

**The Effects of the Native Semantic Structures on the
Representation and Processing of L2 Vocabulary for
Arabic Speakers of English**

Layan Saud Alkhathlan

St.Hilda's College

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Abstract

The mapping of lexical form to meaning is a crucial part of vocabulary acquisition in a second language (L2). This study investigated the difference between advanced speakers of English and native speakers of English in the representation and processing of English vocabulary. Also, the study investigated the involvement of the semantic structures of the native language in L2 form-meaning mapping for advanced speakers of English. This study followed a similar design as Jiang's (2002, 2004) studies; however, a major difference between the present study and Jiang's work is that this study has another ESL sample. There were 14 Arab ESL speakers along with 13 native speakers of English asked to perform a semantic judgment task in which they decided whether or not 2 English words were related in meaning. There were 2 types of related word pairs that served as critical stimuli: word pairs where either the 2 words in the pair shared one translation in Arabic or had 2 different translations in Arabic. The native speakers of English responded significantly faster to all related word pairs than the Arab participants. Another finding was that the pair-type effect, the effect of the translation status of the word pair, was present in both groups of participants. However, the pair-type effect was found to be more significant for Arab participants than for the native speakers of English. The current findings indicated the difference between the representation and processing of English vocabulary between native speakers of English and Arab ESL speakers. However, the evidence of the involvement of L1 semantic structures in L2 vocabulary representation and processing should be treated with caution. The methodological issues which may have contributed to the current findings were discussed, and suggestions were made for future research.

Another aim of this study was to investigate nonnative preference for the language of L2 vocabulary instruction. The Arab sample of this study showed a great preference for L2 use in vocabulary instruction, especially non-novice language learners.

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Chapter 1: Introduction

It has been claimed that second language learners find some elements of the target language relatively easy to learn when they are similar to the elements that exist in their native language, whereas they find some components of the target language comparatively difficult when they are different from those of their native language (Lado, 1957). Richards (1971) agreed with this claim and pointed out that the internalized linguistic system of the learner's native language may lead to errors in second language production. Language transfer, in fact, is evident in various aspects of L2 comprehension along with production (Koda 1997). Many studies into native language influence asserted that this type of influence on L2 learning exists at all linguistic levels, phonological, lexical, syntactic and semantic (e.g. Corder, 1971; Oldin, 1989).

Regarding semantics, Jiang (2000) asserted that the influence is not only found in error production. He suggested that some L2 lexical elements are fossilized (blocked) on a certain level of word knowledge because of the already established L1 lexical system¹. Jiang further suggested that investigating such fossilization could be done through some lexical decision tasks and not only error analysis. Jiang (2002, 2004) designed a lexical decision task to investigate the semantic transfer of L1 structures. The present paper adopted Jiang's design, but used a different advanced ESL sample who have Arabic as a native language². The title of this dissertation specified the nonnative sample in order to respect language-specificity and to avoid the risk of overgeneralization. Also, the two

¹ Lexical system refers to the forms and meaning. The debatable issue of the distinction between meaning and concept (e.g. Pavlenko, 2000) is not to be discussed in this study.

² Nan Jiang was contacted via email and he encouraged the use of the same design with a new sample that had a native language other than Korean and Chinese.

terms ‘representation’ and ‘processing’ were presented in the title because of the difficulty of investigating the former without the latter (Jiang, 2000).

Another aim of this study is to investigate what advanced Arab ESL speakers say about the use of Arabic while learning new L2 vocabulary. The rationale behind investigating this issue comes from Jiang’s (2004) claim that in several studies L2 learners showed a preference for the use of the native language while teaching new L2 vocabulary (e.g. Baxter, 1980). Therefore, it was of interest to investigate what the point of view was of the nonnative sample who participated in this study.

This dissertation is divided into six chapters. The first chapter is the **Introduction**, providing a general explanation of the title of the dissertation and outlining the organization of the chapters. The second chapter is the **Selected Review of the Literature**. This chapter begins with a brief background to L2 vocabulary research. The second section discusses what is meant by L2 word knowledge. Then, the third section discusses the cross-linguistic influence on L2 word knowledge. This section presents some evidence taken from error analysis of the cross-linguistic influence on L2 vocabulary. The following section outlines some of the psycholinguistic models of the bilingual lexicon that attempt to explain the relationship between the two vocabulary systems³. The fifth section presents a model proposed by Jiang (2000) aiming to explain the lexical entries of L2 words. This model highlights the role of L1 word knowledge on L2 lexical entries. The sixth section provides Jiang’s (2002, 2004) attempts to obtain evidence of his proposed model through an experimental design. The seventh section

³ In this context, ‘bilingual’ means the person who possesses two languages. More importantly, the second language of the bilingual was acquired later in life and not from birth.

highlights some of the pedagogical implications Jiang (2004) has suggested. The last section of the literature review provides the aim of the present study and the rationale behind the attempt to replicate Jiang's (2002, 2004) work and to obtain some qualitative data from the Arab sample.

The third chapter presents the **Methodology** of the study. The research design and the research hypotheses are outlined. This chapter includes a brief overview of SLA research, highlighting the relevance of the present design to the general approach of second language acquisition (SLA) research. Then, this chapter briefly describes the preliminary study that was conducted in Jeddah, Saudi Arabia. After this the chapter focuses on the present study which was conducted in Oxford, United Kingdom. One section provides details about the participants and the sampling techniques used. The following section highlights the ethical considerations of this study. The material section provides a detailed description of the construction of the chosen stimuli used in the lexical decision task. The chapter presents the procedure followed to test the participants. Another section presents the questions used in the structured interview. The chapter ends with the pilot testing conducted prior to the main study.

Data Analysis is the fourth chapter of this dissertation. This chapter presents the descriptive data along with their statistical treatment. After presenting the statistical tests used with the numerical results, the chapter includes a brief summary of the findings, relating them to the hypotheses of the study. The chapter ends with the qualitative findings obtained through the structured interviews.

The fifth chapter is the **Discussion** on the findings of the study. The discussion is organized in terms of the research hypotheses, with an attempt to compare the present findings with Jiang`s (2002, 2004) findings. This chapter carries out a discussion on the qualitative findings.

The **conclusion** is the last chapter of this dissertation. It provides a summary of the content of the dissertation. A major aim of this chapter is to provide some implications for SLA along with some suggestions for future research.

Chapter 2: Selected Review of the Literature

Meara (2002) pointed out that in the last twenty years, vocabulary research in second language acquisition (SLA) moved from being a neglected area to one of more importance. Earlier, Levenston (1979) acknowledged the lack of second language lexical research and proposed some theoretical issues that needed to be investigated. Meara (1989) urged for more experimental methods in investigating the lexicon of second language learners other than just relying on the classical method of error analysis. Later on, research in second language vocabulary acquisition was carried out investigating different research questions on a variety of theoretical bases

Schmitt and McCarthy (1997) considered the importance of three main themes related to vocabulary acquisition research and more specifically in second language acquisition. First is the descriptive essence of vocabulary and the work done to explain and define words and meanings. A second issue concerns discovering and investigating the mysteries of the representation and processing of vocabulary in the language learner's mind. A third theme is about the pedagogical issues related to vocabulary. The three themes were suggested by Schmitt and McCarthy to be treated as complementing each other. These three themes present a logical framework for researchers and the idea of treating them as complementary, while tempting, is still not an easy task. The first two themes are a main interest of this chapter. Some pedagogical issues will be highlighted throughout this chapter and the following chapters.

2.1 L2 Word Knowledge:

What is a word? This is a question with a complex answer. Richards (1976) suggested in his influential paper the dimensional approach of lexical knowledge. Lexical knowledge in this sense includes more than just recognizing the form and a single meaning. It also entails syntactic and semantic knowledge of a word, along with frequency of occurrence in the language and associations with other words. Following a similar approach, Nation's (1990) proposal of word knowledge was described by Schmitt (1998) as the most complete and balanced description of word knowledge. Nation (1990, 2001) addressed the issue of the difference between the receptive and productive nature of a word. Nation attempted to overcome the inconsistency of the use of the two terms in the literature by proposing what is involved in knowing a word both receptively and productively. In a general sense, knowing a word involves form, meaning and use. An example from a receptive point of view of knowing a form of a word is to be able to recognize the sounds of this word, and from a productive point of view is to be able to pronounce the word.

The issue of looking at word knowledge as an incremental process, not just from a known/unknown point of view, was encouraged by many researchers (e.g. Laufer, 1997; Schmitt & McCarthy, 1997; Schmitt 1998; Schmitt & Meara, 1997). Word knowledge is an incremental process because a language learner might possess only partial knowledge about a certain word. For example, a language learner might possess receptive knowledge of a certain word but not productive knowledge. Moreover, a learner might know only the partial meaning of a word compared to a native speaker. A logical question would be

whether the knowledge of L2 words can be developed over continuous exposure to the target language?

Schmitt (1998), in a longitudinal study of vocabulary acquisition, tracked the development of 11 English words in the course of an academic year for 3 advanced ESL learners who were studying in the UK. The orthographical and phonological statuses of the words were known by the participants, but not all of the words' meanings. The participants' knowledge of all the meanings of one word was compared to the knowledge of 3 native speakers for the same words. Examining the changes in the knowledge of the meanings for the students in the course of the year showed that the majority of meanings (72%) stayed at the same state of knowledge as they started with. The study provided an insight into the degree of development of the chosen words, but not what facilitated or inhibited development. Jiang (2004) used Schmitt's (1998) results as preliminary, or probable, evidence of the effect of the established L1 conceptual/semantic system on L2 word knowledge. This cross-linguistic influence in L2 word knowledge was documented in SLA literature and it is worth addressing in this paper.

2.2 Cross-Linguistic Influence/ L1 Transfer Affecting Word Knowledge:

Lado (1957) acknowledged the tendency of language learners to rely on their native language while developing L2 word knowledge. The fact that L2 learners already possess a well-established linguistic system of their L1 logically leads to assume that the L1 system will play a role in L2 vocabulary knowledge. Language transfer, as a linguistic concept, has been considered as a phenomenon in L2 learning (Arabski, 2006). Transfer is not just habit formation as is the behaviorist view on language acquisition. Moreover, it is not just interference/negative transfer because the L1 influence could be positive

(Oldin, 1989). Regarding vocabulary, when a learner links a new L2 word with its equivalent in L1 it might help the learner to establish more knowledge about the new L2 word and lead to creative use. However, words in two languages seldom share identical semantic specification and that might lead to L2 lexical errors (Swan, 1997).

The vocabulary errors produced by L2 learners that reflect L1 structures were used as evidence of lexical transfer. For instance, Zughoul (1991) found that 11% of the lexical errors in written compositions by Arab learners of English, with no specified English proficiency, resulted out of literal translations that do not convey the intended meaning in English. Two examples were:

a- We invited people to eat at our home as our customs and *imitations* (traditions).

b- I am going to talk about how to make *grape papers* (vine/grape leaves).

In the first example, the word *taqlid* in Arabic has two meanings: one which is imitation and the other is tradition. In the second example, *Warag* in Arabic has two equivalents in English: paper and leaves. Examples can be found in many other error analysis studies (e.g. Altenberg & Granger, 2001).

Meara (1984) has pointed out that errors do not indicate all of the differences between language learners and native speakers. Additionally, he noted that experimental methods are an important tool for investigating cross-linguistic influence along with error analysis. Meara argued that the lexical errors produced by language learners represent only overt differences between learners and native speakers, and that enormous lexical knowledge differences result in covert errors.

Interestingly, Ijaz (1986) examined whether the meanings ascribed to words by advanced L2 learners are different to ascribed by native speakers, and whether any observed difference could be attributed to cross-linguistic effects or to other learning effects. Ijaz tested native and nonnative speakers of English (with different L1's) on six English spatial prepositions on a semantic-relatedness test and sentence-completion test. In the first test, participants had to indicate the semantic relation between two prepositions out of six in a diagrammatic semantic space. In the sentence-completion test, participants had to complete sentences with the appropriate preposition. Different sentences involved different meaning features of the same preposition. The results of the two tests showed that all groups of advanced L2 learners differed from native English speakers in the semantic-relatedness ascribed to the words. Analyzing the responses of the nonnative speakers of English with German as a native language and another group with Urdu as a native language showed a considerable degree of influence of the corresponding lexical structure in their mother tongue. Ijaz concluded that the word usage and semantic decisions were influenced by the native language for advanced L2 speakers rather than the overt production errors.

Ijaz's findings, in conjunction with other documented errors that are known to be influenced by the native language, lead to a question about the relationship between the bilingual's two lexicons. This relationship forms a debatable issue in the field of psycholinguistics, and a fair amount of research concerning this issue is documented in the literature (Coady, 1993). The next section will highlight some of the most common models that attempt to describe the relationship, with some evidence from the relevant experimental findings.

2.3 Models of the Bilingual Lexicon:

Researching the lexicon has been part of psycholinguistic research for many years now. Empirical and theoretical analyses have resulted in proposals of different models of the mental lexicon. An early proposal by Collins and Loftus (1975) suggested two levels of representation; one is lexical (phonemic and orthographic), and the other is a semantic/conceptual level of representation. They suggested that the lexical level works as a dictionary for the concepts of the semantic level; i.e. a name in the dictionary can be related to one or more of the concepts. The question here concerns the relationship between the two levels in lexicon of the bilingual. Bilingual models adopting the proposal of Collins and Loftus emerged.

Potter Von Eckardt and Feldman (1984) discussed two hypotheses regarding the relationship in the bilingual lexicon between the equivalent words of the two languages. The first is the word/lexical association hypothesis proposing that the L2 word is associated with the L1 word on the lexical level. To access the conceptual level, the L1 word mediates its L2 equivalent. The second hypothesis is the concept mediation model which proposes that the two words of the two languages are linked to the same concept, but the relations between the two words are not direct on the lexical level (Figure 1). Potter et al. (1984) attempted to test the two hypotheses against two groups of learners from two different proficiency levels. The aim was to determine which hypothesis could best explain the relationship between equivalent words and to examine if language proficiency is an active factor in this relationship.

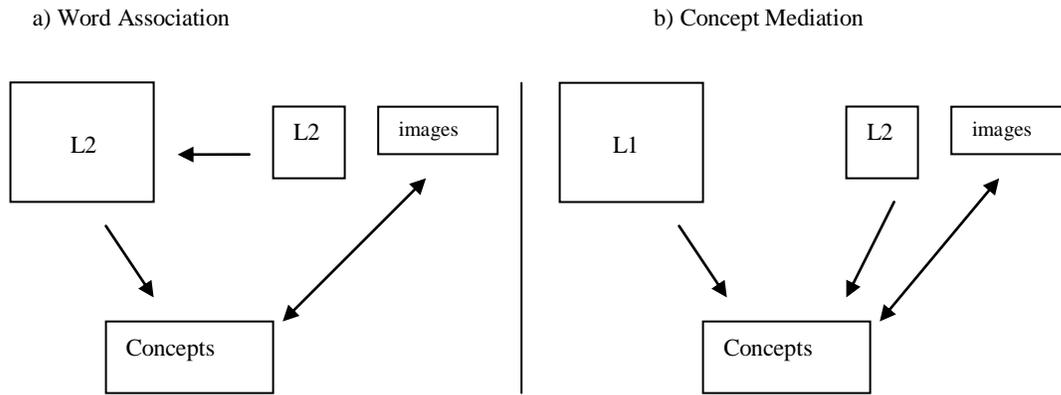


Figure 1: Two models of cross-language connection in which L2 words are associated to L1 words (a) or directly linked to concepts (b). Adopted from Kroll and Stewart (1994).

Potter et al. (1984) conducted two experiments; the first with Chinese proficient speakers of English and the second with English non-fluent speakers of French. In both experiments participants had to name pictures in the L2 and translate words from L1 to L2. The reaction time was compared for the two tasks. The researchers proposed that picture naming activates the conceptual level before the lexical level, while translation activates the lexical level. Moreover, the word association hypothesis predicts that picture-naming will demand substantially longer reaction time than translating words. The explanation is that for the picture naming in L2 the concept will be retrieved, then the L1 word, and finally the L2 word. However, for the translation task the L1 word is already provided. On the other hand, the concept mediation hypothesis predicts that no significant difference will be found between the reaction times for the two tasks on the assumption that the numbers of stages are similar. In the first experiment, the participants

reacted slightly, but not significantly faster to picture-naming than to the translation task. This pattern goes along with the prediction of the concept mediation hypothesis. The participants in the second experiment showed similar results. It was concluded from the results that the concept mediation hypothesis is a better explanation of the relationship between equivalent words in the bilingual lexicon, regardless of language proficiency.

The difference between non-fluent and fluent L2 speakers was of interest for further research. The idea that language expertise does not play a role in the relationship between the bilingual's two lexicons was not widely accepted. Kroll and Curly (1988) replicated Potter et al.'s (1984) study using a larger sample of bilinguals including non-fluent speakers who had studied the L2 for less than two years. The results of this last group of learners challenged the findings of Potter et al.. Participants who studied their L2 for less than two years showed results that were predicted by the word association hypothesis. They translated words into the L2 faster than they named pictures in the L2. The results for the more experienced L2 speakers who participated in the study replicated Potter et al.'s findings. However, the less-fluent participants in Potter et al.'s (1984) research had been studying their L2 for two or three years, while in the replicated study by Kroll and Curly (1988) the non-fluent participants had been studying their L2 for less than two years. Kroll and Curly considered the years of exposure to L2 as evidence of a developmental pattern from the word association to conceptual mediation which is mainly affected by an increase in proficiency.

Kroll and Curly (1988) included another task to check for the conceptual association by manipulating another variable. They asked participants to translate words into their L2 and to name pictures in both L1 and L2; one list was semantically categorized and the

other was a randomized list. They hypothesized that the reaction time to the two lists would be different if the participants were following the concept mediation model. The results showed that fluent participants were affected by the different types of lists, which supported their hypothesis. Interestingly, the semantically categorized list took fluent participants longer to react to. Therefore, the semantic categorization was seen as an interference factor. The non-fluent participants showed no difference in reaction time to the different lists, which was taken to support their reliance on word association.

Kroll and Stewart (1994) replicated this last task but with another sample. They wanted to examine if the previously observed semantic categorization factor would affect participants naming words and pictures in their L1. Another important purpose was to prove that picture naming and word naming triggers different levels of language processes. The native speakers of English were asked to name a group of pictures in English and to name written English words. The pictures and words were categorized into two different lists; one which was semantically related and the other which was a randomized list. The results showed category interference while naming pictures, but not with word naming. The results were taken to prove the conceptual activation while naming pictures. The researchers explained the interference effect of semantic relatedness as a result of the activation of many related concepts that would eventually trigger many related words in the lexical levels. This explanation was supported by the results of another task where the participants were asked to name a word then a picture, in order to reduce the activation of the conceptual level. The effect of the semantic relatedness was eliminated in the responses of the participants. The results of the two tasks were taken to

provide stronger evidence of the reliability of taking picture-naming as an indication of the activation of the conceptual level.

In addition, Kroll and Stewart's (1994) substantial paper included another experiment. They wanted to test a previously proposed model; the revised hierarchical model. This model suggests that for fluent L2 speakers, the links are stronger between the L1 lexical level and the conceptual level than the links between the L2 lexical level and the shared conceptual system. They hypothesized that upon this model, translation from L1 to L2 takes longer and will be more affected by the semantic relatedness than translating from the other route: L2 to L1. Fluent Dutch-English bilinguals, with Dutch as a dominant language, participated in the experiment. The results supported the hypothesis and the revised hierarchical model that was proposed by Kroll and Stewart (1990) (see Figure 2).

The revised hierarchical model

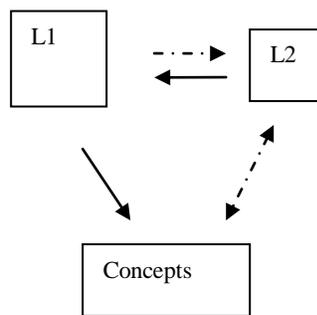


Figure 2: A revised model of lexical and conceptual representation in bilingual memory. Adopted from Kroll and Stewart (1994). (Note: $\leftarrow - \rightarrow$ links are acquired with greater L2 fluency).

To sum up Kroll and Curly's (1988) and Kroll and Stewart's (1994) findings, it is suggested that there is a developmental shift from reliance on the lexical mediation of L1 towards more direct links between L2 words and the shared conceptual system. This development of the bilingual lexicon is influenced by the increase in L2 proficiency.

Moreover, even for fluent bilinguals the links between their L1 and the conceptual system is stronger than L2 links with the same conceptual system.

De Groot (1992, 1993) proposed a mixed model to acknowledge the connections between the conceptual and lexical levels for bilinguals. This mixed model adopted a mixture of the three organizations proposed by Weinreich (1953). Weinreich (1953) proposed three different organizations of word knowledge in the bilingual mental lexicon (illustrated in Figure 3). These three organizations are the compound, co-ordinate and subordinate. They differ from each other in terms of the number of conceptual systems the bilingual possesses and how they are connected. A compound organization is proposed to have a shared conceptual system between the two languages, whereas the co-ordinate organization is proposed to have separate conceptual representation for each language. On the other hand, a subordinate organization is hypothesized to have a single conceptual representation and words from the second language are linked to their translation equivalents in the first language, without a direct connection between L2 words and the conceptual representation; which is similar to the assumption made by the word association hypothesis. De Groot (1993) pointed out that the mental lexicon may not contain just one type of the three proposed organizations, as different words might be located in different organizations.

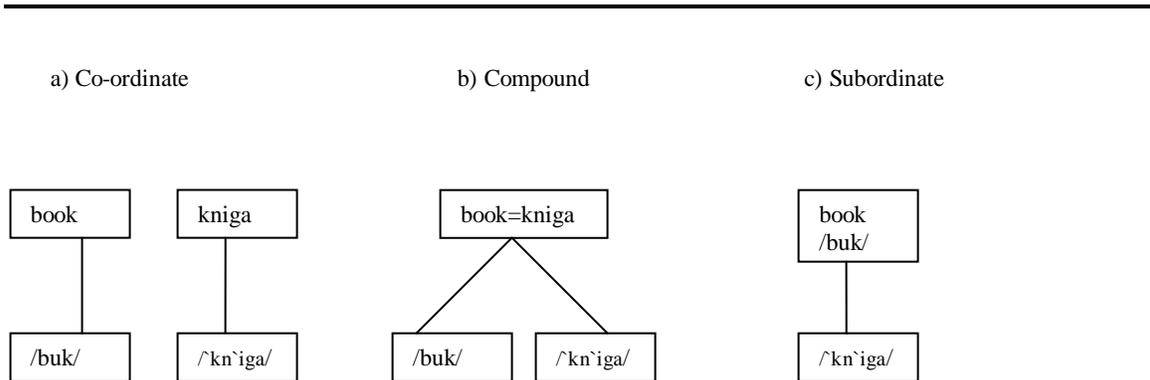


Figure 3: The three possible organizations of word knowledge in the bilingual lexicon. Adopted from Weinreich (1953).

Moreover, De Groot suggested a more complex situation for the links in the bilingual lexicon. The links between items in two languages was found to depend to a large extent on the nature of the word; word concreteness and cognate status both affect those links. For instance, concrete words which refer to perceptible entities (e.g. tables) are assumed to have more shared meanings across-languages than abstract words (e.g. love). The main reason is that concrete words tend to have the same shape, size and function.

2.4 The Lexical Entry for Bilinguals:

Jiang (2000) advocated more research into the word-type effect on L2 form-meaning mapping in the lexicon. However, Jiang attempted to create a model to describe the general developmental stages of L2 words that would respect the effect of different factors on the process of mapping and the mixed representations suggested by De Groot (1992, 1993). Jiang`s model is based on Levelt`s (1989) model of lexical entries (Figure 4). Jiang (2002) defended his choice by saying that he found the previous models of the

bilingual lexicon were more concerned with the idea of links between the two lexicon systems; L1 and L2 lexicons. On the other hand, the focus of this model is the semantic information integrated in L2 lexical entry.

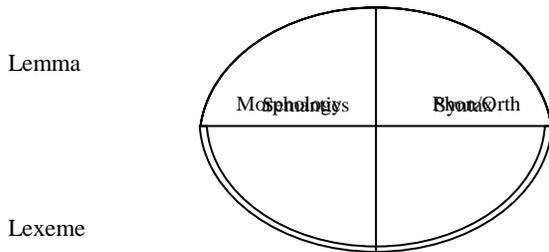
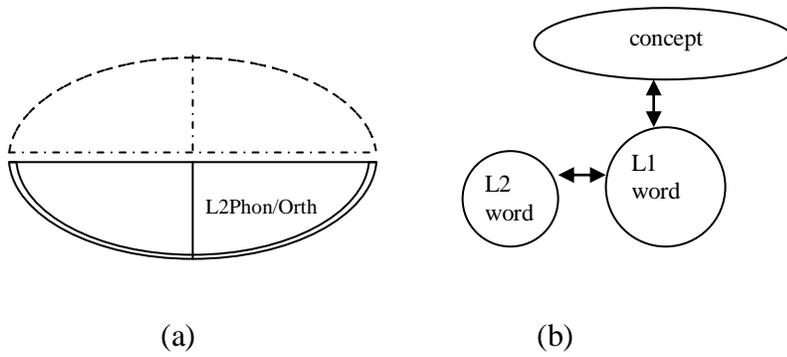
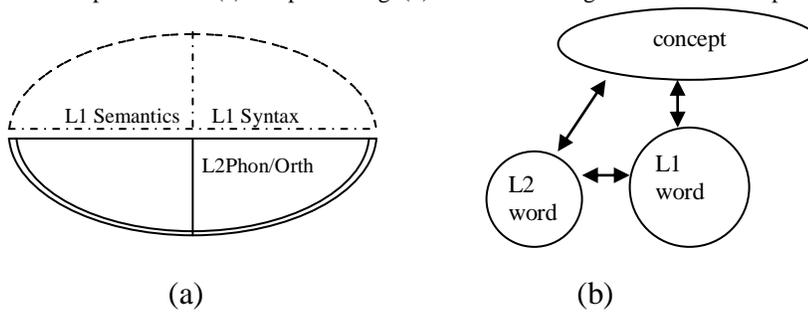


Figure 4: The lexical entry. Adopted from Levelt (1989).

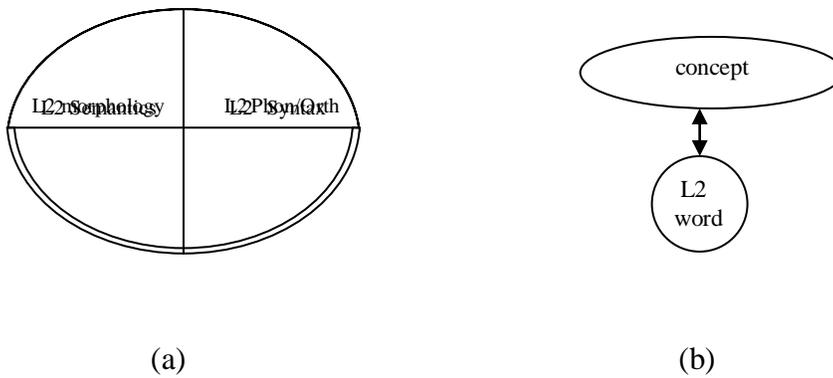
A lexical entry in Levelt's (1989) model is seen as containing two levels of information: (1) lemma, semantic and syntactic information; and (2) lexeme, morphological and phonological/orthographical information. A learned L2 word is seen in Jiang's (2000) model as going into three different stages. First, the L2 word has formal lexeme information but no lemma specification; for example, the person can read the word but does not know its meaning. In the second stage, the L2 lexeme is combined with lemma information of its L1 equivalent; this stage is a parallel of the previously discussed word association model. A third and final stage is when the L2 lexeme is integrated with its own lemma information (Figure 5).



Lexical representation (a) and processing (b) in the initial stage of lexical development in L2



Lexical representation (a) and processing in the second stage



Lexical representation (a) and processing (b) in L2 at the third stage.
 Figure5: All Adopted from Jiang (2000)

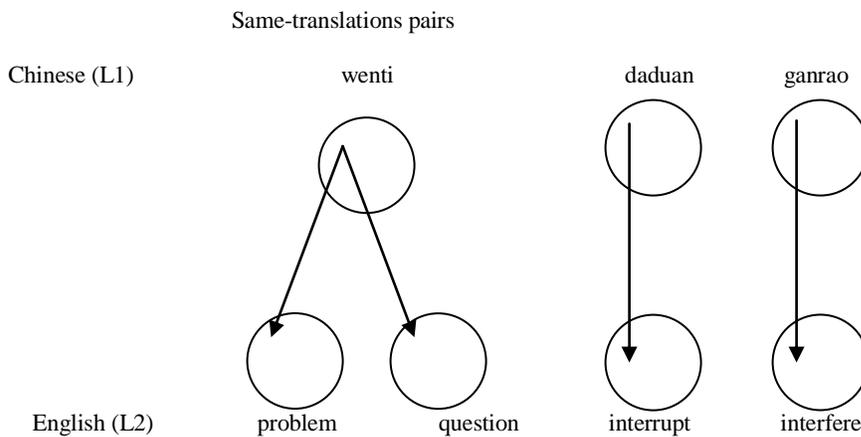
The shift between the second to the final stage was seen as critical. Jiang (2000) emphasized the concept of fossilization. He pointed out that many words are fossilized in the second stage. Fossilization was described by three different features. One possibility is that the L2 word has formal lexeme specification, but also semantic and syntactic information of its L1 translation. A second feature is the confusion while using morphological variants of a word. The evidence is found in the errors made by L2 speakers; e.g. he *goed** to the market. Another feature is that some L2 words might have direct connections with concepts, but also weak connections. This last point goes along with Kroll and Stewart's (1994) findings on asymmetrical translation. Jiang (2000) related fossilization for L2 learners, in a classroom environment, to two practical constraints. The first is the poor quantity and quality of input, especially in the classroom, compared to that in the natural environment where the native language is acquired. The other constraint is the presence of the conceptual/semantic system of the L1, which was previously discussed in this chapter.

As Singleton (1999) pointed out, it is important that one is careful not to oversimplify the lexicon. Interestingly, Jiang (2000) did not neglect other factors that could play influential roles in the acquisition, presentation and processing of L2 words. Jiang expressed the purpose of proposing such a preliminary model as providing a framework to generate new hypotheses.

2.5 Semantic Transfer Hypothesis:

Jiang (2002) attempted to obtain evidence that many L2 words are blocked in the second stage. Experiment 1 was a semantic rating task. The design was based on the fact that a pair of semantically related words or synonyms in one language may have a single or

different translation in another language. The Semantic Transfer Hypothesis, generated from Jiang's (2000) model, predicts that an L2 learner will rate the semantic relatedness of a word pair that has only one equivalent in the native language higher than rating a word pair with a different translation. The two words of any one-translation pair is hypothesized to share a very similar, or identical, semantic content (Figure 6). For the native speakers this effect should not be found.



Figure(6): the difference in the degree of semantic overlap between same-translation and different-translation pairs. Adopted from Jiang(2002).

There were 25 Chinese advanced speakers of English and 27 native speakers of English who participated in Experiment 1. There were 40 English word pairs judged on having the same translation in Chinese and another set of 40 pairs that were judged to have two different translations. The semantic relatedness of all pairs was matched by native speakers of English. The participants were given the word pairs and were asked to rate the semantic relatedness of each pair on a scale of 1 to 5. The findings were consistent with the hypothesis that Chinese ESL speakers rated the semantic relatedness of the one-

translation pairs higher than the other set of pairs; and the native speakers did not show such a pattern.

Jiang (2002) conducted Experiment 2 with the purpose of providing further evidence for the hypothesis, but using a different procedure. A problem tackled with the procedure used for Experiment 1 was that ESL participants might have used the translation status deliberately as a technique while judging the relatedness of the word-pair. Therefore, in Experiment 2 the participants were asked to judge as quickly as possible whether pairs were related or unrelated in English. The same 80 related word pairs as in Experiment 1 were used. Another set of 80 unrelated pairs was added. All pairs were presented on a computer screen. The reaction times were measured for the new sample consisting of 18 Chinese-English bilingual and 18 native speakers of English. The assumption was that the non-native participants would react faster to the one-translation pairs than to the two-translation pairs. Native speakers were not expected to show such a pattern. The results showed that the non-native participants responded significantly faster to the one-translation pairs than to the different-translation pairs. Interestingly, the results of native speakers showed a pair-type effect; where the translation figure of the word pair played a role. However, the effect was not as significant as with the non-natives.

Jiang (2002) addressed frequency as a contributing factor for the pair-type effect found for native speakers. While the pairs were matched for semantic relatedness based on the judgment of native speakers, the word pairs were not of similar frequency and some of the one-translation pairs were found to be much more frequent in English than the pairs on the different-translation set. Therefore, the native speakers might have responded faster to them because of their high frequency status. A re-analysis of the data was

conducted and the word pairs in both sets were matched for frequency, with the non-frequent pairs being dropped. The re-analysis showed that the difference in reaction time between the two sets of pairs almost disappeared for native speakers, but it remained for the nonnative speakers.

These findings were taken as evidence of the L1 lemma mediation in L2 use for advanced L2 speakers, and that this semantic transfer is a normal state and not just a cause of production errors. The effect of L1 translation equivalent on the representation and processing of L2 words could be seen as a facilitating factor in form-meaning mapping.

Jiang (2004) replicated Experiment 2, but with another ESL group: Korean-English bilinguals. The purpose of using a new sample with new materials was to exclude the possibility that the particular materials used by Jiang (2002) were language specific. In other words, it is possible that the significantly faster reaction time towards one-translation pairs rather than for the different-translation pairs might not reflect an English-Chinese relation. Rather, one-translation pairs could be related to ESL learners from different backgrounds.

The participants in Jiang's (2004) study included 15 Korean-English bilinguals. They were students in an American university and had been living in the USA for at least three years at the time of the study. In addition, 15 native speakers of English participated in the study who had no reported knowledge of Korean. The design was the same as the earlier study (Jiang 2002). However, the materials were generated to reflect the Korean language. In addition, in the chosen material all words were matched for frequency. The same pattern of reaction time found in Jiang (2002) was replicated in the study. The same-translation effect offers a reliable demonstration of semantic transfer in adult L2

vocabulary acquisition. The samples of ESL learners in both studies consisted of advanced learners studying in an English speaking environment, but L2 vocabulary processing was still mediated by the semantic structures transferred from their L1. Jiang (2004) interpreted this finding to mean that L1 semantic mediation is a steady state of L2 vocabulary representation and processing, and that the majority of L2 words are blocked on the second stage of Jiang 's (2000) model.

2.6 Pedagogical Issues Related to the Semantic Transfer Evidence:

Jiang (2004) noted that his findings could be taken to indicate that L1 involvement in L2 vocabulary development is inevitable. More specifically, this inevitable involvement is present for advanced ESL speakers. Based on his findings, one of Jiang`s suggestions was not to avoid the use of L1 while explaining new L2 words because mapping new L2 forms to a well-established L1 lexical system will facilitate word learning. Another argument was that there is a documented preference among learners for L1 use in L2 vocabulary instruction. While Jiang did not examine this preference in his work, he provided some examples.

One investigation was conducted by Baxter (1980). Baxter encouraged the use of monolingual dictionaries and in a general sense the use of L2 definition for new L2 vocabulary. From his pedagogical point of view the L2 definition provides learners with an alternative way to express the new L2 word if learners can not use the exact lexical item. Baxter viewed bilingual dictionaries and L1 definitions for L2 words as inhabitant tools. However, the majority of the Japanese students who participated in Baxter`s (1980) study expressed preference for Japanese definitions for new English words with little tendency to ask for English definitions.

The matter of learner preference for certain types of definitions, whether L1 equivalent translations, definitions in L1 or L2 definitions, is not so clear. Laufer and Hill (2000) investigated the type of definition that is looked up for new words when different kinds of information are available. The results from participants who were ESL university learners from Hong Kong and Israel suggested that different people have different lookup preferences. One of Laufer and Hill`s (2000) teaching implications is to provide a variety of lookup options to serve different learners` preferences.

It seems that the language of L2 vocabulary instruction that learners prefer is not well-known and not much work has been done to investigate different samples representing different ESL speaker populations. Jiang (2004) generalized the findings of some studies, and as shown above other studies showed relatively different results. It would be of interest to investigate another ESL sample to see how far the agreement among different ESL populations is.

2.7 The Present Study:

Jiang (2004) emphasized the importance of finding more evidence for the semantic transfer hypothesis. Jiang (2004, p. 428) concluded that:

Whether the prolonged L1 semantic mediation observed in this study is a universal phenomenon or is limited to certain learner populations has yet to be explored.

Therefore, the purpose of this study is to replicate Jiang`s (2002, 2004) work using another sample with Arabic Language as a native language.

In this study participants formed two groups: native speakers of English and Arabs with a good command of English as a second language. They were asked to respond as quickly as possible to randomized English word pairs, stating whether they were related or

unrelated in meaning. Two sets of related word pairs are of interest to the study. First, the set of word pairs that share the same translation in Arabic; for example, house and home/bait. The other set of related word pairs have different translations in Arabic for each word in the pair; for example, gate and door/bawaba and bab, respectively. In order for the participants to judge the semantic-relatedness of the word pairs, the semantic content of each word is assumed to take a certain amount of time to be retrieved. Therefore, using software to measure the reaction time (RT) of the participants while judging the semantic-relatedness of word pairs seems logical. It is also assumed that the RT while judging semantic-relatedness in a second language is affected by the native language.

The semantic transfer hypothesis adopted in the design of the experiment, proposed by Jiang (2002,2004), predicts that Arab ESL speakers will respond to the same-translation pairs faster than to different-translation pairs. In the one-translation condition, the two English words are supposed to have similar L1 lemma information, while in the different-translation condition each English word has different L1 lemma information. Therefore, Arabs ESL speakers will judge the relatedness in meaning for the words in the first condition faster than in the latter condition. The semantic transfer hypothesis further predicts that no translation effect will be found among native speakers of English who do not know Arabic. Another prediction is that the overall RT of the native speakers of English will be faster than for the Arabs ESL speakers.

Additionally, the present study aims to answer one qualitative research question:

What do advanced Arab ESL speakers say about the use of L1 in L2 vocabulary teaching?

As previously mentioned, Jiang (2004) argued that many learners in different studies expressed a preference for L1 use during L2 vocabulary instruction. However, as it is presented, this preference is not so clear. Therefore, it is of interest to investigate a new sample, in this case advanced Arab ESL speakers. In order to obtain an answer to the research question, structured interviews were carried out.

Chapter 3: Methodology

3.1 An Overview of SLA Research:

Second language acquisition (SLA) is an inter-disciplinary field. A phenomenon in SLA could be addressed by a linguistic, psycholinguistic, sociolinguistic, sociological, psychological or educational perspective (Seliger & Shohamy, 1989). Both quantitative and qualitative types of SLA research are found (Henning, 1986). Quantitative research generally starts with an experimental design in which a hypothesis is followed with a numerical analysis of the data. The data analysis is mainly objective and either verification-oriented or confirmatory. On the other hand, qualitative studies are not set up as experiments. The analysis of the qualitative data is generally interpretive rather than statistical. The data analysis is subjective, to a certain extent, and discovery oriented (Mackey & Gass, 2005).

One of the quantitative designs found in SLA research is the measurement of reaction time in lexical decisions tasks using computerized programs (Hulstijn, 2000). Measuring reaction time, which is the time between a stimulus and learner's response, is believed to shed light on how language learners tend to process certain parts of the language. A certain level of knowledge about the language representation in the lexicon is assumed to be obtained through reaction time measurement (Pavlenko, 2000). Reaction time in lexical decision tasks provides a window into the underlying lexical processes and therefore an assumption of the lexical representation. The influence of L1 on L2 is likely to involve a process that occurs without conscious access (Sunderman & Kroll, 2006). It is assumed that when more time is needed to respond it indicates a requirement for more energy (Mackey & Gass, 2005).

Regarding qualitative data, one way of gathering this kind of data is through interviews. One type is the structured/standardized interviews. Structured interviews resemble verbal questionnaires where the researcher asks a similar set of questions to all participants. This similarity allows the researcher to compare the responses of different participants. Other types of interviews, semi-structured or unstructured interviews, provide the participant with the chance to lead the researcher to other questions (Mackey & Gass, 2005).

A mixed method design that integrates both qualitative and quantitative research is needed in SLA research. This type of design begins with a strong research methodology with quantitative methods that are enhanced with qualitative measures of key processes and outcomes. Qualitative methods, such as interviews, improve the design by providing data that can give insights into how findings work (Condelli & Wrigley, 2004).

The main focus of this chapter is the methodological issues connected to the quantitative and qualitative data collection of the present study.

3.2 The Design of the Present Study:

The experiment had a mixed design. A between-subject variable was the group of participants, Arabs ESL speakers or native speakers of English. There were two within-subject variables. The first was the word relatedness, word pairs related in meaning or not. The other within-subject variable was the translation status of the related word pairs, same Arabic translation or different Arabic translation. The interest of the study was to measure the responses of the two different groups to the related word pairs in milliseconds (Figure 7).

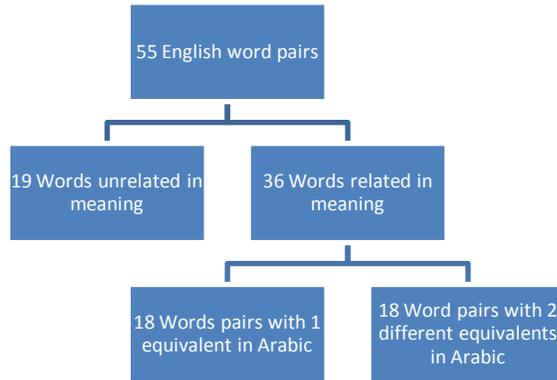


Figure 7: The design of the stimuli used in the semantic judgment task.

The semantic transfer hypothesis adopted in the design of the experiment, proposed by Jiang (2002,2004), predicts that Arab ESL speakers will respond to the same-translation pairs faster than to the different-translation pairs. In the first condition the two English words are supposed to have similar semantic information mapped from their Arabic equivalent, while in the latter condition each English word has its own semantic information. Therefore, Arabs need to retrieve less information to judge the relatedness in meaning for the one-translation word pairs and that leads to faster response for the one-translation word pairs than the different-translation word pairs.

The semantic transfer hypothesis further predicts that no translation effect will be found among native speakers of English who do not know Arabic. Another prediction is that the overall reaction time for the native speakers of English will be faster than for the Arabs ESL speakers. The main interest of this study is to collect quantitative data. However, qualitative data was also collected through short structured interviews. The content of the structured interviews will be discussed later.

3.3 Preliminary Experiment:

The participants in the study included 39 Arab ESL speakers. ESL speakers were medical school graduates (house-officers) who were enrolled in the training program of King Abdul-Aziz University Hospital in Jeddah. They consisted of 23 females and 16 males who had used English Language as a medium of education for 7 years in medical school. Additionally, English is the language used for written and oral communication in the training. Around 44 candidates were met. There were 5 excluded based on their background questionnaire, as they had either a native speaker of English as a parent, lived for more than a year in an English speaking environment, or received a different kind of medical education. Few of the participants had provided TOEFEL scores, therefore an inclusion criterion was that they were King Adul-Aziz University graduates. There were 3 participants who had graduated from other universities; they were interviewed to ensure that they had had a similar education as the others. The age of the participants ranged from 22 to 25 years old. Participants were met individually and were given a background questionnaire to fill in. Once the candidate met the inclusion criteria s/he was instructed about the test. Then 10 participants were interviewed.

The data collection lasted from the 21st of April until the 8th of May 2007. However, after collecting the data a technical programming problem was found back in Oxford on the 16th of May. The computer that was used, ACER-GAWAKV7KL3, did not record the RT accurately. After consulting computer experts and the supervisor, arranging and recruiting a new sample from Oxford was the only practical solution in this case. The rest of this chapter will focus on the experiment conducted in Oxford.

3.4 The Participants of the Oxford experiment:

3.4.1 Arab ESL speakers:

The sample included 14 Arabs who were all postgraduate students from the University of Oxford. They were selected on the criteria of ethnicity, age, ESL proficiency level, formal ESL education and length of residency in an English speaking environment. There were 8 males and 6 females from 6 different Arabic countries: Saudi Arabia, Qatar, Bahrain, Egypt, Lebanon and Jordan. Their age ranged between 25 to 35 years. While the starting age for ESL learning differed among the participants, all of them received structured formal education rather than natural language acquisition. As Oxford requires an International English proficiency examination for the admission of international students, all participants have had at least an overall score of 7.00 in the IELTS (see table1). The IELTS scores were considered an indication of their ESL proficiency level. An overall score of 7.00 or above in IELTS is considered to indicate an advanced ESL speaker in this study.

The recruitment of the sample was started by contacting the chairman of the Oxford Saudi Society. He was asked to provide any contact phone numbers or email accounts for the member of the Saudi Society. Additionally, the Chairman of the Saudi Society provided contact information for Arabs from different countries. Each candidate was asked to provide a list of any other Arab acquaintances who was studying at Oxford. When a new name was found in any list, the candidate provided a contact number for that person. Only the ones that met the inclusion criteria were asked to attend a meeting to complete the computerized task and the interview. Additionally, all candidates were provided with a background questionnaire as confirmation (see Appendix A).

	Minimum	Maximum
Age	25	35
Beginning Age of Learning English	5	12
IELTS overall score	7.00	8.00
Years of Residence in the UK	10 months	3 years

Table (1): Background information for Arab ESL participants.

3.4.2 Native speakers of English:

There were 13 native speakers of English who were recruited from the University of Oxford. Males numbered 3 and females numbered 10. None of them spoke Arabic. All males were postgraduate students. There were 3 females who were third year undergraduates and the remaining 7 females were postgraduates. The native speaker participants were from 5 different English speaking countries: United Kingdom, United States, Canada, Australia and South Africa. The participants' age ranged between 22 to 35. The native speakers were either students in the department of Education or students in St-Hilda's College. They were contacted either by phone or were met face to face in the library of the department of Education or the library in St-Hilda's College. Then, a time was set with each candidate for them to complete the computerized task.

3.5 Ethical consideration:

The research was granted approval from the Departmental Research Ethics DREC. Also, this study received the acceptance of Oxford's Central University Research Ethics Committee (CUREC) 1. All participants were informed about the task they were involved in and they signed a consent form (Appendix B&C). Participants were not

forced to take part and had the chance to withdraw at any point. Issues of confidentiality and anonymity were taken into consideration. At no time were the real names of the participants used on record sheets. The electronic data was saved under fictional names on a password protected personal (not shared) computer.

3.6 Materials:

The construction of materials followed a similar procedure as Jiang`s (2004). There were 47 word pairs chosen, and they were a mixture of nouns, verbs and adjectives. The word pairs were given to an educated native speaker to judge their semantic relatedness on a scale of 1 to 5. The scale starts from level 1 where the two words are closely related in meaning with just a slight difference, and the difference increases with each level where it, ending up with level 5 where the relation between the 2 words is difficult to notice.

Word pairs were included if they were judged to be highly related; the ones provided with a semantic relatedness of level 1 to 3. Following this criterion the number of word pairs was minimized to 42. The pairs were all related in meaning but some pairs were thought to have one equivalent in Arabic for both words, while others have a different translation to each word in the pair.

The Arabic language:

The Arabic language consists of different varieties. One is classical Arabic, which is the Arabic found in the Holy Quran and old books. A simplified version of classical Arabic is called Modern Standard Arabic (MSA), used for written speech and formal spoken language. It is understood by almost all Arabs no matter where they are from. The other variety is colloquial Arabic, used for informal speech. It differs from region to region and is considered a native language, while MSA is the Arabic learnt at school. These facts

about the Arabic Language increase its richness and may influence the kinds of lexical representations Arabic speakers have. Therefore, a word may have many synonyms in each variety and any one Arabic speaker might not be aware of all of those synonyms in each variety of Arabic.

Due to the richness of the Arabic Language discussed above, the translations were generated from the simplified and daily used Modern Standard Arabic without consulting any type of dictionary. In order to ascertain the right translation, the 84 words were randomized and then given to 4 Arabic-English speakers who were qualified English language teachers. They were asked to provide the first Arabic translation that came to their mind for each English word. Then words were paired and categorized. Any two words related in meaning were considered under the same-translation category if the 4 teachers provided the same translation. Other words were categorized as different-translation pairs. In other words two set of words were generated. First was the set of word pairs that share the same translation in Arabic; for example, house and home/bait. The other set of related word pairs had a different translation in Arabic for each word in the pair; for example, gate and door/bawaba and bab.

Next, the two sets of pairs were tested on 2 Arabic-English educated bilinguals to ensure the correct categorization and that the words were highly frequent for the target sample of university graduates. All of the words were found to be highly frequent in either West's General Service List of English Words (1953) or Coxhead's Academic Word List (1998). Lastly, 18 pairs were chosen for each set (see Appendix D).

In addition to the 36 related word pairs, 19 pairs of unrelated English words were chosen from highly frequent words (West, 1953). These unrelated word pairs were needed for the

design of the test. The participants had to give a yes/no response to each word pair as to whether the two words were related in meaning or not. Therefore, unrelated words were needed to produce a 'no' response in some cases. However, the responses for those unrelated word pairs were of no interest to this study; they just worked as distracters. DMDX was used to run the word pairs in the computerized task. DMDX is experimental software developed by K. Forster and J. Forster. It measures reaction time for each response. The accuracy of the DMDX in measuring reaction time in milliseconds is high. Moreover, the main aim of the measurement is to compare the reaction time to different conditions, rather than just being interested in the exact reaction time (Forster & Forster, 2003).

3.7 Procedure:

The recruitment of this sample started on the 2nd of June and the last participant was tested on the 14th of June 2007. The participants were met individually in different locations and on different dates. Arab participants had to complete a background questionnaire (see Appendix A). Afterward, it was checked whether the candidate met the inclusion criteria or not. Therefore, 14 of the Arab candidates who were contacted participated in the study. Regarding the native English speakers, the participants were tested if English was their mother tongue and whether they knew Arabic.

The 27 participants were given a consent form (see Appendix B&C). Afterwards, they were instructed on how to complete the computerized test. The participants were provided with an example of the related word pairs (house/home), and with an example of the unrelated pairs (apple/window). Each participant sat in front of the portable computer, PSL20E-00F00RAR TOSHIBA, and was asked to provide a quick response to

each word pair shown on the screen by pressing the Right Shift (Yes Button) if the words in the pair were related in meaning, or the Left Shift (No Button) if they were unrelated. The test was run when the participant felt s/he was ready to begin. The 2 words of each pair were presented simultaneously at the center of the screen in black letters on a white background. Once the participant clicked the yes or no button, the reaction time was measured and the next word pair appeared automatically. The maximum time for reaction was 4000 milliseconds, otherwise the first word of the next pair appeared automatically without any click. The related and unrelated trails were randomized. When the Arab participant completed the computerized task s/he was briefly interviewed. The answers were written down by the interviewer (the researcher) on paper sheets that contained the questions with empty spaces for the answers.

3.8 The Structured Interviews:

The present study tried to answer one qualitative research question:

What do advanced Arab ESL speakers say about the use of L1 in L2 vocabulary teaching?

Structured interviews were conducted in order to answer this research question. Also, the structured interviews gave more insight into some of the participants' experience with L2 vocabulary learning.

Patton (1980) differentiated between 6 types of questions used in interviews. The first type is experience questions. Another type is opinion questions that reveal what the participant thinks about a certain matter. Feeling questions, although they may seem close to opinion questions, were pointed out by Patton as a different type. A fourth type is background questions. A fifth type is knowledge questions that are used to test whether

the participant knows something or not. The last type is sensory questions that deal with the different senses (hearing, touching, etc.).

The questions used in the structured interview of the present study are a mixture of background, experience and opinion questions. The background questions were not included in the background questionnaire because the pilot testing showed that participants elaborate much more in an oral answer than in a written answer. The following three questions were used in the structured interview:

1- Do you still learn new English vocabulary? If yes, are they academic, general or both?

2- Do you consult dictionaries? If yes, do you use monolingual dictionaries or bilingual ones?

3- In a language classroom is it better for the teacher to provide definitions for new vocabulary in Arabic or just in the target language?

According to Patton's (1980) categorization, the first question is an experience type of question. This question includes more information to the answers taken from the background questionnaire. The second question could also be considered an experience type of question. The third one, which directly answers the research question of the present study, is a mixture of experience, feeling and opinion.

3.9 Pilot Testing:

To ensure the clarity of the instructions given to accomplish the computerized lexical decision task and the clarity of the questions in the structured interview, pilot testing was considered. Three Arabic-English bilinguals, who were not included in the sample, were instructed to complete the task and answer the questions. The three participants agreed on

the clarity of the instructions and questions; therefore, the same instructions were carried out in the main study.

Chapter 4: Data Analysis

4.1 The Quantitative Results:

The mean reaction times in milliseconds for the two groups of participants are presented in Figure 8.

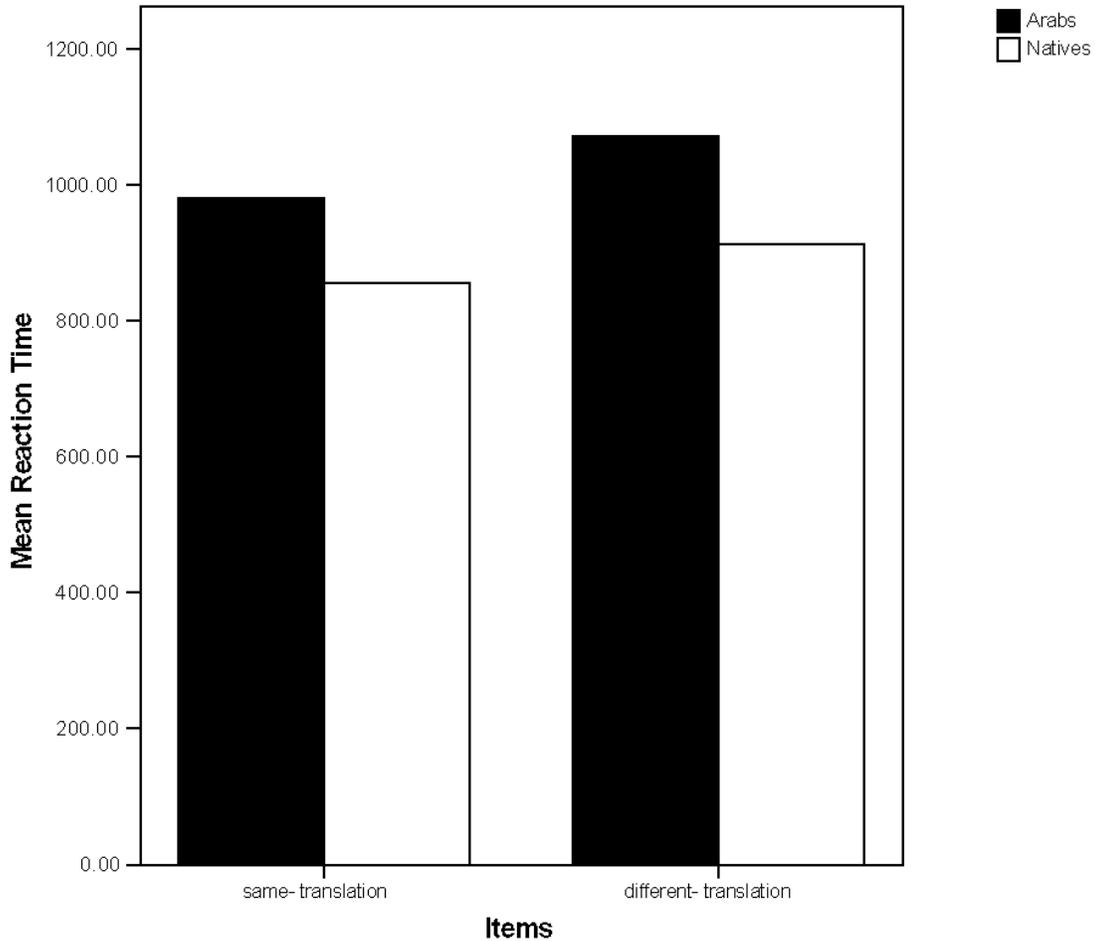


Figure 8

In the analysis of the results, only correct responses were included. An erroneous response was given if the participant responded incorrectly to the word pair or did not respond at all. Errors are common in these kinds of tasks. A participant making 20% errors or more, over all the items being analyzed, would be automatically rejected. This

was done because outliers skew the distribution of the mean. The percentage was chosen because the majority of participants had an error rate that fell between 10 to 18%. Under this calculation, 3 Arab ESL speakers were rejected. Checking their responses showed that they did not press any button in many cases. Therefore, the final number of participants in the data analysis was 11 Arab ESL speakers and 13 native speakers of English. The results of the unrelated word pairs were of no interest to the study, so they were not analyzed.

The mean reaction time for participants for each type of word pair was calculated using Analyze 2.06, which analyzes DMDX output files. Analyze was created by Foster (2005). The mean reaction times towards the two sets of related pairs for the two groups are presented in Table 3 and Figure 8.

SPSS One-Sample Kolmogorov-Smirnov nonparametric test was used for the mean reaction times to the two sets of related pairs for the two groups to check the normality of distribution. The data was found to be normally distributed. Therefore, parametric tests were chosen for further data analysis.

	type	Mean	Std. Deviation	Num. of pairs
NNS	One-translation	981.11	137.02850	18
	Different-translation	1071.72	138.77820	18
	Total	1026.41	143.47810	36
NS	1.00	855.33	153.34390	18
	2.00	913.72	137.10958	18
	Total	884.52	146.38608	36

Table (2): Descriptive Statistics.

SPSS General Linear model Repeated Measures was performed to examine if there was a main effect of participant type; and moreover, if there was an interaction between the two variables: participant type (native vs. nonnative speakers) and pair type (same translation vs. different-translation pairs) (see Table 9).

Alpha value was set up at 0.05 with 95% confidence. There was a main effect of participant type in reaction times for the related items. Nonnative speakers took 142ms longer than native speakers to respond to all of the related items, and this difference was found to be significant, $p < .05$. However, there was no significant interaction between participant type and pair type, $p > .05$, which suggests that both native and nonnative speakers showed a similar pattern while responding to the two types of pairs. The descriptive statistics of the mean reaction times showed that native speakers responded to the same-translation pairs 59ms faster than to the different-translation pairs. Additionally, nonnative speakers responded 91ms faster to the same-translation pairs than to the different-translation pairs. Therefore, there was no significant interaction found between the participant type and pair type because the native and nonnative speakers both responded faster to the same-translation pairs than to the different-translation pairs.

Tests of Within-Subjects Effects

Source	Type III Sum of Squares	Degrees of freedom	Mean Square	F	<i>p</i>
Participant type	362384.222	1	362384.22	31.83	.000
Participant type * pair	4672.222	1	4672.22	.410	.526
Error (participants type)	387023.556	34	11383.04		

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	Degrees of freedom	Mean Square	F	<i>p</i>
Intercept	65730756.056	1	65730756.05	2282.97	.000
Pair type	99904.500	1	99904.50	3.47	.071
Error	978919.444	34	28791.74		

Table 3: Output of General Linear Model Repeated Measures.

In order to check how significant 58ms pair-type effect was for native speakers, one-way ANOVA was carried out. The pair-type effect was not found to be significant, $p > 0.05$. For nonnative speakers, another one-way ANOVA was carried out to examine the 91ms pair-type effect; the effect almost reached significance, $p = .057$.

4.2 Summary of the Quantitative Results:

The data analysis verified the prediction of the semantic transfer hypothesis that the overall reaction time for related items will be higher for native speakers than for nonnative speakers. Additionally, the data analysis revealed that nonnative speakers responded faster to the same-translation pairs than to the different-translation pairs. However, native speakers showed a similar pattern, as they reacted faster to the same-translation pairs than to the different-translation pairs. Though the difference in reaction time was not significant, it contradicts an earlier prediction that the pair type will not

have an effect on the responses of native speakers. Explanations of pair-type effect will be carried out in the discussion chapter.

Interestingly, Jiang`s (2002) work found that it took native speakers an average of 899ms to recognize two words, retrieve and compare the semantic information, make a decision, and execute a response. In the present study the average amount of time for native speakers was found to be 885ms; the two findings are comparable. However, Jiang (2002) found that nonnative speakers need around 234ms more to go through the same process as native speakers. In the present study the difference between the native and nonnative speakers was an average of 142ms. While the difference between the two groups of participants remains significant in the present study, as in Jiang (2002), it is worth highlighting the possible factors that might have affected the population of the present study (i.e. graduate Arab students in Oxford University with less than 3 years residency in the UK).

4.3 The Qualitative Results:

The 14 Arab ESL participants had a structured interview after finishing the computerized test. Three questions were asked:

- 1- Do you still learn new English vocabulary? If yes, are they academic, general or both?
- 2- Do you consult dictionaries? If yes, do you use monolingual dictionaries or bilingual ones?
- 3- In a language classroom is it better for the teacher to provide definitions for new vocabulary in Arabic or just in the target language?

The answers given by participants for each question were written on specific sheets by the interviewer. The answers were read many times and were categorized under the

general answer 'Negative/Positive' or 'Yes/ No'. Then, under each category general themes were generated.

All of the participants confirmed that they still learn new vocabulary, but they did not agree on the word types. Regarding dictionary consultation, only 2 participants reported that they do not use dictionaries at all. Others reported that they do consult dictionaries, and monolingual dictionaries were chosen by the majority; 8 participants said that they only consult monolingual dictionaries. Only 2 other participants said that they save time by consulting a bilingual dictionary; another 2 reported that they consult whichever dictionary is available, with no preference.

The third question, which is of main interest to the study, received a high agreement; 9 out of the 14 participants were against providing Arabic definitions to new vocabulary at all stages of learning. Only 3 of them explained their choice, saying that from their personal experience of learning English they found that using Arabic to define new words was distracting. One of the participants went further, saying that he still struggles when using some of the vocabulary that was explained to him in Arabic. He said that he supports having native speakers of the language as teachers so that they will not be able to use the native language of the students. The other 5 participants were not against the use of Arabic while defining some new vocabulary. A figure of 3 out of 5 thought that the use of Arabic will be helpful only for novice learners, but again it will be distracting to students at a higher level. One participant added that the use of Arabic is inevitable while teaching novice learners otherwise students will not be able to understand many of the basic vocabularies in the new language.

4.4 Summary of the Qualitative Results:

To summarize the qualitative findings the answers will be gathered in points:

- All participants confirmed that they still learn new English words; both general and academic.
- Monolingual dictionaries were reported to be used by more participants than bilingual dictionaries; 8 out of 14 confirmed the exclusive use of monolingual dictionaries.
- The number of participants who expressed their position against the use of Arabic in English vocabulary teaching exceeded the number of participants who were not against the use of Arabic.

In the next chapter a discussion will be carried out to examine the quantitative and qualitative findings. The chapter will attempt to match up the current findings with the findings of other studies presented in Chapter 1. Additionally, the next chapter will attempt to highlight the factors affecting the current findings.

Chapter 5: Discussion

This chapter will discuss the findings of the present study and will attempt to compare those findings to Jiang`s (2002, 2004) findings. Also, the chapter will attempt to explain the validity of each hypothesis in light of the present data analysis. The possible effects of different factors on those findings will also be discussed. Additionally, the qualitative data obtained through the structured interviews will be discussed.

5.1The First Quantitative Finding:

One of the hypotheses of the present study was that the overall reaction time for native speakers will be faster than nonnative speakers for all related word pairs. The findings of the present study replicated Jiang`s (2002, 2004) findings, where native speakers responded significantly faster to all related word pairs than nonnative speakers. This finding, whilst it seems logical, highlights the difference between native and nonnative speakers in performing such a lexical-decision task. It is worth pointing out that the sample of the present study consisted of advanced speakers of English. There is an interest in SLA literature to highlight the difference between advanced L2 speakers and native speakers (Cook 1999). It is not of interest to this section to discuss the different approaches of SLA towards the concept of native-like competence. To be more specific, the extent of the current finding is that it provides more evidence of the difference between advanced L2 speakers and native speakers in lexical performance.

Other evidence that was presented earlier (see chapter 2 section) found the production errors of advanced L2 speakers. Also, evidence was shown through computerized lexical decision tasks, as presented in Jiang (2002, 2004) and Kroll and Curly (1988), or using semantic-relatedness scale as in Ijaz (1986) and Jiang`s (2002) first experiment. In the

first two studies the native speakers responded faster overall compared to nonnative speakers. In Ijaz (1986) and the first experiment of Jiang's (2002) study the native speakers showed more differences than nonnative speakers in their judgment on the semantic-relatedness scale. However, this finding can not yet be taken as evidence of semantic transfer; in other words the cross-linguistic influence.

5.2The Second Quantitative Finding:

The semantic transfer hypothesis adopted in the present study predicts that Arab participants will respond significantly faster to a word pair that shares the same translation in Arabic than to a word pair that has different translations for each member of the pair. The findings of the study illustrated this difference in reaction time. The results of the present study replicate the same-translation effect that was found by Jiang (2002, 2004), with a different set of test materials and ESL speakers with a different L1. This finding could be taken to demonstrate the involvement of L1 semantic information in lexical processing and representation of L2 words. Jiang's (2000) model provides an explanation for this L1 involvement. L2 lexical entry, in a certain stage of L2 word representation, contains the semantic information copied from its L1 translation equivalent (see chapter 2). Therefore, when two L2 words share the same L1 translation, their lexical entries also share the same semantic content. When the semantic content is retrieved and processed for making a semantic-relatedness judgment task, those two words will assumingly receive a faster reaction time. On the other hand, when two related words in L2 have different L1 translation equivalents, different semantic content is copied to there entries; leading to a longer reaction time than in the first case.

The findings of this study should be treated with caution. In this study, the native speakers showed a similar pattern as the Arab participants of responding faster to the same-translation word pairs than to the different-translation word pairs. While this pair-type effect was not as significant for native speakers as for the Arab participants, the possible factors that led to such pair-type effect for the native participants should be acknowledged.

The results of Jiang's (2002, 2004) study showed that native speakers and nonnative speakers produced two distinctive patterns of performance regarding the two types of word pairs. The pair-type effect was only found in the responses of nonnative speakers, while the responses of the native speakers did not show such pair-type effect. The difference between Jiang's (2002, 2004) findings and the present findings can not be taken to challenge the semantic transfer hypothesis because as mentioned above the pair-type effect was found to be more significant in the responses of the Arab participants than for the native speakers of English. This fact suggests that the results of the present study were going in the same direction as Jiang's results. Moreover, the L1 influence on the production of advanced Arab ESL speakers is evident in some error analysis studies (e.g. Zughoul 1991). Therefore, the involvement of some methodological issues could provide a logical explanation for the current findings.

The materials used in the present study could be an important factor that affected the results. Considering the materials as a probable factor is justified for several reasons, especially when comparing the procedure followed to construct the stimuli used in the present study with the procedure used in Jiang's (2002, 2004) studies.

5.2.1 Rater Reliability:

It was previously mentioned (see chapter 3, section) that one educated native speaker of English was chosen as a rater for the semantic-relatedness of the stimuli (the word pairs). Jiang (2002) had 5 native speakers as raters for the degree of semantic relatedness of the two sets of word pairs. Additionally, in his other study, Jiang (2004) had 3 raters. It is logical to assume that having only 1 rater in the present study was not reliable enough. A satisfactory level of rater reliability needs at least 2 raters with around 75% of agreement in the semantic relatedness scale (Ming-Tzu & Nation, 2004). Having 1 rater in this study led to the possibility that some different-translation word pairs might have been more distant in meaning than the one-translation word pairs

5.2.2 Internal Validity:

Internal validity refers to the extent to which the findings of the study are resulted of the effect of the independent variables on the dependant variables; not to other factors (Gass & Macky, 2005). In the design of this study the independent variables were the participants` native language and the pair-type. The dependent variable was the reaction time. The internal validity in this study was compromised. The semantic-relatedness was not highly controlled, as discussed above, which makes this a possible factor that affected the reaction time other than the two independent variables. Therefore, this compromised internal validity and could be a reason why the results of the present study were found to differ, to an extent, from Jiang`s (2002, 2004) results.

Another compromised internal validity was the procedure used for measuring reaction time. The participants had to press a button on the computer`s keyboard to indicate

whether 2 English words were related in meaning or not. They had to press a right button for a yes response (2 English words in a pair are seen to be related in meaning) and a left button for a no response (2 English words in a pair are seen to be unrelated in meaning). This procedure, while it seems easy to be conducted, meant that participants had to press the button as fast as possible. What really compromised the internal validity was that the participants in the study did not have the chance to practice. The test was run when the participant confirmed the clarity of instructions and that s/he was ready to start. It would have been more useful if the participants had the chance to practice the task on unrecorded trials consisting of English related and unrelated in meaning word pairs. Later on, some participants had explicitly expressed the need for practice before starting the intended task.

5.3 The third Quantitative Finding:

An interesting finding of the present study was that the native speakers were found to have a comparable mean of reaction time while responding to the related word pairs as the native participants in Jiang (2002). This replication provides more generalizability for Jiang's earlier finding of the average time (885-899ms) that an educated native speaker of English needs to recognize two words, retrieve and compare the semantic information, make a decision, and execute a response.

More interestingly, the nonnative speakers in Jiang's (2002) study were found to need an average of 234ms more than the native speakers to perform the same semantic judgment task (i.e. the nonnative speakers are graduate students from mainland China, with an average length of residence in the United States of less than 2 years). In the present study, the difference between the native and nonnative speakers was an average of 142ms (i.e.

graduate Arab students in Oxford University with less than 3 years of residency in the UK). Many factors could have played a role in the differences found between the nonnative responses in the present study and those found in Jiang's (2002) study.

5.3.1 Language Background:

The study of Jiang (2002) and the present study included different samples with different native languages. Chinese was the native language for the participants in Jiang (2002), whilst Arabic was the native language for the participants in the present study. It is not determined by the available data of the two studies whether native language plays a role in how quickly the participants respond to a pair of semantically related words. However, the possibility of such native-language effect could not be excluded, and it would be interesting to investigate this effect with different research designs.

5.3.2 English Teaching:

Jiang (2000), in his proposed model of the stages of lexical development in L2, highlighted that his model tackles this development in formal instructional settings. Moreover, it is documented in the vocabulary acquisition literature that the method of instruction could play a critical factor in the development of L2 vocabulary (Sokmen, 1997). While it was not of interest to this study to investigate the effect of vocabulary teaching methods, it is immature to ignore this factor. Jiang (2000) acknowledged the role of vocabulary teaching. He differentiated between two general approaches in vocabulary teaching. The first is the word association approach, where the meaning of an L2 word is conveyed by a definition or L1 translation. The second is the contextualized approach that emphasizes the learning of L2 words from the context. The former approach is

assumed to encourage the learner's tendency to rely on L1, while the latter approach attempts to minimize the reliance on L1.

In the present study there was an attempt to discover what type of vocabulary instruction the Arab participants had received through the background questionnaire and the structured interviews. Unfortunately, it was difficult to detect the vocabulary teaching approaches that had been involved in the participants' English language learning experience. For instance, it was found that one participant received different types of vocabulary instructions throughout their years of English learning. In Jiang's (2002) study it was stated that the participants had received formal English teaching without providing more detail about the vocabulary teaching approaches they had been exposed to. Again, the data does not reveal the effect of vocabulary teaching, but it remains as a probable factor that led Arabs to have an average reaction time that was less than the Chinese participants in Jiang's (2002) study.

5.3.3 Language Proficiency:

Scores in ESL international tests were considered as an indication of language proficiency level. The participants in Jiang's study (2002) had scores of at least 600 in the TOEFL exam. In the present study the participants had at least 7.00 as an overall score in the IELTS exam. According to the widely used table of test score comparisons, the scores of the two samples in both studies show that the two samples are of relatively similar proficiency level. The two language tests, TOEFL and IELTS, examine the general language proficiency level of the learner in different language skills. However, the two tests lack a specific measurement of vocabulary knowledge in English. The scores of the two tests made it possible to group the participants as advanced speakers of English, but

without further information about the depth of the vocabulary knowledge they possess. In order to overcome this lack of information, a vocabulary test of word knowledge was advisable; for example, Nation's (2001) word knowledge test. Again, the depth of vocabulary knowledge is a probable factor that could have played a role in the responses of nonnative speakers in this study and Jiang's (2002) study. Unfortunately, the absolute involvement of such a factor can not be confidently stated.

All of the discussed factors that might have been played a role in the difference between the mean reaction time of the nonnative speakers in the present study and the nonnative speakers in Jiang's (2002) are not absolutely determined through the data available. However, the factors are documented as playing different roles in SLA research, and therefore the probability of the involvement of such factors is high.

5.4 The Qualitative Finding:

Jiang (2004) pointed out that there is preference among teachers and researchers for L2 use in L2 vocabulary instructions (e.g. Baxter, 1980). On the other hand, there is preference among learners for L1 involvement in L2 vocabulary instruction. Jiang noted that this preference comes from the fact that L1 involvement cannot be avoided for learners that have a well-established L1 lexical system, and that will have an effect on L2 form-meaning mapping. Therefore, it was of interest to this study to investigate whether this preference is found among advanced Arab ESL speakers.

The present nonnative sample showed more preference for L2 as a medium of vocabulary instruction. One of the reasons expressed by some participants was that L1 works as a distracter when used for explaining new L2 words. This reason does not go along with Jiang's (2004) point that the L1 well-established lexical system would facilitate L2 form-

meaning mapping. Additionally, some participants expressed their struggle with some L2 words that were associated with L1 translation equivalents. Those participants showed preference for linking the new L2 words to other L2 words, or to discussing the new word in different contexts. Another point of view was expressed by a number of the Arab participants, that L1 use in vocabulary instruction could be a facilitating tool for novice learners but not for learners with a higher level of proficiency. The first theme where L1 use in vocabulary instruction is viewed as an inhabitant tool, and the second theme where it is seen as a facilitating tool for just novice learners of a language, are worthy of discussion. Moreover, the probable effect of the native language of this sample, Arabic, on the answers of the qualitative questions of this study is also worthy of highlighting.

5.4.1 L1 Use as a Distracter Tool in L2 Vocabulary Instruction:

In his model of the L2 lexical entry, Jiang (2000) proposed that many L2 words are fossilized (blocked) in the second stage of the development. The second stage is the L1 lemma mediation stage, where the L2 lexical entry contains L1 semantic information. Two constraints were suggested to play a role in this fossilization. The first is the lack of contextualized L2 input in an instructed environment compared to L1 input in a natural environment. The second is the existence of the well-established L1 lexical system. This last fact led Jiang (2004) to advocate L1 use during L2 vocabulary instruction. His argument was that L1 use will be a facilitative tool because it will speed up the learning process. The new L2 words will be linked to L1 translation equivalents which might appear to be faster than trying to map the new L2 word to a new meaning. However, as Jiang's (2000) proposed model proposed, this fast form-meaning mapping through the use of L1 might be one major cause of fossilization. Copying L1 semantic information

might prevent the full integration where the L2 word has all L2 specifications. It was expressed by a participant in this study that s/he finds the L1 use as a distracter tool. So, L1 use in L2 vocabulary instruction might start as a facilitating tool in the first stage of learning, but an inhabitant tool when the need is for a new L2 entry with its own specifications. As Baxter (1980) pointed out, L1 use in vocabulary instruction prevents the learner from creating links with already known L2 words. On the other hand, the new L2 word is stuck with the information of the L1 translation equivalent.

It must be bore in mind that language-specificity in word usage leads to acceptance of Baxter's (1980) concern. Cross-linguistic Errors produced by second language learners, advanced speakers in this context, which indicates the influence of the L1, are well documented in SLA literature. Moreover, one of the Arab participants in this study expressed his/her difficulty in using L2 words that were first linked to L1 translation equivalents.

As stated above, Jiang (2004) advocated the use of L1 during L2 vocabulary instruction; however, he acknowledged the fact that L1 use might lead to semantic fossilization. Therefore, he suggested that the L1 use should not be limited to linking the new L2 word to a translation equivalent. Different instruction techniques should be applied; one way is to draw learners' attention to the differences between the L2 word and its L1 translation equivalent in an appropriate way. What Jiang is suggesting is not new in SLA literature as this technique was suggested much earlier by Lado (1957). The remaining question is: how practical is this solution and what is meant by appropriate application? Empirical studies investigating the effects of different teaching techniques are trying to answer this

question. Neither Jiang's (2004) work nor the present study has been able to answer the question.

It is of great difficulty to reach a fully stated conclusion for this section. Providing language learners with L1 translation equivalents might help in speeding up the learning of a new L2 word. However, it might decrease the chances of reaching a full L2 word knowledge. Moreover, providing learners with the differences between the new L2 word and its L1 translation equivalent remains a suggestion. The question here is: what about novice learners of a language? Advanced learners of a language possess a certain size of L2 vocabulary; therefore, new L2 words could be linked to already known words. However, this is not the case for novice learners.

5.4.2 L1 Use in Teaching Novice Learners:

It was suggested by some Arab participants that the use of L1 in vocabulary instruction should be limited to novice learners. It was suggested that the basic vocabulary should be taught by linking it to L1 translation equivalents; otherwise, learners will face great difficulty in learning the new L2 words. L1 use will give the learners certainty about the meaning of the new L2 words. The participants further suggested that the increase in L2 proficiency should go along with the decrease of linking the new L2 vocabulary to the L1 lexical system. This suggestion seems logical when considering the revised hierarchical model (Kroll & Stewart, 1994). This model suggests that there is a developmental shift from reliance on the lexical mediation of L1 towards more direct links between L2 words. This is a psycholinguistic model of the lexical representation in the bilingual's memory. However, it seems that some learners can sense this developmental shift, as was expressed by some of the Arab participants in the current study.

5.4.3 Arabic as a Native Language:

One of the factors that might have played a role in the answers of the Arab participants is their native language. Arabic is considered to be more distant from English than some other languages. It is difficult here to define the distance accurately. However, comparing the Arabic-English distance to other languages is possible; for example, Arabic is more distant from English than Spanish is from English (San, 1997). Therefore, this fact could explain the point of view of the majority of the Arab participants against linking the new L2 words to their Arabic translation equivalents.

Error analysis for Arab learners showed a great amount of errors related to literal Arabic translations. The literal Arabic translation means when the choice is an equivalent of Arabic or an expression on the literal level, but does not convey the meaning intended in the target language. Many examples were presented by Zughoul (1991) (see chapter2). Zughoul conducted a quantitative and qualitative analysis of the errors in the lexical choice made by a sample of Arabic speaking learners of English. A huge amount of written data was produced by 128 participants. A preliminary list of “problematic lexicon” for Arabic speaking learners of English was generated from the error analysis. This is evidence of the effect of having Arabic as a native language. However, the English vocabulary teaching method for the sample in Zughoul’s study is not documented. Therefore, it is not clear whether Arabs will inevitably have trouble with this list of “problematic lexicon”, or that a certain type of teaching was the major factor.

Chapter 6: The Conclusion

6.1 Conclusions and Implications:

In conclusion, this study, like those of Jiang (2002, 2004), provides evidence of the difference between native speakers and nonnative speakers in the processing and representation of vocabulary. This evidence was obtained by comparing the overall reaction time of both groups towards all related word pairs. It was found that the native speakers responded significantly faster to related pairs than Arab advanced ESL speakers. However, the prediction that nonnative speakers will show an influence of the semantic structures of their native language on L2 vocabulary representation and processing was not as clear as it was in Jiang's studies (2002, 2004). Certain limitations of this study have been stated in the previous chapter, however, which may offer explanations for the current findings.

The fact that native speakers of English showed a significant difference in the overall reaction time towards the related word pairs than advanced Arab ESL speakers should be taken into consideration. Such a fact leads to more support for the SLA approach that advocates successful learning with less emphasis on achieving native-like proficiency.

The weakness of the current evidence of L1 semantic transfer in L2 vocabulary representation and processing make it difficult to generate implications for SLA. However, the present study can contribute by providing methodological suggestions for future SLA research. Those methodological suggestions will be discussed in the following section.

The present study revealed some preference of Arab advanced ESL speakers regarding the language used during English vocabulary instructions. One interesting finding

expressed by many participants was that the use of Arabic is relatively inevitable in the early stage of learning. However, a stronger agreement was found among participants in avoiding the use of Arabic in vocabulary instructions for students with a higher level of English proficiency. The main reason was that the use of Arabic minimizes the chances of mapping the new words to new meanings. In other words, the learner will keep associating the new word with the Arabic equivalent all the way.

To sum up the qualitative findings of the present study, it seems that the Arab ESL speakers who participated in the present study tended to advocate the use of the target language in L2 vocabulary instruction. This finding goes along with the SLA approach that advocates the avoidance of L1 use in L2 teaching. However, it should be pointed out that the qualitative data can not be taken to support such an approach.

The previous chapter (chapter five) attempted to link some of the qualitative findings to some of the presented psycholinguistic models (presented in chapter two). The task was not an easy one. While the psycholinguistic work should be linked to applied linguistics in order to reach the ultimate aim of improving second language learning, the links are difficult to detect. Jiang (2000, 2002, 2004) expressed such difficulty and aimed to create some preliminary links. He presented a psycholinguistic model of L2 vocabulary representation and processing, and generated hypotheses, aimed at verifying the hypotheses and attempting to achieve some pedagogical suggestions. This seems to be a logical paradigm; therefore, Jiang's work was of great interest to this dissertation. However, the complexity of investigating word knowledge, especially L2 word knowledge, led to more assumptions than clear-cut conclusions.

6.2 Suggestions for Further Research:

Although the data from the present study provided evidence for the difference between advanced ESL speakers and native speakers of English, there are some limitations in the methodology of this study. These limitations led to weaker evidence for L1 semantic transfer. Some of the limitations were presented throughout the Discussion section. One major problem was caused by the materials used. The semantic relatedness of the word pairs was not controlled as sufficiently as possible. In future research it would be wise to have at least 2 native speakers to judge the semantic relatedness of word pairs.

Another major problem in the design of the present study was the limited number of participants. Jiang (2002) had 18 nonnative participants and 14 nonnative participants in his 2004 study. The limited number of nonnative participants was avoided in the preliminary study, which was presented earlier, by having around 40 Arab participants. However, due to a loss of data the present study had only 14 Arab participants. It is advisable for such research design to have a larger number of participants.

It is of great importance to explore whether the L1 semantic transfer can account for the lexical representation and processes for advanced L2 speakers for different classes of words (abstract, concrete, nouns, verbs, adjectives, etc.). De Groot (1993) attempted to explore this issue, but more research is needed. This could be achieved by having a larger set of word pairs than the one used in this study. Then, separate data analysis should be conducted for the responses to each word class.

Interestingly, Jiang (2004) suggested a direct observation design of learner's lexical performance. The design adopted in Jiang (2002, 2004), along with the present study, relies more on inferences and assumptions. The reaction time of the participants is assumed to provide an insight into the representation and processing of vocabulary.

Therefore, Jiang (2004) suggested designing a vocabulary test that involves word pairs that have one translation in the participant's native language. The test should include sentences for which only one of the two words is appropriate, minimizing all contextual cues of the right answer. If advanced L2 speakers have difficulty with the right choice then the L1 semantic transfer could account for this difficulty.

The effect of vocabulary instruction was discussed earlier and it was pointed out that the design of the present study was not able to account for such an effect. It is of great importance to investigate the vocabulary teaching effect by giving the same task to different groups of ESL learners who have received different types of vocabulary instruction. It should be noted that using this kind of design is relatively difficult, but not impossible. Moreover, the role of the learner's belief in the sufficiency of the vocabulary instruction method, along with the outcome, could be investigated by exposing learners to vocabulary instruction methods that they support and comparing their performance to a group exposed to a method they are against. The present qualitative data revealed a tendency for the advanced Arab ESL speakers to support exclusive L2 use in vocabulary instruction, especially for learners with a high-proficiency level. Therefore, it would be interesting to investigate the importance of learners' belief. Moreover, the sample included 14 Arab participants and to be able to generalize such finding more participants are needed.

This study was also not able to detect whether having Arabic as a native language could lead to a special case of lexical choice problems; moreover, whether a certain type of

vocabulary teaching would reduce such a problem. More studies investigating the effect of Arabic should be encouraged.

Appendices

Appendix A: Background Questionnaire

-Gender:

-Age group: 18-21/ 22-25/ 26-29

-Nationality:

-Estimated English Language Proficiency: upper-intermediate/ advanced/ Native-speaker-like

-Did you perform any international English as a second language examination; e.g. IELTS? If yes, specify the exam and provide the overall result with the date of the exam

-When did you start learning English?

- Do you have a family member that speaks English as a first language? If yes specify

-Do you have a close friend that speaks English as a first language?

-How long have you been living in the UK?

-Did you live in an English speaking country before the UK? If yes, specify the duration and the location

-Did you live in a country where English was the language of communication? If yes, specify the duration and the location

Thank you ...

Appendix B: Consent Form for Non-native Speakers

Dear candidate,

My name isand I am one of the graduates of the English Department of King Abdulaziz University and currently reading for Masters in Educational Studies: Applied Linguistics and Second Language Acquisition in the University of Oxford, under the supervision of Dr. Victoria Murphy.

I'm working on my masters' project. The aim of this project is to test a hypothesis regarding vocabulary representation for non-native speakers of English. The test will be conducted using computerized software (DMDX) that measures the reaction time of the response to a certain vocabulary task. The results will help supporting or challenging the hypothesis and hopefully that would lead to have some pedagogical implications in vocabulary teaching.

An important inclusion criterion is that Arab candidates must have a good command of English as a 2nd language, therefore, I thought of you as postgraduate at Oxford University as a potential candidate. Your data will be kept strictly anonymous and your personal information won't be published. Your participation is highly appreciated but it remains voluntary. In addition, you are free to withdraw at any point of time.

Regards,

- I agree to participate in the experiment.

Signature:

Appendix C: Consent Form for Native Speakers

Dear candidate,

My name isand I am one of the graduates of the English Department of King Abdulaziz University and currently reading for Masters in Educational Studies: Applied Linguistics and Second Language Acquisition in the University of Oxford, under the supervision of Dr. Victoria Murphy.

I'm working on my masters' project. The aim of this project is to test a hypothesis regarding vocabulary representation for non-native speakers of English. The test will be conducted using computerized software (DMDX) that measures the reaction time of the response to a certain vocabulary task. The results will help supporting or challenging the hypothesis and hopefully that would lead to have some pedagogical implications in vocabulary teaching.

An important inclusion criterion is that candidates must be native speakers of English. Your data will be kept strictly anonymous and your personal information won't be published. Your participation is highly appreciated but it remains voluntary. In addition, you are free to withdraw at any point of time.

Regards,

- I agree to participate in the experiment.

Signature:

Appendix D: Related English Word Pairs and Their Arabic Translations

Used in the Study

games-toys	لعبه
home-house	بيت
stop-pause	توقف
make-do	يفعل
helper-assistant	مساعد
disease-illness	مرض
tale-story	قصة
library-bookstore	مكتبة
soul-spirit	روح
watch-clock	ساعة
rely-depend	يعتمد
understand-comprehend	يفهم
contain-include	يحتوي
forbid-prohibit	يمنع
mistake -error	خطأ
liberty-freedom	حرية
duty-obligation	واجب
concept-thought	فكرة
argue-claim	يدع
theory-hypothesis	فرضية نظرية
author-writer	مؤلف كاتب
evaluation-grade	تقييم درجة
corner-angle	زاوية ركن
transmit-send	يرسل ينقل
door-gate	بوابة باب
offer-provide	يوفر يعرض
feast-celebration	احتفال وليمة
gain-obtain	يحصل يكسب
apology-regret	ندم اعتذار
difficult-hard	قاسي صعب
construct-build	يبني يشيد
design-draw	يرسم يصمم
ability-capacity	قدرة استيعابيه
charming-attractive	جذاب ساحر
gentle-smooth	ناعم لطيف
reputation-fame	شهرة سمعة

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