that students understand all examples. The test instructions were given in Arabic. The test sentences were presented on a sheet of paper, and subjects answered them on the same paper. There were different versions of the test with the test sentences in random order to control for ordering effects. Subjects were asked to write their correction if they thought a sentence was ungrammatical.

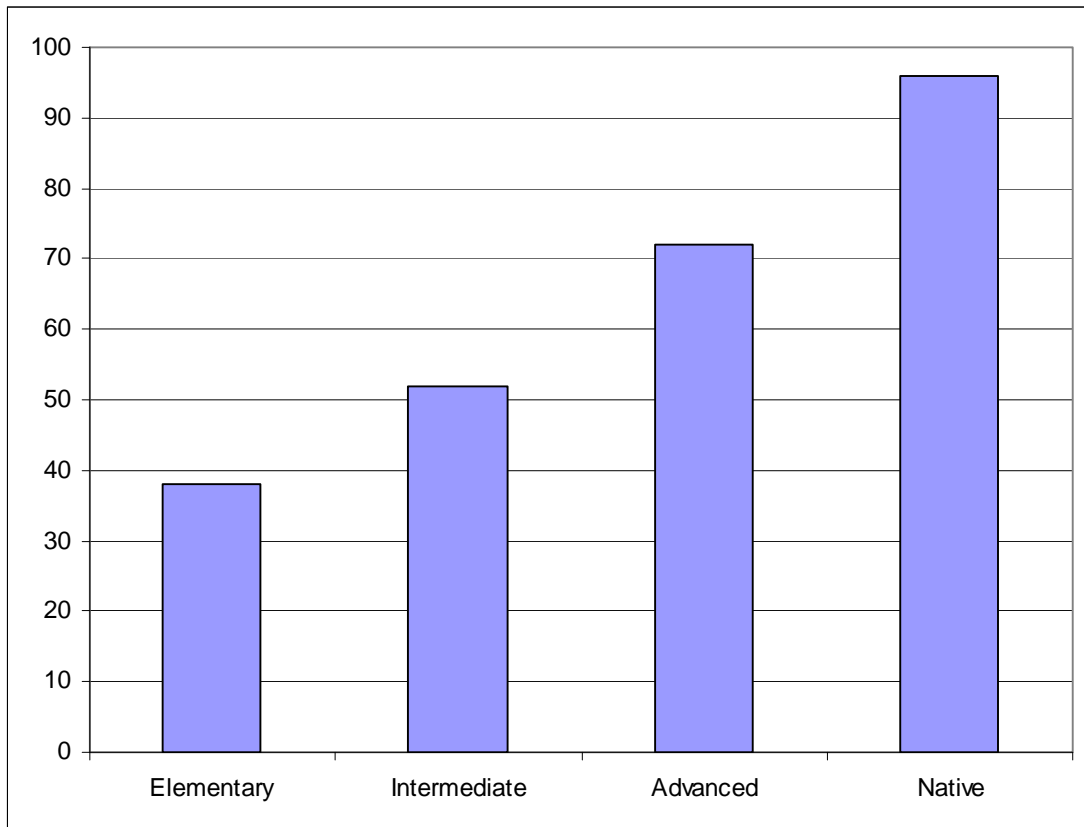
3.6 Results⁵

Group results are presented first, followed by individual results. The first three categories in the task test whether Najdi subjects are able to acquire the surface structure of restrictive relative clauses in English, which, unlike Najdi, involves an obligatory gap instead of a resumptive pronoun. Figure 3.1 presents the results of category one, which involves 20 simple grammatical restrictive relative clause sentences targeting the surface structure of the gap in English⁶.

⁵ Results are presented descriptively because the number of sentences in each category in the test is not balanced and we are not reporting on the correction because subjects either did not correct or their correction is vague.

⁶ The data for the native speakers are taken from Hawkins and Chan's paper.

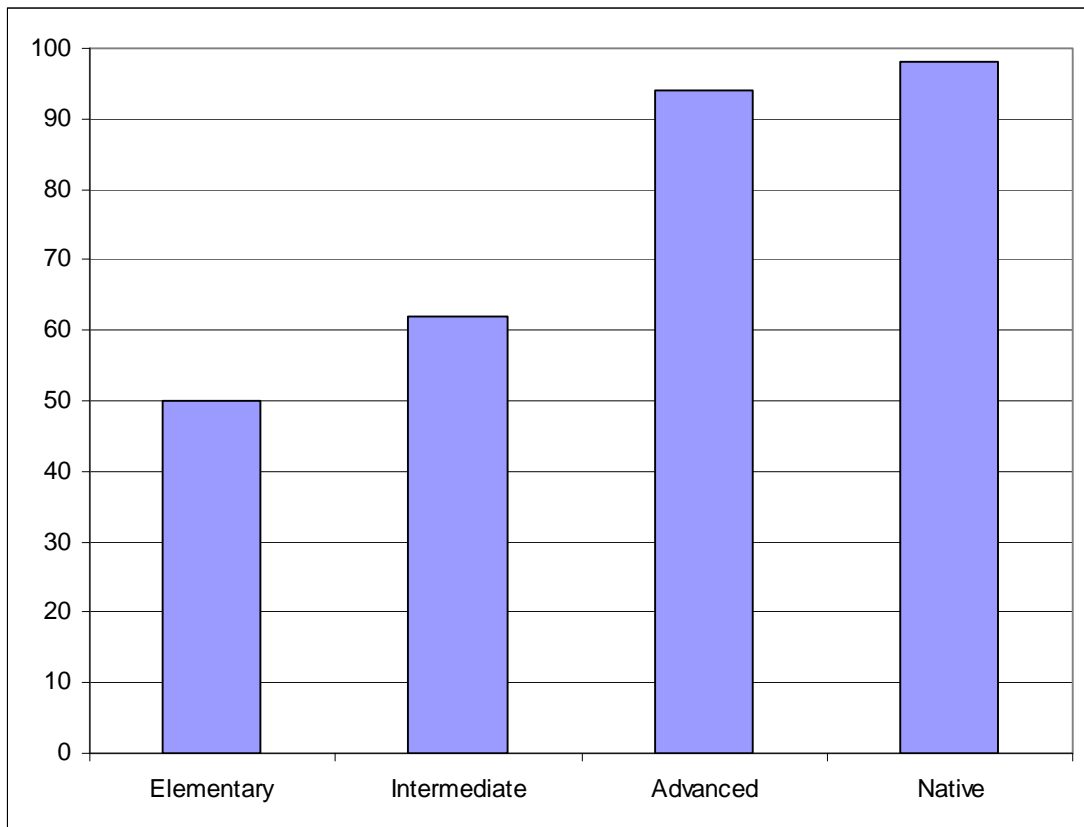
Figure 3.1 Mean correct acceptances of 20 simple grammatical relative clause sentences.



The results show that the elementary and intermediate groups have a lot of difficulties in accepting the gap in English restrictive relative clause sentences; however, the more proficient the subjects are, the more accurate they are in correctly accepting the surface structure of English restrictive relative clauses. The results of the first test suggest that although the accuracy of Najdi subjects improves with proficiency, they start out at a lower level of accuracy when judging the gap in these sentences. This indicates that the elementary group is influenced by the properties of their L1.

The second category tests whether Najdi Arabic subjects are still influenced by the property of their L1, which requires a resumptive pronoun in the position of the gap in English restrictive relative clause. We argue that if they acquire the surface structure of English restrictive relative clause sentences, they are expected to reject resumptive pronoun sentences. Figure 3.2 presents the results of 17 ungrammatical resumptive pronoun sentences in English relative clause sentences.

Figure 3.2 Mean correct rejections of 17 resumptive pronoun RRC sentences.



The results show that although elementary Najdi subjects perform poorly in their judgment of resumptive pronoun sentences, indicating that they are influenced by the existing properties of their L1, the advanced subjects are able to reject resumptive pronouns with native-like performance. These findings confirm that Najdi subjects acquire the surface structure of English restrictive relative clauses, which involves a gap, even though resumptive pronouns are obligatory in these positions in their L1.

- **Individual results on the surface structure categories⁷**

The two categories - 20 simple grammatical wh-movement and 17 ungrammatical resumptive pronoun sentences - investigate the surface structure of the gap in English, which does not allow resumptive pronouns. The results of these two categories are presented in Table 3.12 below.

⁷ We are using 75% as a cut off point for learners who are considered to acquire the structure.

Table 3.12 Mean percent correct for each individual in the surface structure test.

Group	Subject	Score in English test	Grammatical Sentences	Ungrammatical Sentences (resumptives)
			Accept	Reject
Elementary	S5	15	40	35
	S18	21	45	41
	S2	22	40	41
	S13	26	25	53
	Average	21	37	50
Intermediate	S19	29	65	53
	S16	30	30	82
	S17	30	5	94
	S8	32	50	82
	S1	33	25	59
	S10	33	65	41
	S15	33	85	18
	S4	34	25	65
	S7	35	50	76
	S9	36	75	71
	S6	37	90	47
	Average	33	51	63
Advanced	S3	41	80	94
	S11	41	65	94
	S14	41	80	88
	S12	43	60	100
	Average	41.5	71	94

Table 3.12 presents the results of each subject's performance in the two categories and show that all subjects in the elementary group perform below the chance level in accepting the gap and in rejecting resumptive pronoun sentences, which indicates that they are still influenced by the properties of their L1.

In the intermediate group, only three subjects out of eleven perform at or above 75% correct in rejecting resumptive pronouns and in accepting gaps. However, nine subjects perform at or below chance level, which suggests that the intermediate subjects are struggling between their L1 and L2 setting.

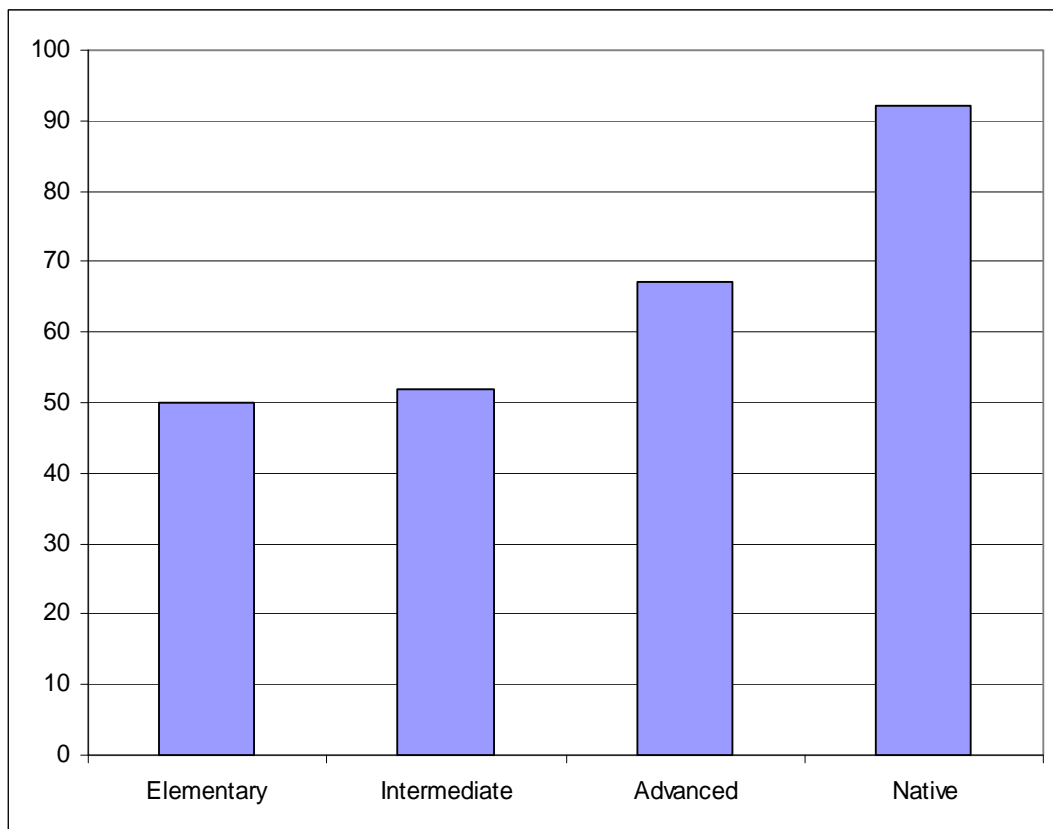
In the advanced group, two subjects perform well in accepting gaps in English, whereas two subjects perform at and above the chance level. However, all subjects perform well when rejecting resumptive pronouns and their means are almost at the level of the native speakers. The results of the three groups in the two categories suggest that subjects' accuracy increases with proficiency at the advanced level and subjects are able to acquire the surface structure of English restrictive relative clauses, which require an obligatory gap.

- **The underlying structure category**

Finally, we present results for the sentences targeting the underlying structure of wh-movement. This is the category in which Representational Deficit Hypothesis and both Direct Access and Full Transfer/Full Access make different predictions. Representational Deficit Hypothesis predicts that Najdi subjects are unable to acquire a wh-feature since it is not in their L1; however, Direct Access and Full Transfer/Full Access predict that Najdi subjects will be able to acquire a wh-feature even if it is not

instantiated in their L1. The study suggests that if Najdi subjects acquire wh-movement in English restrictive relative clauses, they should be able to reject Subjacency violations in English sentences.

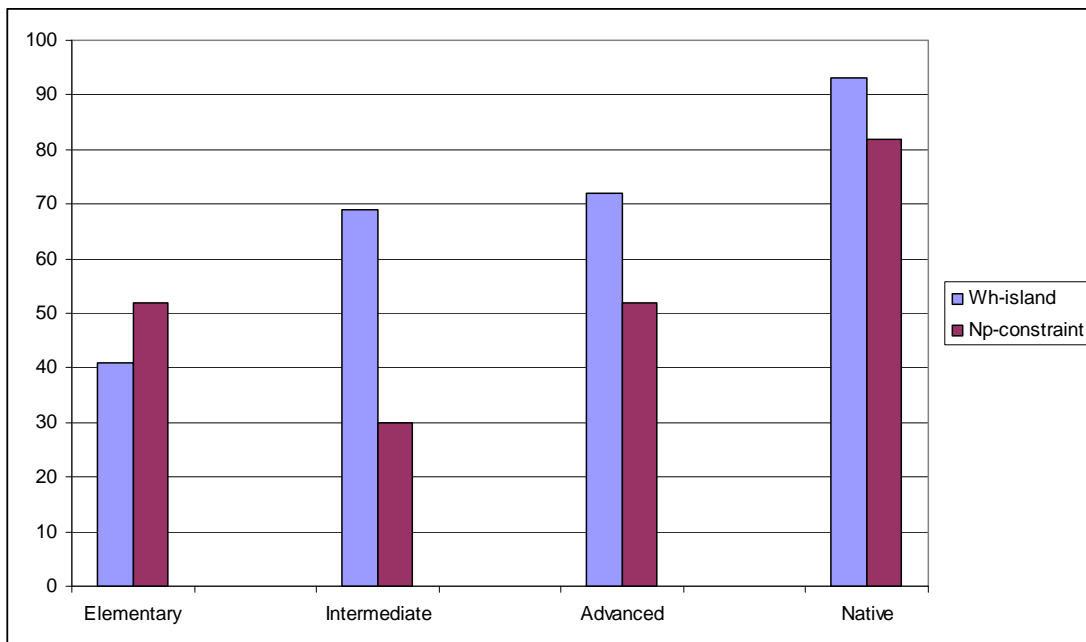
Figure 3.3 Mean correct of rejecting Subjacency violations in English relative clause sentences.



By looking at the subjects' performance on all types of Subjacency violations, weak and strong violations are combined and we find that elementary and

intermediate groups behave similarly at the chance level, whereas the advanced group tends to be more accurate in rejecting these sentences. The relatively similar score between the subjects in the intermediate and elementary group requires us to look at the performance of each subject separately in order to know whether some subjects fully reject Subjacency and whether others accept it or whether all subjects perform similarly in rejecting and accepting these sentences. It is also suggested to look at each type of Subjacency violation separately to see whether subjects have a preference to reject one type over the other. Figure 3.4 represents the subjects' performance on the two types of Subjacency violations (weak and strong).

Figure 3.4 Mean correct of rejecting wh-island and NP-constraint in English relative clause sentences.



The results of this test show that the elementary group starts with a low rate of accuracy when judging wh-island violations; however, as proficiency increases, the advanced subjects are able to reject these violations at a higher rate and above the chance level. The findings in the wh-island test show that the more proficient the subjects are in English, the higher accuracy they achieve; however, when judging NP-constraint violations, the elementary group performs as advanced group, whereas the intermediate group performs poorly. This unexpected result suggests that we need to look at each subject's performance separately as presented in the next section.

- **Individual results on Subjacency**

Table 3.13 represents individual results for rejecting wh-island and NP-constraint. Each subject's performance on the two types of Subjacency will give us a clear picture of whether subjects have a preference for one violation over the other, and how subjects in each group behave. In addition, it shows how many subjects in each group have acquired the underlying structure of the gap in English restrictive relative clauses.

Table 3.13 Mean percent correct for each individual in rejecting two types of Subjacency.

Group	Subject	Score in English test	Subjacency NP-constraint	Subjacency Wh-island
Elementary	S5	15	75	50
	S18	21	75	50
	S2	22	25	25
	S13	26	50	50
	Average	21	56	44
Intermediate	S19	29	0	75
	S16	30	0	75
	S17	30	100	100
	S8	32	50	75
	S1	33	25	75
	S10	33	25	50
	S15	33	0	50
	S4	34	25	75
	S7	35	75	100
	S9	36	25	75
	S6	37	25	25
	Average	33	32	70
Advanced	S3	41	100	0
	S11	41	25	100
	S14	41	50	100
	S12	43	50	100
	Average	41.5	56	75

The results of the elementary group in the wh-island (strong violation) show that no one out of four subjects performs at 75% in rejecting these sentences. However, when they judge NP-constraint violation, two subjects score 75% in rejecting this type of Subjacency. These results suggest that some of the subjects in the elementary group might have acquired the underlying structure of English wh-movement; however, if this is true, they were expected to perform in a way similar to

native speakers in rejecting wh-island (strong violation) more than NP-constraint (weak violation) sentences, but they did not.

In the intermediate group, eight subjects score 75% in rejecting wh-island violation. However, only two subjects are able to reject NP-constraints violation at 75%. These findings suggest that although the intermediate subjects perform less well than the native speakers, their performance shows that they accept weak violation (NP-constraints) sentences more than the strong violation (wh-island) sentences, which is similar to the preference of the native speakers.

As for the advanced group, three subjects out of four score 100% in rejecting the wh-island violations; however, only one subject is able to reject NP-constraint sentences at a rate of 100%. These results for the advanced group suggest that they do not have a problem in rejecting the wh-island, but when they judge weak violation sentences, they tend to reject them less, which is also similar to the native speakers' behavior towards these two types of Subjacency.

To sum up, Najdi subjects start with a low level of accuracy, but they are considered to acquire wh-movement in English in the advanced level. Also, in each group there are some subjects who score 75% in rejecting the Subjacency sentences. These results contradict Hawkins and Chan's findings and suggest that Najdi subjects' performance is constrained by UG. Another piece of supporting evidence that Najdi subjects obey UG principles is the ability of the intermediate and advanced groups to distinguish between the two types of Subjacency violations, strong versus weak, in these sentences.

However, the Subjacency task involves very complicated ungrammatical sentences, which make the results hard to interpret. Most subjects who reject Subjacency sentences do not write their correction for the ungrammatical sentences as we asked them to do, so we do not know why they rejected them. Also, the grammaticality judgment task used by Hawkins and Chan (1997) has some limitations. The limitations, which will be discussed in section 5.

- **Comparing the surface structure sentences to the underlying structure sentences**

The comparison of the performance of all subjects in the underlying structure and surface structure tests will show whether subjects have acquired both structures or whether they failed to acquire new features as predicted by the Representational Deficit Hypothesis. If the Representational Deficit Hypothesis is right, subjects may perform well on the surface structure sentences; however, they are expected by the same theory to perform poorly on the underlying structure sentences. Table 3.14 presents the mean accuracy for the two types of Subjacency violation; wh-island and NP-constraints are combined, to represent the underlying structure and resumptive pronoun sentences to represent the surface structure for each subject.

Table 3.14. Mean percent correct for each subject's performance in rejecting resumptive pronouns and the two types of Subjacency violation.

Group	Subject	Score in English test	Resumptive Pronouns	Subjacency Violations
Elementary	S5	15	65	62
	S18	21	41	62
	S2	22	41	25
	S13	26	53	50
	Average	21	50	49.75
Intermediate	S19	29	53	37
	S16	30	82	37
	S17	30	94	100
	S8	32	82	62
	S1	33	59	50
	S10	33	41	37
	S15	33	18	25
	S4	34	65	50
	S7	35	76	87
	S9	36	71	50
	S6	37	47	25
	Average	33	62.50	50.90
Advanced	S3	41	94	50
	S11	41	94	63
	S14	41	88	75
	S12	43	100	75
	Average	41.5	94	65.75

The comparison between the subjects' performance on rejecting both Subjacency and resumptive pronoun sentences shows that no subject in the elementary group is able to reject both sentences at 75%, whereas only two subjects out of eleven in the intermediate group are able to reject these sentences above 75%. On the other hand, the performance of the advanced group shows that all subjects are

able to reject resumptive pronoun sentences more than 75% and two out of four subjects perform well in rejecting both resumptive pronoun and Subjacency sentences and their means are at the level of native speakers. These results suggest this is not the same pattern that Hawkins and Chan found in the Chinese's performance. Some subjects in the advanced and the intermediate groups are able to acquire both the underlying and the surface structure of English restrictive relative clauses, which suggests that they are not affected by the critical period.

4. Discussion

According to the results discussed in the previous section, some Najdi subjects show consistent improvement in their performance on all tasks. The more advanced the subjects are, the more accurate they are in judging the surface and the underlying structures of English restrictive relative clauses. The performance of the Najdi subjects shows different findings with respect to L1 transfer and the Critical Period theories. As far as transfer is concerned, Najdi subjects show transfer in the elementary group performance on the surface structure test as they reject 50% of the gap sentences and accept 50% of the resumptive pronoun sentences. The elementary Najdi subjects' results are predicted by the Full Transfer/Full Access theory and the Representational Deficit Hypothesis, since both theories consider the L1 grammar to be the starting point for the acquisition of L2. The Direct Access Hypothesis assumes

the starting point for the second language learners is Universal Grammar (UG); however, the results of the elementary Najdi subjects show that they heavily transfer the properties of their L1 into L2. The results suggest that Najdi subjects are influenced by the existing properties of their L1 in the early stages of acquisition.

As for the Critical Period, the results of the advanced Najdi subjects do not support the Representational Deficit Hypothesis, which argues that there is a critical period for the acquisition of any functional features (like *wh*-feature and Agreement) that differ between the L1 and L2. Some advanced adult Najdi subjects have acquired the *wh*-feature which is not instantiated in their L1. However, the results of the advanced Najdi subjects go hand in hand with the Full Transfer/Full Access and Direct Access, as both theories argue that L2 structures can be acquired by second language learners even if these structures are not similar to those of L1.

CHAPTER 4

THE PROCESSING OF WH-QUESTIONS IN NATIVE AND NON-NATIVE ENGLISH

1. Introduction

This chapter will report the second experiment, a self-paced reading study, following Stowe's (1986) study. The experiment will investigate whether acquisition of constraints on wh-movement is possible. This chapter is divided into six sections. The second section presents background information about previous L1 and L2 online studies. The third and the fourth sections introduce our on-line study with the

predictions and the method. Section five shows the results and discusses the findings. The last section presents the conclusion of the on-line study.

2. On-line studies

2.1 L1 On-line studies: incremental processing in native speakers

Crain and Fodor (1985) conducted a self-paced reading task, which required the participants to press a button to read the sentence word by word and after the last word the participants were requested to answer a comprehension question, to test how English native speakers process *wh*-sentences. Crain and Fodor argued that when English native speakers encounter a *wh*-phrase, they immediately begin to search for the position from which the *wh*-phrase originated. For example in (1a), they encounter a *wh*-phrase (*who*) and then they will look for a gap from which the *wh*-phrase originated. If English native speakers come across the verb (*expected*), which is a potential gap licenser as in (1a), they will try to posit a gap in the potential gap position following the verb. However, if there is a filler in that position, in this case the pronoun (*us*), their reading time will slow down compared to their reading time for the same position in the declarative sentence as in (1b):

- (1) a. Who had the little girl expected us to sing those stupid French songs for at Christmas?
- b. The little girl had expected us to sing those stupid French songs for Cheryl at Christmas.

English native speakers were asked to read the sentences word by word in a self-paced reading task. The length of the words and the sentences in both examples (1a) and (1b) were controlled. The results showed that English native speakers slow down at the filled gap position (the pronoun *us*) as shown in example (1a), compared to the same position in the non-extraction declarative sentence as in (1b). These results suggest that English native speakers process wh-sentences incrementally. Crain and Fodor argued that native speakers of English actively search for a gap position in wh-sentences: they immediately try to find the gap position that the moved wh-element came from, as in example (1a). Crain and Fodor argued that English native speakers' reading times show a Filled Gap Effect when they encounter a filler (*us*) in a potential gap position (i.e, after the verb *expected*) in the wh-sentences as in (1a).

Stowe (1986) replicated and extended Crain and Fodor's (1985) self-paced reading task by conducting two experiments. Stowe investigated three questions in the first experiment; her first question was whether native speakers' reading times slow down when they encounter a filler in the object position of a wh-sentence as Crain and Fodor's (1985) found in their study? The second question was whether or not English native speakers posit a gap in the subject position after they encounter a

wh-phrase in the sentence? The last question was what happened for the search of an empty position (gap) after a doubtless gap is posited? In other words, is the search for a gap in wh-sentences immediately ended after readers posit a gap in an earlier position? In Experiment 2, Stowe investigated whether or not the processing of wh-sentences is constrained by syntax. That is, do readers know the syntactic constraints on wh-movement and use them to avoid expecting gaps where these gaps cannot grammatically exist.

2.1.1 Stowe's Experiment 1

Stowe's (1986) Experiment 1 consists of 24 sentence sets. Four versions of each sentence were created, a Declarative version, a Wh-subject gap version, a Wh-object gap version, and a Wh-object of preposition gap version as in example (2). The test involves 76 filler sentences and the words and the sentences length are controlled. In order to answer the above mentioned questions, in her first experiment, Stowe compared the reading time of filled gap positions (subject, object, and prepositional object positions) in a wh-sentence to the same positions in a declarative sentence (a control sentence) as shown in (2):

(2) My brother wanted to know.....

a. if ***Ruth*** will bring ***us*** home to ***Mom*** at Christmas. (DECLARATIVE)

b. who___ will bring us home to Mom at Christmas. (WH-SUBJECT)

c. who ***Ruth*** will bring _ home to Mom at Christmas. (WH-OBJECT)

d. who ***Ruth*** will bring ***us*** home to _ at Christmas. (WH-OBJECT OF PREPOSITION)

Example (2a) is the control sentence and does not have any gap position. It is an if-clause sentence that introduces a subject position (*Ruth*), an object position (*us*) and a prepositional object position (*Mom*) as shown in example (2a). Stowe compared the reading time for the critical regions (subject, object, and object of preposition positions) in the control sentences to the reading time of the same regions in a wh-sentences as in (2b), (2c), and (2d).

Examples (2b), (2c), and (2d) exhibit a wh-phrase (*who*). The gap position in example (2b) is located in the subject position (wh-subject). In example (2c), the subject position is filled by the full noun (*Ruth*) and the gap is located in the object position (wh-object) after the verb (*bring*). In example (2d), the extraction of the wh-phrase is from the object of preposition position (wh-object of preposition).

In order to address the first question and to replicate Crain and Fodor’s findings, whether or not English native speakers posit a gap in the object position, Stowe compared the reading times of the object position (*us*) in if-Clause sentences as in (2a) to the reading times of the same position in the wh-object of preposition sentences as shown in example (2d). Furthermore, she compared the reading time of the filler (*us*) in the wh-subject sentences as in (2b), where the search of a gap is already satisfied earlier in the sentence (in the subject position), to the same region in wh-object of preposition sentences as in (2d).

The results, as presented in Table 4.1, show that English native speakers reading times significantly slow down in the filled object position in wh-object of preposition sentences as shown in example (2d), where the extraction position is in the object of preposition, compared to their reading time for the same region in the control sentences as in (2a).

Table 4.1. Mean reading times for target Noun Phrase (Subject, Object, and Prepositional Object in Milliseconds) in Experiment 1.

The position of the Gap	Ex	The position of the Filler		
		Subject	Object	Obj. of Prep
		Ruth	us	Mom
If-clause –no Gap	a	661	755	755
Gap in Wh-Subject	b	--	801	812
Gap in Wh-Object	c	680	--	833
Gap in Wh- Object of Preposition	d	689	*970	--

Stowe found that participants took longer time processing the filled object position in the wh-sentences (970 ms) that involved a filled subject position as shown in (2d). Stowe argued that while participants processed wh-sentences, they expected to find a gap in the subject position, but when they found a filler (*Ruth*) in the subject position as in example (2c) and (2d), they easily recovered and tried to find that gap (the original place for the fronted wh-phrase) in the next potential gap position (object position); however, when they found another filler (*us*) in the object position as in example (2d), they got surprised and revised their prediction, which results in slower reading time (970 ms vs. 801ms and 755 ms). On the other hand, if the gap in the subject position was empty as in example (2b), the participants' processing time of the object position was similar to the control sentences (801 ms vs. 755 ms) as in example (2a), because they already satisfied the search of the gap in the subject position of the wh-sentence.

The results suggest that there is a processing difficulty at the filled object position in the wh-object of preposition sentences as in example (2d). These findings support Crain & Fodor's results that native speakers have difficulties in processing the filled object position in wh-sentences, which suggests the readers expect an empty gap in the object position as they actively try to link the fronted wh-element to its original position.

In order to address the second question whether or not English native speakers posit a gap in the subject position, Stowe compared the reading time of the subject

position (*Ruth*) in the if-clause sentences as in example (2a) to the reading time of the same position in wh-object and wh-object of preposition sentences as in (2c) and (2d).

The findings showed that readers do not slow down when processing the filled subject position in all sentences, since their reading times for all sentences were the same [in the control sentences (661 ms) as in (2a), in the wh-object position (680 ms) as shown in (2c), and in the wh-object of preposition position (689 ms) as in (2d)]. As mentioned above, there is evidence that readers do posit gaps in the subject position, but perhaps in this case, Stowe hypothesizes that participants did not slow down when processing a filled subject position in the wh-sentences, because they did not associate the semantic role of the potential gap position with the fronted wh-phrase or simply because they recover easily since the subject position is very close to the wh-phrase.

Finally, in order to address the third question, whether the search of a gap is shutdown when the wh-phrase original position is located earlier in the sentence, Stowe compared the reading time of the object of preposition (*Mom*) in if-clause sentences as in (2a) to the reading time of the same position in wh-subject and wh-object sentences as in examples (2b) and (2c).

To answer question three, the results showed that the reading time of the prepositional object position (*Mom*) in all sentences are not significantly different, which suggests that readers already satisfied the gap semantic role in the subject as in (2b) or the object positions as in (2c) and they do not look for a gap position anymore.

2.1.2 Stowe's Experiment 2

In Experiment 2, Stowe uses a self-paced reading task to test whether syntactic constraints can be used to avoid expecting gaps where these gaps cannot grammatically exist. Stowe conducted this experiment to test whether or not participants know that both phrase structure rules and syntactic constraints have to agree on a potential gap position to be a grammatical gap position.

Experiment 2 consists of 20 sentences in four conditions as in example (3). The test involves 76 filler sentences and the words and the sentences length are controlled. In our study, we aim to follow and extend only the first part of Stowe's Experiment 2, which test the syntactic constraints on the processing of an NP-island in *wh*-sentences as in example (3a) and (3b). Therefore, we are going to mention briefly the results of the VP sentences and we will discuss in detail the results of the processing of the NP-island sentences.

(3) The teacher asked.....

- a. *if* the silly story about Greg's older brother was supposed to mean anything. (IF-S)
- b. *what* the silly story about Greg's older brother was supposed to mean. (WH-S)
- c. *if* the team laughed about Greg's older brother fumbling the ball. (IF-VP)
- d. *what* the team laughed about Greg's older brother fumbling. (WH-VP)

A gap can occur after a preposition inside wh-sentences, as in Experiment 1, example (2d); however, a gap cannot grammatically occur after a preposition inside an NP-island in a wh-sentence, as in Experiment 2, example (3b) or as the ungrammatical example as in (4)⁴:

(4) *Who did the story about ____ annoy her boyfriend?

Stowe predicts that if readers use the syntactic constraints to identify the potential position of the gap in the sentence, they will know that the object position after the prepositional phrase in the wh-subject sentences as in example (3b) and (4) should not have a gap, and thus they will not have any difficulties to process this position in wh-sentences compared to declarative sentences..

The results in Table 4.2 show that participants do not face any difficulty when processing the filled position after the preposition in wh-sentence structures (798 ms vs. 800 ms), which suggests that syntactic constraints can be used accurately and quickly; no gap is expected.

⁴ This example was taken from Stowe's (1986) paper.

Table 4.2. Mean reading time (Milliseconds) for different positions in the embedded clause in Experiment 2.

	DET	ADJ	NOUN	PREP	TARGET
IF-clause	611	677	752	750	798
WH-clause	616	698	760	880	800
Sentence	the	silly	story	about	Greg's

Based on this finding, Stowe argues that the gap-locating procedure is controlled by syntactic constraints. Our study will follow and extend this part of Stowe's Experiment 2. On the other hand, in our study, we will not address the second part (VP conditions) of Experiment 2, since it is re-testing the filled gap effect from Experiment 1. However, in this section, we are going to present briefly the findings of the VP conditions.

The results of the VP conditions, if-clause in VP sentences as in (3c) and wh-clause in VP sentences as in example (3d) in Experiment 2, showed the gap position is grammatically licensed in this condition. The findings replicated the same findings for the filled object position in Stowe's Experiment 1, where the reading time slows down at the filled object position in wh-sentences. Table 4.3 presents the reading times of the critical region in the VP-condition.

Table 4.3. Mean reading time (Milliseconds) for different positions in the embedded clause in Experiment 2.

	DET	ADJ	VERB	PREP	TARGET
IF-clause	613	735	754	678	782
WH-clause	608	698	736	755	1063
Sentence	the	team	laughed	about	Greg's

Stowe compared the reading time of the object of preposition position in the VP control (if-clause) sentence as in (3c) to the same position in VP wh-sentences as in (3d), and the results of the two conditions showed that the reading times significantly slow down at the filled object of preposition in wh-sentences (1063 ms) compared to their reading time for the same position in VP if-clause sentences (782 ms), which indicates that they are trying to posit a gap in that position.

To sum up, Stowe, in Experiment 1, argues that the reading time slows down at the filled object position in the embedded clause in wh-sentences, which indicates that readers actively search for a gap and use knowledge of phrase structure rules to posit this gap, compared to the reading time of the same position in the control sentences (if-clause).

While Stowe investigated the processing of wh-sentences by native speakers, the next section will introduce studies (Williams et al. 2001, Marinis et al. 2005, Juffs 2005, and Clahsen and Felser 2006) that investigate the processing of wh-sentences for both native speakers and non-native speakers.

2.2 L2 on-line studies: incremental processing in non-native speakers

Several studies have investigated the real time processing of long-distance wh-movement by L2 learners from different language backgrounds. These processing studies investigated several questions including but not limited to:

- Do L2 learners process L2 sentences incrementally?
- Is L2 learners' processing influenced by their L1?
- Are adult second language learners shallow processors?

Some previous studies found that, similar to native speakers, L2 learners process L2 wh-sentences incrementally by integrating a wh-phrase with a potential gap position as soon as possible (Williams et al. 2001). Williams et al. compared the reading time of the phrase (*the bike*) as in example (5a) to the same word in example (5b) and found that similar to native speakers' processing of wh-question sentence, L2 learners show a Filled Gap Effect by slowing down when encountering a filler (*the bike*) in a potential gap position, as in example (5a), during their processing.

(5) a. Which girl did the man push [the bike] into late last night?

b. Which river did the man push [the bike] into late last night?

Other studies investigated whether or not L2 learners are influenced by their L1 backgrounds and found that there is a transfer in L2 processing (Juffs 2005). Juffs (2005) investigates whether adult L2 learners from different language backgrounds - Chinese, Japanese, and Spanish - process English wh-sentences similarly to native speakers of English. While Spanish is similar to English in the wh-structure, Chinese and Japanese are different in that they do not allow wh-movement. Juffs examines the processing of English subject and object extraction for finite and non-finite clauses as in examples (6) and (7):

- Finite:

(6) Who does the nurse know ___ saw the patient at the hospital?

- Non-finite:

(7) Who does the boss expect ___ to meet the customers next Monday?

Juffs conducted two experiments to see whether or not L1 background plays a role in acquiring English wh-movement. Experiment 1 was a grammaticality judgment task

that consisted of a grammatical and ungrammatical wh-movement in English.

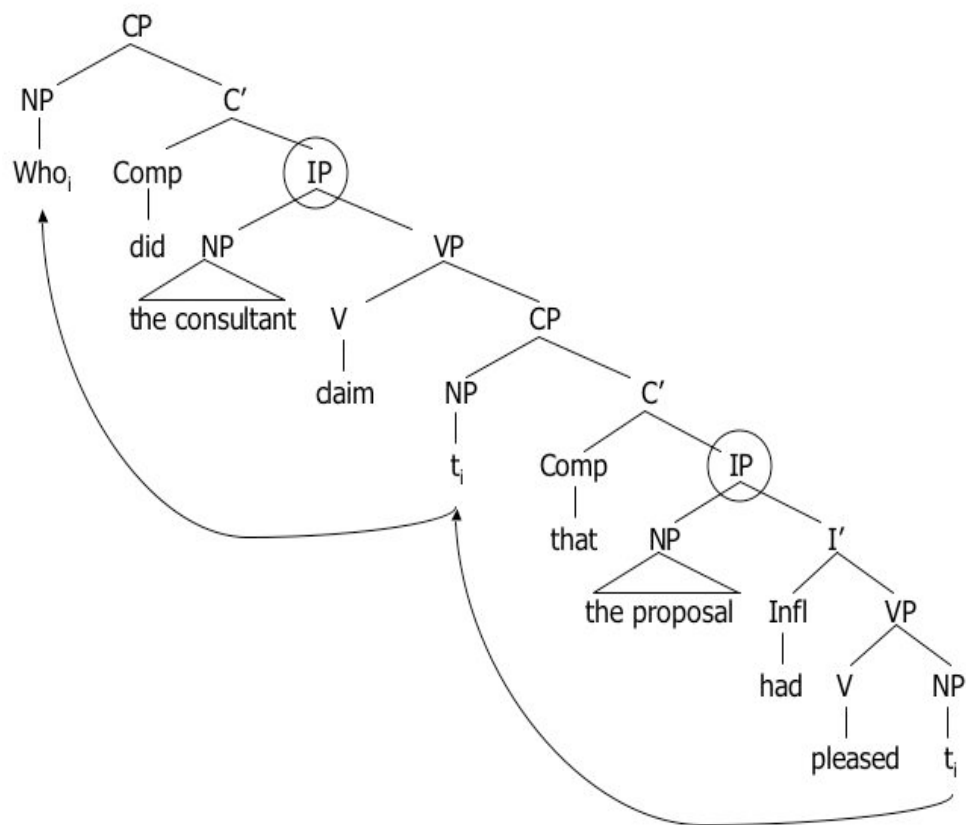
Experiment 2 was a moving window self-paced reading task.

The result of the grammaticality judgment task showed that all groups correctly rejected ungrammatical and accepted grammatical long distance wh-movement sentences above the chance level. The results of the self-paced reading task showed that the processing of subject extraction from a finite clause is more difficult for all learners than a non-finite one. Juffs attributed the processing difficulty to the garden-path effect where learners encountered two finite verbs adjacent to each other and thus their processing is slower in the subject position due to their reanalysis. Although the results of all L2 learners showed that they have similar difficulties in processing subject extraction from finite clause in wh-sentence, the results show that Japanese and Chinese, which do not allow wh-movement, have more difficulties than Spanish speakers. This suggests that the lack of wh-movement in L1 is a disadvantage for L2 learners, whereas the availability of this movement in L1 provides an advantage for L2 learners.

On the other hand, Clahsen and Felser (2006) argued that the native language does not influence the acquisition of L2 structure. Clahsen and Felser proposed the Shallow Structure Hypothesis (SSH), which argues that while native speakers use syntactic and lexical information to process wh-movement, L2 learners only use a lexically driven strategy, and they underuse syntactic structure in their processing of wh-movement regardless of the status of wh-movement in the L1. Clahsen and Felser based their argument on Marinis et al.'s (2005) study.

Unlike previous research in second language acquisition, which investigated wh-sentences with only one gap position, Marinis et al. (2005) involve wh-sentences that exhibit two gap structures as in (8) by replicating Gibson and Warren's (1999) study.

(8) Who_i did the consultant claim t_i that the proposal had pleased t_i?⁵



As in example (8), the wh-phrase original position is after the verb “*pleased*” and it undergoes two movements. The first movement is from its original position to the

⁵ This tree is taken from Gibson and Warren (2004).

first possible landing site in the CP node (an intermediate position), crossing only one bounding node - an IP node - and leaving a trace behind. The second movement is from this intermediate position to the final landing site at the beginning of the sentence in CP node and also crossing one bounding node: an IP node. Gibson and Warren investigated English native speakers' processing of an intermediate gap structure in wh-sentences as in (9a):

- (9) a. The manager *who_i* the consultant claimed *e_i* that the new proposal had pleased *e_i* will hire five workers tomorrow. (Intermediate gap)
- b. The consultant claimed that the new proposal had pleased the manager who will hire five workers tomorrow. (Non-extraction)

Gibson and Warren found that native speakers slow down at the complementizer (that) as in example (9a), but not in the same position in non-extraction sentences as in (9b). The results in Gibson and Warren suggested that this slow down indicated that native speakers are using an active filler strategy to posit a gap in the intermediate gap position.

Marinis et al. investigated whether L2 learners process long-distance wh-movement in the same way as native speakers. They investigated four different language backgrounds: Greek and German, which are similar to English in allowing wh-movement, and Chinese and Japanese, which are different from English in not allowing wh-movement. The study compared the processing of regions three (*that*)

and five (i.e., *had pleased*) in a declarative sentence as shown in (9b) to the same regions in a wh-sentence as shown in (10):

(10) 1 2 3 4
The manager who/ the consultant claimed/ **that**/ the new proposal/
 5 6
had pleased/will hire five workers.

Marinis et al. compared the reading time of region 3, which exhibits the complementizer “*that*” in wh-extraction sentences as in (11a) to the same region that exhibits the complementizer “*that*” in non wh-extraction sentences as in (12a), to determine whether L2 learners are similar to native speakers in positing an intermediate gap during their processing of wh-movement sentences.

Further more, the study compared the processing of region 5, which exhibits (*had angered*) in intermediate gap sentences as in (11a) and non-intermediate gap sentences as in (11b), in order to test whether L2 learners posit gaps while processing long-distance wh-movement.

- Wh-extraction:

(11) The nurse who the

a. doctor argued ____that the rude patient had angered __is refusing to work late. (intermediate gap)VP

b. doctor's argument about the rude patient had angered _ is refusing to work late. (non-intermediate gap)NP

- Non-extraction:

(12) The nurse thought the.....

a. doctor argued that the rude patient had angered the staff at the hospital.(non-extraction) VP

b. doctor's argument about the rude patient had angered the staff at the hospital. (non-extraction) NP

Marinis et al. predicted that if the existing properties of L1 influence the acquisition of L2, Greek and German speakers will perform better than Chinese and Japanese speakers. They also predicted that if readers use the intermediate gap, they will process the word or region (*angered*) in (11a) faster than the same region in the non-intermediate gap sentences in (11b).

The results show that native speakers only slow down at the complementizer (*that*) in the intermediate gap sentences in (11a), but not in the same position in the


non-extraction sentences in (12a). The reading time for native speakers is faster when processing (*had angered*) in the intermediate gap sentences in (11a), but not for the same position in non-intermediate gap sentences in (11b). The results suggest that an intermediate gap helps native speakers by facilitating the processing of the last gap and thus speeding up the reading time for the region (*had angered*). The results show that all groups of L2 learners perform similarly to one another but differently from native speakers. Even the performance of L2 learners, whose L1 is similar to English, differs from the performance of native speakers, suggesting that there is no positive L1 transfer. Unlike native speakers, L2 learners do not slow down at the complementizer (*that*) in the intermediate sentences in (11a). Also, their reading time for region 5 (*had angered*) is similar for both wh-extraction sentences in (12a) and (12b), which indicates that they do not process intermediate and non-intermediate gap sentences differently.

Clahsen and Felser argue that L2 learners in Marinis et al.’s study do not use syntactic structures to activate the intermediate gap in long-distance wh-movement; instead, readers assign thematic roles to each position as explained in the following list of examples:

(13) a. [The nurse] who [the doctor] argued [that
AGENT ← → THEME


First, readers assign thematic roles to the verb “*argued*”: the phrase “*the doctor*” is the agent, and the clause starting with the complementizer “*that*” is the theme as in (13a). Second, they assign a thematic role to the verb “*angered*”, which is the phrase “*the rude patient*” in (13b):

b.[The nurse] who [the doctor] argued[that[the rude patient] had angered



Finally, they link the verb “*angered*” to its experiencer “*the nurse*” as in (13)c:

c.[The nurse] who[the doctor] argued[that[the rude patient] had angered is
refusing to work late.



To conclude, Marinis et al. argue that L2 learners do not transfer their L1 properties to L2. In addition, L2 learners do not use the intermediate gap during processing long-distance wh-movement in English. Clahsen and Felser argue that Marinis et al.’s findings represent shallow processing for L2 learners. Clahsen and Felser argue that L2 learners do not make a syntactic dependency relationship but rather a lexically-driven relationship between the filler (wh-phrase) and other positions in the sentence. These results call into question both the Representational Deficit Hypothesis that argues L2 learners are limited to the inventory of their L1 features; that is, the acquisition is possible only if the L1 features are similar to the L2,

and the Direct Access that argues at the advance level, L2 learners are able to acquire L2: whether or not L2 learners' acquisition is constrained by L2 syntactic structure. The study to be presented in the following section will address these same issues.

3. The self-paced reading task (on-line study)

The second study, in this dissertation, is going to investigate L2 learners' knowledge of wh-movement by using similar task to Stowe's (1986) on-line task. Najdi speakers' performance in this task will help us to know whether L2 learners process sentences similar to native speakers, and whether or not their processing is controlled by syntax. The study enables us to evaluate two important issues in Second Language Acquisition, namely, Transfer and the Critical Period; specifically whether a new feature is possible in L2 acquisition. We are going to test the predictions for three theories, namely Representational Deficit (Hawkins and Chan, 1997; Hawkins, 2000; 2003; Hawkins and Liszka, 2003; Tsimpli, 2003), Full Transfer/Full Access (Schwartz and Sprouse, 1994; 1996), and Shallow Structure Hypotheses (Clahsen and Felser (2006).

Stowe (1986) conducted two experiments to test English native speakers' processing of the filled gap position. Stowe's study is a good test that we can use for testing whether or not L2 learners are incremental processors, similar to native

speakers of English. Also, by using her experiment, we can test the knowledge of L2 learners on the syntactic constraints in L2. We aim to follow and extend Stowe's experiments and we are addressing the same questions in Stowe's study, but we developed a different set of stimuli. Also, we test two different language groups: Najdi speakers and English native speakers as a control group.

We conducted two experiments; Experiment 1 investigates whether or not the processing is incremental for L2 learners by answering two questions: do native and non-native speakers' reading times of a *wh*-sentence slow down when they encounter a filler in the object position? Like Stowe, we also want to know whether the slow down at the filled object position extends to the filled subject position. Experiment 2 investigates whether syntactic constraints can be used to avoid position gaps where these gaps cannot grammatically exist, such as in an NP-island in a *wh*-sentence.

3.1 The predictions of Experiment 1

We tested the predictions of different theories on the performance of Najdi speakers. Recall chapter 3, in which we discussed that English has two structures for *wh*-movement: the surface structure, which exhibits a gap and the underlying structure, which exhibits a covert trace as a result of a *wh*-movement. In Experiment 1, which involves testing the filled gap in the object position (i.e. *us*) as in (14b), both

theories, the Representational Deficit Hypothesis and the Full Transfer/Full Access theory predict that Najdi speakers at the advanced stages of learning English will not show transfer from their L1, and thus, similar to native speakers, their reading time will slow down at the object position (i.e, *us*) because they understand that a pronoun in that position is not allowed in English, even though they have that pronoun in their L1. Furthermore, Shallow Structure Hypothesis predicts that the reading time of Najdi participants, advanced learners of English will slow down at (i.e, *us*), because these learners use lexical information to link the fronted wh-phrase to its theta role assigner.

- (14)a. My brother wanted to know if Ruth will bring **us** home to Mom at Christmas.
- b. My brother wanted to know who Ruth will bring **us** home to _ at Christmas.

In Experiment 1, all theories predict slower reading time for Najdi participants, advanced learners of English and we hope to replicate Stowe's findings which will show that L2 learners process wh-sentences incrementally. In Experiment 2, the above mentioned theories make different predictions on the processing of wh-structure.

3.2 The predictions of Experiment 2

We also aim to follow and extend Stowe's Experiment 2. In her Experiment 2, Stowe tested whether syntactic constraints can be used to avoid positing gaps where these gaps cannot grammatically exist, such as in an NP-island in a wh-sentence, as in example (15):

(15) The teacher asked what [NP the silly story [PP about [NP Greg's older brother]]] was supposed to mean_____.

(16) The teacher asked if the silly story about Greg's older brother was supposed to mean anything.

Stowe's study showed that native speakers use the knowledge of phrase structure rules by positing a gap in the original position of the fronted wh-phrase in Experiment 1, but they do not posit a gap at the prepositional object position (i.e., *Greg's older brother*) as in Experiment 2, because the syntactic constraints in English do not allow the extraction from that position.

Experiment 2 tests the processing of the prepositional object position (i.e., *Greg's older brother*). A preposition is a gap licenser, which makes us predict that readers will slow down if the prepositional object position is filled, but if they know the constraints that the extraction from this position is not allowed in English, readers will not slow down at that position.

Experiment 2 is crucial to distinguish between different theories. The Representational Deficit Hypothesis predicts that advanced learners of English will slow down at (*Greg's older brother*) as in example (15) because they cannot acquire L2 syntactic constraints if these constraints do not exist in their L1. The Shallow Structure Hypothesis makes a similar prediction for all L2 learners regardless of their language background. In contrast, Full Transfer/Full Access predicts no slow down at (*Greg's older brother*), because L2 learners can acquire syntactic constraints even when they are not available in their L1.

To sum up, as shown in Table 4.4, the Shallow Structure Hypothesis and Representational Deficit Hypothesis present different predictions for advanced L2 learners compared to native speakers. The Representational Deficit Hypothesis predicts that Najdi advanced L2 learners have a Critical Period and will consequently not be able to process L2 sentences the same as native speakers.

Table 4.4. The predictions for the three theories on the processing of the complex NP-island in Experiment 2.

	RDH	FT/FA	SSH
English Native	Avoid island	Avoid island	Avoid island
Najdi advanced	Do not Avoid island/slow down	Avoid island	Do not Avoid island/slow down

The Shallow Structure Hypothesis predicts that L2 learners will process L2 sentences differently than native speakers. While Representational Deficit Hypothesis predicts L1 transfer, the Shallow Structure Hypothesis predicts no transfer but that L2

learners use lexical, not syntactic, information to process L2 sentences. In contrast to these two theories, Full Transfer/Full Access theory predicts that L2 learners are able to avoid island and thus will not slow down similar to native speakers' performance.

4. Method

4.1 Participants

The participants in this study consisted of two groups. One group of English native speakers, as a control group, that included 40 participants and a group of Najdi Arabic speakers that included 40 Najdi speakers⁶ who studied English in Saudi Arabia public schools for six years four hours a week. The Najdi Arabic speakers participated in the research experiment after they finished more than one year of intensive English program in the Applied English Center (AEC) at the University of Kansas, Avila University, University of Missouri Kansas City, and Kansas State University. When the Najdi Arabic participants came to the United States, their ages ranged from 18 to 28 years.

⁶ We gave the Najdi Arabic participants Michigan test and we only included participants who scored over 36 out of 45 points. The Michigan test and the comprehension questions excluded 31 Najdi Arabic participants because their proficiency scores were below 36 points (24 participants) or their mistakes, in the comprehension task, were more than eight mistakes (4 participants). Also, to balance the test batteries, the study excluded 3 participants. In addition, we end with the first 40 speakers of English to make equal number of participants in both groups.

English native speakers were undergraduate students at the University of Kansas. They were given extra credit in a linguistics course in order to participate in this study, whereas non-native speakers were given a thank-you note from both the experimenter and the Saudi cultural mission in the Saudi Embassy for their participation.

4.2 Materials

4.2.1 Introduction

This study aims to follow Stowe (1986) and extend her study to test L2 learners. New stimuli were developed; the modifications that were made to Stowe's original stimuli will be described below. The study consisted of two experiments: Experiment 1 which is mainly concerned with whether or not L2 learners are incremental processors and Experiment 2, which is mainly investigated whether or not L2 learners' processing is constrained by syntax. The stimuli in Experiment 1 (20 sentences) and Experiment 2 (20 sentences) were combined and tested together alongside with 80 filler sentences. The description of the materials for each experiment will be discussed below. (The complete list of stimuli is given in Appendix 1).

4.2.2 The test sentences for Experiment 1

Twenty sentence sets were created. Each set included an if- (non-extraction), as in (17a), and a wh- (extraction), as in (17b), version of the sentence. We generated two Latin Square lists, such that every participant read a sentence from every set, but no participant saw more than one version of a given sentence.

(17)a. My brother asked **if** Barbara will photograph **us/Sam** beside **Mom** at the graduation. (Non-extraction condition)

b. My brother asked **who** Barbara will photograph **us/Sam** beside ____ at the graduation. (Extraction condition)

The first condition is the declarative sentences (non-extraction condition), which is the control sentences in Experiment 1. The declarative sentences use verbs that require a sentential complement in if-clause sentence as illustrated in (17a). In the declarative sentences, the pronoun (*us/me*) or the full noun (*Sam*) occupies the object position after the second verb in the sentence (*photograph*) as illustrated in examples (17a). These pronouns and nouns are controlled to be in equal number. Further more, the length of the full nouns is controlled to be two or three letters maximum (for example, *Rob, Sam, Dan, etc...*).

The example in (17a) is showing the object position filled with a pronoun (*us /me*) or a full noun (*Sam*) in declarative sentences (control sentences), whereas example (17b) presents the second condition in Experiment 1, which exhibits the same fillers in the object position in wh-sentences (test sentences).

In the second condition (extraction condition), the extraction position is from the object of preposition region (after the preposition *beside*). In these sentences, the object position is filled with a pronoun (*us / me*) or a full noun (*Sam*) as illustrated in examples (17b). In the extraction condition sentences, the verb (*asked*) takes sentential complement and the original place for the wh-phrase is after the preposition (*beside*).

Each test sentence in Experiment 1 has 12 or 13 regions, and the number of regions depends on the type of the sentence whether it is a wh-clause (12 regions) or if-clause (13 regions). The critical regions are in the same positions in the two conditions as illustrated in Table 4.5 below.

Table 4.5. Experiment 1 sentences.

Region	1	2	3	4	5	6	7	8	9	10	11	12	13
If-sentence	My	brother	asked	if	Rob	will	photograph	us	beside	Mom	at	the	class
Wh-sentence	My	brother	asked	who	Rob	will	photograph	us	beside	at	the	class	

In Experiment 1, one of five main verbs that require a sentential complement (*wonder, reveal, guess, know, and ask*) is used in each test sentence. Each main verb is followed by an embedded sentence that starts with an if-clause or a wh-sentence. In the wh-clause sentence, there are three potential gap positions in each sentence; the subject position (region 5), the object position (region 8), and the object of preposition position (region 10). In the if-clause sentence, there is no gap in these positions, whereas in the wh-sentences the position of the object of the preposition (after the preposition *beside*) is empty. In the wh-sentences, the object position is filled by a pronoun (*me / us*) or a proper noun (*Sam*) and the subject position is filled with a proper noun (*Rob*) in all sentences.

All sentences in Experiment 1 contain one of 10 embedded verbs requiring a direct object and can be followed by a prepositional phrase (*photograph, meet, place, seat, find, put, film, discuss, introduce, and discover*). These verbs in this experiment were different from those in Stowe's study. Stowe used some verbs that require double object whereas the verbs in our experiment take only one object and can be followed by a prepositional phrase. We exclude the double object verbs because of the possibility of having a potential gap position in the sentences. We excluded the verb (*bring*) that was used in Stowe's experiment because it may have double object positions that allows additional gap position.

4.2.3 The test sentences for Experiment 2

Twenty sentence sets were created. Each set included an if- (non-extraction), as in (18), and a wh- (extraction), as in (19), version of the sentence. We generated two Latin Square lists, such that every participant read a sentence from every set, but no participant saw more than one version of a given sentence.

(18) My sister wondered **if** the boring comments about John's used car were intended to entertain the group.

(19) My sister wondered **who** the boring comments about John's used car were intended to entertain ____.

The first condition as in example (18) is the control sentence (if-clause), which does not have extraction. Declarative sentences do not have wh-phrase and thus participants will not expect a gap position in these sentences. The second condition is the extraction condition as in example (19), which involves a wh-movement that requires a gap position (in the original position of the fronted wh-phrase). The grammatical position for the fronted wh-phrase is after the non-finite verb (*to entertain*____) in the end of the sentence. In this sentence there is a potential gap position after the preposition (*about*), but in English the extraction from that position is ungrammatical because it is inside a complex NP-island.

Each sentence in Experiment 2 has 15 or 17 regions, and the number of these regions is determined by the type of sentence: whether it is a wh-sentence or an if-clause sentence as illustrated in Table 4.6. The critical regions appear in the same regions in both conditions.

Table 4.6. Experiment 2 sentences.

Region	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
If-sentence	My	sister	wondered	if	the	boring	comments	about	John's	used	car	were	intended	to	entertain	the	group
Wh-sentence	My	sister	wondered	who	the	boring	comments	about	John's	used	car	were	intended	to	entertain		

One of five main verbs that require a sentential complement (*wonder, question, inquire, know, and ask*) is used in each test sentence. Each main verb is followed by an embedded sentence that starts with an if-clause or a wh-sentence.

Experiment 1 tests the processing of the filled gap position in a grammatical potential gap position, which is licensed by the phrase structure rules in English, whereas Experiment 2 tests the processing of ungrammatical potential gap position, since the syntactic constraints in English do not allow a gap after the preposition (*about*) in a complex NP-island.

To summarize, while Representational Deficit Hypothesis and Shallow Structure Hypothesis predict that L2 learners' processing of wh-sentences differs from native speakers by slowing down at the ungrammatical gap position, Full Transfer/Full Access and Direct Access theories predict that L2 learners are expected to process the complex NP position similar to native speakers' processing and, thus,

will not slow down at the complex NP position, because English does not allow the extraction out of a complex NP-island.

4.2.4 Fillers

Recall that, the stimuli of Experiment 1 and Experiment 2 were combined and 80 filler sentences were also included and tested together. There were 80 filler sentences in total which were modeled after the sentence types in Experiment 1 (40 of the filler sentences) and Experiment 2 (40 of the filler sentences). In the test stimuli, we make 1:2 targets to fillers ratio. The motivation for each filler type is described below.

4.2.4.1 Fillers in Experiment 1

The fillers in Experiment 1 were divided into eight categories each of which had five sentences. As in Experiment 1, each filler sentence consisted of 12 or 13 regions. The fillers in the eight sets are divided as follows:

Categories one and two represent different types of extraction (subject and object extraction) as illustrated in examples (20) and (21):

(20) My friend asked who _____ will meet us with Bill after our vacation.

(21) My friend asked who Karen will seat _____ beside Bill at the party.

In these categories, each filler sentence had exhibited 12 regions and had one of five main verbs in region three (*ask, guess, inquire, question, reveal and wonder*). The verbs used in the fillers were the same verbs that were used in experiment one. The reason behind including these fillers that involve extraction from different positions in the sentence is to prevent the participants from not being able to predict the site of extraction in advance, since the test sentences involve the extraction from the object of preposition region.

Categories three, four, and five use double object verbs. While category three has no extraction as illustrated in example (22), category four and five have two types of extractions (subject and object extraction) as illustrated in sentences (24) and (23):

(22) My friend forgot if Sam will cook us a big dinner on Saturday.

(23) My aunt forgot who ____ will cook us a big turkey on Thanksgiving Day.

(24) My friend forgot what Bill cook us _____ next week at the celebration.

In these categories, each sentence has 13 regions and uses one of the five main verbs (*forget, wonder, ask, inquire, and question*). Similar to the target sentences, we controlled the repetition in each category; for example, the use of the pronouns (*me*)

and (*us*) were controlled throughout the experiment (half of the sentences used *me* and the other half used *us*). The purpose of including these types of sentences was to prevent the participants from detecting which verb we were testing.

Categories six and seven were topicalized clauses that were used to add some variations and different structures to the test materials. Category six did not involve extraction from any position, whereas category seven had extraction after the verb in the relative clause as in examples (25) and (26):

(25) It was Sam that revealed if John would dance at the party.

(26) It was Dennis that said who Bill would see ____ before the big concert.

While category six consisted of 12 regions, category seven consisted of 13 categories and both categories had five different main verbs (*reveal, ask, wonder, inquire, say and predict*). There was no extraction in category six (if-clause), but category seven (wh-clause) had extraction out of the object position.

Category eight represented intransitive verbs and had no extraction as in (27). We used this type of sentence to add different types of verbs that would distract the participants' attention from what we were testing.

(27) My brother asked whether Holly would cry during the extremely sad movie.

This category has 12 regions and five different main verbs in region three (*ask, wonder, inquire, question, and know*).

4.2.4.2 Fillers in Experiment 2

The fillers in Experiment 2 were divided into four categories, each of which exhibits ten sentences consisting of 15 or 17 regions. The filler sentences were constructed to match the number of regions in the test sentences. The motivation for each category of the fillers is described below:

Category one and two represent NPs in different positions (embedded conjoined NP and complex NP) as in examples (28) and (29):

(28) The young boy said that Janet and Sam sang very loudly at the wild party last night.

(29) The teacher said that his students liked the film about the school system in Paris.

Category one had 17 regions and category two had 15 regions. Both categories exhibited 10 main verbs (*reveal, state, think, say, claim, announce, mention, and know*). They were designed to match the number of regions in the test sentences in

Experiment 2. The purpose of including these categories of fillers was to have a mixture of the noun phrases so the participants would not know which type of noun phrase structure we were testing.

Categories three and four represented complex embedded subjects and matrix subjects as illustrated in (30) and (31):

(30) The news reporter said that the American tourists really liked to dance all night long.

(31) Adam and Sara repeatedly asked what their students hated about the chemistry teacher from the prestigious university.

In these sentences, category three consisted of 15 regions and category four consisted of 17 regions. These categories used 10 main verbs (*say, claim, think, reveal, state, complain, and found*). These verbs were used either once or twice in each category.

Finally, the filler sentences were constructed to match the number of regions in the test sentences. Most of the time regions one, two, and three exhibited an NP that was different in each sentence within each group. Each sentence used two different verbs. All nouns are different in all sentences.

4.3 Procedure

Each participant was tested individually by using a computer in the Second Language Acquisition Lab at the University of Kansas and at different universities in the states of Kansas and Missouri. Before we conducted the experiment, we asked all participants to fill in a background questionnaire and to sign the consent form. The non-native participants were also required to take an English proficiency test (The Michigan Proficiency Test). The proficiency test was conducted after they took the experiment and the whole proficiency test took 25 to 30 minutes.

The experiment was administered using the program Paradigm (Perception Research Systems). The experimental method that we used is a non-cumulative moving window self-paced reading method (Just, Carpenter, and Wooley, 1982). In this experiment, the sentences were presented in random order. Each test sentence began with a sequence of dashes that represented each of the words in each sentence. Participants read each stimulus sentence one word at a time and hit the space bar on the keyboard to move to the next word. As soon as they saw the new word, the previous word disappeared and their reading time was recorded at each word. After the participants read the last word in the test sentence, a comprehension question appeared. Participants saw the whole sentence again with a missing word and they were asked to choose the correct word from the two options provided beneath the sentence as shown in example (32):

(32) The teacher _____ if the silly story about Greg's older brother was supposed to mean anything.

claimed

asked

For choosing the word on the left, participants were required to hit the key “**F**,” which is covered by the word **LEFT**, and for choosing the word on the right, participants were required to hit the key “**J**” that is covered by a sticker that has the word **RIGHT** written on it. We have chosen the “**F**” and “**J**” keys because they are close to the space bar and allow participants to choose the correct key while their eyes are focused on the test sentences.

Participants were asked to read the test sentences naturally and to understand their meanings. Before the test started, participants were able to see five practice sentences that were similar to the test sentences, in order for the participants to understand how to do the test. During the test, participants were given a break after completing each set of 40 test sentences. The duration of the whole experiment is 30 to 40 minutes.

5. The results and Discussion

5.1 Data pre-processing

The statistical analysis in this study is conducted based on the data of 40 native speakers and 40 non-native speakers' results. Before we start the statistical calculation, we removed incorrect trials. We excluded for non-native speakers (6.1%) of the trials' data and for native speakers we excluded (3.9%) of the data. We then calculated the mean and standard deviation (SD) for each region in each condition (wh-condition and if-condition). Based on the standard deviation of the reading times for each individual participant, we eliminated each data point outside of 2.5 standard deviations of that participants' mean for that condition. Based on this, the average number of data points that is not included in the data calculation is (9.3%) for native speaker' data and (5.8%) for non-native speakers' data.

5.2 The results of Experiment 1: test of a filled gap effect

Recall that Experiment 1 consists of two conditions: wh-sentence and if-clause sentence as in (33):

(33)a. My brother asked **if** Barbara will photograph **us/John** beside **Mom** at the graduation.

b. My brother asked **who** Barbara will photograph **us/John** beside ___ at the graduation.

Also, recall that, Experiment 1 included two critical noun phrase regions: region 5 (Subject position) and region 8 (object position). We aim to follow Stowe’s questions and extend them to L2 learners: whether native and non-native speakers are incremental processors. The research questions that Experiment 1 tries to answer are:

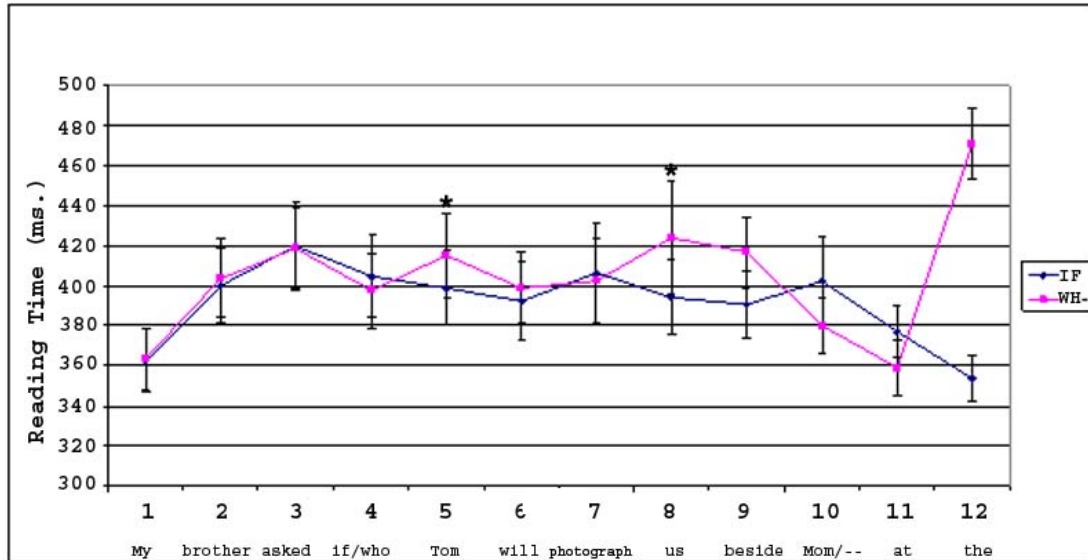
- Do native and non-native speakers posit a gap in the object position of wh-sentences?
- Do they also posit a gap in the subject position?

The mean reading times for each region in each condition in Experiment 1 is summarized in Table 4.7 for native speakers. In addition, we presented the results for native speakers in figure 4.1:

Table 4.7. Native speakers’ reading time for the subject and object positions.

4	5	6	7	8	9	10	11	12
	Subject			Object		Obj-Prep		
	Tom	will	photograph	us	beside	Mom	at	the
If	399	392	406	394	390	403	337	354
Wh	415	399	402	*424	417	380	359	471

Figure 4.1. Native speakers' reading time for Experiment 1.



In order to address the first research question whether native speakers in our study show the same filled gap effect in the object position as in Stowe's study, we compare the reading time of region 8 (object position) in if-clause sentence to the same region in the wh-sentence. The results show that native speakers slow down when reading the filled object position (424 ms) compared to their reading time for the same position in the if-clause sentences (394 ms). The statistical results showed that the reading time for the filled object position in region 8 in wh-sentences is significantly slower than the reading time for the same position in if-clause sentences by participants ($t(39) = 1.892, p < 0.034$, one-tailed paired t-test). And by items, the one-tailed t-test on the reading time for region 8 in both conditions shows that the slower reading time for region 8 in wh-sentence is statistically significant ($t(19) =$

1.934, $p < 0.030$, one-tailed paired t-test). These findings replicate Stowe's results in Experiment 1.

In order to address the second question whether participants have a filled gap effect when trying to posit a gap in the closest potential filled gap position, we compare their processing time of regions 5 (subject position) in the if-condition to the reading time of the same region in a wh-condition. The results show that there is a marginal slow down of the reading time of region 5 (subject position) in the wh-condition (415 ms) over the reading time of the same region in the if-clause condition (399 ms) by participants ($t(39) = 1.556$, $p < 0.062$, one-tailed paired t-test), which indicates that participants were trying to posit a gap in the subject position, but when they find the subject position filled with a noun phrase they reanalyze their prediction and moved to find a gap in a different position. This slower reading time is not found to be significant by items.

To summarize native speakers' results in Experiment 1, the comparison between the reading times for the critical regions in the two conditions: if-clause condition and wh-condition, shows that native speakers' data replicates Stowe's object filled gap effect, and reveals a marginal subject filled gap effect, which was not found in Stowe's study. These two findings support that the participants are incremental processors. Next, we present the results for L2 learners.

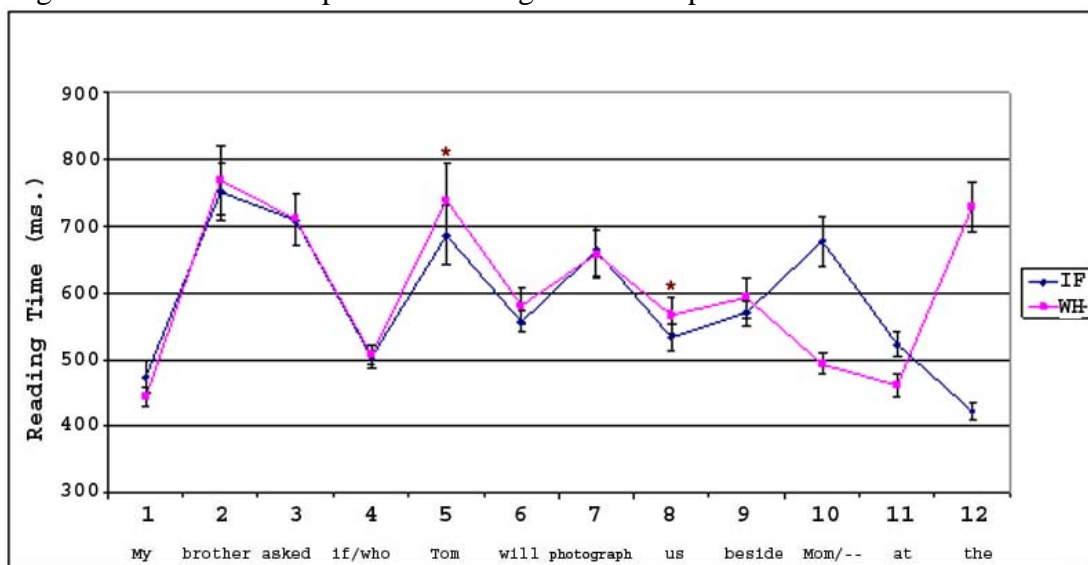
In order to address the first question whether or not non-native speakers show a filled gap effect in the object position, we compare the reading time of region 8 (the object position) in wh-sentences to the reading times of the same region in if-clause

sentences. The results, as presented in Table 4.8, show that non-native speakers' reading times slow down when they encounter a filler in the object position in a wh-sentences (566 ms) compared to their reading time of the same position in if-clause sentences (533 ms). The one tailed t-test shows that the reading times for the filled object position in region 8 in if-clause (533 ms) is faster than the reading time of the same position in wh-sentences (566 ms) which is marginally significant by participants ($t(39) = 1.464, p < 0.076$, one-tailed paired t-test), and is statistically significant by items ($t(19) = 1.722, p < 0.045$, one-tailed paired t-test).

Table 4.8. Non-native speakers' reading time for the subject and object positions.

4	5	6	7	8	9	10	11	12
	Subject			Object		Obj-Prep		
	Tom	will	photograph	us	beside	Mom	at	the
If	687	555	662	533	569	679	523	422
Wh	739	581	658	566	592	493	461	728

Figure 4.2. Non-native speakers' reading time for Experiment 1.



The difference in the mean of the reading time (566 ms vs. 533 ms) indicates that non-native participants were looking to posit a gap in the original place of the fronted wh-phrase and when they encounter a filler in that position (the object position), similar to native speakers, they slow down as they revise their initial prediction of the gap position.

In addition, the results show that non-native speakers' performance on Experiment 1 shows marginal effect, similar to native speakers, on the processing of the subject position. Their reading time slows down at region 5 (subject position) in the wh-sentences (739 ms) compared to their reading time of the same region in the if-clause sentence (687 ms) as shown in Table 4.8 and figure 4.2. The one tailed t-test showed that the slower reading times for the filled subject position in region five in wh-sentences compared to the reading times of the same position in if-clause are marginally significant by participants ($t(39) = 1.422, p < 0.067$, one-tailed paired t-test), which is similar to the results of native speakers. The statistical analysis by items shows that the slower reading time is marginally significant by items ($t(19) = 1.498, p < 0.071$, one-tailed paired t-test) and by participants analysis, as I described in the comments above.

5.2.1 Data sub-analysis on Experiment 1

In addition, we conducted a sub-analysis by filler type in Experiment 1. We collected the reading time for each filler type (pronouns vs. names) in each condition (if-clause and wh-clause). Each condition has two types of fillers in the object position as in example (34a) and (34b)

(34) a. My brother wanted to know if Ruth will bring us/Sam home to Mom at Christmas. (if.....pronoun/noun)

b. My brother wanted to know who Ruth will bring **us/Sam** home to _ at Christmas. (wh.....pronoun/noun)

Each one of these conditions exhibits equal number of the fillers (pronouns or names) in the object position. Given that Najdi Arabic speakers have an obligatory resumptive pronoun occupies the object position in wh-sentences, to show that the performance of the Najdi Arabic participants does not slow down at the object position only when it is filled by a name, we performed a one tailed *t* test on the data and we collected the average reading time for each filler type in Experiment 1. That is, we collected the reading times for the regions that exhibit pronouns and names separately. Table 4.9 presents the results of the reading time for the critical regions by filler types (pronouns) for native speakers in Experiment 1 and Table 4.10 presents the average reading time by filler types (names).

Table 4.9. Native speakers average reading time by filler types (Pronouns)

4	5	6	7	8	9	10
	Subject			Object		Obj-Prep
	Tom	will	photograph	us	beside	Mom
If	396	385	399	394	384	383
Wh-	415	404	401	425	414	381

Native speakers' results by filler types show that when a pronoun occupies the object position (region 8) the slower reading time for the region 8 in wh-sentences compared to reading for the same region in if-clause is marginally significant ($t(39) = 1.424, p < 0.061$, one-tailed paired t-test). In addition to the result of the critical region (region 8), where the object position is filled by a pronoun, native speakers' longer reading time shows a statistically significant spillover effect ($t(39) = 1.582, p < 0.034$, one-tailed paired t-test) at region 9 (immediately after the object position region). Such spillover effects are commonly found in self-paced reading studies. Their reading time is significantly slower at the critical region in wh-sentences (region 8) by items ($t(19) = 1.934, p < 0.030$) and significantly slower at region 9 by items ($t(19) = 1.062, p < 0.014$).

Table 4.10. Native speakers average reading time by filler types (Names).

4	5	6	7	8	9	10
	Subject			Object		Obj-Prep
	Tom	will	photograph	Sam	beside	Mom
If	402	398	413	398	396	
Wh-	414	394	405	423	419	378

Furthermore, as shown in Table 4.10, we compare native speakers' reading time of the object position region (in if-clause and wh-clause sentences) when that

region is filled by a name and we find that native speakers show statistically significant slower processing time at the object position region in wh-sentences by participants ($t(39) = 1.462, p < 0.044$, one-tailed paired t-test) when the object position is filled by a proper name. Next, we present the non-native speakers sub-analyses results.

Table 4.11. Non-native speakers' reading time by filler type (Pronoun).

4	5	6	7	8	9	10
	Subject			Object		Obj-Prep
	Tom	will	photograph	Sam	beside	Mom
If	658	565	683	519	526	526
Wh-	741	562	645	533	603	497

The results showed that if a pronoun (*us or me*) occupies the object position in a wh-sentence, Najdi participants' reading time shows a spillover effect at region 9 after the object position, as shown in Table 4.11 for the filler type (pronoun). This spillover effect indicates that Najdi participants are surprised when they encounter a pronoun in the object position, even though this pronoun is obligatory in their L1. The statistical results of the one tailed t-test showed that the slower reading times for region 9 (which shows a spillover effect) after the pronoun filler (*us or me*) in if-clause and wh-sentences are marginally significant ($t(39) = 1.416, p < 0.050$, one-tailed paired t-test).

Table 4.12. Non-native speakers' reading time by filler type (Name).

4	5	6	7	8	9	10
	Subject			Object		Obj-Prep
	Tom	will	photograph	Sam	beside	Mom
If	716	544	641	547	613	658
Wh-	737	598	672	598	582	489

Furthermore, by looking at the performance of non-native speakers on the filled object position (filled by a name) in Table 4.12, we find the difference between the reading times for region 8, which exhibit the filler (the proper name) marginally significant ($t(39) = 1.405, p < 0.055$, one-tailed paired t-test). Interestingly, we find a slower reading time at (region 5) the filled subject position when the filler type in the object position is a pronoun ($t(39) = 2.446, p < 0.027$, one-tailed paired t-test). In addition, when the filler type is a proper name, non-native speakers slower reading times show a statistically significant spillover effect in region 6 ($t(39) = 1.412, p < 0.049$, one-tailed paired t-test).

5.3 The results of Experiment 2: test of a complex NP-island

Recall that, Experiment 2 consists of two conditions: wh-sentence and if-clause sentence as in example (35):

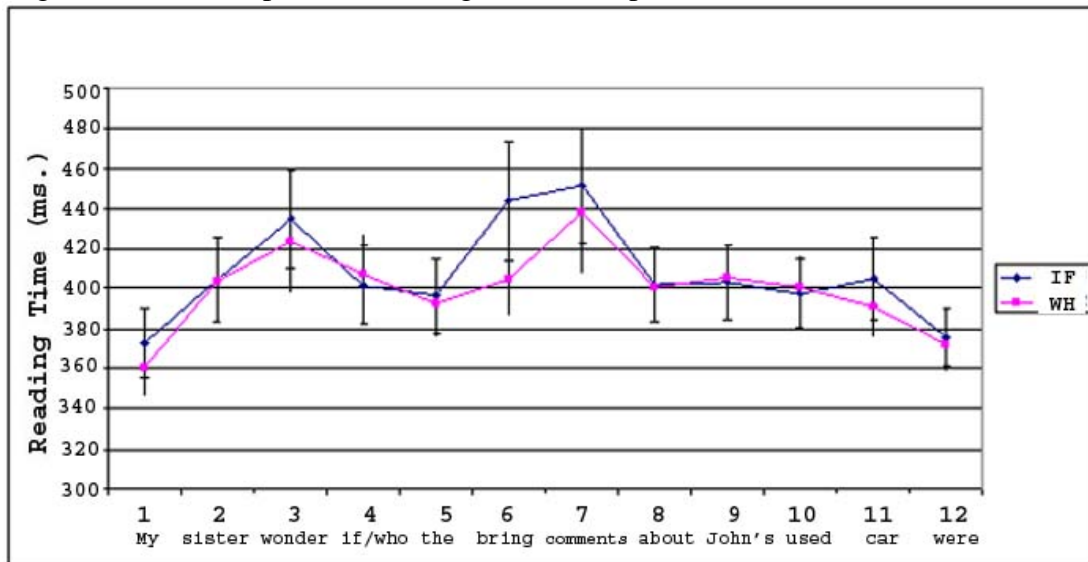
- (35) a. The teacher asked what [_{NP} the silly story [_{PP} about [_{NP} Greg's older brother]]] was supposed to mean_____.
- b. The teacher asked if [_{NP} the silly story [_{PP} about [_{NP} Greg's older brother]]] was supposed to mean anything.

Also, recall that, Experiment 2 included one critical noun phrase region: region 9 (a complex NP-island). The mean reading times for each region in each condition in Experiment 1 are summarized in Table 4.13 for native speakers. Also, we presented the results in figure 4.3 for native speakers:

Table 4.13. The average reading time for the two conditions (*if/wh*) in Experiment 2 for native speakers.

4	5	6	7	8	9	10
				PP	NP	
	the	boring	comments	about	John's	used
If	396	443	451	402	403	397
Wh-	392	405	438	400	405	400

Figure 4.3. Native speakers' reading time for Experiment 2.



In order to answer the research question in Experiment 2 whether or not native and non-native speakers are able to know the ungrammatical gap position and to not

expect a gap in ungrammatical gap position, we compared the reading time of region nine which is ungrammatical potential gap position that exhibits full NP in wh-sentences to the same region in if-clause sentence.

The results show that native speakers of English reading time for region nine in both if-clause (402 ms) and wh-sentence (405 ms) the same, and the t-test does not show any statistical significance in the reading times of these regions ($t(39) = 0.206$, $p < 0.413$, one-tailed paired t-test), which indicates that native speakers do not expect to find a gap in the complex NP position. These results, also, replicate Stowe's findings for native speakers.

As for non-native speakers, the results, in Table 4.14 and figure 4.4, show that their performance is similar to those of native speakers. Non-native speakers do not slow down when processing the complex NP position in wh-sentences (697 ms) compared to their reading times for the same region in if-sentences (670 ms).

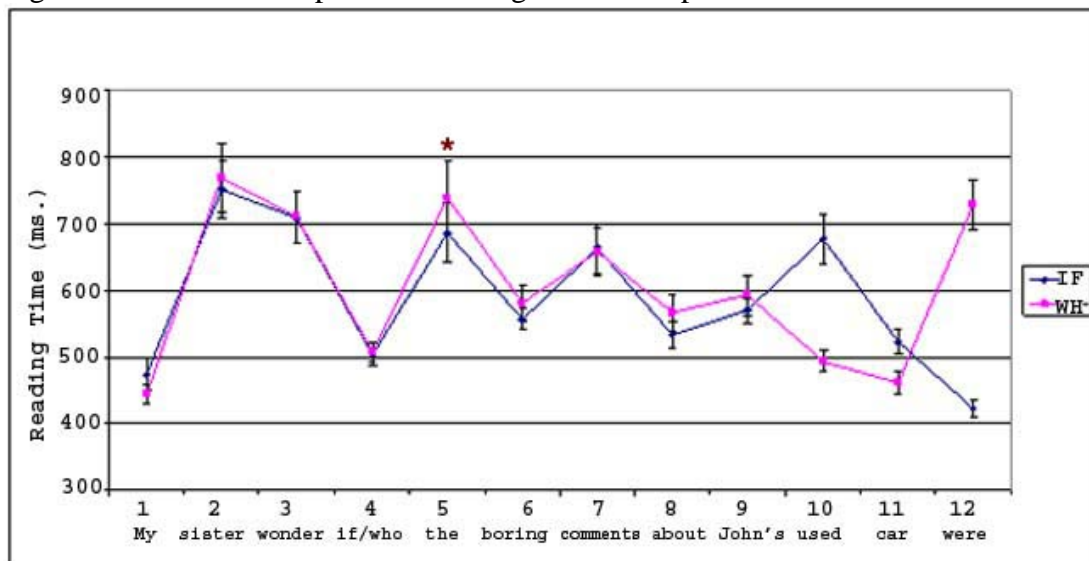
The statistical results of the one tailed t-test showed that the difference between the reading times for the filled complex NP position in if-clause and wh-sentences are statistically not significant ($t(39) = 0.122$, $p < 0.166$, one-tailed paired t-test), which indicates that they understand this position is not a potential gap position. These results replicate Stowe's study and interestingly, the study found that participants slow down at the filled subject position at region five (471 ms) in wh-sentences compared to their reading time of the same region in if-clause sentences (507 ms). The statistical results of the one tailed t-test showed that the reading times for the filled subject position in region 5 in wh-sentences are statistically significant

slower than the reading times of the same position in if-clause sentences ($t(39) = 1.982, p < 0.024$, one-tailed paired t-test), which indicates that participants try to posit a gap in that position.

Table 4.14. Average reading time for the two conditions (*if/wh*) in Experiment 2 for non-native speakers.

4	5	6	7	8	9	10
	Subject			PP	NP	
	the	boring	comments	about	John's	used
If	471	787	710	556	670	585
Wh-	507	770	753	562	697	591

Figure 4.4. Non-native speakers' reading time for Experiment 2.



6. Conclusion

In this study, we found that non-native speakers' processing is constrained by the L2 syntax. In Experiment 1, we showed that advanced L2 learners, similar to native speakers, acquired the surface structure of wh-movement in L2 and, thus, show slower reading times at the filled object position, which replicated Stowe's findings in her first experiment. In addition, we found an interesting result that Stowe did not find in her study on native speakers, that L2 learners and native speakers not only slow down at the filled object position, but, also, they slow down at the filled subject position, which suggested that they process the wh-sentences incrementally, that is as soon as they encounter a wh-phrase in the sentence, they started looking to posit a gap in the first potential gap position.

Furthermore, in Experiment 2, which tested the knowledge of syntactic constraints, the results show similar findings to Stowe's study. Our results show that native and non-native speakers treat the wh-sentences and the declarative sentences similarly, suggesting that they do not posit a gap within a complex NP-island in the wh-sentences. This result indicates that adult advanced L2 learners' knowledge is constrained by syntax.

We conducted this study to test the predictions of three theories in the second language acquisition research; namely, Representational Deficit Hypothesis, Full Transfer/Full Access theory, and the Shallow Structure Hypothesis. We argue that

this study contradicts the predictions of the Representational Deficit Hypothesis and the Shallow Structure Hypothesis. While these theories argue that L2 learners cannot acquire the wh-feature in L2, our study shows that Najdi participants, advanced learners of English have acquired this structure similar to native speakers. In contrast, these findings support the Full Transfer/Full Access theory and suggest that adult L2 learners have access to UG.

CHAPTER 5

CONCLUSION

1. Introduction

In this chapter we will evaluate the results of the two studies (the grammaticality judgment task and the self-paced reading task) that we conducted with respect to the theories that we tested (Representational Defect Hypothesis, Full Transfer/Full Access theory, and Shallow Structure Hypothesis). We conducted two main studies in this dissertation. The first study, which used an off-line grammaticality judgment task, was an extension of Hawkins and Chan's (1997) study. Hawkins and Chan tested L2 learners at three levels of proficiency. They tested knowledge of both the surface word order in relative clause sentences in English as well as knowledge of constraints on wh-movement in relative clauses. The results

showed a surprising pattern: low-proficiency learners performed poorly on the sentences as in example (1) targeting the resumptive pronoun but performed well on the sentences targeting movement constraints as in example (2):

(1) *The patient that I visited **him** was very sick. Resumptives

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

The advanced learners on the other hand correctly rejected the sentences with resumptive pronouns but performed poorly on the sentences targeting wh-movement violation (Subjacency). Hawkins and Chan argued that low proficiency learners reject successfully Subjacency violation sentences because they were searching for a resumptive pronoun in the sentence and when they did not find it, they reject the sentences. Hawkins and Chan argue that advanced Chinese group's difficulty in judging Subjacency violation sentences because of transfer. Given that Chinese has a null resumptive pronoun in the subject position Hawkins and Chan propose that the advanced Chinese group use the null resumptive for all positions in L2, as in example (3):

(3) The girl_i [_{CP} who_i [_{IP} I like *pro*_i]] is here. Null pronoun

Hawkins and Chan attributed these findings to their Representational Deficit Hypotheses, which predicts if a feature does not exist in the learners' L1, L2 learners cannot acquire it. In contrast to Hawkins and Chan's findings which showed development only in the surface structure, the results of our study showed development in both knowledge of the surface properties and knowledge of constraints on movement. Results for some of the Najdi speakers, advanced learners of English showed that they were able to reject ungrammatical resumptive pronoun sentences as well as reject ungrammatical sentences with Subjacency violation, similar to native speakers' performance. These results suggest that L2 learners can acquire new features even if these features do not exist in their L1.

Our findings are in contrast to Hawkins and Chan's pattern. We found in the results of the grammaticality judgment task that as proficiency increases the ability of L2 learners in judging both types of test sentences increases. These results are predicted by the Full Transfer/Full Access theory, but contradict the Representational Deficit Hypothesis. In addition, our findings argue that although transfer can happen in development stages, native-like performance can be achieved at the advanced proficiency level, which is predicted by Full Transfer/Full Access theory.

In the second study, we aimed to follow and extend Stowe's (1986) study. We conducted two experiments: Experiment 1, similar to Stowe's, tested whether participants process wh-sentences incrementally. Stowe found that native speakers' reading time for the filled object position is slower for the wh-sentences than for the same position in the control sentences (Filled-Gap Effect). Our results in Experiment

1 showed that, similar to Stowe's findings, native and non native speakers slow down when they encounter a filler in the object position

While the knowledge of phrase structure helps the parser to identify the potential gap position as we found in Experiment 1, the knowledge of syntactic constraints helps the parser to identify the positions which do not allow gaps. Our second self-paced reading study tested whether participants acquire the syntactic constraints on wh-movement in English. If the parser is constrained by L2 syntax, there will not be a slow down at the ungrammatical potential gap position inside a complex NP-island in a wh-sentence, since syntactic constraints do not allow a gap to occur inside an NP-island in English.

Stowe found that there is no significant difference between the reading times of the complex NP-island in the control if-sentences and in the wh-sentences, which suggests that participants show their knowledge of syntactic constraints. Stowe argues that the parser does not simply look around the surface word order for a place where a gap might be located; instead this procedure is constrained by syntax.

Our results in Experiment 2 show that both learners and native-speakers avoid positing a gap inside the complex NP-island. These results replicate the findings of Stowe's study for native speakers and extend these findings for L2 learners.

The Representational Deficit Hypothesis argues that L2 learners will not be able to acquire features that are not instantiated in the L1. The Shallow Structure Hypothesis argues that while native speakers use syntactic and lexical information to process wh-movement, L2 learners only use a lexically driven strategy, and they

underuse syntactic structure in their processing of wh-movement regardless of the status of wh-movement in the L1. Both theories predict that Najdi speakers, advanced learners of English will not acquire the wh-movement structure in English. However, the Full Transfer/Full Access theory predicts that advanced L2 learners are able to acquire new features regardless of whether or not their present in the L1. Our findings supported the Full Transfer/Full Access theory. We argue that L2 learners can acquire new features in the second language.

2. Recommendation for future research

I will conduct a similar study on Najdi learners of English in Saudi Arabia. This study will address the role of the input and the learning environment in the acquisition of syntactic constraints on wh-movement. In addition, I would like to test learners whose L1 is similar to English with respect to wh-movement. This study will allow us to examine the potential advantages of L1-L2 similarities.

Appendix 1

The Grammaticality Judgment Task (From Hawkins and Chan, 1997)

The wh-phrases sentences:

- 1) The actor who performs well wins a lot of prizes. (S)
- 2) The boy who I hit broke the window. (O)
- 3) The woman for whom I have bought a vase is my aunt. (IO)
- 4) The man whom I have borrowed money from has a big house.(IO)
- 5) The house in which they had a party was on fire. (OO)
- 6) The man whom they are talking with is my principal. (OO)
- 7) The tennis player whose leg was broken could not join the competition.
(GENS)
- 8) The manager whose car John borrowed arrived late. (GENO)
- 9) The classmate to whose mother I always send a Christmas card has moved.
(GENIO)
- 10) The woman with whose son we always discuss problems is a good mother.
(GENOO)
- 11) The man whom Peter runs faster than is an athlete. (OCOMP)

The complementizer *that* sentences:

- 12) The thief that stole my purse escaped. (S)
- 13) The lady that I met yesterday was my former teacher. (O)

- 14) The girl that he gave a gift to was delighted. (IO)
- 15) The girl that I always play with is my cousin. (OO)
- 16) The neighbor that I am taller than does not play basketball. (OCOMP)

Grammatical relative clauses that do not involve either wh-phrases or the complementizer *that* in English:

- 17) The girl John likes is studying at the university. (O)
- 18) The friend I lent the book to studied very hard. (IO)
- 19) The postcard John wrote his address on disappeared. (OO)
- 20) The girl we sing better than is in the choir. (OCOMP)

Ungrammatical sentences that have a complementizer and a wh-phrase at the same time (*who that):

- 21) *The girl who that lost her way cried. (S)
- 22) *The dog which that hurt a child ran away. (S)
- 23) *The classmate who that I hate is very selfish. (O)
- 24) *The vase which that I broke was very expensive. (O)
- 25) *The student whom that I lent the book to worked very hard. (IO)
- 26) *The cat which that I gave the milk to was very skinny. (IO)
- 27) *The lady whom that I talked with was my teacher. (OO)
- 28) *The school which that they are studying English at is very famous. (OO)
- 29) *The classmate whom that I work harder than always copies my homework.
(OCOMP)
- 30) *The tree which that I am shorter than is falling down. (OCOMP)

Ungrammatical resumptive pronouns in relative clauses:

- 31) *The man who he lives next door has left. (S)
- 32) *The waiter that he always serves us is called George. (S)
- 33) *The man who she admires him is an artist. (O)
- 34) *The patient that I visited him was very sick. (O)
- 35) *The actress I saw her was very famous. (O)
- 36) *The aunt whom I received a parcel from her had left America. (IO)
- 37) *The schoolboy that I read a story to him finished his homework. (IO)
- 38) *The uncle Mary sent the letter to him moved to a new house. (IO)
- 39) *The river which he got the water from it was very dirty. (OO)
- 40) *The pan that the cook made his pancake in it was very big. (OO)
- 41) *The file she put the papers in it has been stolen. (OO)
- 42) *The teacher whom we talk about her is very nice. (OO)
- 43) *The neighbor that I chat with him will move very soon. (OO)
- 44) *The boy I play with him is my cousin. (OO)
- 45) *The classmate whom Sally is cleverer than him reads very slowly.
(OCOMP)
- 46) *The sailor that Bill is more experienced than him owns a boat. (OCOMP)
- 47) *The writer David became more famous than him lives in England.
(OCOMP)

Sentences that violate subadjacency principle in English:

Violation of wh-island constraint

- 48) *This is the man who Mary told me when she will visit. (O)
- 49) *This is the clerk who Lily told Peter when she will employ. (O)
- 50) *This is the lady who Richard told me when he will meet. (O)
- 51) *This is the flat which my mother told me when she will rent. (O)

Violation of the complex NP constraint

- 52) *This is the secretary who Peter heard the news that the boss will marry. (O)
- 53) *This is the boy who Mary described the way that Bill attacked. (O)
- 54) *This is the building which they heard the news that the government will buy.
- 55) *This is the land which the manager questioned the decision that we should sell.

Ungrammatical sentences that involve null subjects in embedded clauses:

- 56) *The girl cried when lost her way.
- 57) *The children played games when attended lessons.
- 58) *The boy felt sick when took the examination.
- 59) *My sister burnt her fingers when cooked the chicken.

Filler sentences: (Aldwayan, 2007)

- 60) I saw the sick boy at the library.
- 61) Too much fast food is not healthy for young children.
- 62) What do you do at home in the evening?
- 63) Where have the students from France been lately?
- 64) When is he coming to finish his homework?
- 65) Why did he put the writing book on the table last night?
- 66) Was the Lawrence public library closed last weekend?
- 67) Which rain coat do you like better, the red one or the blue one?
- 68) Is the manager of the company increasing our salaries this year?
- 69) Do these old grammar books and notes belong to you or your brother?
- 70) The boy and his friends is playing football on the school playground.
- 71) Mohammed and Ahmed are here at the hospital to see their friend Fahad.
- 72) John does not like winter because he often gets sick for several weeks.
- 73) Niagara Falls is the most beautiful sight I have ever been.
- 74) Can you tell me what time the meeting starts?
- 75) Why do they come late to school everyday?
- 76) What did he see to make him so happy?
- 77) Abdullah's blue car is very old but it is still running.
- 78) Mohammed likes his math teacher, because he is very helpful.

Appendix 2

Self-Paced Reading Task

Experiment 1

- 1) a. My brother asked if Barbara will photograph us/Ali beside Mom at the graduation.
b. My brother asked who Barbara will photograph us/Ali beside at the graduation.
- 2) a. The manager asked if Ethan will meet us/Sam with Jeff outside the office.
b. The manager asked who Ethan will meet us/Sam with outside the office.
- 3) a. The boy asked if Matt will place me/Ben with Susie at the party.
b. The boy asked who Matt will place me/Ben with at the party.
- 4) a. My mother asked if John will find us/Rob beside Dad at the restaurant.
b. My mother asked who John will find us/Rob beside at the restaurant.
- 5) a. The teacher wondered if Peter will seat me/Bob by Rachel in the classroom.
b. The teacher wondered who Peter will seat me/Bob by in the classroom.
- 6) a. My cousin wondered if David will put me/Liz near Jack at the wedding.
b. My cousin wondered who David will put me/Liz near at the wedding.
- 7) a. The instructor wondered if Chris will film us/Tom with Susan at the reception.
b. The instructor wondered who Chris will film us/Tom with at the reception.
- 8) a. My friend wondered if Julie will discuss me/Amy with Sarah before the interview.
b. My friend wondered who Julie will discuss me/Amy with before the interview.
- 9) a. My nephew revealed if Alex will put me/Ed near Nancy at the gathering.
b. My nephew revealed who Alex will put me/Ed near at the gathering.

- 10) a. The secretary revealed if Shawn will introduce us/Lou to Jared after the speech.
b. The secretary revealed who Shawn will introduce us/Lou to after the speech.
- 11) a. My classmate revealed if Jack will meet us/Sam with Sarah before the dance.
b. My classmate revealed who Jack will meet us/Sam with before the dance.
- 12) a. The girl revealed if Melissa will seat me/Ann by Susan at the dinner.
b. The girl revealed who Melissa will seat me/Ann by at the dinner.
- 13) a. The babysitter guessed if Christopher will discover me/Dan with Lindsey in the closet.
b. The babysitter guessed who Christopher will discover me/Dan with in the closet.
- 14) a. My niece guessed if Kelly will photograph us/Kim with Edward at the parade.
b. My niece guessed who Kelly will photograph us/Kim with at the parade.
- 15) a. My aunt guessed if Patrick will film me/Sue with Kelly at the banquet.
b. My aunt guessed who Patrick will film me/Sue with at the banquet.
- 16) a. The student guessed if Ryan will introduce us/Jim to Heather after the break.
b. The student guessed who Ryan will introduce us/Jim to after the break.
- 17) a. The teachers knew if Michael will discover us/Ron with Jerry during the game.
b. The teachers knew who Michael will discover us/Ron with during the game.
- 18) a. My sister knew if Tom will place me/Pat with Jason at the lunchtable.
b. My sister knew who Tom will place me/Pat with at the lunchtable.
- 19) a. My grandmother knew if Adam will find us/Jen with Rachel at the mall.
b. My grandmother knew who Adam will find us/Jen with at the mall.
- 20) a. The manager knew if Katie will discuss me/Joe with Patricia after the meeting.
b. The manager knew who Katie will discuss me/Joe with after the meeting.

Experiment 2

- 1) a. My sister wondered if the boring comments about John's used car were intended to entertain the group.
b. My sister wondered who the boring comments about John's used car were intended to entertain.
- 2) a. My dad wondered if the upsetting facts about David's first wife were said to anger the family.
b. My dad wondered who the upsetting facts about David's first wife were said to anger.
- 3) a. The principal questioned if the rude statement about Bob's falling grades was used to shock the class.
b. The principal questioned who the rude statement about Bob's falling grades was used to shock.
- 4) a. The girl questioned if the sad findings about Sam's sick mother were announced to upset the relatives.
b. The girl questioned who the sad findings about Sam's sick mother were announced to upset.
- 5) a. The teacher inquired if the long presentation about Susan's summer holiday was given to bore the school.
b. The teacher inquired who the long presentation about Susan's summer holiday was given to bore.
- 6) a. My mom inquired if the weird book about Marie's haunted house was written to scare the children.
b. My mom inquired who the weird book about Marie's haunted house was written to scare.
- 7) a. My classmate doubted if the depressing song about George's old girlfriend was performed to annoy the audience.
b. My classmate doubted who the depressing song about George's old girlfriend was performed to annoy.
- 8) a. The judge doubted if the shocking evidence about William's important lawsuit was devised to fool the jury.
b. The judge doubted who the shocking evidence about William's important lawsuit was devised to fool.

- 9) a. My grandmother asked if the scary story about Dan's huge cat was meant to frighten the girls.
b. My grandmother asked who the scary story about Dan's huge cat was meant to frighten.
- 10) a. The mayor asked if the surprising claim about Ron's political campaign was made to excite the community.
b. My mayor asked who the surprising claim about Ron's political campaign was made to excite.
- 11) a. The spy wondered if the secret information about Lukas and Carrie was gathered to help the detective.
b. The spy wondered who the secret information about Lukas and Carrie was gathered to help.
- 12) a. My boss wondered if the strange question about Doris and Liz was asked to irritate the secretary.
b. My boss wondered who the strange question about Doris and Liz was asked to irritate.
- 13) a. My grandfather questioned if the hilarious jokes about Michael and Janet were supposed to impress the neighbor.
b. My grandfather questioned who the hilarious jokes about Michael and Janet were supposed to impress.
- 14) a. My mother questioned if the difficult test about Darwin and Newton was designed to challenge the students.
b. My mother questioned who the difficult test about Darwin and Newton was designed to challenge.
- 15) a. My coach inquired if the nasty rumors about Mark and Chris were spread to distract the team.
b. My coach inquired who the nasty rumors about Mark and Chris were spread to distract.
- 16) a. The tourist inquired if the new website about Lincoln and Washington was published to educate the visitors.
b. The tourist inquired who the new website about Lincoln and Washington was published to educate.
- 17) a. My professor doubted if the Christmas play about Mary and Joseph was expected to teach the kids.

- b. My professor doubted who the Christmas play about Mary and Joseph was expected to teach.
- 18) a. The reporter doubted if the recent announcement about Hillary and Bill was released to please the voters.
b. The reporter doubted who the recent announcement about Hillary and Bill was released to please.
- 19) a. The policeman asked if the scandalous report about Jake and Jill was hidden to protect the criminals.
b. The policeman asked who the scandalous report about Jake and Jill was hidden to protect.
- 20) a. The senator asked if the short film about Bush and Chaney was shown to influence the public.
b. The senator asked who the short film about Bush and Chaney was shown to influence.

Fillers Experiment 1

- 1) My roommate asked who will meet us with Chris after our vacation.
- 2) My brother guessed who will accompany us with Mom to the office.
- 3) My father inquired who will find us with Vicki at the mall.
- 4) My boss questioned who will introduce me to Martha after the meeting.
- 5) My dad wondered who will seat me by Joe at the dinner.
- 6) My friend asked who Karen will seat beside Bill at the party.
- 7) The writer inquired who Matt will photograph with Kevin during the ceremony.
- 8) The teacher revealed who Beth will meet with Henry at the cafeteria.
- 9) The actor wondered who Mary will film with Sally in the movie.

- 10) The girl guessed who Jessica will put beside John at the table.
- 11) My uncle forgot if Sam will cook us a big dinner on Saturday.
- 12) My sister wondered if Susie will give me the secret recipe after school.
- 13) My son asked if John will send us a big package on Christmas.
- 14) My mother inquired if Matt will bake me some chocolate cookies on Friday.
- 15) My brother questioned if Jim will make me a delicious lunch for tomorrow.
- 16) My cousin forgot what Bill will cook us next week at the celebration.
- 17) My mom predicted what Jill will tell me next Monday after the wedding.
- 18) The students guessed what Judy will ask us next week on the test.
- 19) My dad questioned what Mary will show me this evening at the party.
- 20) The manager discussed what Hilary will teach us next Friday at the conference.
- 21) My aunt forgot who will cook us a big turkey on Thanksgiving day.
- 22) My sister revealed who will bring me an expensive present on Christmas Eve.
- 23) My father asked who will buy me a new costume for Halloween night.
- 24) My mother wondered who will deliver me a large vase of fresh flowers.
- 25) The teacher guessed who will bake us an apple pie for the picnic.
- 26) It was Sam that revealed if John would dance at the party.
- 27) It was Tom that asked if Nancy would play in the game.
- 28) It was John that wondered if Judy would eat at the restaurant.
- 29) It was Mary that inquired if Matt would run in the marathon.
- 30) It was Karen that predicted if Todd would sleep at the opera.
- 31) It was Dennis that said who Bill would see before the big concert.

- 32) It was Lisa that inquired who Richard would meet at the fancy reception.
- 33) It was James that wondered who Joseph would interview at the press conference.
- 34) It was Christopher that predicted who Ronald would bring to the wedding party.
- 35) It was Donald that asked who Maria would visit during the family vacation.
- 36) My brother asked whether Holly would cry during the sad French movie.
- 37) The girl wondered whether Charles would sleep during the boring class lecture.
- 38) My sister inquired whether Thomas would return after the long winter break.
- 39) The manager questioned whether Betty would go to the annual office picnic.
- 40) The students knew whether George would play for the best football team.

Filler Experiment 2

- 1) The young boy said that Janet and Sam sang very loudly at the wild party last night.
- 2) The new student revealed that Saad and Emad studied every day at the public library this week.
- 3) My gym teacher stated that Sam and Julie practiced the routine at the old stadium last weekend.
- 4) The project manager claimed that Tom and Chris put several boxes in the new office yesterday morning.
- 5) My oldest daughter thought that Nancy and Kathy spent several hours at the big mall last Monday.
- 6) The scared girl revealed that Sara and Holly bothered many children on the school bus yesterday afternoon.

- 7) My new neighbor said that Susie and Bill washed the windows of the old house last night.
- 8) The old librarian claimed that Mike and John stole many books from the library shelf last Saturday.
- 9) My new coach announced that Betty and George ran several miles on the stadium track yesterday morning.
- 10) The new chef knew that Sara and Julie cooked various dishes in the busy kitchen yesterday afternoon.
- 11) The teacher said that his students liked the film about the school system in Paris.
- 12) The principal thought that his staff loved the summary of the new policy on testing.
- 13) My daughter revealed that her friends hated the lecture on the political situation in Canada.
- 14) The teachers stated that their students enjoyed the show about the wild animals in Africa.
- 15) My friend mentioned that his boss loaned the copy of the computer program to Sally.
- 16) The manager announced that her staff rejected the revision of the office manual on harassment.
- 17) My professor said that his son wrote the article about the new theory in physics.
- 18) My friend thought that his dad liked the story about the native Americans in Oklahoma.
- 19) The teacher mentioned that her class enjoyed the book about the haunted houses in Massachusetts.
- 20) My brother stated that his wife liked the movie about the fishing towns in Maine.
- 21) The news reporter said that the American tourists really liked to dance all night long.

- 22) My younger brother claimed that the French students really wanted to get much higher grades.
- 23) The head nurse claimed that the eye doctor truly wanted to perform the risky surgery.
- 24) The new professor thought that the ambitious athletes really needed to study more after class.
- 25) My previous landlord revealed that the building owners desperately wanted to increase the monthly rents.
- 26) The worried parents stated that the angry teachers urgently needed to end the noisy protest.
- 27) The police officer thought that the young drivers really needed to obey the traffic rules.
- 28) My local newspaper stated that the insurance companies really needed to lower the monthly rates.
- 29) My annoyed grandmother complained that the new cashier really hated to help the elderly costumers.
- 30) The school principal found that the annoying students really needed to receive more strict discipline.
- 31) Adam and Sara repeatedly asked what their students hated about the chemistry teacher from the prestigious university.
- 32) Kathy and Sandra always wondered what their friends liked about the red car in the parking lot.
- 33) Helen and Kevin clearly knew what the principal disliked about the expensive repairs to the new school.
- 34) Donna and Jason finally discovered what the teachers said about the boring lecture at the education conference.
- 35) Laura and Paul finally revealed what their parents liked about the famous school in their small town.
- 36) James and Mark never revealed what their boss mentioned about the employee cafeteria in their office building.

- 37) Joseph and Thomas easily guessed what the group disliked about the English professor from the famous college.
- 38) Edward and Daniel specifically asked what the reporter wrote about the old temple in the big city.
- 39) Maria and Christopher constantly wondered what the engineers loved about the electric engines in the new cars.
- 40) Joan and Matt often questioned what their professor claimed about the new theory in the science book.

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