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The role of learning strategies in vocabulary acquisition

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The role of learning strategies in vocabulary acquisition

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Declaration and Consent

Yr wyf drwy hyn yn datgan mai canlyniad fy ymchwil fy hun yw'r thesis hwn, ac eithrio lle nodir yn wahanol. Caiff ffynonellau eraill eu cydnabod gan droednodiadau yn rhoi cyfeiriadau eglur. Nid yw sylwedd y gwaith hwn wedi cael ei dderbyn o'r blaen ar gyfer unrhyw radd, ac nid yw'n cael ei gyflwyno ar yr un pryd mewn ymgeisiaeth am unrhyw radd oni bai ei fod, fel y cytunwyd gan y Brifysgol, am gymwysterau deuol cymeradwy.

I hereby declare that this thesis is the results of my own investigations, except where otherwise stated. All other sources are acknowledged by bibliographic references. This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless, as agreed by the University, for approved dual awards.

ABSTRACT

This thesis presents the results from three interrelated studies. The first study investigated the potential impact of different vocabulary learning strategies (VLS) as well as different learner styles on vocabulary size in Saudi Arabic-speaking students in higher education. Participants completed a VLS questionnaire and a vocabulary size test. The results implied that undergraduates tended to use simpler strategies than postgraduates. The strategies of *guessing a word's meaning from context* and *watching television* related positively to lexical knowledge in both groups. Moreover, clustering analysis revealed two learner groups that varied in how frequently they used VLS overall, rather than in terms of which VLS they preferred. Those students who used more VLS overall also had greater vocabulary sizes, irrespective of educational level. Hence, the study found no evidence for differences in individual learner styles in the current groups. Consequently, it recommended that VLS usage should be encouraged overall, but that the need for teachers to cater to individual vocabulary learning styles may not be warranted.

The second study compared how lexical inferencing and lexical translation influence L2 vocabulary acquisition. Sixty-one undergraduate Saudi EFL students read target words in authentic reading materials and were either asked to guess their meaning or look it up in a dictionary. Pre- and post-tests were measured participants' knowledge of target words and overall vocabulary size. The results show a significant and comparable learning effect for both vocabulary learning strategies, with a higher pre-test vocabulary knowledge related to a larger learning effect. Furthermore, the better participants were at guessing correctly, the better they learned vocabulary through inferencing. The results suggest that both VLS are equivalently effective and that learners' overall vocabulary size influences the amount of learning that occurs when using these VLS.

The third study used the same methods and participants as the second study to explore how vocabulary learning strategy usage and skills in the four language domains relate to participants' increase in lexical knowledge and to the learning of specific vocabulary items over a certain period of time. Results showed that learning through inferencing, but not learning through dictionary use, depended on learners' familiarity with the particular learning strategy. Additionally, the study revealed a complex relationship between reading comprehension, note taking, vocabulary size and attainment. The

results suggest that familiarity with inferencing strategies may be beneficial for learners and that the relationship between note taking and vocabulary acquisition warrants further investigation.

DEDICATION

This thesis is dedicated to my lovely family

Othman Alahmadi

My father and my idol

Hamdah Alahmadi

My mother and my mercy

Marwah Alahmadi

My wife and my anchor

Aser & Yousef

My children and my little angels

Ahmed Alahmadi

My brother in law who passed away before seeing this day

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CHAPTER ONE

Introduction

1.1 Introduction

Language acquisition research has noted the importance of lexical knowledge in overall language skills (Stæhr, 2008, 2009; Adolphs & Schmitt, 2003). Anglin (1993), for instance, proposed that lexical competence is an important building block of language knowledge and that lack of vocabulary would lead to inadequate production and comprehension of the language. Vocabulary attainment, and more precisely, the size of the second language lexicon, had been systematically investigated over last three decades (Masrai, 2015).

Many scholars have created vocabulary learning strategy (VLS) taxonomies to assist in expanding leaners' vocabulary size (e.g. Gu & Johnson, 1996; Schmitt, 1997; Nation, 2001). As a consequence, different studies investigated the potential relationship between VLS usage and vocabulary knowledge (e.g., Al Qahtani, 2005; Alsaif, 2011; Hamzah, Kafipour & Abdullah 2009; Tanyer & Ozturk, 2014) and found that some strategies influence participants' vocabulary knowledge. Apart from its significant role in second or foreign language acquisition, vocabulary knowledge, especially in terms of breadth, has been a problematic issue for EFL learners in Saudi Arabia (e.g., Al-Akloby, 2001; Al-Hazemi, 1993; Al Qahtani, 2005; Alsaif, 2011; Alqurashi, 2013; Masrai, 2015). Inadequate lexical knowledge could prevent the L2 learning progress and affect proficiency levels (Shen, 2008).

This thesis endeavours to explore Saudi students' VLS usage and its relationship to their vocabulary knowledge by identifying any individual learner styles and how different learner styles relate to vocabulary size. Furthermore, the thesis systematically investigates whether lexical inferencing and/or lexical translation supports initial learning and retention of English vocabulary by using a within-participant design and a comparatively authentic learning situation. Moreover, it explores how vocabulary learning strategy usage and skills in the four language domains relate to participants'

increase in vocabulary size and to the learning of specific vocabulary items over a certain period of time.

The rationale and motivation for the thesis are twofold. First, the dominant role of English as a global language of academia requires students in higher education to have achieved a certain level of English proficiency. This is even more important for international students studying abroad or studying for a degree in an English-speaking country. These students need to accomplish a certain level of English proficiency prior to pursing such an academic journey. Consequently, more systematic studies are required to assist leaners in attaining their personal and academic aims by shedding light on the common issues faced by EFL leaners and investigating the likely reasons of those obstacles with constant reference to the related literature.

Second, lexical knowledge is a crucial element in language development, as highlighted above, and adequate vocabulary knowledge is needed for success in an L2 academic context. As mentioned above, the literature has revealed poor vocabulary knowledge among Saudi students, which is a problematic issue and challenge for both students and instructors. Thus, the need to investigate the potential reasons causing this issue has motivate this study.

This research aims to provide a systematic study on vocabulary learning processes in a Saudi context, based on insights from the current literature and common vocabulary attainment problems. To accomplish this, the current thesis investigates the prior mentioned areas in three interrelated studies.

The first study aimed to highlight VLS usage of Saudi students in higher education. The undergraduate participants in this study were completing their degree in Saudi Arabia, while the postgraduates were Master's and PhD students in an L2 environment. The study aimed to explore which VLS are used more frequently by postgraduates than undergraduates and vice versa and which of those VLS are related to participants lexical knowledge. It was assumed that postgraduate participants would have more opportunities to acquire vocabulary through social strategies, such as interacting with and listening to native speakers. In addition, this study explored individual learning styles and the relationship between those styles and learners' vocabulary knowledge by applying a cluster analysis following Kojic-Sabo and Lightbown (1999).

Two adopted instruments (a VLS questionnaire and a vocabulary size test) were used to examine participants in the first study. The study showed that undergraduates used simpler VLS than postgraduates. Moreover, inferring a word's meaning from context

and watching television were found to be positively related with participants' vocabulary size in both groups. The applied clustering analysis revealed two learner groups which contrasted in how regularly they used VLS overall, rather than in terms of which VLS they preferred. Furthermore, students with more frequent use of VLS overall also had larger vocabulary sizes, regardless of their educational level. Consequently, there was no evidence for individual learner styles in the current groups.

The second study examined how lexical inferencing and lexical translation affect initial learning and retention of L2 vocabulary. Lexical inferencing (guessing from context) was selected because the results from first study revealed a significant positive correlation between guessing meaning from context and lexical knowledge across the two participant groups. Lexical translation (dictionary look-up) was chosen because it has been argued to be one of the most frequently used VLS by most foreign language learners (Piotrowski, 1989). To accomplish the goal of the study, Saudi undergraduate students of both genders were exposed to target words in authentic reading materials and their knowledge of these target words and their overall vocabulary knowledge in terms of breadth prior to and following exposure were measured in a pre- and post-tests design. In the exposure phase, participants were either asked to infer target words' meanings or find those words in dictionary. Obtained results indicated a comparable learning effect for both lexical inferencing and lexical translation. Additionally, participants with a larger vocabulary size at the beginning of the study learned more words through the lexical inferencing and lexical translation strategies. Both examined VLS increased leaners' lexical knowledge over the study duration. Ultimately, multiple factors (e.g. prior vocabulary size, learning during training, and reading comprehension) were found to influence the amount of learning that occurred through lexical inferencing and lexical translation, highlighting a complex relationship between these elements.

Third study explored how the use of VLS and participants' language skills in the four domains relate to learners' lexical capacity growth over the duration of the study and to how many lexical items leaners obtained by using inferencing and translation over the period of the study. The same data and methodological approaches from the second study were used in this study. Furthermore, the current study shed light on outcomes from the applied English-language self-assessment questionnaire that assessed participants' proficiency level and language skills and a VLS questionnaire that explored learners' VLS use. The obtained results indicated that both dictionary use and

inferencing seem to support lexical attainment, but that gaining vocabulary through inferencing relays on learners' familiarity with this strategy. Additionally, the strategies of reading comprehension and note taking seem to relate to vocabulary size and vocabulary acquisition in complex ways.

1.2 Thesis aims and significance

The thesis has the following aims:

1) To highlight VLS usage of Saudi students in higher education and to explore which VLS are used more frequently by postgraduates than undergraduates and vice versa.
2) To explore which of VLS are related to participants lexical knowledge.
3) To detect any individual learner styles and to investigate the relationship between those styles and learners' vocabulary knowledge by applying cluster analysis.
4) To examine how lexical inferencing and lexical translation affect initial learning and retention of L2 vocabulary acquisition.
5) To investigate how vocabulary learning strategy usage and skills in the four language domains relate to participants' increase in vocabulary size over a certain period of time.
6) To explore whether language skills or familiarity with learning strategies involving guessing or dictionary use also influence the amount of learning that occurs when engaging in inferencing and dictionary use over the period of the study.

The current thesis contributes substantially to the literature as very few previous studies have explored individual learner styles in terms of L2 vocabulary acquisition or how language skills or familiarity with learning strategies involving guessing or dictionary use influence the amount of learning that occurs when engaging in inferencing and dictionary use. The thesis contributes to the currently rather heterogeneous picture of how lexical inferencing and lexical translation contribute to vocabulary acquisition. Unlike many previous studies, it uses a within-participant design and a comparatively authentic learning situation. Therefore, novel and additional insights can be added to the current picture.

The results from the current thesis also have implications for teaching and pedagogy. Vocabulary knowledge is a problematic issue among Saudi students and the current

results can contribute to efforts to enhance vocabulary knowledge and to developing the current curriculum and EFL teaching for this learner group.

1.3 Research questions

The current thesis will endeavour to answer the following questions:

1) Which of the VLS relate significantly to vocabulary size in both examined groups (i.e. undergraduate and postgraduate)?
2) Are there any strategies that postgraduates use significantly more or less frequently than undergraduates?
3) Are there distinct VLS profiles or learning styles across the sample and, if so, which of these contribute to vocabulary size?
4) Do learners show a larger learning effect for words that were trained in the two training sessions than for words that were not trained?
5) Do learners show a larger learning effect for words that they guessed in the two training sessions than for words that they looked up in a dictionary?
6) Does learners' vocabulary size, previous knowledge of the trained words, success in guessing, success in correctly looking up words and/or success in correctly answering comprehension questions about the texts influence how large their learning effect is for (a) words that they guessed and (b) looked up in the two training sessions?
7) Do learners show a larger vocabulary size after than before the study?
8) Does learners' overall learning effect, previous knowledge of the trained words, success in guessing, success in correctly looking up words and/or success in correctly answering comprehension questions about the texts influence how much their vocabulary size increased over the course of the study?

9) Is participants' VLS usage related to their vocabulary size in general and to the increase in their vocabulary knowledge over the course of the study?
10) Is participants' VLS usage related to how well they learn the words through guessing or dictionary use throughout the duration of the study?
11) Are participants' self-assessed English language skills related to their vocabulary size in general and to the increase in their vocabulary knowledge over the course of the study?
12) Are participants' self-assessed English language skills related to how well they learn the words through guessing or dictionary use throughout the duration of the study?

1.4 The structure of the dissertation

Chapter 2 will provide a thorough literature review, presenting relevant concepts and previous research. It explores the concepts of a word and related terminology (i.e. token and types; lemmas and word family) and introduces the dimensions of word knowledge (i.e. receptive and productive; breadth and depth). It reviews the role of lexical knowledge on the four language skills (listening, speaking, reading and writing). Moreover, it reviews the characteristics of a reliable and valid vocabulary test. Within validity, the concepts of content, concurrent, construct and face validity are explored. The chapter concludes by introducing an overview of some breadth of vocabulary knowledge tests (i.e. The Vocabulary Level Test (VLT), The Eurocentres Vocabulary Size Test (EVST), The X-Lex vocabulary size test and The passive vocabulary size test XK-Lex). Furthermore, this chapter shall provide a wider overview on the following areas; vocabulary learning strategies (VLS), lexical inferencing, lexical translation and individual leaner styles.

Chapter 3 will report on the first study in this thesis. As already mentioned, it investigates VLS usage of Saudi students in higher education, the relationship between VLS and participants' vocabulary knowledge as well as participants' learning styles.

Chapter 4 will present the second study, which explores how lexical inferencing and lexical translation affect initial learning and retention of L2 vocabulary acquisition.
Chapter 5 will detail the third study in this thesis, which will explore how VLS usage and language skills in the four domains relate to participants' increase in vocabulary size over the course of the study.
Chapter 6 will provide a general discussion for the obtained results and their relationship to the current literature. Moreover, highlight some pedagogical implications of the current results for instruction and learning in the EFL field. It will also make proposals for future research, discuss the limitations of the three studies conducted in this thesis, and provide a general conclusion.

CHAPTER TWO

Literature review

2.1 Introduction

Vocabulary is considered to be the backbone of any language and an essential component in a learner's cumulative growth towards foreign language proficiency (Eyckmans, 2004). In fact, learners with little or no vocabulary cannot accomplish appropriate communication (Laufer, 1991). Despite its importance, vocabulary learning is not a straightforward process. Weigand (1998: 44) claimed that "to learn a language means to know how words are used and what utterances are used in specific situations". However, acquiring a sufficient number of lexical items appears to correlate positively with further linguistic competences (e.g. knowledge of grammar, speed of sentence construction or pronunciation skills) within the target language (Al-Masrai, 2009; Hulstijn, Schoonen, De Jong, Steinel, & Florijn, 2012). As a consequence, interest in vocabulary learning and teaching has been increasing during the past decades and it is an attractive topic of discussion for investigators, instructors and curriculum designers. A number of important books concentrating on vocabulary have been published (Nation, 1990, 2001; Schmitt et al, 1997; Schmitt, 2000; Folse and Briggs, 2004; Milton, 2009).

Nonetheless, vocabulary encountered a period of negligence as grammar studies were dominating language syllabi. O'Dell (1997: 258) explains this neglect by stating, "the words *lexis* and *vocabulary* are remarkable by their absence from either chapter headings or indexes in the major writers on syllabus of the 1970s and 1980s". Milton (2009) argues that this negligence might have an even longer history. As early as 1979, Levenston described vocabulary as a victim of discrimination (Levenston, 1979). A possible explanation is the myth that assumes learners will acquire vocabulary while they learn reading, writing or grammar (Folse et al., 2004).

2.2 What is a word?

Although the importance of vocabulary – a body of lexical items or words – and the role it plays in language learning may seem obvious, finding an answer to questions like "what is a word?" and "what counts as a word?" is not an easy task and considered one of the controversial topics within the field of vocabulary testing. Sapir (1921; cited in Dixon & Aikhenvald, 2002: 5) defines a word as "one of the smallest, completely satisfying bits of isolated meaning". Moreover, the Oxford Advanced Learners Dictionary states that a word is "a single unit of language which means something and can be spoken or written" (Oxford Advanced Learners Dictionary, 2010, 8th Edition). The previous definitions seem transparent and straightforward. Nevertheless, if we ask a group of language learners how many words they think they know in their second language, their responses will probably vary immensely. Some learners might argue that they know thousands of words while others might consider their word knowledge to be a few hundred words. Such a variety in responses may have to do with the definition of 'word' and what is counted as a word? For instance, should they count different forms of a verb like *eat*, *eats*, *ate*, *eaten* or *eating* as a single word or several words?

What counts as a word seems an issue of paramount importance for both vocabulary size test designers and language learners; the former need the answer to design an acceptable and reliable vocabulary size test, while the latter may want the answer to set themselves vocabulary knowledge goals. For some learners, the uncertainty of what to count as a word could be a frustrating matter. Milton (2009: 7) provides an example of undergraduate learners of English who read in the literature that an estimation of English native speakers' vocabulary size is 200,000 (Seashore et al., 1940). When they tested their vocabulary knowledge through Goulden et al.'s (1990) vocabulary size test, they were surprised that their vocabulary knowledge was less than one tenth of the target vocabulary size (200,000). Their frustration might vanish if they knew that early vocabulary size tests, such as those that Seashore et al.'s (1940) early estimate is based on or have used what is called the 'dictionary count' in which different forms of a verb like *write*, *writes* and *writing* are considered separate words (Milton, 2009). Later attempts to design vocabulary size tests have used a different methodology in which dissimilar forms of verbs or nouns are counted as belonging to the same base forms or

lemma. The following section will shed some light on different word sub-classifications (tokens, types, word-families and lemmas) which can help in the word counting process.

2.2.1 Tokens and types

If we review the literature on vocabulary knowledge, we will find that two terms, 'word' and 'vocabulary', are frequently used by researchers. According to Milton (2009: 7), this occurs "presumably, for ease and convenience, when we are really referring to some very specialist definitions of the term such as types, tokens, lemmas, and word families". The terms *tokens* or *running words* usually refer to counting all occurrences of a single word in a context. Nation (2001) suggested that words could be counted as tokens. Following this process of counting words can be helpful in knowing how much students have written in an assignment or essay, or if we want to describe how large a corpus or dictionary is. Another procedure of counting words is counting *types*. Here, a word is counted only once, even if it occurs multiple times in a given context. In other words, only distinct words are counted. A sentence such as *the boy ate the banana* has five tokens and four types as the word *the* occurs twice. Using types as a procedure for counting words to estimate vocabulary knowledge or learning is a more useful process than using tokens, as we aim to determine how many distinct words a language learner knows, produces or has learned rather than how frequently he/she can reiterate the same words (Milton, 2009).

2.2.2 Lemmas and word families

Gardner (2007) argues that a considerable number of linguists depend heavily on the concept of *lemmas* as a tool to express morphological associations between lexical items and as a procedure of word count. Francis et al. (1982: 1) introduce the term lemma as "a set of lexical forms having the same stem and belonging to the same major word class, differing only in inflection and/or spelling". Masrai (2009) commented on the previous definition as flexible because it comprises irregular verb forms (e.g. *ate* belongs to *eat*). Moreover, Nation (2001: 7) indicates that lemma "involves a headword and some of its inflected and reduced forms". The aforementioned definition implies that lemmas include items which have the same part of speech, for example, the lemma

of the verb *employ* might involve *employed* and *employing* but not *employment*, as it is a noun. *Employ* and *employment* are considered two different lemmas because they belong to different parts of speech.

Counting lemmas is a good process to reduce the number of vocabulary items in a corpus or dictionary. For instance, by changing the procedure of counting words from types to lemmas, the vocabulary in the Brown Corpus decreases by 40% (Bauer et al., 1993). Such procedures can also have a direct benefit to a language learner through reducing the amount of words which need to be acquired and, as a result, making the learning task seemingly more manageable. Importantly, Vermeer (2004) considered lemmas as the most reliable tool to measure vocabulary. In addition, many vocabulary size tests have applied lemmatised wordlists to yield reliable results, for example, the X_Lex by Meara and Milton (2003) and Nation's Levels Test (Nation, 1990; revised by Schmitt et al., 2001).

Counting word-families is another convention for counting words. In this type of word count, a wider variety of derivations and inflections can be included. As a result, this might be described as a more inclusive version of the lemma. Nation (2001) notes that "a word family consists of a headword, its inflected forms, and its closely related derived forms" (Nation, 2001:8). The Academic Word List (AWL) by Coxhead (2000) is a clear example of a list based on word-families. This list was primarily built on word families as a method of counting words. The affixes used in English were described in a list by Bauer et al. (1993) and distributed to nine frequency bands, which can be used when creating lemmas and word-families. When lemmatising wordlists, the affixes found within the three most frequent bands in Bauer et al. (1993) are typically included. For word families, more derivations and inflection are typically involved, sometimes comprising affixes from band six in Bauer et al.'s wordlist (Masrai, 2015). Consequently, more lexis might be treated as recognized, learned, or known if the root form of a word is acquired when using word families compared to lemmas. Table 2.1, adapted from Milton (2009: 11), provides examples of word forms that could be included in a word family and lemma.

Table 2.1 Examples of common words and forms included under the definition of lemma and word family (adapted from Milton, 2009: 11)

Base form	Forms that might be included in a lemma	Forms that might also be included in a word family
week	weeks	weekly, mid-week
govern	governs, governed, governing	government, governance, governess, governable, misgovern
wide	wider, widest	widen

2.3 Dimensions of word knowledge

What is considered word knowledge? This is an important question for every language learner. However, word knowledge involves many classifications and degrees and is not so easy a task as one might imagine. For instance, a learner could know a specific form of vocabulary and identify it within a given context, but may not recognise its irregular forms, pronunciation or dissimilar inflections or derivations. There are multiple theories. Laufer (1991) argued that knowing a word means knowing all its structures. Ma (2009) stated that there are two extents of lexical knowledge; firstly, to recognize the meaning of the target lexical item and secondly, to recognize how it is used correctly in several contexts. Nevertheless, it seems that defining vocabulary knowledge is a complex process. Laufer et al. (1998: 366) pointed out that "no clear and unequivocal consensus exists as to the nature of lexical knowledge".

It might be useful before progressing any further in reviewing the previous dimensions of vocabulary knowledge to provide some descriptions about what is included in vocabulary knowledge. In a description that is used in a large body of research (Masrai, 2009), Richards (1976; cited in Masrai, 2015: 43) argues that word knowledge includes "knowing the extent to which this word may be encountered and the words it occurs with, its register, it's appropriate syntactic behavior, its underlying form and morphological aspects, the network of associations it has, its semantic features, etc."

Nevertheless, Nation (2001: 23) mentions that "there are many things to know about any particular word and there are many degrees of knowing". In line with this, Nation (1990, as mentioned in Nation, 2001) modified Richards's ideas by adding receptive and productive dimensions. Table 2.2, adapted from Nation, (2001: 27) illustrates these modifications.

Table 2.2 What is involved in knowing a word (adapted from Nation, 2001: 27)

Form	spoken	R	What does the word sound like?
		P	How is the word pronounced?
	written	R	What does the word look like?
		P	How is the word written and spelled?
	word parts	R	What parts are recognisable in this word?
		P	What word parts are needed to express meaning?
Meaning	form and	R	What meaning does this word form signal?
	meaning	P	What word form can be used to express this meaning?
	concepts and	R	What is included in the concept?
	referents	P	What items can the concept refer to?
	associations	R	What other words does this word make us think of?
		P	What other words could we use instead of this one?
Use	grammatical	R	In what patterns does the word occur?
	functions	P	In what patterns must we use this word?
	collocations	R	What words or types of words occur with this one?
		P	What words or types of words must we use with this one?
	constraints on	R	Where, when and how often would we meet this
	use		word?
		P	Where, when and how often can we use this word?

(**R** = Receptive, **P**= Productive)

The above table elucidates Nation's (2001) ideas regarding what is included in word knowledge. Nation has divided vocabulary knowledge into three main classifications: form, meaning, and use. Those classifications include other subdivisions, which in turn

are divided into reception and production. However, both Nation's and Richards's lists are purely descriptive and do not afford a theoretical paradigm, or lexical competence's model (Masrai, 2015). Schmitt et al. (1997) further argued that those lists are lacking an exploration of links and common relationships across numerous kinds of vocabulary knowledge.

The aforementioned literature makes clear that there are distinctions among researchers regarding what comprises vocabulary knowledge. As a result, the nature of word knowledge is still obscure. For instance, Dupuy (1974, cited in Huckin et al., 1993) and Smith (1941, cited in Huckin et al., 1993) have provided different vocabulary size estimations for third grade students, in which the former estimates an average of 2,000 words, while the later argues that 25,000 words is the average vocabulary size for students at the same level. The former example shows the inconsistency of what is meant by vocabulary knowledge. It also suggests that there is no reliable model amongst scholars for what could stand as an obvious definition for lexical knowledge. For the purposes of the current study, the discrepancy between receptive and productive word knowledge warrants particular discussion. Consequently, the subsequent section will discuss receptive and productive knowledge of vocabulary in some detail.

2.3.1 The receptive and productive dimensions of vocabulary knowledge

Receptive and productive word knowledge are two terms which usually surround the traditions of vocabulary attainment. Despite the terms' importance, few teachers or researchers have provided adequate definitions or explanations (Laufer et al., 1998). Generally, receptive vocabulary knowledge includes words that are acquired from listening and reading. Productive knowledge refers to the ability of the learner to express himself/herself both orally and in writing (Nation, 2001). In simple terms, if learners recognise a certain lexical item when they come across it, whether in a reading or listening situation, and do not use it productively, that will be considered as receptive vocabulary knowledge. In contrast, if learners used a certain lexical item in a learning or everyday life situation through written or oral means, then this will be considered productive lexical knowledge.

However, there are two assumptions which seem to be accepted by most researchers: namely, L2 learners' receptive lexical knowledge is richer and/or larger than their expressive lexis, and receptive vocabulary knowledge usually comes before productive

knowledge (Clark, 1993, cited in Melka, 1997; Ma, 2009). Baumann et al. (2012) attributed the first assumption to the current vocabulary teaching methods which encourage learners to read or listen to new vocabulary rather than pronounce or write the target words. In the case of the second assumption, we can conclude that vocabulary knowledge could be either receptively or productively acquired. Nevertheless, there are some studies which indicate that the receptive learning of words leads to a certain level of productive knowledge, and vice versa (Mondria et al., 2004, cited in Bogaards et al., 2004). While an argument raised by Webb (2005) suggested that if a word is learned receptively, L2 learners will subsequently expand their receptive knowledge, whereas the expressive learning of words will similarly lead to greater productive knowledge. This suggests that Webb (2005) considers receptive and productive vocabulary knowledge as two individual dimensions.

The current literature seems unclear about the distinction between the two notions of receptive and productive vocabulary knowledge as there is a frequent overlap in most circumstances. However, there is evidence that receptive knowledge of vocabulary correlates positively with productive lexical knowledge (e.g. Zareva, 2005; Zhong, 2018). This implies that receptive vocabulary size tests are sufficient to distinguish more competent learners from lower level learners.

2.3.2 The dimensions of breadth and depth of word knowledge

Anderson et al. (1981) proposed breadth and depth as new terms in the field of vocabulary acquisition. Put simply, breadth of vocabulary knowledge refers to the quantity or amount of words known by a learner, whereas depth of vocabulary knowledge refers to the quality or value of that knowledge (Milton, 2009). It seems that depth of lexical knowledge is more complex to pin down, as it comprises several elements of word knowledge. These include pronunciation, connotations, meaning, spelling and morphological properties (Qian, 1999; Masrai, 2015). Nagy et al. (1987: 115) emphasize the vital role of depth of vocabulary knowledge when stating that "the more profound the network surrounding a word, the greater the knowledge of that word". A review of the literature suggests a robust relationship between measures of breadth and depth of lexical knowledge, as both grow consistently and are linked to the frequency of input (Vermeer, 2001).

Many studies, including the studies reported in this thesis, have focused on breadth of vocabulary knowledge for various reasons (e.g. Al-Masrai, 2009; Alhazmi, 2018; AlSaif, 2011; Masrai & Milton, 2017). Breadth of vocabulary knowledge is easier to measure than other dimensions of vocabulary knowledge, such as depth of vocabulary knowledge (David, 2008). One reason for this is that a larger number of dimensions of vocabulary knowledge, including aspects such as collocations and word functions, need to be tested to capture learners' depth of vocabulary knowledge (Milton, 2009). Furthermore, many studies have proposed that depth of vocabulary knowledge is a consequence of breadth of vocabulary knowledge (Vermeer, 2001). Some studies also suggest that breadth of vocabulary knowledge may be a better predictor of certain language skills. For instance, Li et al., (2014) highlighted a greater positive correlation between breadth of lexical knowledge and reading comprehension than depth of lexical knowledge.

2.4 Vocabulary knowledge and performance in language skills

A considerable number of studies highlight the influence of vocabulary size or knowledge on the four language skills (listening, speaking, reading and writing). For instance, Meara et al. (1988) found a positive correlation between word knowledge and scores from reading and writing tests. Moreover, Stæhr (2008) found a statistically significant relationship between vocabulary size and the skills of reading, writing and listening. The following sections will highlight the effect of lexical knowledge on the four language skills.

2.4.1 Vocabulary knowledge and L2 reading

A learner must usually recognise most of the words in a provided text to comprehend at least its general idea. As a result, vocabulary is an important factor for successful reading comprehension. While Laufer (1997) argued that successful reading comprehension does not solely rely on vocabulary and that there are other aspects which can influence reading comprehension, such as previous knowledge and reading strategies, Laufer (1997) considered vocabulary to have the greatest effect on reading comprehension.

Most studies investigating a possible relationship between vocabulary knowledge and the four language skills have been conducted within the realm of reading (e.g. Laufer, 1992, 1996; Qian, 1999, 2002; Henriksen et al, 2004; Ouellette, 2006; Milton et al, 2010). There appears to be consensus among the previous studies that vocabulary knowledge is the most important factor in reading comprehension. In the same vein, Schmitt et al. (2011: 39) suggest that "there is a fairly straightforward linear relationship between growth in vocabulary knowledge for a text and comprehension of that text". Stæhr (2008) tested Danish secondary school learners and found a high, statistically significant correlation of 0.83 between participants' vocabulary size, measured through a receptive vocabulary size test (VLT; Nation, 1983, 1990), and reading comprehension, measured through multiple-matching and multiple-choice questions covering several text types, such as short messages, newspaper articles and long stories. Moreover, a regression analysis revealed that vocabulary knowledge explains 72% of the variance in gaining an average score or higher in the reading comprehension test.
Similarly, Rashidi & Khosravi (2010) tested Iranian intermediate level learners to examine the possible influence of vocabulary breadth and depth on reading comprehension. They found a significant positive correlation between breadth and depth of lexical knowledge and reading comprehension, with the latter correlation being higher.

2.4.2 Vocabulary knowledge and L2 listening

As mentioned above, many empirical studies have documented the role of vocabulary knowledge on reading skills. If we shift our view to the relationship between vocabulary size and listening skills, we will find only a moderate number of studies. Alkhofi (2015) attributes this to some researchers considering the skills of listening and reading to be similar, as both implicate passive discernment of language. Lending some support to this, Hirai (1999) suggests that some studies have found a positive correlation between the two skills. However, Stæhr (2009) argues that reading and listening differ in the kinds of linguistic structures that learners typically encounter. Lynch et al. (2002) follows that line of argument and suggests that "listening is not merely an auditory version of reading" (Lynch et al., 2002: 197). In line with this, the role of vocabulary knowledge in listening may not be the same as in reading.

Stæhr (2009) examined Danish undergraduate EFL learners and found a relationship between breadth and depth of vocabulary knowledge and listening comprehension, such that, combined, depth and breadth of vocabulary knowledge were responsible for 51% of the variance among listening grades. Listening comprehension was assessed through the Cambridge certificate of proficiency in English (CPE, 2002), breadth and depth were assessed through the VLT (Nation, 1983, 1990; Schmitt et al., 2001) and a self-developed test, respectively.

Similarly, Bonk (2000) also found a positive correlation between listening comprehension and lexical knowledge. A recall protocol for a listening text examined listening comprehension. Learners recall responses were used to divide them into two categories: high and low comprehension levels. A dictation procedure was applied as a measure of lexical familiarity, where learners listened to an audio recording and attempted to write what they had heard, regardless of whether this included spelling or grammar mistakes. Results highlighted that participants with higher scores in word dictation showed high scores in the listening comprehension test. However, Stæhr (2008) described the previous findings as equivocal "as some learners obtained good comprehension although they knew less than 75% of the word types in the text and other learners knew more than 90% of the word types but did not obtain good comprehension" (Stæhr, 2008: 140). In a later study, Stæhr (2008) applied a gist comprehension task to highlight the relationship between listening comprehension and learners' vocabulary knowledge. Participants listened to three texts twice and answered multiple choice questions gauging their comprehension of the gist and details in the texts. Results indicated only a moderate relationship with a coefficient of 0.69 between participants' listening comprehension and their lexical knowledge.

Milton et al. (2010) highlighted a modest statistical correlation between two receptive vocabulary size tests and listening and reading sections on the IELTS (0.54 and 0.52, respectively) among 29 EFL learners. The orthographic vocabulary size test X_Lex (Meara et al., 2003) and its counterpart, the phonological vocabulary size test A_Lex (Milton et al., 2005), and the IELTS proficiency test, were the applied instruments. Additionally, it was revealed that both reading and listening skills were at the same level of correlation with vocabulary size.

2.4.3 Vocabulary knowledge and L2 writing

The relationship between the quality of writing and vocabulary knowledge has been fairly well-established by a considerable number of studies. Overall, holistic evaluations of composition writing among EFL learners are relatively highly correlated with vocabulary size (Stæhr, 2008). For example, Astika (1993) conducted a holistic analysis of 210 writing samples using the ESL Composition Scale (where samples are scored based on language use, organisation, content, mechanics and vocabulary). The results highlight that the vocabulary part was responsible for 84% of the variance in the evaluations. Similarly, Stæhr (2008) found a statistically significant correlation between vocabulary size, as measured through the VLT (Nation, 1983, 1990; Schmitt et al., 2001), and writing quality, assessed by asking participants to write 350- to 450-word letters, allowing dictionary use. The assessment criteria covered grammatical complexity, writing organisation, and content depth and quality (i.e. ideas and argument). Moreover, Stæhr (2008) highlighted that learners who scored above average in the writing assessment had also acquired 1200 word families and more. In contrast, participants with fewer than 1200 word families scored below the average within the writing test. These findings indicate the importance of vocabulary knowledge as a key factor for successful writing.

Laufer (1994) considered vocabulary an important tool in academic writing. In the same vein, Nation (2001: 178) argued that "vocabulary plays a significant role in the assessment of the quality of written work". This is reflected in Engber's (1995) and Daller and Phelan's (2007) studies, which found that instructors' ratings of composition quality are influenced by learners' vocabulary proficiency. Overall, these findings indicate the importance of vocabulary knowledge as a key factor for successful writing.

2.4.4 Vocabulary knowledge and L2 speaking

Compared to the other aforementioned skills, the possible contribution of vocabulary knowledge on learners' fluency in speech has rarely been investigated. In general, the area is suffering from a lack of empirical research (Alkhofi, 2015). It seems logical that if a foreign language learner did not have adequate vocabulary knowledge to convey basic messages, he/she will not be able to communicate effectively, or interaction would be severely limited. Similarly, Folse (2008) suggests that inadequate knowledge of

grammar will not prevent comprehension, but insufficient vocabulary knowledge will undoubtedly do so.

Analysing the spoken Cambridge and Nottingham Corpus of Discourse in English (CANCODE, Cambridge International Corpus, 2000), Adolphs & Schmitt (2003) argue that in order to achieve 95% of spoken coverage, a learner should have acquired 2000 word families. They concluded their findings by stating that "these results suggest that more vocabulary is necessary in order to engage in everyday spoken discourse than was previously thought. The implication is that a greater emphasis on vocabulary development is necessary as part of aural improvement." (Adolphs & Schmitt, 2003: 425).

Koizumi et al. (2013) investigated the possible effect of depth and breadth of vocabulary knowledge on speaking proficiency in a group of Japanese EFL learners. Results indicate that speaking fluency in an interview task is highly correlated to learners' vocabulary size. Breadth of vocabulary knowledge was assessed through a Japanese-English translation task using a list of Japanese words known as JACET800 (2003). Depth of vocabulary knowledge was assessed by asking learners to provide antonym, derivation and collocation of some selected items.

2.5 The importance of testing lexical knowledge

In the aforementioned section we have seen the statistically significant relationships between lexical knowledge and the skills of reading, listening, writing and speaking. That is, learners with larger vocabulary sizes are expected to perform well in various language tasks. Consequently, assessing a learner's lexical knowledge is expected to provide a rough overview of her/his language abilities. Masrai (2015) has suggested that the importance of vocabulary knowledge has been highlighted by most language programme developers, but they do not endeavour to consolidate lexical assessment in their programmes. Therefore, some language learners may not recognise the importance of the variety of naturalistic vocabulary items to which they are exposed within their language programmes. The influence of lexical assessment is clearer among novel language learners were vocabulary knowledge might characterise a great portion of their comprehension of the language. Eyckmans (2004) argued that vocabulary tests provide useful information about L2 learners' lexical development. Moreover, those tests are a

good source of information for researchers to help them estimate the extent of learners' vocabulary knowledge and "how fast their target vocabularies grow and how these factors are related to other aspects of their linguistic competence" (Eyckmans, 2004: 13).

Vocabulary knowledge tests can play a similar role to other forms of language assessment tests. For example, vocabulary knowledge tests can be used as a placement test to allocate language learners to their appropriate level or group, or as an achievement test to examine whether learners have acquired the vocabulary they were taught or predicted to acquire. Language instructors can also use such tests as a diagnostic to discover gaps in learners' vocabulary knowledge. Learners' achievements in vocabulary proficiency tests such as TOEFL and IELTS can also be useful indicators of learners' overall language proficiency (Schmitt, 2000; Eyckmans, 2004).

2.6 The characteristics of a good vocabulary test

Building a vocabulary test is not a straightforward or easy task. For that reason, "for a long time there were no standardised tests in the field of vocabulary testing and tests had to be created ad hoc." (Milton, 2009: 17). Moreover, apart from a few well-established tests within some specific areas, no comprehensive set of tests appears in the field of vocabulary testing (Milton, 2009). Such sets of tests would assist in testing every aspect of learners' vocabulary knowledge in an easy and reliable manner. Vocabulary knowledge testing, regardless of the process of the test itself, must contain certain characteristics in order to achieve their objectives. Reliability and validity are of upmost importance (Alsaif, 2011). A number of standard vocabulary knowledge tests that are considered to be valid and reliable will be discussed in the following sections.

2.6.1 Reliability of the test

Broadly, a reliable test measures what it is supposed to measure in a consistent and accurate way (Milton, 2009). Reliability was defined by Daves et al. (1999) as "the actual level of agreement between the results of one test with itself or with another test." (cited in Gyllstad, 2007: 63). This quotation encompasses both methods of test reliability: test-retest (internal) reliability and the comparison of a test to another reliable test (external reliability). Simply, if we wanted to know the weight of three

apples on a scale and the reading was 2 kilograms, the same reading should appear on the scale if we repeat the same process after few minutes. But if we do not have the same reading, we will assume that the particular scale is not reliable. Similarly, if our scale shows a reading that differs from that of other trusted scales, we would also assume that our scale is not reliable. Within the field of vocabulary, if a test is applied twice on the same participant or learner and the period between the two processes was not long to allow the learner to increase her/his lexical knowledge significantly, then the results should be the same or quite close to each other. This methodology of examining reliability in a test is often known as test-retest or internal reliability. It is essential to note that the researcher should provide the same or at least similar conditions between the two testing sessions. For instance, if the first test was presented in a comfortable and quiet room, the second test must be under the same conditions, as those factors might affect test reliability. However, conditions across tests or participants' mental acuity are likely to not be entirely identical over two sessions. Therefore, the reliability of the test-retest methodology need not be called into question if there is some variance in the results from the first and second tests.

External reliability, wherein a test is compared to another reliable test, is another method by which one may examine test reliability. If the scores from both tests reflect a similar or identical result, then we can say that both tests are reliable. For instance, if we have two scales that intend to indicate the weight of three apples and the first scale is indicating that these apples weigh 2 kilograms, while the other scale shows that the same apples weigh 1.5 kilograms, then we assume that one or both of the scales have a reliability problem.

In general, the notion of consistency of assessment scores does not indicate that reliable tests will never create errors. In reality, even well-known reliable tests cannot always produce identical results whenever administered, especially if we bear in mind how difficult it is to measure an aspect of a language. This will be the case even if test developers have attempted to control for the factors that could influence test outcomes. Nation (2007) stated some of the factors which he believed to affect test scores. These include learners' attitudes and individual differences. Moreover, it may be wise to take a learner's anxiety towards the test into account. Realistically, test consistency should not be affected by learners' minor errors, such as errors due to examination stress or by errors that can occur during the assessment process. Therefore, fewer grading errors in a test relate to

test reliability. Gyllstad (2007) argues that the major objective of a language test is to "minimize errors and subsequently to maximize reliability." (Gyllstad, 2007: 64). This draws to light that objective style tests, such as multiple-choice, could generate fewer assessment errors when compared with subjective style tests, like essay writing, which may show a higher rate of errors.

2.6.2 Validity of the test

Validity is another main feature of a good test. Messick (1989) indicated that validity is "the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of interpretations and actions based on test scores" (Messick, 1989, quoted in Chapelle, 1989: 49). In more simple terms, a test is valid if it measures what it is believed to measure and not anything further (Milton, 2009). Therefore, we could say that if the outcome of a test measures a factor other than the one we want to measure, we might conclude that the test is not valid. We can argue that measuring language is more difficult than measuring a purely objective item. In objective analyses the outcome is only reliant on the measuring instrument, whereas in language the tested learner can play a significant role. As a result, validity within language testing could be a challenging issue for test developers, as there is the learner, an uncontrollable variable that must always be considered. Regarding the learners' role in language assessment, Nation (2007) has mentioned that any language test's validity relies on the learners' motivation to display their knowledge of a language accurately.

Some researchers have argued that reliability is a requirement for validity. For instance, Oller (1979) uses reliability as a criterion for validity by stating, "the ultimate criterion for the validity of language tests is the extent to which they reliably assess the ability of examinees to process discourse" (Oller, 1979, cited in Chapelle, 1999: 255). Simply, the test will not be considered reliable if it has failed in measuring the ability it has attempted to measure, which also makes that test invalid. Nevertheless, reliability and validity are not the same, as reliability would be seen through explicit scores of a test, while validity might be seen within possible interpretations of the detected scores (Alsaif, 2011). The following subsections will address four different types of validity: content, concurrent, construct, and face validity.

2.6.2.1 Content validity

Testing all features of a language learner's knowledge in a specific domain is nearly impossible. Consequently, a representative sample of the whole domain which is intended to be examined is needed. This process is called content validity. Hughes (1989) defined it as "the extent to which the test incorporates a representative sample of the entire domain being investigated" (Hughes, 1989: 22). In the same vein, Milton (2009) suggests that if a test has suitable and necessary content to measure what it is purported to measure, then the test has content validity. Theoretically, if vocabulary knowledge test designers aim to measure the learner's knowledge of the most common 3000 vocabulary items in English, then the best method could be to present the entire list to the learner during the test. However, exhibiting 3000 words in a single test would be highly inconvenient and impractical. A sample of 100 representative words could be used as an alternative method and presented to the learners. Learners' vocabulary knowledge could then be extrapolated from the obtained score. Nation's (1990) Vocabulary Levels Test (VLT), for instance, uses words from different 1,000-word frequency bands in English, in particular from bands two, three, five and ten, as well as words from the University Word List (Nation, 1990). As a base for word selection in the test, Nation chose lemmatised word lists as lemmas are believed to "reflect some reality as the unit of storage in the minds of learners" (Levelt, 1989, cited in Milton, 2009: 18). In general, as the words are carefully and sensibly selected, Nation's test is believed to have a high level of content validity.

2.6.2.2 Concurrent validity

Hughes (1989) has defined concurrent validity as the "extent to which the results of the test in question agree with another independent, highly dependable second assessment method" (Hughes, 1989: 23). In other words, if a test displays a high level of correlation with other reliable and valid tests, and both are purported to examine the same construct, then we seem to achieve what is known as concurrent validity. Two conditions need to be met to have a high correlation coefficient between two tests and thus high concurrent validity: both tests have to be presented to the same learners and at the same time to measure the same aspect of language knowledge (Masrai, 2015). If both tests use different indirect methods to examine knowledge of the language and performance, then only a modest correlation would be expected (Milton, 2009).

According to Fitzpatrick (2007), this could raise the question of which assessment method is superior.

2.6.2.3 Construct validity

This type of validity may be described as the degree to which an assessment measures the construct or notion that it proposes to measure. Explicitly, it is "an ability or set of abilities that will be reflected in test performance, and about which inferences can be made on the basis of test scores" (Davies et al., 1999, cited in Gyllstad, 2007: 62). For example, if we have a test which measures the aspect(s) of language ability we planned to measure, then we can conclude that this test has a high level of construct validity (Bachman & Palmer, 1996). Construct validity is perhaps the most important type of validity since it could be argued to include all other types of validity (Masrai, 2015). Milton (2009) further highlighted the close association between content and construct validity, such that construct validity is an aim for content validity, while content validity is a prerequisite for construct validity.

How test scores relate to abilities can be difficult to determine. For example, productive vocabulary knowledge might subsume other characteristics of language knowledge and abilities. Thus, measuring the construct validity of productive vocabulary knowledge tests may be an enormously challenging matter for test designers as it seems that there isn't an obvious agreement across scholars, presently, on what precisely productive vocabulary knowledge means. In contrast, testing the construct validity of receptive vocabulary knowledge is seen as less problematic as test developers can selectively examine words, and learners only need to state whether or not they know the word (Masrai, 2015).

2.6.2.4 Face validity

The term of face validity discusses the degree to which an assessment measures what it is proposed to measure according to the test taker's opinion. Consequently, even tests with excellent construct and content validity could be questioned by test takers or participants. For some participants, straightforward and simple tests could raise a concern about the ability of that test to accurately measure their knowledge in a specific task. This kind of uncertainty can negatively affect the degree of face validity in a test.

For instance, within some breadth of vocabulary knowledge tests, learners must simply answer *yes* or *no* as to whether they know the word or not. However, some learners might not completely trust the idea that their answers to such a simple question will accurately measure their vocabulary knowledge in terms of breadth. This type of concern undoubtedly has the potential to influence a learner's responses to the test.
In general, researchers have to use the aforementioned multi-faceted reliability and validity checks. This could be accompanied by reviewing recently constructed tests and some empirical studies to confirm that the selected test can be used to examine the exact knowledge of a language they intend to measure. Henning (1987) further emphasises that any misapplication of an assessment has the potential to invalidate a test.

2.7 An overview of breadth of vocabulary knowledge tests

The term 'vocabulary breadth' has been widely used in a considerable amount of vocabulary knowledge studies. Current literature on lexical knowledge usually uses the concept of vocabulary size to refer to vocabulary breadth (Meara, 1996). This research project focuses on learners' vocabulary knowledge in terms of breadth, and this and the following sections will therefore review some of the tests that measure learners' breadth of vocabulary knowledge.
Different studies have attempted to provide an estimate of their participants' vocabulary sizes (e.g. Hazenberg et al., 1996; Milton, 2009; Alsaif, 2011; Masrai, 2015). In general, there are two methods to create a breadth of vocabulary knowledge test: one by collecting a representative sample of words from a dictionary, and another by designing a representative sample from corpus frequency words lists. Within a dictionary-based methodology, learners' vocabulary knowledge will be tested on a representative sample, and learners' total score will be extrapolated to all the vocabulary items in the dictionary. For instance, if the representative sample consists of one word for every 50 words in the dictionary, then if we multiply learners' scores in the test by 50, we have the learner's estimated vocabulary size. D'Anna et al. (1991) represents an example for the previous methodology.
The other technique relies on frequency lists from different kinds of corpora. This technique may either use a general corpus, like the Brown Corpus (Francis et al., 1982), or a more specific corpus, such as the Academic Word List (Coxhead, 2000), as a tool

to build frequency lists. The idea of frequency lists is based on the regular occurrences of certain lexical items, and lists are normally divided into distinctive frequency bands. The first band, for instance, denotes the 1,000 most frequent words in the language, while the second band symbolises the 2,000 most frequent words etc. The correction criteria are almost the same as for dictionary-based techniques: If a learner shows a proportion of knowledge for one band, the researcher extrapolates this proportion to all items in the band.

For many reasons, breadth of vocabulary knowledge tests could be considered less problematic in comparison with depth of vocabulary size tests. First, validity can easily be examined, as the constructs in these kinds of tests are usually well defined (Alsaif, 2011). Second, vocabulary breadth tests provide a good indication of learners' receptive vocabulary knowledge (Webb, 2008). Learners with a broad receptive vocabulary knowledge are predicted to possess more productive vocabulary knowledge than learners with little breadth of vocabulary knowledge. Learners with substantial knowledge of receptive vocabulary, in particular, are unlikely not to know how to use their vocabulary productively. Third, receptive or breadth vocabulary tests are usually fast and cheap, and can be applied to a large number of learners simultaneously. Moreover, the tests' outcomes can be determined quickly, and with the assistance of a small number of marking staff relative to other testing methods. Moreover, within such objective styles of vocabulary test, with clearly defined correct and incorrect answers, the attitudes of marking staff will not affect the correctness of learners' answers. For some of the more subjective vocabulary tests, for instance depth of vocabulary knowledge tests, the marker's attitudes, especially regarding essay writing, could influence learners' scores as it might vary from one marker to other. The following sections will examine and review some of the widely used receptive vocabulary tests.

2.7.1 The Vocabulary Level Test (VLT)

The VLT is a receptive vocabulary size test designed by Nation (1983, 1990). This test was mainly designed to determine whether a student has the necessary level of English comprehension to enter and pass a degree at Victoria University of Wellington. Later it became a tool widely used by researchers and language teachers to estimate learners' vocabulary size. The VLT presents learners with 36 words and 18 definitions (often synonyms) in each section, and they must match each word with its definition. Those

sections are divided into groups; each group consists of six words and three definitions. This procedure may be seen in the following example from Nation (1990: 265) for the 2000 word frequency level:

1. original
2. private ---------- complete
3. royal ---------- first
4. slow ---------- not public
5. sorry
6. total

The VLT might help language instructors in developing appropriate vocabulary teaching and learning plans, but this is not its key function. The rationale of most vocabulary size tests, including the VLT, originates from the findings of several studies which showed that vocabulary knowledge is directly related to the ability to use language in different ways (Schmitt et al., 2001). For instance, Schonell et al. (1956) suggested that acquiring the most frequent 2,000 words in English provides the learner with the required threshold to become fluent in everyday conversation. Knowledge of 3,000 words gives a learner the initial step to read authentic resources and about 5,000 words increases their ability to read authentic materials. Thus, vocabulary size tests could assist language instructors in designing suitable pedagogical contexts geared towards learners' language levels.

The VLT estimates learners' receptive vocabulary knowledge at four frequency band levels: 2,000, 3,000, 5,000 and 10,000 words. The first two levels exhibit the most frequent words, which Alsaif (2011) argues are needed by EFL learners to use the language efficiently. Nation (1990) proposed to spend most of the instruction time on these most frequent words. The 5000 word level is considered as a transition stage between low and high frequency words. University students are encouraged to acquire more words from the 5,000 to 10,000 word level in order to understand more authentic materials and to use the language confidently. In general, it is assumed that if learners know all the words in a particular frequency band of the test, then they will also know the words in the lower frequency bands.

It is important to note that the test presents words in alphabetical order to reduce guessing. Words have clearly contrasting meanings in order to avoid confusion for the test takers. Moreover, to reduce testees' reading time, VLT definitions are generally short and use highly frequent words, either from the same frequency band as the words

tested or from a lower frequency band (i.e. words that are more frequent than the words tested). However, Milton (2009) argued that it is not necessarily the case that most frequent words are always learned before less frequent ones.

One of the drawbacks of the VLT is the possibility that test takers might guess the correct answers in spite of the aforementioned measures taken to minimise this. A learner has, for instance, a chance of one in six to correctly guess the definition for the word 'first'. If this is completed successfully, he/she has a chance of one in five to find the correct word for the next word, and a chance of one in four for the last attempt. Kamimoto (2005) argues that although we cannot reliably calculate the actual influence of guessing on final scores, we must acknowledge that guessing does occur.

The aforementioned gap between the 5,000 and 10,000 word frequency bands might also be a major drawback of the VLT. The test considers familiarity of words within the 10,000-word band as a sign that learners know the lower frequency levels (6,000, 7,000, 8,000 and 9,000 word levels). This might overestimate learners' vocabulary knowledge, since results are not adjusted for potential guessing and may thus give credit for words which were not known at all (Masrai, 2015). A learner without any knowledge of the 6,000, 7,000, 8,000 and 9,000 word bands might still guess some words from the 10,000 word band correctly, which could lead to incorrect extrapolation to the 6,000, 7,000, 8,000 and 9,000 word bands (Alsaif, 2011).

In addition, the VLT ignored two important bands: the 1,000 and 4,000 word frequency bands. According to Al-Hazemi (1993) and Alsaif (2011), Saudi learners graduated from high school with very low receptive vocabulary knowledge – under 1,000 words. As a consequence, we might need to test learners' receptive vocabulary knowledge in bands that the VLT did not include, especially for first year university students, and it would be impractical to ask the students about words we strongly expect they would not know. For the aforementioned reasons, it would be difficult to apply VLT to high school level or first year university Saudi learners.

In summary, many researchers have used the VLT as a tool to examine participants' vocabulary size (e.g. Cobb, 1997; Laufer et al., 1998), and despite the above-mentioned limitations, the VLT is considered to be a reliable and valid test (Schmitt et al., 2001).

2.7.2 The Eurocentres Vocabulary Size Test (EVST)

The EVST (Meara & Buxton, 1987; Meara & Jones, 1988) is a *yes/no* format receptive vocabulary test. This test replaced the Joint Entrance Test (JET) used by Eurocentres schools. One of the main reasons for this replacement was that JET took a long time to administer and mark, while EVST is a computerised test which only takes ten minutes to administer and provides instant results. The ability to administer the EVST to a large number of students at the same time, along with the feature of automatic marking, is a clear strength in comparison with other vocabulary size tests. The test measures the learners' vocabulary size within the most frequent 10,000 words in English from the highest to the lowest frequency bands.

The EVST begins with words from the 1,000 word band, by presenting 10 actual words from this band and 10 imaginary words or "pseudo-words". Participants have only to click *yes* for the words they identify as actual words and press *no* for the lexical items they believe are not actual English words. To proceed to the next level or band, learners need a sufficiently high score in the current level. If a participant cannot achieve the required score for the next level, the test will automatically stop and assume that his/her receptive vocabulary knowledge is somewhere between the current level and the next level. For instance, if a participant's score is below the required level in the 4,000 word band, the expected vocabulary knowledge is between 3,000 and 4,000 words. This test can be described as a good indicator of learners' vocabulary knowledge, and applying it as a placement test might be justifiable.

One of the major drawbacks of the EVST is the unspecified mathematical equation used to compute participants' scores. Moreover, the test designers did not specify the lowest score, which permits participants to move on to the following frequency band, and the highest score which nevertheless makes the testing procedure end. Although the EVST withdraws participants form the test based on the assumption that they have reached their ceiling point in terms of vocabulary knowledge, some studies have found that this may not be warranted. For instance, Masrai (2009) found out that the EVST could underestimate learners' vocabulary size. He reached this conclusion after comparing his own receptive vocabulary test (XK-Lex) with the EVST. Specifically, the same learners which EVST prevented from completing the test due to lack of knowledge at certain frequency bands did show some knowledge in frequency bands that the EVST did not assume they would. Due to the aforementioned concerns, the EVST does not seem to be

the best choice to examine participants' vocabulary knowledge within the current research project.

2.7.3 The X-Lex vocabulary size test

X-Lex is a receptive vocabulary size test designed by Meara and Milton (2003) to measure participants' vocabulary knowledge within the most frequent 5000 words in English. This test exists in two formats: a pencil and paper form and a computer-based format. In the pencil and paper format, participants just need to place a tick mark in front of words they know. In the computer-based format, they simply click on the smiling face if they know the word or the sad face if they do not recognise the word. Test takers see 120 words distributed into six columns, each consisting of 20 words. The first five columns represent the most frequent 5,000 words in English, selected randomly from Hindmarsh's (1980) and Nation's (1984) frequency lists. The sixth column contains 20 pseudo-words to permit the final score to be adjusted for the influence of guessing, and to minimise overestimating participants' lexical knowledge (see Table 2.3).

Table 2.3 Summary description of the X-Lex vocabulary test (adapted from Alahmadi, 2015: 32).

X-Lex	**Most frequent 5,000 words in English**						**Total**
Word criteria	1st 1,000	2nd 1,000	3rd 1,000	4th 1,000	5th 1,000	6th pseudo-words	120 words
Number of words	20	20	20	20	20	20	

Word frequency band

High frequency — Low frequency

The calculation process is straightforward: Test administrators need to count the ticked words within the first five columns and multiply that number by 50 in order to get the students' score out of 5,000. The ticked words in the pseudowords column also need to be counted and multiplied by 250. To get learners' final score out of 5,000, the total

number from the second calculation needs to be subtracted from the first. For instance, if a participant scores 17, 16, 13, 12 and 9 in the first five columns, the total score will be (17+16+13+12+9) × 50 = 3,350 words. If the participant had 8 false alarms in the last column, the adjustment score will be 8 × 250 = 2000 words. The estimated vocabulary size is then 3350−2000 = 1350 words. The idea behind using the adjustment score is to reduce the amount of guessing by the learner and to give test administers a more reliable score regarding learners' vocabulary knowledge.

For many reasons X-Lex is considered to be a suitable tool to examine learners' vocabulary size. First, it provides a full overview of a learner's vocabulary knowledge at each frequency band from 1,000 to 5,000, making it particularly useful in examining learners with low proficiency levels. Second, marking procedures are simple (Masrai, 2015). However, the test is less appropriate for more advance learners as they are likely to know vocabulary outside X-Lex's 5,000 word limit. The findings of two studies support this argument: Masrai (2009) and Alsaif (2011) both examined the vocabulary knowledge of undergraduate EFL Saudi students. Masrai (2009) used a self-designed vocabulary test called XK-Lex to measure learners' vocabulary knowledge within the most 10,000 frequent words in English and found that the estimated average vocabulary knowledge of Saudi university students in their final year at university was approximately 5,200 words. On the other hand, Alsaif (2011) applied the X-Lex test and concluded that senior-year Saudi university students know on average 3,200 words. It seems reasonable that the X-Lex test may have underestimated senior-year Saudi students' vocabulary knowledge. We might therefore conclude that the XK_Lex, introduced in the following section, might be a more adequate tool to measure vocabulary knowledge for university-level learners compared to the X-Lex test.

2.7.4 The passive vocabulary size test XK-Lex

XK-Lex is a passive lexical knowledge test designed by Al-Masrai and Milton (2012) that estimates learners' vocabulary knowledge out of the most common 10.000 words in English. This paper-and-pencil checklist format test involves 100 lemmatised words distributed into ten columns with ten words each. The first five columns exemplify vocabulary from the most common 5,000 words in English, adapted from Nation's frequency list (1984). The remaining five columns include words from Kilgarriff's (2006) word list representing vocabulary from 5,000 to 10,000 word bands in English.

In order to mitigate the effect of guessing and the ensuing overestimation of learners' vocabulary knowledge, the XK-Lex test includes 20 non-words, which are included in the ten test columns with two words in each column. Participants' vocabulary size score is calculated by adding 100 points for each selected vocabulary item from the actual English words and deducting 500 points for each non-word selected.

According to test designers, XK-Lex has more advantages than drawbacks. Firstly, as the test includes the first ten frequency bands, encompassing the 10,000 most frequent words in English, it is equally suitable for learners of English with low and high proficiency levels. Secondly, the XK-Lex yields frequency profile data for ten frequency bands as it does not leave out any frequency bands. It thus allows monitoring lexical progression and designating levels of weakness for each leaner. Thirdly, its paper and pencil format is arguably time and effort saving in terms of test administration compared to the EVST, which measures the same frequency levels. For instance, a computer lab that can hold all participants is needed for a computer-based test or, alternatively, participants need to be tested in several groups, which is time-consuming. Furthermore, not every educational institution has a suitable computer lab for research purposes. Moreover, the XK-Lex allows learners to complete the ten frequency bands without withdrawing them from the test if they did not reach a certain score. The test thus makes no assumptions regarding a ceiling point in vocabulary knowledge and is thus less likely to underestimate vocabulary knowledge. Finally, the paper and pencil format allows participants to revise their responses before handing in the test.

For the purposes of the current research project, the XK-Lex seems to be the most suitable test. The participants in the current project are Saudi undergraduate students, some of whom are likely to have a vocabulary knowledge of over 5,000 words (Masrai, 2009). Specifically, Masrai (2009) found that Saudi undergraduate university students majoring in English language had an average vocabulary knowledge of 5200 words. As the current study will examine almost the same level of learners, we assume that testing their vocabulary size for the first ten frequency bands, which the XK-Lex covers, will provide more adequate result.

2.8 Aspects of vocabulary learning

The following sections provide information about select additional aspects of vocabulary learning that are relevant to the current project. Specifically, the sections cover relevant information about vocabulary learning strategies and individual learner differences.

2.8.1 Vocabulary learning strategies (VLS)

Learning a new language usually starts with acquiring the most basic lexical items and phrases. Language acquisition is a challenging, and – especially in the case of vocabulary – also a continuous task, with even learners at the highest proficiency levels continuing to develop their vocabulary knowledge. As vocabulary items need to be learned individually, vocabulary learning can be quite challenging and may warrant strategic learning. Strategic learning refers to an intentional dynamic process assisting learners in solving learning problems, enhancing learning speed and leading the overall process to the most efficient outcomes (Gu, 2018).

In the case of vocabulary acquisition, strategic learning can occur in the form of vocabulary learning strategies, which are considered to be a sub-category of the wider concept of language learning strategies (LLS). These strategies are a product of the shift in the language learning field from focusing on teachers and teaching approaches towards learners and acquisition processes (Alsaif, 2011). Cohen (1998: 4) proposed a definition of LLS as "processes which are consciously selected by learners and which may result in action taken to enhance the learning or use of a second or foreign language, through the storage, retention, recall, and application of information about that language".

Multiple classifications and taxonomies for LLS have been proposed over the years (e.g. Rubin, 1981; O'Malley & Chamot, 1990; Oxford, 1990, 2016). Oxford's (1990) LLS taxonomy is considered to be one of the most frequently cited taxonomies in the field (Bremner, 1999). It consists of direct and indirect language learning strategies. Direct strategies consist of the following subcategories: memory (e.g. creating mental associations), cognitive (e.g. analysing and reasoning) and compensation strategies (e.g. guessing effectively). Indirect strategies comprise the following subcategories: metacognitive (e.g. learning planning), affective (e.g. reducing anxiety) and social

strategies (e.g. cooperating with others) (see Appendix A). In later work, Oxford (2016) departed from the aforementioned six-categories of LLS and instead presented three categories: affective, cognitive and socio-cultural interactive strategies. The latter has two levels: meta-strategies, which includes organising strategy use, planning and feelings; and strategic strategies, which operate with the aim to enhance learning or task completion (LaBontee, 2019).

Oxford (2016) defined VLS as "teachable, dynamic thoughts and behaviors that learners consciously select and employ in specific contexts to improve their self-regulated, autonomous L2 vocabulary development" (Oxford, 2016: 244). Investigative research on learners' VLS usage has generated a range of proposed VLS taxonomies (e.g. Gu & Johnson, 1996; Schmitt, 1997; Nation, 2001, 2013). For example, Gu and Johnson's (1996) extensive vocabulary learning questionnaire (VLQ), with 180 items based on a Likert scale, assumes a VLS taxonomy with two general categories: meta-cognitive (self-organisation and study planning) and cognitive strategies (including guessing, dictionary use, note taking and memory strategies). Recently, the VLQ was updated so that the cognitive category now includes initial handling strategies (techniques for forming new words' learning), and reinforcement and activation (usage) strategies (Gu, 2013; LaBontee, 2019), (see Appendix B).

Nation's (2013) VLS taxonomy uses four categories for learning new lexical items: planning, which refers to the ability to decide what to focus on and when (e.g. selecting words, strategies or aspect of words' knowledge); source strategies, which refer to locating information about words (e.g. guessing from context); processing strategies, which refer to consolidating the gained knowledge, for instance, through detection and retrieval; and skills in use, which concern the use of strategies through input (i.e. listening and reading) or output (i.e. speaking and writing) as well as maintaining progress in the four language skills (see Table 2.4).

Table 2.4 Nation's (2013) Taxonomy of vocabulary learning strategies (adapted from LaBontee, 2019: 318).

Class of strategies	Types of strategies
Planning: choosing what to focus on and when to focus on it	Choosing words Choosing the aspects of word knowledge Choosing strategies Planning repetition
Sources: finding information about words	Analyzing the word Using context Consulting a reference source in L1 or L2 Using parallels in L1 and L2
Processes: establishing knowledge	Noticing Retrieving Generating (creative use)
Skill in use: Enriching knowledge	Gaining in coping with input through listening and speaking Gaining in coping with output through reading and writing Developing fluency across the four skills

Schmitt's (1997) VLS taxonomy was chosen as the primary VLS taxonomy for the current research project for multiple reasons. First, it is geared specifically towards EFL learners – the population tested in the current thesis – as it was based on an empirical study of Japanese EFL learners that explored their VLS usage and evaluation. Second, it is a frequently cited VLS taxonomy that was based on the categorisations and classifications of both Oxford's (1990) and Nation's (1990) earlier taxonomies (Waldvogel, 2013). Generally, Schmitt's (1997) VLS taxonomy has two broad categories: discovery strategies (techniques applied to learn new words) and consolidation strategies (strategies to reinforce already learned words). Discovery strategies are divided into two subcategories: determination and social strategies; consolidation strategies have four subcategories: social, memory, cognitive and metacognitive strategies (see Appendix C and chapter 3 for further information). Some of the work presented in this thesis focuses on lexical inferencing and lexical

translation, which fall under determination strategies following Schmitt's (1997) VLS taxonomy, and their impact on learners' vocabulary growth and retention. The subsequent sections shall therefore take a closer look at these strategies.

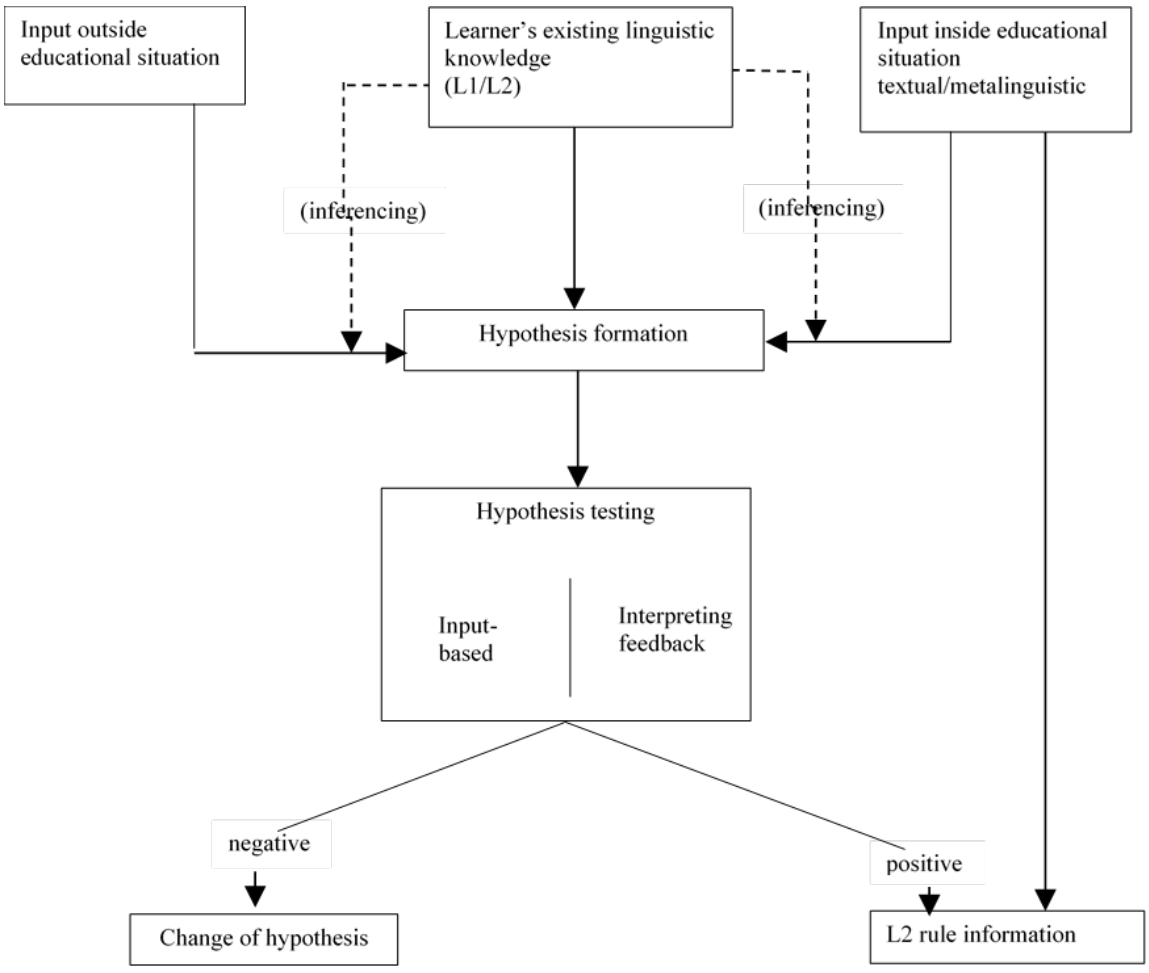
2.8.2 Lexical Inferencing

A language learner will likely encounter new lexical items when reading a text, and has multiple strategies available to determine the meaning of these novel lexical items. One of these strategies is lexical inferencing, which refers to a learner's ability to apply available linguistic cues and other key elements in a text to determine a target word's meaning (Morrison, 1996). An alternative definition refers to connections drawn by learners to obtain an explanation for what they heard or read (Brown & Yule, 1983). These definitions comprise three types of inferencing: locating missing links, creating non-automatic associations (i.e. connections to words outside the faced context) and filling gaps in knowledge in meaning interpretations (Brown & Yule, 1983). In terms of the source knowledge involved in inferencing, Carton (1971) suggested a taxonomy in which he highlighted three sources of knowledge: intra lingual cues, which refer to knowledge from the objective language; interlingual cues, which include knowledge from the first language and other languages except the target language, and contextual cues, which comprise knowledge from the world and linguistic context (see Appendix D). In a similar vein, Bialystok (1978) proposed three main knowledge sources for guessing: other or world knowledge, explicit and implicit linguistic knowledge. This means that learners are able to apply implicit (habitual processes) and explicit (conscious efforts) knowledge of linguistic cues through "defining properties of morphological, syntactic, and lexical form and the semantic, pragmatic, and discourse functions that are associated with it [the target word]" (Ellis, 2005: 306). Haastrup (1991) criticised the aforementioned sources of knowledge and mentioned that inferencing may be a central comprehension process, but comprehension does not always lead to learning.

There are different models of inferencing. According to Haastrup's (1991) Hypothesis Formation and Testing model, second or foreign language acquisition is in general a cognitive process in which a learner makes conscious and unconscious hypotheses (e.g. automatisation and consciousness-raising) about the target language. As Figure 2.1

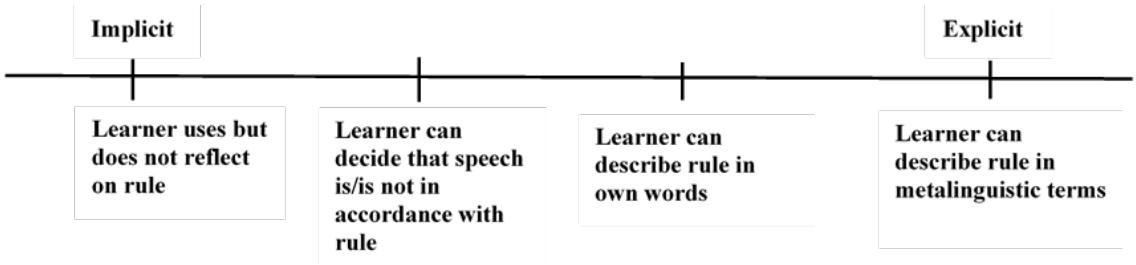
shows, hypothesis formation in the model can be based on the L1 or L2 and hypothesis testing can be seen in two possible forms: feedback from the teacher (interpreting feedback) and/or through solutions gained by inferencing for a particular comprehension issue (input based). If a learner faces an unknown lexical item, hypothesis formation can be based on the following: input outside the educational situation, his/her existing linguistics knowledge from the L1 or L2, or input inside the educational situation (e.g. through the instructor). The hypothesis formation process occurs in the form of inferencing. The next phase is to test whether his/her inferencing leads to a solution to comprehend this particular lexical item. This process can be either input based (learner's own knowledge) or based on feedback from the instructor. The hypothesis testing process can lead to either a positive outcome resulting in L2 rule formation (i.e. actual learning) or to a negative outcome which leaves the hypothesis open for inquiry at this point (Haastrup, 1991).

Figure 2.1 Inferencing model of hypothesis formation and testing (adapted from Haastrup, 1991: 27).



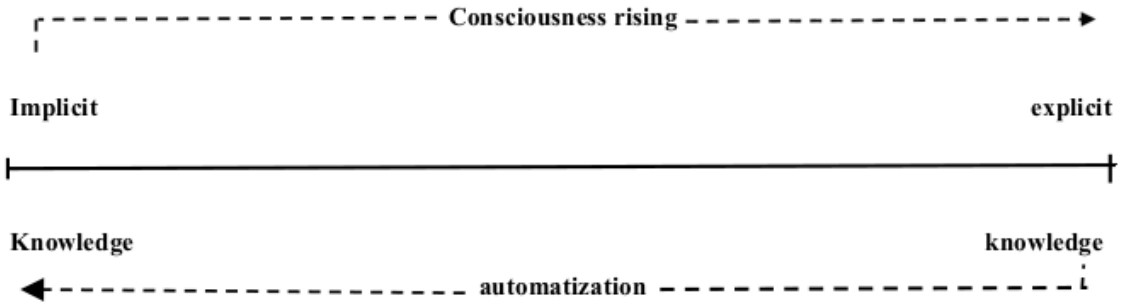
Another model proposed by Haastrup (1991) concerns the organisation of knowledge. In this model, implicit and explicit knowledge are represented along a continuum of linguistic knowledge in which the two end points range from unconscious to conscious knowledge (see Figure 2.2). Haastrup (1991) argues that a certain lexical item can be at the extreme implicit or extreme explicit side of the figure as learning can occur from either side.

Figure 2.2 Implicit and explicit knowledge according to the organisation of knowledge (adapted from Haastrup, 1991: 29).



Applying this organization of knowledge to vocabulary attainment, a word can start at the explicit end, indicating that it was obtained through an instructor or dictionary usage. In this case, regular encounters with the target word is predicted to lead to automatisation (such that a word can be recalled easily from memory). In contrast, a lexical item beginning at the implicit end implies that a learner retrieves its meaning from the provided context (see Figure 2.3). In this situation, the awareness raised at that level is considered be sufficient for transforming input (receptive or gained knowledge) to intake (productive knowledge; Schmidt, 1990). In other words, the learner transforms his/her own knowledge from the receptive to the productive stage or, simply, can use the understood word.

Figure 2.3 Inferencing model of the organisation of knowledge (adapted from Haastrup, 1991: 28).



Any inferencing attempt aims to determine the meaning for a target word in a given context. The literature has highlighted some factors that contribute to inferencing success. For instance, Frantzen (2003) indicated that the amount of attention paid by the learner to the available cues in the text in addition to his/her background knowledge with regard to the potential meaning of the target word can help learners guess meaning successfully from context. How relevant the area that a word or a text comes from is to the learner also has an impact on inferencing success (Paribakht & Wesche, 1999). Furthermore, the density of unknown words in a text can negatively impact the inferencing process (Nastaran & Tabatabaei, 2014). In other words, the higher the number of unknown lexical items in a text, the lower the opportunity for participants to use context cues and engage in successful inferencing.

2.8.3 Lexical translation

Using a dictionary to determine the meaning of unknown words in second or foreign language learning is one of the most traditional strategies. Following Shangarfam et al., (2013) and Soderland et al., (2010), this thesis also refers to dictionary consultation as lexical translation. It is also considered as one of the most assessible and cheapest learning resources (Wright, 1988). The efficacy of applying dictionary consultation in language classrooms has been a topic of debate. As such, some language instructors adopted the idea that dictionary use should be avoided as a pedagogical means and that any references to the L1 should be discouraged in the classroom (Hummel, 2010). However, other studies have highlighted dictionary usage as a possible learning aid (c.f.

Chen, 2017; Dziemianko, 2014; Ezza & Saadeh, 2011; Liang & Xu, 2017; Tseng, 2009).

The process of lexical translation is believed to contribute to the L2 learning process (Manyak, 2004). Researchers have noted that the process of dictionary consultation could boost learners' autonomy (Lin, Pandian & Jaganathan, 2017). In a similar vein, Asher (1999: 66) argued that dictionary usage is a "gateway to independent learning". Luu (2011) suggests that lexical translation could also lead to enhanced motivation among learners. Moreover, with increased autonomy, it could provide more language communication opportunities that allow learners to master some of the basic skills that could guarantee long-term leaning. The technique of lexical translation is considered to play a vital role in improving learner's reading comprehension and vocabulary size (Chiu & Liu, 2013; Dziemianko, 2010). It could also influence the process of learning from multiple perspectives, such as reinforcing the correct use, meanings and spelling of the target lexical items (Chan, 2012; Lew, 2012; Liu et al., 2014).

However, dictionary consultation has also been criticised in the literature. For instance, Knight (1994) argued that lexical translation is a time-consuming strategy and the amount of time spent does not always lead to effective learning. In addition, Koyama and Takeuchi (2004) concluded that comprehension is not always guaranteed when applying lexical translation. De Ridder (2002) indicated that dictionary usage involves low mental effort and, therefore, will mostly lead to short-term retention. This process, moreover, has been considered more useful for learners with lower proficiencies as it assists them in gaining an initial comprehension threshold, which more proficient learners have usually already attained (Prichard, 2008). Prince (1996) seemed to agree that lexical translation is more useful for learners with lower proficiency levels, arguing that when L2 items are linked to their L1 equivalents in the first months of language learning, they can be efficiently stored in memory.

The depth of cognitive processing involved in lexical translation has been debated in the literature. Schofield (1999), for example, argues that dictionary usage requires deep processing as learners pick up information about spelling, inflection, part of speech etc. O'Malley & Chamot (1990), however, describe the process as involving little conceptual processing. This is the case, for example, if we view the process from a narrow angel and define it as a tool to determine a target word's meaning. Exploring word meaning is a process that involves focusing on linguistic units beyond the target word and fully understanding the surrounding conceptual content (Hummel, 2010). Liu,

Fan and Paas (2014) argue that dictionary consultation could involve the following deep cognitive processes: (1) attention to unfamiliar vocabulary features; (2) repeated exposure to unknown words; (3) locating headwords and lexical syllables in dictionary content. However, the first two processes also apply to the lexical inferencing process. The strategy of dictionary consultation is sometimes assumed to be more effective compared to encountering target words in context. Laufer & Shmueli (1997) claim that dictionary use allows learners to engage in more elaborative processing by "self-generated imagery and sematic mediation" (Laufer & Shmueli, 1997: 105), i.e. linking target words to key words and creating phrases with target words, respectively. Guessing through context may not have the same advantage as dictionary consultation because unknown words could simply be ignored or effortlessly inferred and subsequently forgotten. Furthermore, lexical translation may involve deep processing in that the "exposure to translation equivalents may entail an increased set of interconnections, resulting in a more elaborate set of memory traces associated with the L2 structures" (Hummel, 2010: 64).

2.8.4 Individual learner styles

It is commonly assumed that learners have individual learning styles. For example, while some learners may prefer reading target materials, others may seek verbal clarifications. According to Miller (2001), one of the challenges instructors face is to adapt their teaching approaches to meet different learning styles and to improve learners' performance, motivation, and learning outcomes. El Guabassi, Bousalem, Al Achhab, Jellouli & El Mohajir (2019) echo the view that it is the teacher's role to initially identify learners' styles. Generally, individual learner styles could be defined as learners' abilities to receive, process, store and recall the obtained materials in the most efficient way (Wongsuphasawat & Sittiprapaporn, 2018). Kinsella (1995: 171) defined learner styles as "an individual's natural, habitual, and preferred way of absorbing, processing, and retaining new information and skills".

The literature has provided numerous classifications for individual learner styles (e.g. Christison, 2003; Dunn, 1984; Honey & Mumford, 1986; Klob, 1984, 1985; Reid, 1995; Vermunt, 1994). These models were based on different assumptions, highlighting areas such as learners' cognitive styles, ways of processing learned materials and/or learning preferences (Coffield Moseley, Hall & Ecclestone, 2012). Kolb (1976, cited in Henson & Hwang, 2002) represents one of the first attempts to design a theoretical model for

learner styles. The Experiential Learning Model (ELM) divided learning into four learning styles: concrete experience (i.e. participating in novel experience), reflective observation (i.e. reflecting on the previously obtained experiences), abstract conceptualisation (i.e. improving informal concepts) and active experimentation (i.e. learners' ability to apply these theories in decision making and problem solving situations). In order to operationalise the previous theory, Kolb (1985) introduced the Learning Style Inventory (LSI), a commonly used tool in this area (Henson & Hwang, 2002), which classified individuals according to the four mentioned learning styles. Honey and Mumford (1986) developed a modified learner styles questionnaire in light of Kolb's (1985) model. The Learning Style Questionnaire (LSQ) classified learners at each cycle of learning based on their strengths and weaknesses according to the following criteria: (1) Activists are learners who are highly enthusiastic about obtaining novel information, but lose patience rapidly. Competitive activities can be the best solution for this type of student (Shaw & Marlow, 1999); (2) Reflectors are learners who usually exercise caution when dealing with novel materials and need more time for preparation to overcome this issue; (3) Theorists are individuals who typically try to fit their interpretations into a logical model. Therefore, they do especially well when asked to understand complex issues; (4) Pragmatists are learners who do not prefer discussion of novel information, and instead adopt a direct experimental approach. They are expected to learn better when results from a learning task are evident (Shaw & Marlow, 1999).

One of the widely used models to identify learning characteristics is the Visual, Auditory, Read/Write and Kinesthetic (VARK) model (Fleming, 1995; Fleming & Bonwell, 2001). This model is known as a perceptual instructional model that classifies learners according to their sensory preferences (Wongsuphasawat & Sittiprapaporn, 2018). The visual aspect refers to learners' preference to gain information through visual aids, like maps, graphs or charts. Aural or auditory describes a preference to learn materials through heard or spoken means. Read/write represents a preference to display needed information as words. Kinesthetic learning refers to a preference to absorb information through experimental learning. Importantly, some learners might apply a mixture of all these sensory modes, but one style is usually assumed to be dominant (Lujan & DiCarlo, 2006). However, Moradkhan & Mirtaheri (2011) argue that a learner who frequently adopts only one learning style will not tap into his or her full learning potential.

The effect of individual learner styles on second language learning has been highlighted in different studies. Kojic-Sabo & Lightbown (1999) investigated the relationship between learners' styles and vocabulary knowledge. The applied clustering analysis divided participants according their learner styles and determined eight diverse learner groups. Overall, the study found that the regular users of VLS have greater vocabulary size. Furthermore, the two groups with the highest vocabulary knowledge spent additional time using strategies in and outside of the classroom. Al Hamdani (2015) also explored the preferred learning styles and its relationship to learners' GPA. The study also explored the impact of additional factors (e.g. gender, handedness and major) on participants' learner styles. Results indicated that learner styles and related factors have no significant impact on students' performance in terms of GPA and on the adoption of certain learning styles.

Based on the reviewed literature, the current thesis investigates the role of vocabulary knowledge among L2 English learners in higher education, and how vocabulary knowledge is linked to their language skills and proficiency. To measure the learners' breadth of vocabulary knowledge, the studies presented in the current thesis will apply what has been argued to be valid and reliable lexical knowledge tests; the X-Lex by Meara and Milton (2003) and the XK-Lex by Al-Masrai and Milton (2012), introduced in sections 2.7.3 and 2.7.4. Moreover, these vocabulary tests measure lexical knowledge at the level of the lemma rather than the level of the word family, which is considered to be less likely to overestimate word knowledge as learners can predictably derive inflected forms from the headword. Finally, these tests focus on receptive vocabulary knowledge, which is typically larger than and acquired before productive knowledge for most learners (Ma, 2009). The studies presented in this thesis also apply Schmitt's (1997) VLS taxonomy, introduced in section 2.8.1.

The first study will highlight the VLS usage among undergraduates who are completing their degree in Saudi Arabia and postgraduates studying in an L2 environment. It will explore which vocabulary learning strategies are applied more frequently by each target group of learners and whether this impacts on the size of their lexical knowledge. The study explores why lexical knowledge is a problematic issue for many Saudi EFL students (i.e. Alhazmi, 2018; Alsaif, 2011) by shedding light on participants' VLS usage in dissimilar learning environments. In addition, the first study will examine whether participants show individual learner styles, and how distinctive learner styles

may relate to their lexical knowledge. The noticeable role that individual learner styles can play in second language acquisition in general and in vocabulary attainment in particular (see section 2.8.4 for further information) has motivated the exploration of this factor in the current study. Finally, the first study focuses on the educational community in Saudi Arabia (i.e. researchers, language instructors, curriculum designers and individual learners) and the role that lexical knowledge plays in Saudi learners' second language acquisition, for which there has been little empirical evidence.

Using a longitudinal study design, the second study will explore the impact of lexical inferencing and dictionary consultation, the two VLS introduced in more depth in sections 2.8.2 and 2.8.3, on learners' initial word learning and retention. These particular VLS were explored for the following reasons: Lexical inferencing has been argued to promote vocabulary acquisition as learners engaged in guessing from context must pay attention to the available cues in the target context, which encourages deep processing (Frantzen, 2003). Lexical translation increases learners' autonomy and is considered to be one of the most accessible and traditional methods to attain vocabulary (Lin, Pandian & Jaganathan, 2017). Furthermore, the two examined VLS will be considered in the context of two processing depth theories, the Involvement Load Hypothesis (Hulstijn & Laufer, 2001) and the Feature Technique Analysis (Nation & Webb, 2011), which will be introduced in more depth in Chapter 4. The study will be using a within-participant design, which has been rarely applied in previous similar studies.

The third study explores whether language skills or familiarity with learning strategies involving guessing or dictionary use also influence the amount of learning that occurs when engaging in inferencing and dictionary use. Familiarity with learning strategies is emphasised here since it is considered to be an element that may speed vocabulary acquisition through a general practice effect (Gu, 2018). The level of language skill or proficiency is additionally considered because prior studies found a positive connection between the amount of learners' vocabulary knowledge and higher levels of proficiency in all four language skills (Laufer, 1997; Stæhr, 2008).

Overall, this thesis will contribute to the currently rather heterogeneous picture about the role of vocabulary attainment in second language acquisition.

CHAPTER THREE

Study I

Student contribution

This chapter has been published as a journal article. The researcher was the first author and his contribution includes: study design, which was enlightened by supervisor feedback and guidance, data collection, data analysis with the help and support of the supervisor, drafting the initial research paper and modifying it based on supervisor feedback and guidance as well as reviewer feedback. Please note that this study contains both novel as well as the student's previous MA data, which was analysed here using more sophisticated statistical analyses.

Vocabulary Learning Strategies and Vocabulary Size: Insights from Educational Level and Learner Styles

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Abstract

This study investigates the effect of different vocabulary learning strategies (VLS) as well as different learner styles on vocabulary size in Saudi Arabic-speaking students in higher education. The goals of this study were to examine which VLS undergraduates used more frequently than post- graduates and vice versa, to determine which VLS related positively and significantly to vocabulary size, and to explore individual learner styles and their relationship to vocabulary size. Participants filled in a VLS questionnaire and completed a vocabulary size test. The results indicated that undergraduates tended to use simpler strategies than postgraduates. The strategies of *guessing a word's meaning from context* and *watching television* related positively with vocabulary size in both groups. Clustering analysis revealed two learner groups which differed in how frequently they used VLS overall, rather than in terms of which VLS they preferred. Those students who used more VLS

overall also had larger vocabulary sizes, irrespective of educational level. We thus found no evidence for differences in individual learner styles in the current groups. We conclude that VLS usage should be encouraged overall, but that the need for instructors to cater to individual vocabulary learning styles may not be warranted.

Key words: Vocabulary acquisition; vocabulary learning strategies; vocabulary size; postgraduates; Arabic learners of English.

Background

In the past three or more decades, the importance of second language (L2) vocabulary learning has gained increased attention. Researchers, teachers and curriculum designers agree that acquiring the vocabulary of a foreign language is important for language learners (Coady, 1997; Gu, 2003; Nation, 1990; Ruutmets, 2005; Schmitt, 1997, 2000). Moreover, language learners seem to acknowledge the significance of vocabulary knowledge, as they usually use dictionaries rather than grammar books (Wilkins, 1972). In the same vein, Wilkins (1972) stated that "without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (p. 110–111). Furthermore, McCarthy (1990) and Shen (2008) argued that language proficiency is heavily dependent on individuals' vocabulary knowledge. Indeed, several studies have found a significant and positive correlation between learners' vocabulary size and scores on formal tests of the four language skills: listening, speaking, reading and writing (Koizumi & In'nami, 2013; Laufer, 1994, 1997; Meara & Jones, 1988; Stæhr, 2008, 2009).

While vocabulary knowledge plays a vital role in language proficiency, many researchers have argued that vocabulary acquisition is the most challenging feature of learning a foreign language (Milton, 2009; Schmitt, 2000). McCarthy (2001, p. 2) suggests that "vocabulary forms the biggest part of the meaning of any language, and vocabulary is the biggest problem for most learners". To address these difficulties, a number of researchers have developed various strategies to support language learners in their efforts to efficiently acquire vocabulary (Gu, 2003; Oxford, 1990; Read, 1997; Schmitt, 1997).

3.1 Language Learning Strategies and Vocabulary Learning Strategies

Language learning strategies (LLS) have received considerable attention since the 1960s (Safian, Malakar, & Kalajahi, 2014). This reflects the educational shift from focusing on instructors and teaching methods to learners and learning styles (Chamot & O'Malley, 1987; Fillmore, 1983; Stern, 1975; Wenden, 1982). Schmitt (1997) attributed this educational shift to the general awareness that aptitude is not the only major factor for successful language learning, but that individual learner's strategies may be equally important. As such, researchers have shifted their focus to learners' individual learning approaches and how learners control their learning and language use.

There are various, and sometimes controversial, definitions of LLS in the literature (Oxford, 1990). We follow Cohen's (1998) definition of LLS:

> Language learning and language use strategies can be defined as those processes which are consciously selected by learners and which may result in action taken to enhance the learning or use of a second or foreign language, through the storage, retention, recall, and application of information about that language. (p. 4).

While VLS are considered a sub-class of LLS, O'Malley and Chamot (1990) have argued that most LLS are used for accomplishing vocabulary learning tasks. We follow Catalan's (2003) definition of VLS as:

> the mechanism used in order to learn vocabulary as well as steps or actions taken by students (a) to find out the meaning of unknown words, (b) to retain them in long-term memory, (c) to recall them at will, and (d) to use them in oral or written mode. (p. 56).

Many vocabulary learning strategies have been proposed in the literature (e.g., Nation, 2001; Schmitt, 1997; Stoffer, 1995). This study uses Schmitt's (1997) comprehensive and frequently cited VLS taxonomy, which integrates key components of Nation's (1990), Oxford's (1990) and Cook and Mayer's (1983) taxonomies. Schmitt's taxonomy (see Figure 3.1) divides VLS into discovery strategies,

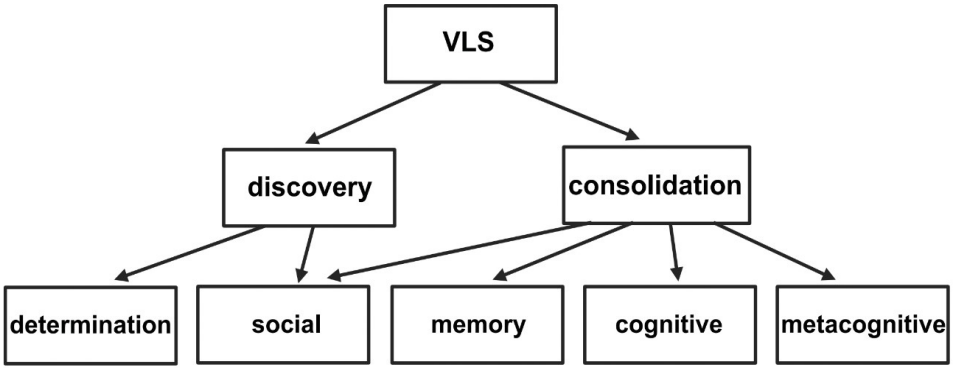

Figure 3.1 Graphical Overview of Schmitt's (1997) Taxonomy

which are used to learn the meaning of a new word, and consolidation strategies, which are used to remember words once they have been initially learnt. Schmitt's discovery strategies have two sub-strategies: determination strategies and social strategies. Determination strategies aid vocabulary acquisition by providing a set of limited choices from which a word's meaning can be determined, such as using a dictionary or deriving meaning from context. Social strategies support vocabulary attainment by cooperating with others in the acquisition process (Tanyer & Ozturk, 2014). Consolidation strategies are further subdivided into social (see above), memory, cognitive and metacognitive strategies. Memory strategies refer to learners' mental attempts to link new words with their background knowledge (Schmitt, 1997). Cognitive strategies involve manipulating language materials to enhance the learning process, for example, note-taking, analysis or outlining (Oxford, 2003). Finally, metacognitive strategies may be described as knowledge about learning. This could involve learners' conscious knowledge about how to identify their own learning style preferences, monitoring learning shortcomings and evaluating their learning progress (Oxford, 2003; Schmitt, 1997).

3.2 The Importance of Vocabulary Knowledge

Previous studies have shown a statistically significant positive relationship between vocabulary knowledge and language proficiency (e.g., Milton, 2009). Most research concerning this relationship has been conducted within the realm of reading (Stæhr, 2008). A number of researchers have proposed vocabulary sizes necessary to achieve a minimum level of understanding in a foreign language. Mil-

ton (2009) indicated that English as a Foreign Language (EFL) learners needed to know at least 3000 words to perform well in basic communicative tasks (Nation, 1990). Proposed thresholds for reading academic and authentic texts range from 5000 words to 9000 word-families (headword plus inflected forms and some derived forms; Al-Masrai & Milton, 2012; Hirsh & Nation, 1992; Nation, 2001). Nation (2006) suggested a vocabulary knowledge of 6000 to 7000 word-families to understand spoken discourse. Overall, it is presumed that, regardless of the skill, learners familiar with more words have more opportunities to achieve better comprehension and production of the foreign language.

A number of studies have investigated how English learners' VLS use relates to vocabulary size, using VLS questionnaires in combination with tests that estimate vocabulary knowledge. These studies have yielded rather diverse results. For example, Al Qahtani (2005) conducted a comprehensive analysis of VLS use among 455 students from three educational levels (ages 13 through 15, high school and university undergraduate level) in Saudi Arabia and found significant correlations between vocabulary size and guessing the meaning of a word from its structure, monolingual dictionary usage and learners' self-monitoring by listening to their own recordings to detect errors.

Hamzah, Kafipour and Abdullah (2009) have also investigated VLS usage and its relationship with vocabulary size in 125 Iranian second-year undergraduates majoring in Teaching English as a Foreign Language (TEFL). In their study, significant and positive correlations were found between vocabulary knowledge and performing a physical action while learning a new word, communicating with native speakers and watching English media.

Alsaif (2011) explored the use of VLS and their relationship with vocabulary size among 111 Saudi male students representing four public schools and distinctive school levels (from level 7 to level 11). The findings highlighted a positive relationship between vocabulary knowledge and associating new words with known synonyms and antonyms and guessing the words' meanings from context.

Finally, Tanyer & Ozturk (2014) examined 80 Turkish university students in years 1 through 4 of their undergraduate studies, who were majoring in English Language Teaching (ELT). A hierarchical multiple regression analysis revealed that social, cognitive and metacognitive strategies significantly influenced

participants' vocabulary knowledge and explained 6.5%, 5.3% and 5.2%, respectively, of the variability in vocabulary size.

3.3 Individual Learner Styles

Individual learning styles refer to the idea that learners differ in terms of the approach of teaching or learning that is optimal for them (Pashler, McDaniel, Rohrer & Bjork, 2008). The concept of learning styles has gained much attention recently (e.g., Kozhevnikov, 2007; Sternberg, Grigorenko, & Zhang, 2008), which has led learning styles proponents to design learning styles models or schemes, such as Kolb's (1984, 1985) Learning Styles Inventory. These schemes can assist instructors in highlighting their students' learning styles. Based on this, teachers can also adapt their instruction to these individual learner styles. For example, Kolb's (1985) learning styles differentiate between a preference for active experimentation and reflective observation. In terms of VLS, this would reflect a preference for strategies that involve active participation compared to observation or for strategies that involve speaking compared to listening.

However, whether or not using individual learning styles as a means to improve learning outcomes is effective has been debated in the literature. Ormrod (2008) suggests that "some cognitive styles and dispositions do seem to influence how and what students learn" (p. 160). Kojic-Sabo and Lightbown (1999) explored how English as a Second Language (ESL) and EFL learners' styles relate to vocabulary knowledge. They used clustering analysis to group participants in terms of learner styles and found eight different learner groups. Their results suggest that learners who make more use of VLS have larger vocabulary knowledge. In addition, the two most successful groups in terms of vocabulary knowledge were characterised by a large amount of time spent on using strategies and a high amount of strategy use outside of the classroom. Similarly, Pashler et al.'s (2008) review of learning styles suggests that there was no adequate evidence to justify the prominent role of individual learning styles in general educational practice.

3.4 Current Study

The purpose of this study is to shed light on the VLS usage of students in higher education. We will consider the VLS usage of undergraduates who are completing their degree in Saudi Arabia and postgraduates studying in an L2 environment, as this is a common educational path for Saudi students. Universities in English-speaking countries are accepting many international postgraduates into their programmes. These students are typically required to have reached a certain level of English proficiency, typically a score of 5.5 or above in the International English Language Testing System (IELTS), before they can begin their studies. In addition, these students need to build up their vocabulary competence in order to participate effectively within their academic disciplines in the L2. Postgraduates in the L2 environment have different opportunities to practice their vocabulary than students in the first language (L1) environment. In particular, they have more opportunities to learn vocabulary through social strategies, such as communicating with and listening to native speakers. This study investigates which VLS postgraduates use significantly more frequently than undergraduates and vice versa and which VLS are related to participants' vocabulary size. Furthermore, the study explores whether we can identify any individual learner styles and how different learner styles relate to vocabulary size. The latter analysis follows Kojic-Sabo and Lightbown (1999) in using cluster analysis to explore whether there are any distinct VLS profiles that could contribute to participants' vocabulary knowledge. To the best of our knowledge, very few previous studies have attempted to explore individual learner styles in terms of L2 vocabulary acquisition, and this is the first study that considers VLS usage of postgraduate learners. In summary, the study attempts to answer the following research questions (RQs):

1. Which of the VLS relate significantly to vocabulary size in both groups?
2. Are there any strategies that postgraduates use significantly more or less frequently than undergraduates?
3. Are there distinct VLS profiles or learning styles across the sample and, if so, which of these contribute to vocabulary size?

3.5 Study 1

Study 1 explores VLS and the breadth of vocabulary knowledge in undergraduates studying in their home country.

3.5.1 Methodology

3.5.1.1 Participants

A total of 49 students (mean age = 23.65, standard deviation [*SD*] = 2.445) participated in the study. All students were third year (level six) students in the English Department at King Abdulaziz University in Saudi Arabia. Students received approximately 1600 hours of EFL instruction during their public school and university education (Alqurashi, 2013).

3.5.1.2 Materials

VLS questionnaire. The questionnaire we used to gauge students' VLS use was adapted from Alsaif (2011) and based on Schmitt's VLS taxonomy (1997). It contained 37 closed questions. An additional open question that allowed participants to mention additional strategies that they used will not be reported here because no learner mentioned additional learning strategies. All closed questions used the following Likert scale to gauge how often learners used a particular learning strategy: always = 4, often = 3, sometimes = 2, rarely = 1 and never = 0.

Following Alsaif (2011), the questionnaire was organised into three sections: (1) strategies used to learn new words, (2) strategies used to consolidate already learned words and (3) general VLS. Each of the learning strategies was categorised as either memory, social, cognitive, metacognitive or determination strategies following Schmitt (1997).

Vocabulary size test. We used Meara and Milton's (2003) vocabulary size test X_Lex (paper-based format; see Milton, 2009) to gauge participants' vocabulary size. This test estimates participants' passive vocabulary knowledge in terms of breadth up to a vocabulary knowledge of 5000 words and has a high level of test validity and reliability (Al-Mutawa, 2013). We used this test as participants' vocabulary knowledge was expected to not exceed 5000 words (e.g., Al-Akloby, 2001; Al-Hazemi, 1993; Alsaif, 2011).

X_Lex is a checklist vocabulary test in which participants place a checkmark next to the words they know. The test consists of six columns with 20 words each (120 words in total), representing the 5000 most frequent words in English. The words were selected from Hindmarsh's (1980) and Nation's (1984) frequency lists (Milton, 2009). The first five columns contain real words that are among the most frequent 5000 words in English. The last column contains non-words or pseudo-words to gauge the amount of guessing by the learners. Vocabulary size scores are calculated as follows: All checkmarks within the first five columns (which contain real words) are added up and this number is multiplied by 50. Then, all checkmarks in the sixth column (which contains pseudo-words) are added up and multiplied by 250. Finally, the total number for the sixth column is subtracted from the total number for the first five columns. For example, if the first five columns yield a score of 2500 and the sixth column yields a score of 1000, then the participants' vocabulary size score is 1500.

3.5.1.3 Procedure

Participants first completed the VLS questionnaire, which was administered in Arabic, the participants' L1. After a short break, participants completed the vocabulary size test. There was no time limit for completion of the questionnaire and vocabulary size test, but all the participants finished within 20 min.

3.5.2 Results

3.5.2.1 Summary Measures

The results of the X_Lex vocabulary size test showed that participants' estimated mean vocabulary size is 1976 words (*SD* = 597). Estimated vocabulary size ranged from 350 words to 2900 words out of a possible maximum test score of 5000 words. The ratings for individual VLS range from 0.85 (a value between *rarely used* and *never used* on the scale) to 2.95 (a value corresponding to *often*), with a mean rating of 1.98 (a value corresponding to *sometimes*) out of a maximum score of 4.00.

3.5.2.2 Relationship between VLS and Vocabulary Size

To determine which VLS contribute significantly to vocabulary size (RQ1), we performed multiple regression analyses, separately for each type of VLS in Schmitt's taxonomy (determination, cognitive, social, memory and metacognitive strategies). All analyses had vocabulary size as the dependent variable and all VLS of the relevant type as independent variables. All independent variables were centred before analysis to minimise collinearity (Belsley, Kuh, & Welsh, 2005). Independent variables that did not contribute significantly to model fit were removed in a stepwise procedure to yield the final analysis model (Baayen, 2008). Table 3.1 shows the results from the final statistical models. The only strategy that is significant at the level of $p < 0.001$ is *guessing the meaning of new words from context*. Overall, we can see that most of the strategies that are related to vocabulary size were categorised by Alsaif (2011) as strategies to learn new words (7, 9, 10, 14, 19, and 20) rather than as strategies to consolidate and memorise learned words (21 and 24) or general VLS (32). In addition, the most frequent strategy type in Table 1 is memory strategies (10, 14, 19, and 20).

3.5.3 Discussion

The results revealed that undergraduate participants' receptive vocabulary knowledge is generally poor and would likely not allow learners to perform well in basic communicative tasks and general reading tasks. In addition, participants did not employ many vocabulary learning strategies on a regular basis. However, four of the VLS that positively relate to students' vocabulary size had mean ratings above 2 (i.e., above *sometimes*) and were thus among those that undergraduates used more frequently. This suggests that some strategies that students were using might have contributed to building their vocabulary knowledge, possibly because use of these strategies might indicate their engagement with English in general. Those findings will be discussed in more detail in the general discussion section.

3.6 Study 2

Study 2 tests VLS and the breadth of vocabulary knowledge in postgraduates living in an L2 environment.

Table 3.1 Results from the Multiple Regression Analyses for Undergraduates

Strategy type	VLS	Mean (*SD*)	Estimate	Std. error	*t*-value	*p*-value
Determination	9. Guessing the meaning of the new words from their contexts	2.35 (1.332)	235.75	51.86	4.545	< 0.001***
Cognitive	21. Writing the words in a special vocabulary notebook	2.27 (1.204)	155.28	60.39	2.571	< 0.05*
Social	7. Asking the teacher about vocabulary meanings	1.24 (1.267)	183.23	80.55	2.275	< 0.05*
Memory	10. Using grammar cues to guess the meaning of words	2.27 (1.335)	199.36	57.97	3.439	< 0.01**
	14. Writing the words in full sentences	1.92 (1.367)	156.51	52.53	2.979	< 0.01**
	19. Associating new words with known synonyms	0.86 (1.225)	212.23	68.03	3.120	< 0.01**
	20. Associating the new words with known opposites	2.27 (1.204)	-178.32	72.61	-2.456	< 0.05*
Metacognitive	24. Writing the words with all the synonyms known	1.63 (1.185)	112.65	64.07	1.758	= 0.09
	32. Watching television programmes	1.53 (0.739)	152.66	57.70	2.646	< 0.05*

3.6.1 Methodology

3.6.1.1 Participants

The postgraduate group included 22 male Saudi learners (mean age = 30.50, *SD* = 3.051) completing their Master's or PhD degrees in different disciplines at Bangor University. These participants have spent between 2 to 7 years in an L2 environment.

3.6.1.2 Materials

VLS questionnaire. We used the same questionnaire as in Study 1 to measure the participants' VLS.

Vocabulary size test. Participants' passive vocabulary size was measured using the XK_Lex vocabulary size test developed by Al-Masrai and Milton (2012; see Al-Masrai, 2009, for validity and reliability information), which captures vocabulary knowledge beyond the 5000-word limit and is thus appropriate for learners in the L2 environment at a higher educational level. Similar to the X_Lex test used in Study 1, the XK_Lex is a paper-and-pencil checklist vocabulary test in which participants place a checkmark next to the words they know. It comprises 100 words representing the 10 000 most frequent words of English, divided into 10 columns with 10 words each. The lexical items in the test are taken from Nation (1984) and Kilgarriff (2006). To minimise the effect of guessing, each column of the test also includes two pseudo-words, for a total of 20 pseudo-words (see Appendix E). Similar to the X_Lex test in Study 1, vocabulary size scores are calculated by adding up all the real words that received a checkmark and multiplying the sum by 100. Then, all checked pseudo-words are added up and the sum is multiplied by 500. Participants' vocabulary size score was derived by subtracting the latter sum from the first.

3.6.2 Procedure

The procedure was the same as in Study 1.

3.6.3 Results

3.6.3.1 Summary Measures

The XK_Lex test revealed that postgraduates' estimated mean vocabulary size is 5368 words (*SD* = 1307). Vocabulary sizes ranged from 3100 to 8200 words out of a possible maximum test score of 10 000 words. Mean VLS ratings ranged from 1.09 (roughly corresponding to *rarely* on the scale) to 3.41 (a value that is between *often* and *always* on the scale), with an overall mean rating of 2.11 (which roughly corresponds to *sometimes*) out of a maximum rating of 4.00.

3.6.3.2 Relationship between VLS and Lexical Knowledge

We performed multiple regression analyses analogous to the ones in Study 1 to determine which VLS relate significantly to vocabulary size (RQ1) in Saudi postgraduates. Table 3.2 presents the results from the final statistical models. Again, most VLS strategies that relate to vocabulary size are strategies used to acquire new words (2, 9, 11, 12, 13, 19 and 20) rather than strategies to consolidate and memorise learned words (none) or general VLS (32, 34 and 37). Furthermore, the most common strategy category in Table 3.2 is again memory strategies (11, 12, 13, 19 and 20). However, three of the five memory strategies which relate to vocabulary size show a negative relationship, such that more use of the strategy relates to a smaller vocabulary. All three of these strategies relate to considering words in isolation rather than in context.

3.6.3.3 Comparison of VLS Use between Groups

In this section, we will highlight VLS that postgraduates use significantly more or less frequently than undergraduates (RQ2). Table 3.3 lists all VLS for which the mean ratings for undergraduates were significantly or marginally higher than the mean ratings for postgraduates.

Table 3.2 Results from the Multiple Regression Analyses for Postgraduates

Strategy type	VLS	Mean (*SD*)	Estimate	Std. error	*t*-value	*p*-value
Determination	9. Guessing the meaning of the new words from their contexts	2.64 (0.790)	883.3	343.1	2.574	< 0.05*
Cognitive	2. Reading the text aloud before searching for new words meanings	1.41 (0.854)	628.1	261.6	2.401	< 0.05*
Social	37. Speaking English with non-Arabic speakers in shops, hospitals, restaurants, etc.	3.32 (1.041)	510.4	256.5	1.989	= 0.06
Memory	11. Visualising the meaning of the words	1.86 (0.941)	869.2	262.0	3.317	< 0.01**
	12. Saying the words repeatedly to learn their sounds	2.59 (1.182)	-422.8	194.6	-2.173	< 0.05*

	13. Writing the words alone repeatedly to learn their written forms	2.14 (0.889)	-783.1	235.3	-3.328	< 0.01**
	19. Associating new words with known synonyms	2.23 (1.27)	-440.7	205.7	-2.143	< 0.05*
	20. Associating the new words with known opposites	2.23 (1.11)	752.5	255.6	2.944	< 0.01**
Metacognitive	32. Watching television programmes	3.44 (0.590)	650.3	218.2	2.981	< 0.01**
	34. Reading newspapers or magazines	2.41 (0.908)	601.8	261.9	2.298	< 0.05*

Table 3.3 Vocabulary Learning Strategies for Which Mean Ratings for Undergraduates Were Significantly or Marginally Higher than Mean Ratings for Postgraduates

VLS	Mean scores (*SD*) undergraduates	Mean scores (*SD*) postgraduates	*t*-test
7. Asking the teacher about their meanings	2.86 (0.979)	1.59 (0.959)	$t = -5.1113$ $p < 0.001$***
16. Volunteering to say the words loudly in class if the teacher asks	2.24 (1.217)	1.50 (1.225)	$t = -2.3747$ $p = 0.09$
25. Writing the words with all the opposites I know	1.67 (1.144)	1.09 (0. 921)	$t = -2.2805$ $p = 0.1$

Two-tailed *t*-tests with *p*-values adjusted for multiple comparisons with a false discovery rate correction (Benjamini & Hochberg, 1995) showed that only one strategy was used significantly, and a further two marginally more frequently, by undergraduates compared to postgraduates, reflecting the infrequent use of VLS in general among undergraduate participants. Notably, two of the strategies that undergraduates used more frequently than postgraduates are social strategies involving simple classroom interaction (7 and 16). All strategies were relatively simple and focused on the word in isolation rather than in context.

In contrast, Table 3.4 lists all VLS for which the mean ratings for postgraduates were significantly or marginally higher than the mean ratings for undergraduates. Two-tailed *t*-tests with *p*-values adjusted using a false discovery correction showed that seven strategies were used significantly or marginally more frequently by postgraduates compared to undergraduates. Notably, all but two of these strategies serve to consolidate and memorise already learned

words. Moreover, postgraduates use strategies that allow them to process words in their sentential and conversational contexts (2, 34, 35, 36 and 37) more frequently than undergraduates. Finally, some of the strategies that postgraduates use more frequently than undergraduates are related to living in an L2 environment and the opportunities to engage with the L2 that go along with this (36, 37 and possibly 34, 35).

3.6.3.4 Individual Differences

This section focuses on individual learner styles (RQ3) using cluster analysis. This procedure allows us to group participants with similar VLS profiles and has the ability to uncover different learner styles.

Table 3.4 Vocabulary Learning Strategies for which Mean Ratings for Postgraduates were Significantly or Marginally Higher than Mean Ratings for Undergraduates

VLS	Mean scores (*SD*) undergraduates	Mean scores (*SD*) postgraduates	*t*-test
2. Reading the whole text aloud before searching for the meaning of the new words	1.57 (1.323)	2.27 (0.985)	$t = 2.4827$ $p = 0.08$
6. Using English/English dictionary	1.24 (1.269)	2.41 (1.221)	$t = 3.6714$ $p < 0.01$**
31. Connecting the English words with other words in English which have the same sound, like *meat* and *meet*, etc.	1.53 (0.737)	2.59 (1.141)	$t = 3.9998$ $p < 0.01$**
34. Reading newspapers or magazines	1.55 (1.276)	2.41 (0. 908)	$t = 3.2271$ $p < 0.05$*
35. Reading stories or novels	1.41 (1.257)	2.14 (1.167)	$t = 2.3735$ $p = 0.09$
36. Speaking English with my friends inside or outside school	1.57 (1.258)	2.64 (1.002)	$t = 3.814$ $p < 0.01$**
37. Speaking English with non-Arabic speakers in shops, hospitals, restaurants, etc.	2.53 (1.386)	3.32 (1.041)	$t = 2.6475$ $p = 0.07$

We used a K-means clustering approach, an unsupervised machine learning algorithm that identifies a predetermined number of groups in the data. One issue with this approach is to determine the right number of clusters (*K*) for the analysis. We did this using the NbClust package in R (Charrad, Ghazzali, Boiteau, & Niknafs, 2014). The NbClust function uses 30 different approaches

for finding the optimal number of clusters in a data set and determines which number of clusters is considered optimal in the largest number of approaches. The optimal number of clusters was 2. Inspection of the groups suggests that the first cluster represents learners with infrequent VLS usage overall (24 undergraduates and 10 postgraduates). The second cluster includes learners with frequent VLS usage overall (25 undergraduates and 12 postgraduates). In particular, the mean usage ratings for all VLS were numerically lower and the mean usage ratings for 26 of the 37 VLS were statistically significantly lower (Welch two-sample *t*-tests with *p*-values adjusted with a false discovery rate correction, all $t > 2$, all $p < 0.05$) for participants in the first cluster than for participants in the second cluster.

Next, a linear regression model tested whether the level of education and the VLS profile (as established through the cluster analysis) relate to vocabulary size. The model included level of education (undergraduate vs. postgraduate), the VLS profile (low vs. high VLS use) and their interaction as independent variables and vocabulary size as dependent variable. The interaction did not significantly contribute to model fit and was removed. The results show a significant main effect for both level of education (estimate = -3375.2, std. error = 213.7, $t = -15.478$, $p < 0.001$***) and VLS profile (estimate = -496.9, std. error = 197.8, $t = -2.102$, $p < 0.05$*). This suggests that using more VLS in general is related to larger vocabulary size independently of level of education.

3.6.4 Discussion

Results from Study 2 indicated that Saudi postgraduates' vocabulary size is considerably higher than that of undergraduates. Postgraduate vocabulary size showed significant relationships with several strategies that involve considering words in their sentential and conversational context. In addition, VLS used more frequently by undergraduates tended to focus on words in isolation and simple classroom interactions, whereas VLS used more frequently by postgraduates tended to focus on words in their sentential and discourse contexts. Finally, we determined two groups of learners which differed in their overall use of VLS rather than in preferring certain VLS over others. These findings are discussed in more detail in the next section.

3.7 General Discussion

3.7.1 Participants' Vocabulary Size

The findings of this study indicate that undergraduates' and postgraduates' vocabulary sizes are comparable to findings from previous studies that measured Saudi students' vocabulary size (e.g., Al-Akloby, 2001; Al-Hazemi, 1993; Al Qahtani, 2005; Alsaif, 2011; Masrai, 2015). None of the undergraduates met the suggested vocabulary thresholds for performing well in basic communication, general reading comprehension, reading academic or authentic texts, comprehending authentic materials or understanding spoken discourse (Al-Masrai & Milton, 2012; Hirsh & Nation, 1992; Laufer, 1997; Milton, 2009; Nation, 2006). All postgraduates met the threshold for general reading comprehension and performing well in basic communication (Laufer, 1997; Milton, 2009). In addition, a majority of postgraduates met Hirsh and Nation's (1992) suggested thresholds for reading academic and authentic texts, reflecting that their vocabulary knowledge is adequate. Our results support Fu's (2005) argument that lexical attainment is often problematic for many L2 students, even for advanced learners.

Previous studies have linked the low vocabulary size among Saudi students to the late beginning of English instruction within Saudi public schools (grade 4, 10 years old), the classroom environment, instructional approaches, teachers' experience, word difficulty variables and morphological processing (Alsaif, 2011; Masrai, 2016; Masrai & Milton, 2015). The results from the current studies suggest that the infrequent use of VLS may relate to Saudi undergraduates' low vocabulary uptake. The results also suggest that undergraduates may benefit from quite simple and easily implemented VLS, such as asking about a word's meaning in class. However, students may not always be aware of the benefits of such simple strategies. EFL instructors could therefore emphasise the importance of VLS to students or provide students with a repertoire of VLS that are relevant for their level of knowledge and that students can draw from when learning vocabulary.

3.7.2 Relationship between VLS Use and Lexical Knowledge

Our first research question (RQ1) explored which VLS relate positively and significantly to vocabulary size in both groups. These strategies are *guessing the meaning of words from context*, and *watching television programmes*. Notably, the strategy of *guessing the meaning from context* related to vocabulary size in both groups and was the only VLS that was significant at the $p < 0.001$ level in the undergraduate group. This finding supports previous studies, which also found significant relationships of this VLS and vocabulary size (e.g. Al Qahtani, 2005; Alsaif, 2011). Since guessing the meaning of words from context relates to vocabulary size in several studies, it is worth exploring whether using this strategy increases one's vocabulary size or whether participants with larger vocabulary sizes simply have more opportunities to use this strategy. In order to guess the meaning of words from context, learners need to have adequate knowledge about the vocabulary and grammatical structures in the context. Furthermore, the more words, grammatical structures and sentences in context learners understand, the easier it becomes for them to guess an individual unknown word from the context. Lexical inferencing strategies are also useful as test-taking strategies when using a dictionary is not an option. Thus, students with substantial English test-taking experience may be more effective users of this particular strategy. Even when dictionary use is an option, being able to guess the meaning of words from context, although possibly more error-prone, is more time-efficient than looking up words in a dictionary. If this is the case, then learners with larger vocabularies and more confidence to guess correctly may simply choose to employ this more time-efficient strategy more often than learners with smaller vocabularies. Alternatively, using this strategy may actually benefit vocabulary acquisition. In particular, in order to successfully guess the meaning of a word from context, the learner needs to engage with the material in-depth (Ellis, 1995; Hulstijn, 2001). This involves engagement such as determining the meaning of surrounding words, the grammatical structures and thematic roles of the surrounding sentences, the topic and broader context of the text. Such deep engagement with the text may actively increase learners' vocabulary knowledge, possibly by strengthening associative bonds between words (Richards, 1976). However, previous studies on this topic have found inconclusive results: While Shangarfam, Ghorbani, Safarpoor and Maha (2013) found an advantage for guessing word meaning

overlooking words up, Mondria (2003) did not.

Interestingly, another VLS which positively related to vocabulary knowledge in both groups is watching television programmes. This strategy actually requires learners to guess unknown words from context, as speech in television programmes is typically too fast to allow looking up vocabulary. In addition, it is possible that only students with sufficient confidence in their lexical inferencing ability attempt to watch English-language television. Overall, our results support a connection between guessing strategies and vocabulary size; however, more studies with larger sample sizes, especially at the postgraduate level, are needed to determine whether these strategies increase learners' vocabulary knowledge.

It is also noteworthy that three of the memory strategies in the postgraduate group related negatively to vocabulary size. All of these strategies involved basic strategies that relate to words in isolation rather than in context, such as *saying words repeatedly to learn their sounds* or *writing words repeatedly to learn their written forms*. It is very unlikely that using such strategies would decrease learners' vocabulary size. Rather it seems that learners with smaller vocabulary sizes, to begin with, may select these strategies more frequently than learners who already have larger vocabularies.

Our results also suggest that the interrelationship between vocabulary acquisition and VLS use might be more sophisticated than what is reported in the literature. In particular, only two strategies showed reliable positive relationships with vocabulary size in both groups of students. This suggests that there are some strategies which may be beneficial for certain learner groups or learners of certain proficiency levels, but not for others. In line with Alsaif (2011) and Alqurashi (2013), the most frequent type of strategy that related to learners' vocabulary size in the current study was memory strategies. However, not all memory strategies related positively to vocabulary size, with some of the more basic memory strategies associated with learners with small vocabularies. Contrary to results from Hamzah et al. (2009) and Tanyer & Ozturk (2014), only one social strategy in each group related to learners' vocabulary size. This suggests that the undergraduates, and even some postgraduates, in the current study focused on and may have benefited from strategies that encourage rote learning and memorisation. Further studies with larger sample sizes are needed to determine which strategies may potentially be beneficial for which learner groups.

3.7.3 Comparison of VLS Use across Groups

RQ2 focused on strategies which postgraduates use significantly more or less frequently than undergraduates. The current results revealed that undergraduates only used three strategies significantly or marginally more often than postgraduates. Moreover, all of the VLS are simple strategies that consider words in isolation and represent strategies that are typically part of the normal routine in the EFL classroom and thus represent expected classroom behaviour, such as volunteering to say words aloud in class or asking the teacher about a word's meaning. In contrast, postgraduates take advanced content classes in their field of study with little opportunity to volunteer to say words aloud in the class. In addition, students may consider asking the teacher about a word's meaning inappropriate in advanced content-based classes. This highlights that the learning environment in the classroom may be more or less conducive to the use of certain VLS. In addition, there is no evidence that undergraduates used any VLS that are more complex or occur outside of the classroom more frequently than postgraduates.

Postgraduates used seven strategies reliably or marginally more frequently than undergraduates. Again, some of these strategies seem to be related to postgraduates' current learning environment. As students in an L2 environment, postgraduates have ample opportunity to interact with native English speakers and other international students in English. Postgraduates also make use of advanced metacognitive and social strategies, such as reading newspapers or magazines and stories or novels or interacting with speakers in English inside and outside of the classroom. This suggests that postgraduates are actively engaging with authentic English language materials and English language speakers, which are more readily available in the L2 environment compared to the L1 environment of the undergraduates. In addition, postgraduates are more likely to use VLS outside of the classroom environment.

3.7.4 Individual Differences

We used cluster analysis to explore whether there were any distinct VLS

profiles or learning styles (RQ3). Cluster analysis determined two VLS usage profiles: overall infrequent VLS usage and overall frequent VLS usage. We thus found no evidence for different types of learner styles, such as visual learners compared to auditory learners, a preference for speaking compared to listening, or a preference for social compared to memory strategies, when it comes to VLS. Our results thus do not support the claim that individual learner profiles "might do more justice to the individuality of the language learner" (Skehan, 1986, p. 82). These results also suggest that asking instructors to cater to individual vocabulary learner styles may not be warranted, an argument which is in line with that of Pashler et al. (2008). However, it may also be the case that the learners do have individual learner styles, but do not have sufficient awareness of their needs as a learner to select VLS that work well for their particular learner style. We did, however, find that participants who reported using VLS more frequently overall had significantly larger vocabulary sizes and that this effect occurred in addition to whether they were undergraduates or postgraduates. This finding is in line with that of Sanaoui (1992) and Kojic-Sabo and Lightbown (1999), who concluded that frequent and elaborate usage of VLS was related to high achievement levels. Gu & Johnson (1996) also contended that both learners' vocabulary knowledge and language proficiency appear to be related to certain learning aspects, such as learners' motivation in language acquisition, the ability to use dictionaries and the willingness to spend additional time on practicing novel acquired lexical items. However, our findings contrast with that of Lessard-Clouston (1996), who did not find any relationship between frequent usage of VLS and language learning success. It is thus possible that both the quantity and quality of VLS are involved in language learning success, and that quantity alone may not necessarily relate to higher success in language learning.

Overall, the results of our study suggest that VLS usage in general positively relates to vocabulary size. It seems that learners who show greater engagement with VLS overall also have larger vocabularies, irrespective of educational level. Again, the directionality of this result is not clear. It is possible that engagement with the learning process through the frequent use of VLS might lead to larger vocabulary sizes (e.g., Hamzah et al., 2009; Tanyer & Ozturk, 2014). However, another possibility is that learners who already have larger vocabularies have more means to engage with VLS, especially those that require a certain vocabulary base, such as reading newspapers, interacting with other speakers outside of the

classroom, etc.

3.8 Conclusion

This study highlighted the VLS use of students in higher education and the relationship of VLS with students' breadth of vocabulary knowledge. The results showed that postgraduates had overall larger vocabulary sizes and used more strategies that considered lexical items in their sentence and discourse contexts than undergraduates. The strategies of *guessing the meaning of words from context* and *watching television programmes* stood out among the VLS because they related positively to vocabulary size in both groups. Cluster analysis provided two VLS usage profiles which differed in the frequency of VLS use overall rather than in terms of individual learner styles. Frequency of VLS use and educational level were found to be independently related to learners' vocabulary size. The results tentatively suggest that VLS use overall should be encouraged in the EFL classroom, that guessing strategies may possibly contribute to vocabulary size in both undergraduates and postgraduates, and that students may not differ enough in terms of their learning styles to justify asking teachers to cater to individual learning styles.

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CHAPTER FOUR

Study II[1]

Student contribution

This chapter consists of two general sections; the first section is a published article, and another section with additional data analyses and research questions. The researcher was the first author for the published article, and his contribution includes: study design, which was enlightened by supervisor feedback and guidance, data collection, data analysis under the guidance of the supervisor, writing the first draft and revising drafts based on supervisor feedback and guidance as well as reviewer feedback.

Exploring the effect of lexical inferencing and dictionary consultation on undergraduate EFL students' vocabulary acquisition

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[1] Sections 4.1 to 4.12 of this chapter represent a published article in the journal PlosOne. Sections 4.13 to 4.16 present additional research questions and analyses from the study that are not part of the published research article.

Abstract

This study compares how lexical inferencing and dictionary consultation affect L2 vocabulary acquisition. Sixty-one L1 Arabic undergraduates majoring in English language read target words in authentic English reading materials and were either asked to guess their meaning or look it up in a dictionary. A pre- and delayed post-test measured participants' knowledge of target words and overall vocabulary size. The results show a significant and comparable learning effect for both vocabulary learning strategies (VLS), with a higher pre-test vocabulary size related to a larger learning effect for both VLS. In addition, the better participants were at guessing correctly, the better they learned words through inferencing. The results suggest that both VLS are equally effective for our learner group and that learners' overall vocabulary size influences the amount of learning that occurs when using these VLS.

Keywords: Vocabulary acquisition; vocabulary learning strategies; vocabulary size; lexical inferencing; dictionary consultation.

4.1 Introduction

Vocabulary acquisition is a fundamental aspect of foreign language learning that positively impacts the learning and communicative developments in that language (Nation, 2001) and that is vitally important for adequate and efficient communication (Alavi & Kaivanpanah, 2006). Moreover, inadequate vocabulary knowledge can be a major obstacle in acquiring a target language (Folse & Briggs, 2004). Despite its value, vocabulary has not received the same attention that second language instructors and researchers have bestowed on other aspects of language, such as grammar and phonology. Lewis (1993) criticized this neglect by stating that "language consists of grammatical lexis, not lexicalized grammar" (p. 95). Since then, research on vocabulary acquisition has increased (Coady, 1997; Jordaan, 2011; McCarthy, 1990; Nation, 1990; Nation, 2001; Schmitt, 1997; Wang, 2007) and instructors and course designers have increased their focus on how learners acquire and retain new words.

4.2 Vocabulary Learning Strategies

A good number of foreign and second language learners adopt what is known as vocabulary learning strategies (VLS), either inside or outside of the classroom. Catalan (Catalan, 2003) defined VLS as mechanisms that language learners typically apply to determine the meaning of unknown lexical items, retrieve them from long-term memory and apply them in verbal and written situations. The current study focuses on two particular VLS: guessing the meaning of words from context (lexical inferencing) and looking words up in a bilingual dictionary (dictionary consultation). We focus on these two strategies because they are among the most frequently used as reported by learners (Çelik & Toptaş, 2010; Fan, 2003; Hamzah, Kafipour, & Abdullah, 2009; Komol & Sripetpun, 2011; Schmitt, 1997) and previous studies have yielded conflicting results in terms of the learning effect that both strategies yield (Akpınar, Aşık & Vural, 2015; Ali, Mukundan, Ayub, & Baki, 2011; Amirian & Momeni, 2012; Shangarfam, Ghorbani, Safarpoor & Maha, 2013; Zaid, 2009; Zou, 2016).

Following Schmitt's (1997) VLS taxonomy, both lexical inferencing and dictionary consultation are discovery strategies, which are employed to learn new words, rather than consolidation strategies, which are employed to remember initially learned words. Discovery strategies are further subdivided into determination strategies, which provide a set of limited choices to learn new words, and social strategies, which

refer to the cooperation with others to learn new words. Both lexical inferencing and dictionary consultation constitute determination strategies. While learners use various VLS when reading a written text in the target language (Harley & Hart, 2000; Qian, 2004), some VLS seem to be more popular than others. As mentioned above, both dictionary consultation and lexical inferencing are rather popular (Çelik & Toptaş, 2010; Fan, 2003; Hamzah et al., 2009; Komol & Sripetpun, 2011; Schmitt, 1997), possibly because they are quite easily implemented.

4.3 Processing depth

Many second language researchers assume that deeper processing and more elaboration of lexical information will increase retention compared to less deep processing and less elaboration (Hulstijn, 2001). This assumption is expressed in a number of psycholinguistic theories of vocabulary retention (e.g. Craik & Lockhart, 1972; Hulstijn & Laufer, 2001; Nation, 2001; Nation & Webb, 2011). Craik and Lockhart's (1972) Level of Processing theory was one of the early theories on retention emphasising that learners could engage with novel materials either shallowly or in depth.

Hulstijn and Laufer's (2001) more recent Involvement Load Hypothesis operationalises the concepts of processing depth and elaboration for L2 vocabulary learning. They introduce the notion of involvement load, made up of the components *need*, *search* and *evaluation*. Need is a motivational component that considers who has set the particular task of determining the meaning of a word. Need is moderate if an instructor sets this task for learners (e.g. by asking learners to look up a specific lexical item), and it is strong if learners set this task for themselves (e.g. deciding to look up a certain target word when reading a text). Search is a cognitive component that refers to whether the meanings of the new lexical items are given to learners (e.g. by providing them in the margins) (Hu & Nassaji, 2016) or whether they need to find them. Search is absent in the former case, and present in the latter. If search is present, it can be moderate if learners have to engage in receptive retrieval (e.g. looking for the meaning of a target word) or strong if learners have to engage in productive retrieval (e.g. determining the form of a target word) (Hulstijn & Laufer, 2001). Finally, evaluation is a cognitive component that refers to whether learners have to compare or combine the new lexical items with other words. Evaluation is moderate when learners compare the meaning of the target lexical item with other words' meanings (e.g. comparing multiple

meanings of the word *bank* against the provided context). Evaluation is strong when learners need to assess how the new word can combine with other words in a specific linguistic context (e.g. determining how the target word *intellectual* fits in with other words in an original sentence) (Hulstijn & Laufer, 2001). The stronger these three components are, the greater is the involvement load and the better is the retention of the new lexical items (Hulstijn & Laufer, 2001). To estimate involvement load for a task, scores are assigned to the strength of each component: 0 if a component is absent, 1 if it is moderate, and 2 if it is strong.

The Technique Feature Analysis is another more recent theoretical framework for lexical learning (Nation & Webb, 2011). It involves five factors that affect the depth with which learners process new lexical items that they encounter: *motivation*, *noticing*, *retrieval*, *generation* and *retention*. Each factor has associated questions about the particular task that learners are engaged in. Questions are posed such that a *yes* response captures a type of elaboration or processing that has been suggested to facilitate vocabulary learning (see, Webb, 2012). For each question that can be answered with a *yes*, the task therefore receives 1 point for a possible total of 18 points. The complete set of questions from the Technique Feature Analysis is given in Table 4.1 in the following section.

4.4 Lexical Inferencing

Guessing or inferring meaning from context usually involves "direct mental operations" (Hedge, 2001) (p. 117) to comprehend, categorize, store and memorize target words. It is generally assumed that a rather high amount of lexical text coverage is needed to successfully infer unknown lexical items from context. For example, Nation (2006) suggests that 98% of text coverage is needed for adequate comprehension and successful lexical inferencing. This amount of coverage requires a vocabulary size in terms of breadth of between 8000 and 9000 words (Laufer & Ravenhorst-Kalovski, 2010). Lexical inferencing is thought to enhance student autonomy in vocabulary acquisition (McCarthy, 1990; Shangarfam et al., 2013).

Haastrup (1990) suggests that inferencing includes "informed guesses as to the meaning of a word in the light of all available linguistic cues in combination with the learner's general knowledge of the world, her awareness of the co-text and her relevant linguistic knowledge" (p. 39). Haastrup (1990) mentions three major sources of

knowledge involved in guessing. Intralingual cues refer to knowledge from the target language. Interlingual cues refer to knowledge from the native language or any other foreign language. Contextual cues involve knowledge of the world and the linguistic context. Inappropriate use of these cues might lead to incorrect guesses (Bensoussan & Laufer, 1984). Some researchers suggest that the presence of clear textual cues besides the existing linguistics clues are vital components for correct lexical inferencing (Haastrup, 1991; Hulstijn, 1992; Wesche & Paribakht, 2009).

The literature has highlighted several factors which could influence the process of lexical inferencing. These factors fall into two main categories: contextual and learner-related aspects (Hatami & Tavakoli, 2013). Contextual aspects include the importance of the unfamiliar word for text comprehension as a whole and the semantic richness of the context (Brown, 1993; Li, 1988). Learner-related factors comprise the level of attention that the learner dedicates to the provided text and the breadth and depth of his/her vocabulary knowledge (Laufer, 1997; Nassaji, 2006). The learner's level of engagement includes several factors, such as determining the meaning of surrounding vocabulary items, the grammatical structures, the structural character of surrounding sentences, the topic and the broader context of the target text (Hulstijn & Laufer, 2001).

In terms of processing depth and elaboration, the Involvement Load Hypothesis (Hulstijn & Laufer, 2001) assigns a high score of 4 out of a possible 6 to lexical inferencing as it is implemented in the current study, where participants were asked to read a text and guess the underlined words from context. Need is moderate and receives a score of 1 as learners were instructed to do the task, search is also moderate and receives a 1 as participants were engaged in receptive retrieval, and evaluation is high and receives a 2 as learners needed to establish how the word meaning fits into the particular linguistic context.

The Technique Feature Analysis (Nation & Webb, 2011) assigns lexical inferencing as implemented in current study a moderate to high score of 11 out of 18 (see Table 4.1; (Gohar, Rahmanian, & Soleimani, 2018). The task receives 2 points out of 3 for motivation as there is a clear vocabulary learning goal and the activity motivates learning. The task receives all 3 points for the noticing factor because the underlining focuses attention on the target words, the task directly involves new vocabulary learning, and inferencing involves negotiation of meaning (cf. Newton, 1995). Retrieval yields 3 points out of 5 since the target words need to be retrieved through recall and

since there is spacing between the retrieval of successive target words. The task scores 1 out of 3 for generation as target words are encountered in a novel sentence. The task thus involves generative use. Finally, retention scores a 2 out of 4: The task involves instantiation as the written context can help with recall, and it mostly avoids interference as the task does not involve interference from semantic sets.

Table 4.1 Technique Feature Analysis (adapted from Nation & Webb, 2011, p. 7) with points assigned to the tasks of lexical inferencing (LI) and dictionary consultation (DC) as implemented in the current study during training. For a detailed explanation of these questions and the concepts they refer to, see (Webb, 2012).

Factor	Questions	LI	DC
Motivation	Is there a clear vocabulary learning goal?	1	1
	Does the activity motivate learning?	1	1
	Do the learners select the words?	0	0
Noticing	Does the activity focus attention on the target words?	1	1
	Does the activity raise awareness of new vocabulary learning?	1	1
	Does the activity involve negotiation?	1	1
Retrieval	Does the activity involve retrieval of the word?	1	1
	Is it productive retrieval?	0	0
	Is it recall?	1	0
	Are there multiple retrievals of each word?	0	0
	Is there spacing between retrievals?	1	1
Generation	Does the activity involve generative use?	1	1
	Is it productive?	0	0
	Is there a marked change that involves the use of other words?	0	0
Retention	Does the activity ensure successful linking of form and meaning?	0	1
	Does the activity involve instantiation?	1	1
	Does the activity involve imaging?	0	0
	Does the activity avoid interference?	1	1
Total score out of a maximum of 18		11	11

4.5 Dictionary consultation

Many researchers (e.g. Nation, 2008) have noted the impact of dictionary consultation in general as a beneficial strategy for building learners' lexical knowledge. Dictionary consultation promotes reading comprehension and vocabulary acquisition (e.g. Abraham, 2008; Chiu & Liu, 2013; Dziemianko, 2010). However, dictionary consultation might be an obstacle to the development of other VLS (Thornbury, 2002). Specifically, learners relying mostly on basic and straightforward VLS strategies such as dictionary consultation may be reluctant to use more complicated strategies like lexical inferencing. Moreover, Nation (2001) criticizes dictionary usage because it supports the notion that the first language (L1) has exact equivalences of the target language words.

There is no agreement on whether bilingual or monolingual dictionaries promote more successful vocabulary acquisition (Hayati & Fattahzadeh, 2006; Shamshirian, 2015), with some studies highlighting more effective vocabulary acquisition through monolingual dictionary use (Ahangari & Abbasi Dogolsara, 2015), others through bilingual dictionary use (Zarei & Lotfi, 2013), and yet others suggesting that both methods yield comparable outcomes (Hayati & Fattahzadeh, 2006). Differences in learners' proficiency levels may have yielded these discrepant results. Specifically, bilingual dictionary usage is considered to be a beneficial strategy for less proficient learners as it encourages them to link the second language (L2) target word to their first language knowledge, allowing them to use the L1 as a reference to comprehend the L2 (Nation, 1997). Furthermore, Kroll and Curley (1988) argue that new L2 vocabulary is effectively stored in the lexicon if it is linked to its L1 equivalent. In contrast, monolingual dictionaries may be more beneficial for more proficient learners (Nation, 1997).

Numerous researchers have discussed the depth of cognitive processing involved in dictionary consultation. For instance, Scholfield (1999) argues that dictionary consultation involves exploring a target word's spelling, inflections and part of speech in addition to establishing the word's meaning, all of which contributes to vocabulary retention. In line with this, Liu et al. (2014) suggest that dictionary consultation can involve deep cognitive processing (1) when considering unknown lexical features, (2) through repeated exposure to unfamiliar vocabularies, and (3) by detecting headwords

and word syllables in dictionary content. In contrast, O'Malley and Chamot (1990) argue that dictionary consultation involves a low degree of conceptual processing.

In terms of processing depth and elaboration, the Involvement Load Hypothesis (Hulstijn & Laufer, 2001) assigns a high score of 4 to dictionary consultation as implemented in the current study, where participants read a text and were asked look up the meaning of underlined words in a bilingual dictionary. Specifically, need receives a 1 as learners were instructed to engage in dictionary consultation, search receives a 1 as learners engaged in receptive retrieval, and evaluation receives a 2 as learners needed to decide which of the suggested translations in the dictionary entry fits the sentence context.

The Feature Technique Analysis (Nation & Webb, 2011) assigns a moderate to high score of 11 out of 18 to dictionary consultation as implemented in the current study (see Table 4.1). Dictionary consultation scores identically to lexical inferencing, with two exceptions: In contrast to lexical inferencing, the type of word retrieval through dictionary consultation does not involve recall. While lexical inferencing involves recall, i.e. retrieving the meaning of target words from memory, dictionary consultation does not, but instead recognition of the correct translation among a number of choices. Furthermore, while lexical inferencing does not ensure that form and meaning are successfully linked because learners can guess incorrectly, dictionary consultation mostly allows for the successful linking of form and meaning.

4.6 Vocabulary acquisition through lexical inferencing vs. dictionary consultation

The previous two sections have shown that the Involvement Load Hypothesis (Hulstijn & Laufer, 2001) and Feature Technique Analysis (Nation & Webb, 2011) assign the same number of points with a moderate to high score to lexical inferencing and dictionary consultation as they are implemented in the current study. These approaches thus predict that both strategies should yield a sizeable learning effect.

Numerous studies have explored how lexical inferencing and dictionary consultation affect vocabulary acquisition. Shangarfam et al. (2013) examined the impact of bilingual dictionary consultation and guessing from context on learners' ability to select the appropriate vocabulary item in a fill-in the blank exercise. Participants were explicitly taught inferencing procedures and finding a word's meaning

in a bilingual dictionary. The pre- and post-tests were multiple choice fill-in-the-blank exercises, where participants had to decide which of four words correctly fills the blank. The results indicated that the context-guessing group significantly outperformed the dictionary look-up group in terms of selecting the correct vocabulary item in the post-test fill-in-the-blank task. This suggests that practicing inferencing strategies increases performance at tasks that require guessing meaning from context.

In contrast, other studies found better vocabulary acquisition through dictionary consultation (mostly using bilingual dictionaries) than through guessing (e.g. Amirian & Momeni, 2012; Knight, 1994; Prince, 1996; Zou, 2016). Participants in Zou (2016) read a text, either translated ten underlined words using a monolingual dictionary or inferred the meaning of the underlined words, and answered comprehension questions about the text. Participants were tested on the meanings of the underlined words in both immediate and delayed post-tests. Results showed better vocabulary acquisition for the dictionary consultation strategy compared to inferencing.

Still other studies found that both strategies similarly assisted learners' vocabulary acquisition (e.g. Çiftçi & Üster, 2009; Zaid, 2009). Participants in Mondria (2003) either looked up the translation of target words in a provided word list or guessed the meaning of target words from context and then verified their guess through the provided words list (to prevent learning incorrect meanings for target words). Participants in both groups had similar vocabulary retention levels, but the guessing-plus-verifying method was significantly more time consuming than the look-up strategy.

4.7 How lexical inferencing and dictionary consultation relate to vocabulary size

Several studies have found relationships between the frequency of using lexical inferencing and dictionary consultation strategies and learner's vocabulary size (e.g. Gu & Johnson, 1996; Hatami & Tavakoli, 2013). For example, Alahmadi, Shank & Foltz (2018), found a significant positive relationship between learners' vocabulary size and how frequently learners reported guessing the meaning of words from context. In the same vein, Gu and Johnson (1996) found that contextual inferencing and dictionary use positively correlated with participants' vocabulary knowledge. While it is likely that increased dictionary use leads to a larger vocabulary size rather than the other way

around, the same is not necessarily the case for lexical inferencing. Specifically, it is possible that successfully guessing word meaning from context increases learners' vocabulary size, but it is also conceivable that learners with larger vocabularies use this strategy successfully more often than learners with smaller vocabularies. Specifically, learners with larger vocabulary sizes have greater lexical coverage and may thus be able to engage in lexical inferencing more successfully (Nation, 2006).

4.8 The current study

This study examines whether lexical inferencing or dictionary consultation supports initial learning and retention of English vocabulary among male and female Saudi senior undergraduate English-major students. We exposed students to target words in authentic reading materials and measured their knowledge of these target words and their overall vocabulary knowledge in terms of breadth prior to and following exposure. During the exposure phase, students were asked to guess the meaning of some of the target words and to look up the meaning for others in a dictionary. The pre- and delayed post-tests allowed us to calculate a learning effect in both the guessing and dictionary conditions. We explored whether these two vocabulary learning strategies impact target word acquisition. The study contributes to the currently rather heterogeneous picture of how lexical inferencing and dictionary consultation contribute to vocabulary acquisition. Unlike many previous studies, we used a within-participant design and a comparatively authentic learning situation, thus emphasizing ecological validity (Chen & Truscott, 2010). Furthermore, our design allowed us to measure the amount of successful lexical inferences. This study intends to answer the following research questions (RQs):

1) Do learners show a larger learning effect for words that were trained in the two training sessions than for words that were not trained?
2) Do learners show a larger learning effect for words that they guessed in the two training sessions than for words that they looked up in a dictionary?
3) Does learners' vocabulary size, previous knowledge of the trained words, success in guessing, success in correctly looking up words and/or success in correctly answering comprehension questions about the texts influence how

large their learning effect is for (a) words that they guessed and (b) looked up in the two training sessions?

4.9 Methodology

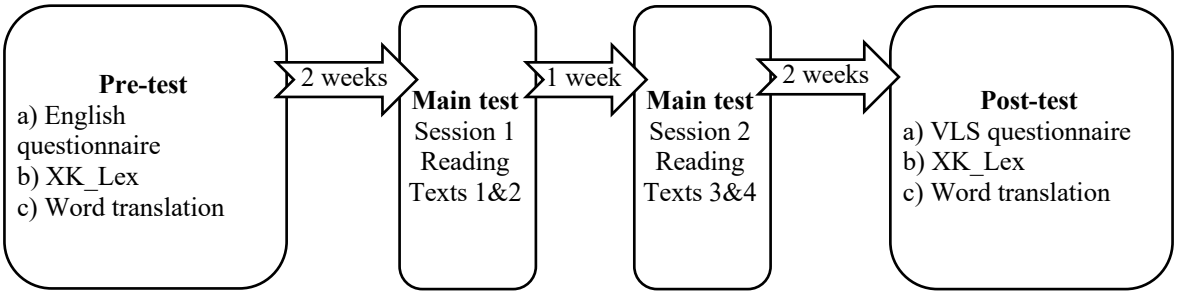
4.9.1 Participants

Sixty-one Saudi senior undergraduate English major students (47 [77%] males; 14 [23%] females) from three different Saudi Universities participated. Participants' ages ranged from 20 to 28 years (M = 22.75; *SD* = 1.63). All participants had Arabic as their first language. They started learning English in grade 4 of primary school and had received approximately 1600 hours of EFL instruction between their public school and university education (Barnawi & Al-Hawsawi, 2017). Two additional participants were excluded because they did not guess or did not look up any target words during the training sessions (see below).

4.9.2 Materials and procedure

The study was approved by the ethics committee of the College of Arts, Humanities and Business at Bangor University (approval number LX-1610). The study involved four sessions, a pre-test, two training sessions and a delayed post-test (see Fig 4.1). During the pre-test, participants completed (a) an English language self-assessment questionnaire gauging their use and knowledge of English, (b) Al-Masrai and Milton's (2012) vocabulary size test XK_Lex, which provides an estimate of learners' breadth of lexical knowledge out of the most common 10,000 words in English, and (c) a translation task gauging participants' knowledge of 48 words that were relevant for the current study. During the two training sessions, participants read four texts (two per test session) that included a vocabulary task and comprehension questions. During the delayed post-test, participants completed (a) a vocabulary learning strategy (VLS) questionnaire, (b) the XK_Lex test again, and (c) the translation task again.

Figure 4.1 The overall study design



4.9.2.1 Pre-test

English-language self-assessment questionnaire. An English-language self-assessment questionnaire, given in Arabic, assessed how participants rated their English knowledge in the four language skills (listening, speaking, reading and writing). The questionnaire recorded demographic information (age, native language). Learners also rated their English generally as near native (4), fluent (3), advanced (2), intermediate (1) or beginner (0) and gauged how frequently they used English outside the classroom using the Likert scale: always (4), frequently (3), sometimes (2), rarely (1) or never (0). Participants then gauged how frequently various statements about reading, writing, listening, and speaking applied to them, using the same Likert scale.

Word translation task. A word translation task before and after training assessed participants' pre-test and delayed post-test knowledge of the words trained during the training sessions. The translation task consisted of 24 target words, which were trained during the main training sessions, and 24 control words, which were not trained during the main training sessions. None of the target or control words were cognates with or loanwords from Arabic (see Appendix F for a list of target and control words).

Target and control words were matched for frequency, difficulty, word length, derivational complexity and part of speech. Target and control words had mean frequencies of 1764 words (*SD* = 2685) and 1745 words (*SD* = 1898), respectively, in the BYU British National Corpus (BYU-BNC; Davies, 2004), which did not differ statistically significantly (generalized linear model with family = "quasipoisson" for overdispersed count data: $\beta = -0.01$, $SE = 0.38$, $z = -0.03$, $p = 0.98$).

A norming study with 16 senior undergraduate English major Saudi students (11 females, 5 males; mean age = 22.38, *SD* = 3.03; self-assessed proficiency level of 2.43, *SD* = 0.72) assessed the target and control words' difficulty levels. Students provided Arabic translations for the target and control words without consulting dictionaries or any other aids, and we counted how many points participants scored in the translation task. Scoring followed Wesche and Paribakht's (2009) system, with participants receiving 1 point for presenting a semantically and syntactically suitable translation, 0.5 points for a partial success, such as providing an incomplete meaning or a semantically but not syntactically applicable response, and 0 points for an incorrect translation. This means that the maximum possible score corresponded to the number of words scored, and scores therefore approximated the number of words known. Participants correctly translated an average of 2.40 (*SD* = 1.86) and 2.13 (*SD* = 2.06) of the 24 target and 24 control words, respectively, which did not differ statistically significantly (generalized linear model with family = "poisson" for count data: $\beta = 0.12$, *SE* = 0.19, $z = 0.62$, $p = 0.53$).

Letter counts revealed that target and control words had mean word lengths of 8.96 letters (*SD* = 1.90) and 7.86 letters (*SD* = 3.05), respectively, which did not differ statistically significantly (generalized linear model with family = "poisson" for count data: $\beta = 0.13$, *SE* = 0.10, $z = 1.29$, $p = 0.20$). Target and control words had mean derivational complexities (as number of derivational affixes) of 0.58 (*SD* = 0.65) and 0.42 (*SD* = 0.50), respectively, which did not differ statistically significantly (generalized linear model with family = "poisson" for count data: $\beta = 0.34$, *SE* = 0.41, $z = 0.81$, $p = 0.42$). Finally, there was no significant difference in how the parts of speech noun, verb, adjective and adverb were distributed across the target and control word lists (Pearson's Chi-squared: $\chi^2 = 3.82$, $df = 3$, $p = 0.28$).

Overall, this suggests that target and control words are quite well matched for frequency, difficulty, word length, derivational complexity and part of speech. It needs to be noted though that the absence of statistically significant differences in the above tests does not provide evidence for equivalence (Lakens, 2017). Instead, matching merely ensures that target and control words are relatively comparable across a range of factors. Importantly for the current study, participants in the norming study correctly translated only a minority of target and control words, suggesting that their knowledge of these words is not already at ceiling.

The XK_Lex vocabulary size test. The XK_Lex test (Al-Masrai & Milton, 2012), assessed participants' vocabulary knowledge in terms of breadth out of the most familiar 10,000 words in English. The test estimates the number of lemmas, i.e. the number of headwords and some inflected and reduced forms (Nation, 2001), that learners know. For instance, the lemma for the word *perform* includes *performs*, *performed* and *performing*, but not *performer*. Participants selected the words they knew from a total of 100 words spread across ten columns with ten words per column. Each column contained eight real words and two pseudo-words (to minimise the influence of guessing on learners' responses) for a total of 80 real words and 20 pseudo words. Participants' vocabulary size (as number of lemmas) was calculated using the following formula.

1. vocab size = ∑ selected real words * 100 – ∑ selected pseudo words * 500

We selected the XK_Lex test for numerous reasons: It is considered to be a reliable and valid test to measure participants' breadth of lexical knowledge (Al-Masrai & Milton, 2012) and has been used in various previous studies (e.g. Masrai, 2020; Masrai & Milton, 2018; Wang-Taylor & Milton, 2019). It is quick and easy to administer (Meara, 1989), taking only about 5 to 10 minutes. It is therefore less time-consuming than, for example, the Vocabulary Levels Test (VLT; Nation, 1983), revised by (Schmitt, Schmitt & Clapham, 2001) or the Vocabulary Size Test (VST; Nation & Beglar, 2007), which take 30 to 45 minutes to administer (Enayat, Amirian, Zareian & Ghaniabadi, 2018; McLean, Hogg, & Kramer, 2014). Since we were testing university students, we expected some students to have vocabulary sizes above 5,000, but below 10,000. We therefore chose a test that covers all frequency bands from 1,000 to 10,000 (Al-Masrai & Milton, 2012) as opposed to, for example, the VLT (Schmitt et al., 2001), which skips bands 6,000 through 9,000.

We also chose the XK_Lex because it is less likely to overestimate vocabulary knowledge than some other tests: First, its unit of word count is the lemma, as opposed to the word family used in many other vocabulary knowledge tests, including the VLT (Schmitt et al., 2001) and VST (Nation & Beglar, 2007). Lemmas are less likely to overestimate vocabulary knowledge because learners can typically easily derive inflected forms from the headword, but may not know all members of a word family (Kremmel, 2016), which tests based on the word family assume. Furthermore, the multiple choice format of the VLT (Schmitt et al., 2001) and VST (Nation & Beglar,

2007) may overestimate learners' vocabulary size (Stewart, 2014). In contrast, the XK_Lex (Al-Masrai & Milton, 2012) includes pseudo-words to control for the potential amount of guessing.

Pre-test Procedures. Participants were tested in their classrooms at three Saudi universities. They gave informed consent immediately before the pre-test. As part of this, they could consent to grant the researcher access to their academic Grade Point Average (GPA), which was used as a general estimate of their English language academic performance (Ginther & Yan, 2018; Roche & Harrington, 2013), reflecting long-term monitoring of students' language level in a degree program with more than 95% of academic classes delivered in English. After giving consent, students completed the English-language self-assessment questionnaire, the word translation task, and the XK_Lex vocabulary size test. Participants' were then grouped into a low and high English proficiency level. Specifically, each participant whose scores for the GPA, translation task and vocabulary size test were below the median scores for two or more of these measures was considered to have low English proficiency and vice versa.

4.9.2.2 Training

Counterbalancing. Participants were distributed across two groups (A and B). Assignment to groups was not entirely random. Instead, participants with low English proficiency were randomly distributed across these two groups; separately, participants with high English proficiency were randomly distributed across both groups. This was done to ensure a spread of abilities across both groups, with half the participants in each group having low vs. high English proficiency, respectively. We refrained from an entirely random assignment of participants to minimize proficiency differences across the two groups. Specifically, we wanted to avoid a situation where the majority of participants in one group have high English proficiency, whereas the majority of participants in the other group have low English proficiency. Text order and task (lexical inferencing or dictionary consultation) during the two training sessions were also counterbalanced across the two groups, as illustrated in Table 4.2. Notice that this counterbalancing ensured that both groups engaged in the guessing tasks and in the dictionary tasks at the same time, e.g. while one group engaged in guessing with Text 1, the other group also engaged in guessing, but with Text 2. This allowed us to better

check that participants were actually following instructions. Specifically, during guessing tasks, the experimenters ensured that participants in both groups were not using a dictionary. During dictionary tasks, the experimenters observed that learners were frequently using a bilingual dictionary of their choice, mostly through apps on their phones. While we cannot entirely rule out that some participants may have guessed some words during a dictionary task, the frequent dictionary use suggests that, if this happened, it should have been a rather rare occurrence.

Table 4.2 Overview of the study's counterbalancing.

Groups	A	B
Session 1	Task 1: Text 1 Guessing	Task 1: Text 2 Guessing
	Task 2: Text 2 Dictionary	Task 2: Text 1 Dictionary
Session 2	Task 1: Text 3 Dictionary	Task 1: Text 4 Dictionary
	Task 2: Text 4 Guessing	Task 2: Text 3 Guessing

Reading Texts. The four texts used for training were adapted from two primary English textbooks (De Chazal & Rogers, 2013; Schmitt & Schmitt, 2011). All four texts had a moderate level of difficulty, especially regarding vocabulary, which we considered to be well suited for undergraduate students majoring in English (see Appendix G). Individual vocabulary items that were deemed too specialized (for example, medical terminology) or culturally inappropriate were replaced with more appropriate words. All texts had similar lengths, which was achieved by shortening longer texts.

Six words in each text, corresponding to the target words in the pre- and delayed post-test word translation tasks, were underlined (4 texts x 6 words = 24 target words). Students were asked to provide the Arabic meaning for each underlined word. For two texts, they translated all the underlined words that they knew, and looked up the remaining words in a dictionary. For the remaining two texts, participants translated all the underlined words that they knew, and guessed the meaning of the remaining words from context. In both cases, participants engaged in translation from the L2 to the L1, which is generally considered to be easier for learners than translation from the L1 to the L2 (Laufer & Goldstein, 2004). Two different response columns were provided, and

participants were asked to write their translation in the first column if they already knew the word and in the second column if they had looked up or guessed the word. Each text was followed by two multiple-choice text-comprehension questions. There was no time restriction to complete the task, but most participants completed it in about 20 minutes. Participants completed the two training sessions two weeks and three weeks, respectively, after the pre-test.

Scoring. The first author rated participants' translations of underlined words in line with Wesche and Paribakht's (2009) scoring system. As in the pilot study, participants received 1 point for presenting a semantically and syntactically suitable translation, 0.5 points for a partial success, and 0 points for an incorrect translation. A second Arabic-English bilingual coder rated translations from a random subset of 20 participants. Inter-coder agreement was extremely high with 98.75% agreement (Cohen's Kappa $\kappa = 0.987$; $p < 0.001$).

4.9.2.3 Delayed post-test

The delayed post-test occurred two weeks after the second main training session. Participants completed the word translation task, the XK_Lex vocabulary size test, and a vocabulary learning strategy questionnaire. Results from the latter two are beyond the scope of this paper, but we mention these instruments here for reasons of transparency.

4.10 Results

The data and analysis scripts for RQ1 through RQ3 are available on the Open Science Framework at https://osf.io/zsvqk/?view_only=08774f18cd314c219916e30bcfabed27.

4.10.1 Participants' English language profile

Participants rated their English-language proficiency as, on average, 2.32 (SD = 0.71), a value between *advanced* (2) and *fluent* (3). Participants' average vocabulary size during the pre-test of 3331 words (*SD* = 1427), however, is substantially lower than what has been suggested for high text coverage and successful use of inferencing strategies. It is therefore possible that participants overestimated their proficiency, and

that they might only be at the intermediate level. Participants rated their English use outside of the classroom with a mean value of 1.97 (*SD* = 0.98), roughly corresponding to *sometimes* (2). Table 4.3 presents participants' mean scores from the statements that self-assessed their English reading, writing, listening and speaking. Most of the rating values for the four language skills are between *sometimes* (2) and *frequently* (3).

Table 4.3 Mean scores of English language self-assessment questionnaire.

Self-Assessment statements	**M *(SD)***
I recognise the main ideas when reading texts in my course textbooks	2.76 (*1.00*)
I can locate the information that I need in a general text in a quick and easy manner	2.65 (*0.88*)
I can comfortably read complex lengthy texts, stories and articles	1.84 (*1.19*)
I can freely write my opinion on a variety of topics	2.29 (*0.94*)
I can take notes during lectures	2.49 (*1.03*)
I can build up my arguments in a logical way within an essay	1.62 (*1.16*)
I can understand informal conversations on common topics	2.76 (*0.93*)
I can easily follow lectures and presentations when they are conveyed clearly	2.90 (*0.82*)
I can understand the news on the radio or TV	2.35 (*0.99*)
I can express myself confidently within informal life situations	2.68 (*0.86*)
I can present an academic topic in front of my class	2.03 (*1.24*)
I can participate in an academic argument during lectures	2.11 (*1.06*)

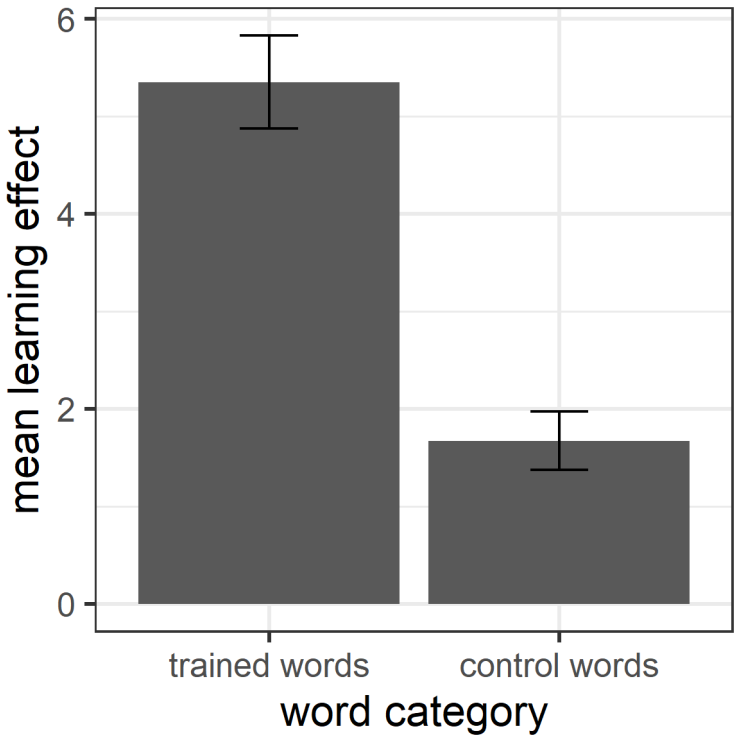
4.10.2 Target word learning (RQ1)

We first report participants' knowledge of the target and control words before and after the training. As expected, before training participants knew only a minority of the 24 target (M = 4.61, *SD* = 4.40) and 24 control (M = 3.75, *SD* = 3.39) words. This number of known words was larger than expected based on the norming study, where participants scored, on average, below 3 for both the target and control words. Compared to the norming study, there is thus a somewhat larger than expected proportion of target and control words that cannot be learned because they are already

known. Nevertheless, the vast majority of words are unknown, avoiding a ceiling effect and leaving room for additional learning during training. After training, participants had substantially increased their knowledge of the 24 target words (M = 9.98, *SD* = 6.05), but numerically less so for the 24 control words (M = 5.43, *SD* = 3.71).

We then assessed whether the training sessions yielded a learning effect at all by analyzing whether participants showed more learning for target words compared to control words. Fig 4.2 shows the mean vocabulary learning effect, i.e. the average increase in correctly translated words from pre-test to delayed post-test, for target and control words. This was calculated by subtracting the score for correctly translated words in the pre-test from that in the delayed post-test. Importantly, our calculation of the learning effect takes into account the two groups' pre-knowledge of the target words, i.e. their knowledge before training, and therefore rules out that the learning effect is merely due to the two groups differing in their knowledge of the target words before the training sessions. A Welch two sample t-test showed that the mean learning effect is significantly higher for trained words than control words ($t = 6.54$, $df = 100.45$, $p < 0.001$). Cohen's $d = 1.18$ (confidence interval: 0.80–1.57) shows a large effect size.

Figure 4.2 Mean learning effect for trained and untrained words

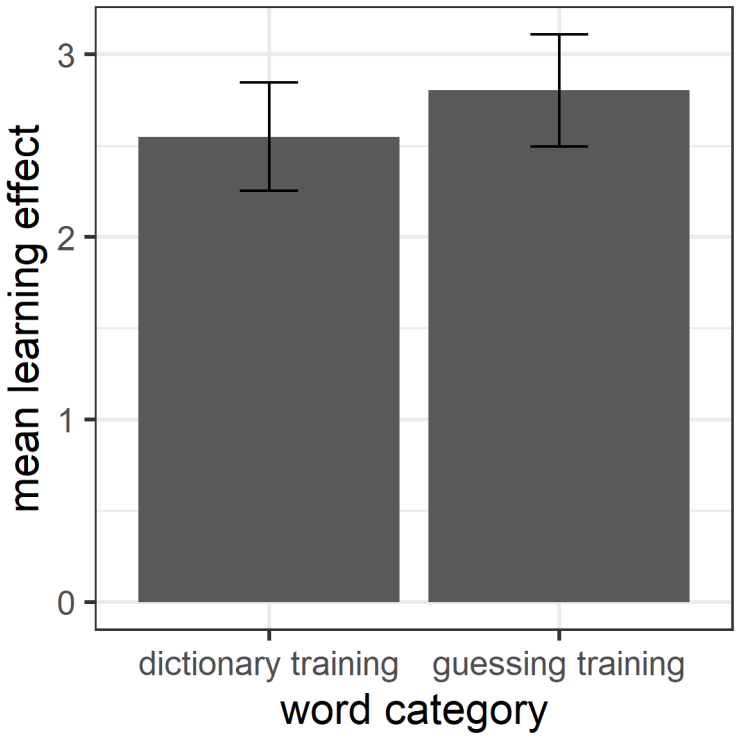


4.10.3 Word learning through lexical inferencing vs. dictionary consultation (RQ2)

We first report participants' knowledge of the target words learned through inferencing vs. dictionary consultation before and after the training. Before training, participants received similar scores for the 12 target words that they would be asked to guess (M = 2.24, *SD* = 2.41) and for the 12 target words that they would be asked to look up (M = 2.38, *SD* = 2.36) during training. After training, participants had substantially increased their knowledge of both the 12 target words that they were asked to guess (M = 5.04, *SD* = 3.04) and the 12 target words that they were asked to look up (M = 4.93, *SD* = 3.52).

We then tested whether participants showed a larger learning effect for words that they guessed than for words that they looked up in a dictionary. Fig 4.3 shows the mean vocabulary learning effect for the two learning conditions, calculated as above to control for participants' pre-knowledge of target words. A paired t-test found no evidence that guessing words from context yields a significantly larger learning effect than looking words up in a dictionary ($t = 0.59$, $df = 119.85$, $p = 0.55$). In line with this, Cohen's $d = 0.11$ (confidence interval: -0.25–0.47) is negligible.

Figure 4.3 Mean learning effect for dictionary training and guessing training



4.10.4 Factors influencing word learning (RQ3)

Next, two separate generalized linear models explored which factors influenced the mean vocabulary learning effect (a) for words that participants guessed and (b) for words they looked up in the dictionary. The independent variables were participants' vocabulary size (pre-test score from the XK_Lex; numeric from 0 to 10000), previous knowledge of the trained words (pre-test score for target words from the translation task, numeric from 0 to 24), success in guessing during training (score for correctly guessed words divided by the total number of words guessed; numeric from 0 to 1), success in correctly looking up words during training (score for correctly looked-up words divided by the total number of looked-up words; numeric from 0 to 1), and success in correctly answering the comprehension questions during training (number of correctly answered comprehension questions; numeric from 0 to 8). The dependent variable for the first model was the mean vocabulary learning effect for words that participants encountered in the guessing condition during training (delayed-post-test minus pre-test score for guessed words from the translation task; numeric from -12 to 12); The dependent variable for the second model was the mean vocabulary learning effect for words that participants looked up during training (delayed-post-test minus pre-test score for looked-up words from the translation task; numeric from -12 to 12).

All independent variables were centred prior to analysis to minimize collinearity. Independent variables that did not significantly contribute to model fit were removed from the models in a step-wise procedure to yield the final statistical models. The model for the guessing condition revealed three significant main effects, showing that the higher participants' pre-test vocabulary size ($\beta = 0.006$; $SE = 0.0003$; $t = 2.04$; $p < 0.05$) and the better participants were at guessing correctly ($\beta = 2.39$; $SE = 1.03$; $t = 2.33$; $p < 0.05$), the better they learned the words in the guessing condition. Furthermore, the more words participants already knew before training, the lower their learning effect in the guessing condition ($\beta = -0.22$; $SE = 0.09$; $t = -2.47$; $p < 0.05$). The marginal R-squared (Nakagawa, Johnson, & Schielzeth, 2017) for the model is $R^2_m = 0.17$, suggesting that 17% of the variance in the data can be explained by the fixed factors.

Various authors have emphasized the need for large lexical coverage, which requires a sufficiently high vocabulary size to be able to understand a text and infer unknown words successfully (Nation, 2006). We therefore conducted an additional analysis to test for a possible relationship between lexical coverage, measured as

vocabulary size, and guessing. This additional generalized linear model had vocabulary size as independent variable and success in guessing as dependent variable. The results showed that participants with higher vocabulary knowledge were significantly more successful at guessing from context than participants with lower vocabulary knowledge ($\beta = 0.00008$; $SE = 0.00003$; $t = 2.90$; $p < 0.01$).

The final statistical model for the look-up condition revealed only one main effect showing that the higher participants' vocabulary size, the better they learned the words in the look-up condition ($\beta = 0.001$; $SE = 0.0004$; $t = 3.00$; $p < 0.01$). The marginal R-squared for the model is $R^2_m = 0.13$, suggesting that 13% of the variance in the data can be explained by participants' vocabulary size.

4.11 Discussion

The current study found a clear learning effect for the words trained in the study, with a statistically significantly higher learning effect for target words compared to control words. Words trained through lexical inferencing and dictionary consultation produced similar learning effects, suggesting that both learning methods are equally effective for the current learner group. Learners' vocabulary size predicted the size of their learning effect in the guessing and look-up conditions. Specifically, the larger participants' vocabulary size, the larger their learning effect. The learning effect in the guessing condition was additionally influenced by the number of words that participants already knew during training, with higher previous knowledge related to lower learning effects, and by participants' success in guessing correctly, with participants who were better at guessing correctly showing a larger learning effect.

4.11.1 Target word learning

The first research question (RQ1) investigated whether learners' retention for words that were trained in the two training sessions was better than their retention for words that were not trained. Our results indicate that this was indeed the case. This suggests that encountering a word while reading for comprehension and engaging with the word by either guessing its meaning from context or looking it up in a dictionary yields a larger learning effect than vocabulary learning that would have occurred anyway during the duration of the study. This finding emphasizes the substantial role of

the examined VLS (lexical inferencing and dictionary consultation) on vocabulary learning.

The current results suggest that the trained words were processed in a sufficiently deep and meaningful manner within the context in which they appeared, resulting in enhanced retention. In contrast, most control words were only encountered in isolation and without any contextual cues for learning (Craik & Tulving, 1975) during the pre- and delayed post-tests, resulting in significantly less retention. Generally, rich and deep semantic processing is believed to facilitate the learning process (Schmitt, 1995). The current results are also in line with prior-mentioned studies in which lexical inferencing and dictionary consultation are considered as strong predictors of vocabulary retention (Mondria, 2003; Zaid, 2009).

4.11.2 Word learning through lexical inferencing vs. dictionary consultation

Our second research question (RQ2) explored whether a larger learning effect would be observed for words that participants guessed in the two training sessions compared to words that they looked up in a dictionary. Results revealed a similar learning effect across the two learning situations. These findings are consistent with Çiftçi and Üster's (2009), Mondria's (2003) and Zaid's (2009) outcomes, in which lexical inferencing produced similar levels of retention as dictionary consultation. It seems that both VLS play similar roles in building learners' vocabulary knowledge.

This result is also consistent with the predictions of the Involvement Load Hypothesis (Hulstijn & Laufer, 2001) and Technique Feature Analysis (Nation & Webb, 2011). Both approaches suggest similar processing depth and elaboration for lexical inferencing and dictionary consultation, as implemented in the current study. In line with this, both VLS showed a comparable learning effect. Furthermore, both approaches suggest that lexical inferencing and dictionary consultation, again as implemented in the current study, involve relatively deep processing and elaboration. In line with this, participants showed a significant learning effect for target words compared to control words even though they encountered each target word only once during training. Engagement with each target word during this single encounter sufficed to yield a measurable learning effect.

However, our results are not consistent with some studies that have highlighted the superiority of one strategy over the other in terms of impact on learners' vocabulary retention level. For instance, Akpınar et al. (2015), Shokouhi and Askari (2010) and

Shangarfam et al. (2013) found that inferencing is more efficient than dictionary use. Most studies linked such findings to the deep mental processes involved in inferencing, as a learner will need a combination of cognitive techniques, linguistic clues and world knowledge to determine the meaning of a word. According to Van Parreren (1992), inferencing engages many mental processes, such as determining the word form and linking current context with one's background knowledge. Such cognitively meaningfully processed materials enrich retention (Azin, Biriya & Sardabi, 2015).

Other studies highlighted the role of dictionary consultation as a strong predictor of learners' vocabulary retention (e.g. Amirian & Momeni, 2012; Prince, 1996; Zou, 2016). Dictionary use often provides different aspects of word knowledge besides the meaning, for instance, the word's pronunciation, synonyms, derivatives and example sentences or phrases (Zou, 2016). All this information can establish a cognitive network or foothold for the target word in the learner's mind.

While both lexical inferencing and dictionary consultation involve a fair amount of cognitive engagement, the kind of engagement seems to differ across the two VLS. For example, Amirian and Momeni (2012) found that learners who applied guessing techniques paid more attention to word roots and meaning than morphological and phonological features. Moreover, successful lexical inferencing usually requires a high L2 proficiency level and an adequate vocabulary size (Haastrup, 1990; Laufer, 1997; Nassaji, 2006), whereas even beginning learners can successfully use a bilingual dictionary. Interestingly, participants in the current study benefited equally from dictionary consultation and lexical inferencing, even though their average vocabulary size was much below that suggested for sufficient text coverage and for successful lexical inferencing. This suggests that learners with vocabulary sizes that are smaller than previously proposed can successfully engage in lexical inferencing.

Our findings indicate that both VLS methods lead to higher learning than the baseline, but we found no evidence that inferencing lead to higher learning than dictionary use or vice versa. Discrepancies of our results with previous findings could be linked to many factors, such as the applied methodological approach, learners' vocabulary size, learning styles, proficiency levels or learners' motivation to participate in the study. For example, Shangarfam et al. (2013) differs from the current study in relevant ways. While VLS was a within-participant factor in the current study, Shangarfam et al. (2013) used a between-participant design, where each participant engaged in either lexical inferencing or dictionary consultation (e.g. Azin et al., 2015;

Zou, 2016), for other studies where VLS was a between-participant factor). Thus, Shangarfam et al. (2013) may have found higher learning from inferencing than dictionary use due to individual differences in participants' retention abilities or engagement with the task. Furthermore, Shangarfam et al. (2013) explicitly taught participants how to apply these two strategies. One possibility is therefore that inferencing leads to higher learning than dictionary use, but only if students are aware of or have been trained in proper inferencing strategies. There is, however, evidence that not all inferencing strategies need to be explicitly taught. For example, using a think-aloud protocol, Yayli (2010) found that learners naturally used some guessing strategies, for example cohesive ties, such as anaphora, conjunctions, causal cohesion etc., as clues to guess word meaning. In addition, not all studies have found that inferencing strategies lead to higher retention than dictionary consultation even when participants are taught inferencing strategies. For example, Amirian and Momeni (2012) found that high school students who were explicitly told the target words' meanings and experienced the words in suitable contexts outperformed students who were taught how to infer target words' meanings from context. One possible explanation for this finding is that participants, particularly at lower proficiency levels, may not successfully use inferencing strategies even if explicitly taught. Alternatively, experiencing target words in meaningful sentences after being provided the correct translation might have impacted the words' recall.

Azin et al. (2015) also found higher learning for inferencing over dictionary consultation. Their control group was explicitly taught the target words' meanings, whereas their experimental group was asked to infer the target words from provided context. The experimental group additionally had the opportunity to verify their guess by using a dictionary. The differences in results between Azin et al. (2015) and the current study may be related to this additional verification method. For example, it is possible that guessing followed by verifying the correct meaning may lead to better retention than simply inferring the target words' meanings because the combination of guessing and verifying may lead to deeper engagement with the lexical items than guessing alone. However, Mondria (2003) found no advantage for guessing-plus-verifying compared to dictionary consultation in terms of learning, but guessing-plus-verifying took reliably longer than just dictionary consultation, suggesting that guessing-plus-verifying is less efficient than dictionary consultation alone. Furthermore, guessing and verifying prevents participants from guessing incorrectly and potentially learning

incorrect meanings for lexical items. In fact, the current results are fully compatible with the idea that just guessing can lead to incorrect learning as we found that participant who were better at guessing the correct meanings of target words during the training also showed higher learning than participants who were less successful at guessing correctly during the training.

The present finding raises questions about what skills are needed for successful inferencing and whether strategies should explicitly be taught or should arise naturally in the language learner. Based on their results, Shangarfam et al. (2013) argue that inferencing strategies should be explicitly instructed. However, inferencing requires the application of many processing strategies, including the use of extra-textual clues. That is, a text may not always provide enough information to infer the correct meaning and one has to rely on one's own knowledge for successful inferencing (Cai & Lee, 2010). In the current study, participants were not explicitly taught guessing strategies, but were simply told to guess in order to let them naturally apply these techniques.

4.11.3 Factors influencing word learning

Our third research question (RQ3) explored various factors that may influence the vocabulary learning effect when participants are guessing from context or looking words up in a dictionary. First, learners with a higher vocabulary size showed a larger vocabulary learning effect than learners with a lower vocabulary size in the guessing condition. In addition, we found that participants with a larger vocabulary size were significantly more successful at guessing from context than participants with a lower vocabulary size. These results are in line with some previous studies (Nassaji, 2006; Wesche & Paribakht, 2009) and with the claim that vocabulary knowledge plays an important role in language acquisition (e.g. Folse, 2006; Milton, Wade, & Hopkins, 2010; Nation, 1990; Read, 1997). This finding also supports the notion that substantial prior vocabulary knowledge is needed to guess meaning from context correctly and efficiently. Specifically, Huckin and Coady (1999) suggested that in order to guess meaning successfully from context, a learner must have high lexical coverage so as to identify most of the surrounding lexical items. Similarly, Nation (1990) claims that successful inferencing relies on learners' lexical knowledge. Higher vocabulary size

eases the inferencing attempt as the more vocabulary learners know, the more text coverage they have and the more effective their guessing will be.

However, our results do not support the claim that 98% of text coverage requiring a vocabulary size of 8000 to 9000 words is needed for successful inferencing (Laufer & Ravenhorst-Kalovski, 2010; Nation, 2006). While we did find that participants with larger vocabulary size and thus higher text coverage learned more effectively through inferencing and were more successful at guessing correctly, participants in the current study had an average vocabulary knowledge of only 3331 words, less than half that proposed for successful inferencing. In fact, none of our participants reached the suggested 8000 words for successful inferencing. Our results thus confirm the importance of lexical coverage for successful inferencing, but suggest that even learners with smaller vocabulary sizes can engage in successful inferencing that yields comparable learning gains compared to dictionary consultation.

It is possible that learners in the current study could engage in successful inferencing despite their relatively low vocabulary size because we chose reading texts from textbooks geared towards their level of knowledge. These texts may include cues that allow even learners with lower vocabulary sizes to engage in successful inferencing. To tentatively explore this idea, we probed which target words were learned most successfully during the study and which cues might have contributed to this. Two patterns emerged: First, participants seemed to have particular trouble with words that appeared in a list, as in *Cognitive processes include perception, thinking, problem-solving, memory, language and attention* or *At least until the start of schooling, the family is responsible for teaching children cultural values, attitudes, and prejudices about themselves and others*. Lists do not provide any specific cues as to how the words listed are related, which may explain why target words found in lists were comparatively difficult to learn. In addition, unfamiliar words contained in lists may not be of high importance for text comprehension as a whole. Some of the words that were learned most successfully were attributive adjectives, such as *diverse issues* or *glamorous magazine*, and adverbs, as in *The iceman's hair was neatly cut* or *[S]ociology was born out of a concern with this rapidly changing character of the modern, industrial world*. Here, the meaning of both adjectives and adverbs is constrained by the nouns and verbs that they modify. For example, in the iceman example above, *neatly* modifies *cut* in the context of *hair*, which constrains the possible meanings for *neatly* to a manner of hair having been cut. Such constraints can aid

guessing (as well as dictionary consultation) and act as cues to support the vocabulary acquisition process. In contrast, nouns modified by an adjective, as in *Cognition is based on a person's mental representations of the world, such as images, words, and concepts*, tended to yield moderate learning gains. It is possible that adjectives do not constrain the meaning of the nouns that they modify as much as nouns constrain the meaning of the adjectives that can modify them.

Second, we found that learners with a higher vocabulary size showed a larger vocabulary learning effect than learners with a lower vocabulary size not only in the inferencing condition, but also in the dictionary condition. This novel result expands on previous findings as it highlights that successful vocabulary learning through dictionary use also relies on learners' vocabulary size. It seems that even when engaged in dictionary consultation, a strategy that even beginning learners can use successfully, a solid vocabulary base supports vocabulary learning. It is possible that learners with larger vocabularies could integrate and connect the words that they looked up more easily into their mental lexicon than learners with smaller vocabularies. This result thus puts into perspective Krashen's (1989) idea that dictionary consultation is especially suited for novice L2 learners. Overall, our results support the idea that vocabulary knowledge is important for a wide range of tasks, even for such simple tasks as looking up words in a dictionary.

We further found that the more words participants already knew during training, the lower their learning effect in the guessing condition. This effect is most likely simply related to the experimental design. Participants who already knew many of the twelve target words that they were asked to guess during training could not learn many words. For example, a participant who already knew six of the twelve words, could only learn six words through guessing. In contrast, a participant who knew none of the twelve words, could potentially learn all twelve words through guessing. While our norming study ensured that participants overall knew few of the target words that they would be asked to learn during training, there were individual differences among learners that were beyond our control.

Finally, we found that the better participants were at guessing correctly, the better they learned the words in the guessing condition. Conversely, participants who were less successful as guessing the correct meaning, showed less learning. Our results therefore support the idea that guessing is risky because incorrect guesses may lead to learning incorrect meanings for vocabulary items. This result is in line with Huckin and

Coady's (1999) observation that inferencing is an imprecise technique, which may be problematic if a reading task asks for precise meanings. In the current study, participants who were less successful at guessing correctly may not have been entirely wrong, but may have guessed a lexical item related to the target translation. Interestingly, Mondria (2003) found that words that were incorrectly inferred prior to verification were retained better than words that were correctly inferred before verification. This suggests that incorrect inferences are risky, but the process of discovering that a guess was incorrect seems to be beneficial for learning.

4.12 Conclusion

In conclusion, the results from the current study suggest that both lexical inferencing and dictionary consultation led to substantial vocabulary learning over the course of the study. A larger vocabulary size at the beginning of the study supported acquisition of words trained through lexical inferencing, but also through dictionary consultation. The amount of learning of the particular words trained was thus influenced by participants' prior vocabulary size. In addition, learning through inferencing was also influenced by previous knowledge of the target words and how successful learners were at guessing correctly.

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4.13 Additional analyses

The following sections present two additional research questions and analyses that were completed as part of this study.

4.14 Additional research questions

4) Do learners show a larger vocabulary size after than before the study?

5) Does learners' overall learning effect, previous knowledge of the trained words, success in guessing, success in correctly looking up words and/or success in correctly answering comprehension questions about the texts influence how much their vocabulary size increased over the course of the study?

4.15 Results

4.15.1 Increase in vocabulary size (RQ4)

Next, we tested whether the learning that takes place during the duration of the study (both as part of the study and in students' regular classes) transfers to participants' overall vocabulary knowledge by exploring whether participants' overall vocabulary size increased over the course of the study. A paired t-test revealed that participants' average vocabulary size increased statistically significantly ($t = -4.92$, $df = 60$, $p < 0.001$) from 3331 (SD = 1318) for the pre-test to 3837 (SD =1400) for the delayed post-test. Cohen's $d = 1.11$ (confidence interval: 0.81–1.42) shows a large effect size.

4.15.2 Factors influencing increase in vocabulary size (RQ5)

Finally, a GLM investigated which factors influenced how much participants' vocabulary size overall increased over the course of the study. As for the RQ3 analysis above, the independent variables were participants' vocabulary size, previous knowledge of the trained words, success in guessing during training, success in correctly looking up words during training, and success in correctly answering the comprehension questions during training. The model additionally contained the overall vocabulary learning effect for trained words in the current study (delayed post-test minus pre-test

score for target words from the translation task; numeric from 0 to 24) as independent variable. The dependent variable was participants' increase in vocabulary size over the course of the study (delayed post-test minus pre-test score from the XK_Lex; numeric from 0 to 10000).

Again, all independent variables were centered prior to analysis and removed from the model if they did not contribute to model fit. The final model revealed four significant main effects showing that participants who correctly answered more comprehension questions during the training (estimate = 151.59; std. error = 53.69; $t = 2.82$; $p < 0.01$), who had more previous knowledge of the trained words (estimate = 48.55; std. error = 13.53; $t = 3.59$; $p < 0.001$), and who had learned more target words (estimate = 27.53; std. error = 12.46; $t = 2.21$; $p < 0.05$) showed a larger increase in vocabulary knowledge over the course of the study. Furthermore, participants who had larger vocabularies at the beginning of the study showed a smaller increase in vocabulary knowledge over the duration of the study (estimate = -0.51; std. error = 0.1; $t = -5.08$; $p < 0.001$). The marginal R-squared for the model is $R2m = 0.34$, suggesting that 34% of the variance in the data can be explained by the fixed factors in the model.

4.16 Discussion

We found a significant increase in overall vocabulary size over the duration of the study. Participants with better reading comprehension, more previous knowledge of the trained words, and a larger learning effect for the trained words showed a larger increase in overall vocabulary size than participants with poorer reading comprehension, less previous knowledge of trained words, and a smaller learning effect for the trained words. In addition, participants with larger vocabulary sizes at the beginning of the study increased their vocabulary size less than those with smaller vocabulary sizes.

4.16.1 Increase in vocabulary size

Positively answering our fourth research question (RQ4), we found a significant increase in participants' vocabulary size over the duration of the study. At first sight, the increase in vocabulary size of 506 words on average over a period of five weeks seems rather large and would make one wonder how vocabulary acquisition could ever be a problem if learners can learn such a large number of words in just five weeks. It is therefore important to contextualize this result. First, our results are quite comparable to

those of other studies looking at an increase in vocabulary size over a short period of time. Webb (1962), for instance, found that participants tested over a four-hour period could learn 33-166 word pairs per hour. Cobb and Horst's (2001) participants learned 140-180 words in two months from just an hour a week of instruction. Laufer (1998) found that 11th graders had passively learned 1600 word families within one year, corresponding to approximately 133 word families a month. Based on Brysbaert, (2016), this corresponds to about 500 lemmas a month. Similarly, our participants passively learned about 500 lemmas within five weeks as full-time English undergraduate majors, with 95% of their classes conducted in English and learning most likely occurring both inside and outside of the classroom. Second, our result does, of course, not reflect longer-term learning, which may also involve forgetting of previously learned words. For example, the 11th graders in Laufer (1998) had passively learned 1600 word families within one year, but had only known 1900 word families as 10th graders, after six years of English instruction. Third, the XK_Lex that we used for the current study measured shallow passive word knowledge, such that participants only needed to know that the word exists (cf. Laufer, 1998). Such a test would not reflect active vocabulary knowledge, which increases at a substantially slower pace than passive vocabulary knowledge (Laufer, 1998). Finally, participants completed the same test twice within a period of five weeks, which may have somewhat inflated the scores of the second test. However, overall, the increase in vocabulary size found here is compatible with previous studies.

4.16.2 Factors influencing increase in vocabulary size

Our fifth research question (RQ5) explored factors influencing an increase in overall vocabulary size over the duration of the study. It is important to note that we do not assume a direct link between how well participants did in the training sessions and their increase in overall vocabulary size. Specifically, participants' overall increase in vocabulary size is due to their overall exposure and learning, both inside and outside of the classroom, during the five weeks of the study. The training sessions themselves likely contributed little to participants' overall increase in vocabulary size. Rather, we assume that we measured different kinds of knowledge pre-training and different skills during the training, and we investigated how these kinds of knowledge and skills may relate to an overall increase in vocabulary size over the duration of the study.

We found that overall larger success in answering comprehension questions about the texts, i.e. better reading comprehension, related to a larger increase in vocabulary size over the course of the study. This result is in line with many studies in the literature that reveal a positive relationship between vocabulary growth and reading comprehension (e.g. Anderson, Wilson, Fielding, 1988; Greaney, 1980). In the same vein, Krashen (1989) claimed that "more comprehensible input, in the form of reading, is associated with greater competence in vocabulary" (p. 441). While the current results suggest that better reading comprehension relates to a larger increase in vocabulary size over the course of the study, it is not necessarily the case that reading comprehension relates to overall vocabulary size. In fact, Freebody and Anderson (1983) argued that limited lexical knowledge does not always relate to comprehension difficulties. Similarly, Pany et al. (1982) claimed that learner's word knowledge does not seem to play a decisive role in comprehending extended discourse.

The results also indicated that participants with higher vocabulary size at the beginning of the study showed a smaller increase in their overall vocabulary size over the duration of the study. One possibility for such finding is that participants with larger vocabulary sizes to begin with encountered fewer novel lexical items in the provided texts and, importantly, most likely also in other learning materials that they were exposed to for the duration of the study. They thus most likely had less of an opportunity to increase their vocabulary size. This suggests that the more advanced of our participants might benefit from texts containing more advanced vocabulary items. This is in line with Laufer and Paribakht (1998), who suggested that teachers may underestimate their students' abilities and not challenge them enough in terms of vocabulary exposure and learning. Alsaif (2011), moreover, observed that the overwhelming majority of words used by English teachers inside the classroom are frequent words, again suggesting little exposure to a wider range of vocabulary items.

Furthermore, we found that greater previous knowledge of the target words during training related to a larger increase in learners' overall vocabulary size at the end of the study. This outcome seems to contradict with the previous finding that participants with higher vocabulary size at the beginning of the study showed a smaller increase in their overall vocabulary size over the duration of the study. However, pre-training knowledge of the target words was measured through a translation task, which reflects deeper knowledge than the XK_Lex, which we used to measure overall vocabulary size. One tentative explanation for the current result is that participants with better skills in

establishing links between the L2 and the L1, measured as success in a translation task, learned more words over the course of the study. The findings therefore suggest that there may be a complex interplay between pre-study vocabulary size, linking L2 words with those in the L1, and participants' vocabulary size increase over the duration of the study. Further studies to explore such a possible interplay are needed.

Our final finding is that participants who learned more of the trained words also increased their overall vocabulary size more over the course of the study. In terms of skills, this arguably reflects participants' success in learning new words through lexical inferencing and dictionary use. In other words, participants who more successfully engaged in inferencing and lexical translation strategies during training also increased their vocabulary overall more over the course of the study. This result is generally consistent with studies finding positive relationships between these two strategies and vocabulary size (e.g. Alahmadi, 2015; Alahmadi et al., 2018; Al Qahtani, 2005; Alsaif, 2011; Gu & Johnson, 1996; Hamzah, Kafipour & Abdullah, 2009; Hatami & Tavakoli, 2012). In contrast, Tanyer and Ozturk (2014) found that determination strategies (including inferencing and dictionary use) did not represent any significant contribution to participants' word knowledge, even though they were the most frequently used VLS in that study. However, Tanyer and Ozturk (2014) found that learners' use of determination strategies as a whole (based on a 58-item questionnaire) did not contribute to participants' vocabulary knowledge. It is thus possible that only some determination strategies positively relate to vocabulary knowledge, while others do not or relate negatively to vocabulary knowledge, such that overall there is no significant correlation between determination strategies as a whole and vocabulary knowledge. In line with this, Alahmadi et al. (2018) found that some VLS related positively and some negatively to vocabulary size. It needs to be emphasized though that neither Tanyer and Ozturk's (2014) nor Alahmadi et al.'s (2018) results allow any conclusions in terms of causation. For example, Alahmadi et al. (2018) found that saying words repeatedly to learn their sounds related negatively to vocabulary size. Here, it is likely that learners with lower vocabulary sizes simply use this strategy more frequently than learners with higher vocabulary sizes, and it is unlikely that saying words repeatedly to learn their sounds would somehow decrease learners' vocabulary size.

CHAPTER FIVE

Study III[2]

Student contribution

This chapter consists of a published article. The researcher was the first author for the published article and his contribution includes: study design, which was enlightened by supervisor feedback and guidance, data collection, data analysis under the guidance of the supervisor, writing the first draft and revising drafts based on supervisor feedback and guidance.

Effects of language skills and strategy use on vocabulary learning through lexical translation and inferencing

Abstract

This study explores how vocabulary learning strategy usage and skills in the four language domains relate to participants' increase in vocabulary size and to the learning of specific vocabulary items over a certain period of time. Sixty-one advanced L1 Arabic L2 learners of English read target words in authentic readings sources and were instructed to either guess the meaning from context or consult a dictionary. Pre- and post-tests assessed vocabulary size and knowledge of the target vocabulary items. Results showed that learning through inferencing, but not learning through dictionary use, depended on learners' familiarity with the particular learning strategy. Additionally, note taking and reading comprehension influenced lexical knowledge and acquisition in complex ways.

Keywords: Vocabulary acquisition; vocabulary learning strategies; language skills, lexical inferencing; lexical translation.

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5.1 Introduction

Vocabulary acquisition is an important component of communicative competence and is a core element in language mastery (Baharudin & Ismail, 2014). Furthermore, learners' achievement in the language skills listening, speaking, reading and writing relies on their vocabulary knowledge (Richards & Renandya, 2002). Weigand (1998, p. 44) argued that "to learn a language means to know how words are used and what utterances are used in specific situations". The vital role of vocabulary in language learning has triggered a large amount of research (cf. Akpınar, Aşık & Vural, 2015; Milton, 2009; Nation, 2001; Schmitt, 2000; Wang, 2007).

Despite its important role in language learning, learners often identify vocabulary as the most challenging area. Various explicit and implicit techniques and strategies, so-called vocabulary learning strategies (VLS), have been identified and developed to help learners acquire vocabulary (e.g. Gu & Johnson, 1996; Schmitt & Schmitt, 2011; Schmitt, 1997; Nation, 2001). We follow Catalan's (2003, p. 56) definition of vocabulary learning strategy as:

> knowledge about the mechanisms (processes, strategies) used in order to learn vocabulary as well as steps or actions taken by students (a) to find out the meaning of unknown words, (b) to retain them in long-term memory, (c) to recall them at will, and (d) to use them in oral or written mode.

Vocabulary learning strategies form a sub-class of language learning strategies (LLS), which are "the conscious thoughts and actions that learners take in order to achieve a learning goal" (Chamot, 2004, p. 14). O'Malley and Chamot (1990) suggest that most LLS could be applied for completing word learning tasks. Several scholars have proposed VLS taxonomies (e.g. Gu & Johnson, 1996; Nation, 2001; Schmitt, 1997). The current study will follow Schmitt's (1997) VLS taxonomy, which divides VLS into two major classes: (a) discovery strategies, which refer to learners' attempts to work out the meaning of novel words and (b) consolidation strategies which refer to learners' ability to solidify initially learned word meanings. We focus on two specific discovery strategies: lexical inferencing and lexical translation. Lexical inferencing refers to using context cues to guess a word's meaning, whereas lexical translation refers to obtaining the word's meaning from a language resource, such as a dictionary. Generally, discovery strategies include two sub-categories: determination and social strategies. Determination strategies involve learners' direct attempts to determine a novel word's meaning from a limited set of choices, including dictionary consultation and contextual

inferencing. Social strategies involve interactions with other speakers. Lexical translation by means of asking a teacher about a word's meaning would represent a social strategy.

In this study, we use a longitudinal design to investigate how learners' self-reported use of VLS and self-reported proficiency and language skills relate to their overall vocabulary size as well as the vocabulary learning that occurs over a certain period of time through lexical inferencing (guessing meaning from context) and lexical translation (looking words up in a dictionary).

5.2 Vocabulary learning strategies and vocabulary size

Previous studies have revealed a statistically significant positive relationship between the use of certain VLS and lexical knowledge (Alahmadi, 2015; Alahmadi, Shank & Foltz, 2018; Al Qahtani, 2005; Alqurashi, 2013; Alsaif, 2011; Hamzah, Kafipour & Abdullah, 2009; Tanyer & Ozturk, 2014). Of most relevance for the current study are VLS that relate to guessing the meaning of words from context and to dictionary use. Several studies have found positive relationships between these two VLS and vocabulary knowledge in terms of breadth. For example, Alahmadi (2015), Alahmadi et al. (2018) and Alsaif (2011) found a statistically significant positive relationship between the strategy of *guessing a word's meaning from the provided context* and English vocabulary knowledge in terms of breadth in Saudi participants across a range of educational levels. More generally, Alqurashi (2013) found that determination strategies, which include *using monoligual or bililingual dictionaries* and *inferring meaning from context*, showed the highest contribution (44%) to learners' vocabulary size, followed by social strategies (37%).

5.3 Vocabulary learning strategies, inferencing and lexical translation

As determination strategies, both guessing from context and obtaining meaning through dictionary use involve conscious attempts to determine word meaning from a limited set of choices. It seems that such conscious attempts would require some skills on the part of the learner. For instance, Haastrup (1991, p. 39) defined inferencing as the ability to use "all available linguistic cues in combination with the learner's general knowledge of

the world, her awareness of the co-text and her relevant linguistic knowledge". In order to engage in lexical inferencing successfully, learners would need to have all of the above-mentioned knowledge and abilities. Similarly, dictionary use requires learners to find the appropriate entry in a dictionary and then select the translation that is appropriate in the particular context from what is typically a variety of translation choices. Thus, experience with inferring meaning from context or with using a dictionary may relate to learning new vocabulary more successfully when using these strategies.

Fraser (1999) investigated three vocabulary acquisition strategies (ignore, consult, infer) and their effect on participants' vocabulary attainment and found that different strategies have different levels of success. While lexical inferencing was participants' first choice to determine a novel word's meaning, dictionary consultation had a higher success rate (78%) than lexical inferencing (52%).

Marefat and Shirazi (2003) found that directly teaching vocabulary learning strategies impacted participants' short- and long-term vocabulary retention. Their results for short-term retention showed that lexical translation led to similar retention (44%) than using linguistic clues for inferencing (45%), with using non-linguistic clues for inferencing having somewhat higher retention rates (56%). Their long-term retention results show rather low retention rates for lexical translation (28%), with somewhat higher rates for linguistic inferencing (37%) and yet higher rates for non-linguistic inferencing (51%).

5.4 Language skills and vocabulary size

Various researchers have noted the influence of lexical knowledge on the four language skills (listening, speaking, reading and writing). Most of these studies focus on reading skills (e.g. Laufer, 1992; Ouellette, 2006; Qian, 1999, 2002). Schmitt, Jiang and Grabe (2011, p. 39) argue that "there is a fairly straightforward linear relationship between growth in vocabulary knowledge for a text and comprehension of that text". In line with this, Stæhr (2008) found a stronger relationship between vocabulary size and reading skills than vocabulary size and writing or listening skills. While all three skills produced statistically significant correlations with learners' vocabulary size in terms of breadth, reading skills produced the highest (0.83) and listening the smallest (0.69) correlation. Similarly, a regression analysis showed that vocabulary size accounted for 72%, 52%

and 39%, respectively, of the variance in learners' ability to score above the mean in reading, writing and listening tests.

In terms of speaking skills, Koizumi and In'nami (2013) concluded that vocabulary knowledge both in terms of breadth and depth plays a significant role in learners' speaking proficiency. Specifically, they found significant relationships between vocabulary knowledge and speaking skills. Across two studies, learners' vocabulary knowledge accounted for 44% and 84%, respectively, of participants' speaking proficiency. Furthermore, 63% and 60%, respectively, of learners' speaking proficiency could be accounted for by breadth and depth of vocabulary knowledge alone.

In line with such results, some reseachers have proposed a minimum level of vocabulary size needed for certain language tasks. Milton (2009), for instance, suggested a vocabulary size of 3000 words to successfully engage in a simple conversation. Laufer (1989) proposed a threshold of 5000 words for an average of 95% text coverage. Similarly, Laufer and Ravenhorst-Kalovski (2010) proposed a level of 8,000 words for 98% text coverage.

5.5 Language skills, inferencing and lexical translation

Studies on the relationship between language skills and the strategies of lexical inferencing and lexical translation have been inconclusive. While Bensoussan & Laufer (1984) found no correlation between learners' ability to infer meaning correctly and their language skills, measured as proficiency level, Haynes (1984) found a significant effect of language proficiency level on successfully determining appropriate meanings through inferencing, with learners with higher proficiency levels successfully guessing more of the target words than learners with lower proficiency levels. Similarly, Knight (1994) found an effect of dictionary consultation on reading comprehension, such that learners who consulted a dictionary did not only learn more words, but also achieved higher reading comprehension levels.

5.6 Current study

The current study follows on from the results of Alahmadi (2015) and Alahmadi et al. (2018), where we found a significant positive relationship between inferencing and vocabulary size across two participant groups. However, it was not clear whether engaging in inferencing increased participants' vocabulary size or whether learners with

larger vocabulary sizes found inferencing easier (de la Garza & Harris, 2017) and therefore used it more frequently. The current study explores this issue through a longitudinal design. It also follows on from Alahmadi and Foltz's (2020b) longitudinal results, which found similar levels of vocabulary learning for both lexical inferencing and lexical translation as well as a significant influence of learners' overall vocabulary size on the amount of learning that occurred when engaging in inferencing and dictionary use. Specifically, learners with larger vocabulary sizes learned more lexical items through both inferencing and dictionary use over the course of the study than learners with smaller vocabulary sizes. Here, we expand on this previous work and explore whether language skills or familiarity with learning strategies involving guessing or dictionary use also influence the amount of learning that occurs when engaging in inferencing and dictionary use.

Participants in the current study learned target words in authentic reading materials during two training phases. They were asked to guess some of the target words from context and look up others in a dictionary. Their vocabulary size in terms of breadth was measured before and after training. In addition, an English-language self-assessment questionnaire assessed learners' proficiency level and language skills and a VLS questionnaire assessed participants' VLS usage.

In this paper, we expand our previous results by considering the information from the VLS and English-language self-assessment questionnaires, which was beyond the scope of Alahmadi and Foltz (2020b). Specifically, we investigate how VLS usage and language skills in the four domains relate to participants' increase in vocabulary size and to how many words participants learned through guessing and dictionary use over the course of the study. The current study aims to answer the following research questions (RQs):

RQ1: Is participants' VLS usage related to their vocabulary size in general and to the increase in their vocabulary knowledge over the course of the study?

RQ2: Is participants' VLS usage related to how well they learn the words through guessing or dictionary use throughout the duration of the study?

RQ3: Are participants' self-assessed English language skills related to their vocabulary size in general and to the increase in their vocabulary knowledge over the course of the study?

RQ4: Are participants' self-assessed English language skills related to how well they learn the words through guessing or dictionary use throughout the duration of the study?

5.7 Methodology

5.7.1 Participants

The study comprised 61 senior undergraduate Saudi English-major students (47 [77%] males and 14 [23%] females) from three Saudi Universities. Informed consent was obtained from all participants included in the study. Participants' ages varied from 20 to 28 years (mean = 22.75; *SD* = 1.63). They were all native speakers of Arabic who started learning English in grade 4 of primary school. They received an approximate number of 1600 hours of EFL tuition between their public school and university education (Alqurashi, 2013).

5.7.2 Materials and procedures

The study involved three phases: a pre-test, two training sessions, and a post-test. The following sections describe the materials and procedures for each phase.

5.7.2.1 Pre-test materials

English language self-assessment questionnaire. An English language self-assessment questionnaire, given in participants' L1 Arabic to avoid the possibility that proficiency level interfered with responses, assessed participants' English language skills and usage. Following questions about basic demographic information, the questionnaire was divided into five sections. In the first section, participants rated their English proficiency level by ticking one of the options beginner (0), intermediate (1), advanced (2), fluent (3) or near native (4). Moreover, they rated their English use outside of the classroom on a Likert scale from always (4), frequently (3), sometimes (2), rarely (1) to never (0). The remaining four sections assessed the individual language skills (listening, speaking, reading and writing), with three questions per section. Participants evaluated how commonly different statements regarding each language skill applied to them. For instance, in the listening section, participants replied to statements like *I can easily follow lectures and presentations when they are conveyed clearly*, applying the Likert scale mentioned above.

Word translation task. A word translation task gauged learners' knowledge of the target words used during the training phase. Participants translated 24 target and 24 control words. The target words occurred in the training sessions, whereas the control words did not (see the section on reading texts below). Target and control words were matched for frequency, word length, derivational complexity and part of speech, which did not differ significantly across target and control words (all $p > 0.1$; see Alahmadi & Foltz, 2020b, for details). Difficulty level was assessed through a norming study with 16 senior undergraduate English major Saudi students (11 females, 5 males; mean age = 22.38, *SD* = 3.03; self-assessed proficiency level of 2.43, *SD* = 0.72). Students translated the target and control words from English into Arabic without the use of any translation aids. An average of 4.79 (*SD* = 3.73) target words and 4.25 (*SD* = 4.12) control words were translated correctly, again a non-significant difference (generalized linear model with family = "poisson": estimate = 0.11, std. error = 0.13, $z = 0.88$, $p = 0.38$). Thus, target and control words had similar frequencies, word lengths, derivational complexity, parts of speech, and difficulty levels. Moreover, difficulty levels were sufficiently high to allow for learning, with participants in the norming study correctly translating only a minority of both target and control words.

The XK_Lex vocabulary size test. Participants' lexical knowledge was calculated using the XK_Lex vocabulary breadth size test designed by Al-Masrai and Milton (2012). The test estimates EFL/ESL learners' vocabulary knowledge in terms of breadth out of the most frequent 10,000 words in English. XK_Lex is a reliable and valid vocabulary breadth test (Al-Masrai, 2009). In this paper-and-pencil checklist test, participants check all the English words that they know. To reduce the amount of guessing, the test includes 80 real words and 20 pseudo words. Learners' vocabulary size in terms of breadth is calculated by adding up all the checked real words and multiplying the result with 100, then adding up all the checked pseudo words and multiplying the result with 500, then subtracting the latter product from the first.

5.7.2.2 Pre-test procedures

Participants were tested during their normal class sessions. After giving informed consent, which included access to students' academic Grade Point Average (GPA), participants completed the English language self-assessment questionnaire, the word

translation task, and finally the XK_Lex vocabulary breadth size test (cf. Alahmadi & Foltz, 2020b, for more detailed information).

5.7.3 Training materials

Reading Texts. Four texts from Schmitt & Schmitt's (2011) and de Chazal & Rogers' (2013) textbooks for English learners were adapted for the reading comprehension task used during training (see Appendix G). All texts were of medium difficulty in terms of vocabulary and had similar lengths. Each text contained six of the 24 target words from the word translation task described above. These words were underlined in the texts. Participants translated the target words that they knew in one column, and the target words that they did not know in another. To translate words that they did not know, participants were either instructed to guess their meaning from context or to look them up in a dictionary. Two multiple-choice questions following each text assessed participants' text comprehension (cf. Alahmadi & Foltz, 2020b, for further details).

5.7.3.1 Training procedures

The training sessions occurred two and three weeks, respectively, after the pre-test. Prior to training, participants were distributed into a low and high proficiency group based on their GPA, scores from vocabulary size test, and the word translation task. Participants whose scores across two of the measures were above the median for these measures were considered to have high proficiency, those whose scores were below the median for two measures were grouped as low proficiency. Based on this, participants were distributed across two training groups, such that half the participants in each group were of low, and the other half of high proficiency. This was done to ensure a similar spread of proficiencies across groups. During each training session, participants read two of the texts and completed the associated tasks. Both training groups completed the same tasks (guessing vs. dictionary look-up) in the same order, but the texts were counter-balanced across training groups, such that for each particular text, one group engaged in guessing and the other in dictionary look-up.

5.7.3.2 Coding of responses

The first author scored participants' translations of the target words using Wesche and Paribakht's (2009) scoring system. Each semantically and syntactically appropriate translation received 1 point. Any semantically, but not syntactically, appropriate

translation received 0.5 points. Incorrect translations received no points. A second Arabic-English bilingual additionally scored translations from 20 randomly-selected participants, with high inter-coder agreement (Cohen's Kappa $\kappa = 0.987$; $p < 0.001$).

5.7.4 Post-test materials

Word translation task and the XK_Lex vocabulary size test. Participants again completed the word translation task and the XK_Lex vocabulary size test.

VLS questionnaire. Participants completed a vocabulary learning strategies (VLS) questionnaire that gauged their VLS usage, again provided in their L1 Arabic to avoid that proficiency level interfered with their responses. Ten VLS items were included, based on Ahmed (1988), Al Qahtani (2005), Alsaif (2011), O'Malley and Chamot (1990) and Oxford (1990). In this paper, we will focus on the eight VLS that relate to lexical inferencing and lexical translation. The questionnaire used the above-mentioned Likert scale from always (4) to never (0).

5.7.4.1 Post-test procedures

Participants completed the post-test two weeks after the training sessions. Participants first completed the word translation task, then the XK_Lex vocabulary size test, and finally the VLS questionnaire.

5.8 Results

5.8.1 Participant profiles

Before addressing the research questions, we will provide a profile of the participants by summarizing their self-rated proficiency and language use, their vocabulary size, and their responses to the VLS questionnaire (Table 5.1) and the English-language self-assessment questionnaire (Table 5.2). Participants' average self-rated English proficiency was 2.31 (*SD* = 0.71) on a scale from *beginner* (0) to *near-native* (4), which represents a score between *advanced* (2) and *fluent* (3). On average, participants used English outside of the classroom only *sometimes* (2), with an average rating of 1.96 (*SD* = 0.98). Participants' average vocabulary size during the pre-test was 3331 words (*SD* = 1318), which increased to 3837 words (*SD* = 1400) after the training sessions. Both

average vocabulary sizes are noticeably lower than what has been proposed for high text coverage and effective usage of inferencing strategies (Laufer & Ravenhorst-Kalovski, 2010). Also notice that the increase in vocabulary size with an average of 506 lemmas over the five weeks of the study seems rather large. This number is surely somewhat inflated because participants took the same XK_Lex vocabulary size test twice only five weeks apart. However, the overall magnitude of the increase is compatible with some previous studies (Webb, 1962; Cobb & Horst, 2001). For example, based on Brysbaert et al.'s (2016) estimates, Laufer (1998) found that 11th graders had passively learned about 500 lemmas a month.

Table 5.1 shows that participants are moderate users of VLS, as most of their mean frequency ratings for the provided statements are between *sometimes* (2) and *frequently* (3). Bilingual dictionary use is the most commonly used strategy with a mean value of 2.85 (*SD* = 0.85), whereas monolingual dictionary use is the least commonly used strategy with a mean value of 1.68 (*SD* = 1.28). Lexical inferencing use is between these values, with an average rating of 2.45 (*SD* = 0.86).

Table 5.2 shows that most of participants' ratings in the English language self-assessment questionnaire are between *sometimes* (2) and *frequently* (3), suggesting that they can achieve the tasks mentioned in the questionnaire moderately frequently. Following clearly conveyed lectures and presentations received the highest mean rating (2.9), indicating that participants are frequently able to do so. In contrast, essay writing represents a difficulty with a mean rating (1.61) between *rarely* (1) and *sometimes* (2).

Table 5.1 Participants' mean frequency ratings for the assessed VLS with ratings from *frequently (4)* to *never (0)*.

VLS statement	Mean (*SD*)
I use traditional English/ Arabic dictionary to find out the meaning of new word	2.85 (0.85)
I underline the word and use a special application in my phone to find out the meaning	2.59 (0.95)
I try to infer the right meaning of this word from its context	2.45 (0.86)
I apply the grammar cues strategy to infer the meaning of novel words, for instance, (-ment or -tion = noun)	2.40 (1.10)
I enquire with my instructor about the meaning of the novel word	2.24 (1.13)
I consult a fellow student about the new word's meaning	2.18 (1.11)

I try to write the new word in a full sentence	1.90 (1.22)
I use a traditional English/ English dictionary to find out the meaning of new word	1.68 (1.28)

SD= standard deviation

Table 5.2 Participants' mean frequency ratings in the English Language Self-Assessment questionnaire

Skill	Questionnaire statement	Mean *(SD)*
Reading	I recognise the main ideas when reading texts in my course textbooks.	2.76 (0.99)
	I can locate the information that I need in a general text in a quick and easy manner.	2.65 (0.88)
	I can comfortably read complex lengthy texts, stories and articles.	1.84 (1.19)
Writing	I can take notes during lectures.	2.49 (1.02)
	I can freely write my opinion on a variety of topics.	2.28 (0.94)
	I can build up my arguments in a logical way within an essay.	1.61 (1.15)
Listening	I can easily follow lectures and presentations when they are conveyed clearly.	2.90 (0.81)
	I can understand informal conversations on common topics.	2.76 (0.92)
	I can understand the news on the radio or TV.	2.34 (0.98)
Speaking	I can express myself confidently within informal life situations.	2.68 (0.85)
	I can participate in an academic argument during lectures.	2.11 (1.06)
	I can present an academic topic in front of my class.	2.03 (1.24)

SD= standard deviation

5.8.2 VLS and breadth of vocabulary knowledge (RQ1)

We first examined whether there is a relationship between participants' reported VLS usage and their vocabulary size prior to the training sessions. To explore this, we used a generalized linear model (GLM). Participants' vocabulary size according to the pre-test was the dependent variable and ratings for all VLS were the independent variables. All independent variables were centred before analysis to minimize collinearity. The independent variables that did not significantly contribute to model fit were removed from the models in a step-wise procedure to yield the final statistical models (cf. Baayen, 2008). There was a statistically significant main effect of asking the instructor about a word's meaning on pre-test vocabulary size (estimate = -406.6; std. error = 133.4; t = -3.04; $p < 0.05$), showing that students with lower vocabulary sizes used this strategy more often than students with higher vocabulary sizes. Second, there was a statistically significant main effect of inferencing meaning from context on participants' vocabulary size highlighting that learners with greater vocabulary sizes engaged in lexical inferencing more often than their counterparts with lower vocabulary sizes (estimate = 677.9; std. error = 174.6; t = 3.88; $p < 0.05$).

We also examined whether there is a relationship between participants' self-reported VLS usage and their gain in vocabulary size over the duration of the study. The generalized linear model had gain in vocabulary size (participants' vocabulary size in the post-test minus their vocabulary size in the pre-test) as the dependent variable and ratings for all VLS as independent variables. Again, all independent variables were centred prior to analysis and removed from the model if they did not contribute to model fit. The final model revealed a significant main effect of bilingual dictionary use on overall vocabulary gain (estimate = 333.2; std. error = 114.7; t = 2.90; $p < 0.05$), indicating that learners who reported using a bilingual dictionary more often increased their vocabulary knowledge more over the course of the study than learners who reported using a bilingual dictionary less often.

5.8.3 VLS and retention of inferred and looked up words (RQ2)

We then investigated whether participants' VLS usage (independent variables) impacted their amount of vocabulary learning for words that they were instructed to infer or look up in a dictionary (dependent variables) during the training sessions. We conducted two separate analyses, one for learning through inferencing and one for learning through

dictionary use, using the same procedures and model comparisons as before. The final model for the inferencing condition revealed a significant main effect of guessing from context on learning words through inferencing during training (estimate = 0.197; std. error = 0.086; $t = 2.28$; $p < 0.05$), such that participants who reported using the lexical inferencing from context strategy more often learned more words when asked to engage in inferencing during the study than participants who reported using this strategy less regularly. The final model for the dictionary condition had no fixed effects. In other words, none of the factors that we looked at contributed to model fit.

5.8.4 Self-assessment questionnaire and vocabulary knowledge (RQ3)

Next, we explored the relationship between how participants rated themselves in the self-assessment questionnaire and their breadth of vocabulary knowledge prior to the two training sessions. Participants' responses to questions in the self-assessment questionnaire were the independent variables and their vocabulary knowledge according to the pre-test was the dependent variable in the generalized linear models. The analysis procedure was the same as before. The final model produced two significant main effects. First, we found a significant main effect of the self-reported ability to recognize the main ideas when reading texts on vocabulary size prior to training (estimate = 441.2; std. error = 168.1; $t = 2.62$; $p < 0.05$). Participants with higher vocabulary sizes prior to the study reported recognizing the main ideas when reading texts more often than participants with lower vocabulary sizes. Second, we found a significant main effect of the strategy of taking notes during lectures on participants' vocabulary size prior to training (estimate = 331.6; std. error = 158.8; $t = 2.08$; $p < 0.05$). Participants with higher vocabulary sizes reported taking notes during lectures more often than participants with lower vocabulary sizes.

We also examined whether there is a relationship between how students rated themselves in the self-assessment questionnaire and the increase of their vocabulary size over the course of the study. Generalized linear models included responses to the statements of the self-assessment questionnaire as independent variables and learners' vocabulary size gain during the study, i.e. post-test vocabulary size minus pre-test vocabulary size, as a dependent variable. The analysis procedure was the same as above. The final model showed two significant main effects. First, there was a significant main effect of the strategy of taking notes during lectures on participants' overall vocabulary

growth over the duration of the study (estimate = -244.8; std. error = 100.6; t = -2.43; p < 0.05). Surprisingly, participants who reported being able to take notes less often improved their overall vocabulary more than participants who reported being able to take notes more frequently. There was also a significant main effect of presenting an academic topic on learners' overall vocabulary size increase over the course of the study (estimate = 191.5; std. error = 84.85; t = 2.25; p < 0.05). Specifically, participants who reported being able to present an academic topic more often increased their vocabulary size more over the course of the study than participants who reported being able to present an academic topic less often.

5.8.5 Self-assessment questionnaire and retention of inferred and looked-up words (RQ4)

Finally, two GLMs tested whether there is a relationship between how students rated themselves in the self-assessment questionnaire (independent variables) and their retention level for words that they were instructed to guess or look up (dependent variables) during the training sessions. Again, the same analysis procedure as above was used. The analysis for the guessing from context condition revealed no significant main effects. None of the independent variables that we looked at contributed to model fit. The analysis for the dictionary condition revealed two significant main effects. First, we found a significant main effect of how participants rated themselves in the skill of finding needed information in a general text on the size of their learning effect through dictionary use (estimate = 0.184; std. error = 0.065; t = 2.80; p < 0.05). In particular, participants who reported more frequently being able to find needed information in a general text retained more of the words that they looked up in a dictionary as part of the training sessions than participants who reported less frequently being able to find needed information in a general text. Second, the results revealed a significant main effect of how students rated themselves in the skill of freely writing their opinions on the size of their learning effect through dictionary use (estimate = -0.150; std. error = 0.061; t = -2.42; p < 0.05). Interestingly, participants who reported less commonly being able to freely write their opinions learned more of the words that they looked up in a dictionary than participants who reported more often being able to freely write their opinions.

5.9 Discussion

The current research explored how VLS usage and language skills relate to vocabulary size and vocabulary learning over a certain period of time. In the following sections, we will summarize the results and discuss them with respect to our four research questions.

5.9.1 VLS usage and vocabulary size (RQ1)

The first research question explored the potential relationship between participants' VLS usage and their pre-test vocabulary size as well as their increase in vocabulary size over the course of the study. We found that (1) participants with lower vocabulary sizes reported asking instructors about word meanings more frequently than those with higher vocabulary sizes. In addition, (2) participants with larger vocabulary sizes reported engaging in more inferencing from context than those with smaller vocabulary sizes. Furthermore, (3) participants who reported using a bilingual dictionary more often increased their vocabulary size more over the course of the study than participants with less bilingual dictionary usage.

The first finding is inconsistent with Alahmadi et al. (2018) who found no such effect for postgraduates and the reverse effect for undergraduates, namely that those with *higher* vocabulary sizes reported asking instructors about word meanings more frequently than those with *lower* vocabulary sizes. This discrepancy may be due to participants' different vocabulary sizes across the two studies. Undergraduates in Alahmadi et al. (2018) had an average vocabulary size of 1976 words, compared to 3331 words for the current undergraduate participants and 5368 words for Alahmadi et al. (2018)'s postgraduates. This pattern of results from Alahmadi et al. (2018) and the current study could be explained by an inverse U-shaped relationship between vocabulary size and asking instructors about word meanings. Specifically, among the group with the lowest vocabulary sizes, use of this VLS increases as vocabulary size increases, possibly as learners become more confident in asking questions. Among the group with medium vocabulary sizes, use of this VLS decreases as vocabulary size increases, possibly because learners have less need to ask their instructor about words' meanings as their vocabulary size increases. No effect for this VLS was found for the group with the highest vocabulary size, who used this strategy very infrequently overall.

This suggests that learners may make use of this strategy more often at a certain stage in their learning that corresponds to a particular vocabulary size.

The second finding is consistent with various previous studies, such as Alahmadi et al. (2018), Alsaif (2011) and Al Qahtani (2005), who found a significant positive relationship between participants' inferencing strategy use and their vocabulary size for learners of various proficiency levels. However, the current results contradict Alqurashi (2013), who found no relationship between inferencing strategy use and vocabulary size. As we have argued in Alahmadi et al. (2018), it is not clear whether learners with higher vocabulary sizes choose to engage in inferencing more frequently, possibly because they know more words in the immediate context, which facilitates engaging in inferencing (de la Garza & Harris, 2017), or whether learners who engage more frequently in inferencing increase their vocabulary size as a result of this relatively deep engagement with the text (cf. Richards, 1976).

The third finding is consistent with studies that find a positive relationship between bilingual dictionary use or determination strategies more generally and vocabulary size (Hamzah et al., 2009; Komol & Sripetpum, 2011). The current study goes beyond these previous results in showing that frequent self-reported use of a bilingual dictionary contributed to learners' vocabulary size increase over a certain period of time. Our results support Kroll and Curley's (1988) claim that using L1 equivalents to learn novel L2 words is an efficient vocabulary acquisition method. Specifically, dictionaries are easily accessible (e.g. in phone applications) and allow viewing examples, synonyms or antonyms for the relevant lexical items so that an orthographic and aural representation for the target word can be acquired. In contrast, we found no evidence for Hamzah et al.'s (2009) claim that the relationship between bilingual dictionary use and vocabulary size in previous studies is due to learners' inadequate knowledge of other VLS. Participants in the current study engaged in various other VLS with mean values between *sometimes* (2) and *frequently* (3).

5.9.2 VLS usage and retention of inferred and translated words (RQ2)

The second research question investigated the potential relationship between participants' VLS usage and the amount of vocabulary learning that occurred through guessing and dictionary look-up throughout the study. We found that learners who

reportedly use the strategy of guessing from context more often overall learned more vocabulary items through inferencing from context than those who use the strategy of guessing from context less often. In contrast, we found no effect of any VLS on learning through dictionary use. Our results suggest that how successfully learners can acquire vocabulary through inferencing may be due to how familiar they are with inferencing as a strategy. No such familiarity effect was found for dictionary use. Together with the results for RQ1, this paints a picture of both dictionary use and inferencing contributing to vocabulary acquisition, with only inferencing being a strategy whose success seems to depend on having practice with the strategy.

Our results are consistent with Nassaji (2003) who differentiates between strategy use and learners' ability to apply strategies in an appropriate and effective manner. Specifically, our results suggest that, for some strategies, frequent strategy use relates to success in using the strategy. Our results are also consistent with Hulstijn (1992) who argued that inferencing can support comprehension and learners' short- and long-term lexical retention. Marefat and Shirazi (2003) highlighted a similar effect of non-linguistic inferencing on learners' short- and long-term retention level. With regards to explicit instruction of inferencing skills, both Fraser (1999) and Marefat and Shirazi (2003) found no direct effect of explicit instruction on vocabulary acquisition, but noted an indirect influence, such that better inferencing skills related to learners ignoring fewer unfamiliar words. Furthermore, Mondria (2003) found that direct instruction of inferencing strategies has a positive impact on learners' retention level, but was less efficient in terms of time. Our results do not speak directly to explicit instruction, as participants in the current study were not explicitly taught inferencing or lexical translation strategies, but it does suggest that familiarity with inferencing, which could be achieved through explicit instruction (as, for example, in Alyami & Mohsen, 2019), supports learning vocabulary through inferencing.

5.9.3 Language skills and breadth of lexical knowledge (RQ3)

The third research question explored the potential relationship between participants' language skills and their pre-test vocabulary size as well as their increase in vocabulary size over the course of the study. We found that participants who self-reported more often (1) being able to recognize the main ideas when reading texts and (2) taking notes during lectures had higher vocabulary sizes prior to training than participants who self-reported doing so less often. In addition, we found that (3) participants who self-

reported more often taking notes during lectures increased their vocabulary size less over the course of the study than participants who self-reported doing so less often. Finally, (4) participants with higher ability to present an academic topic increased their vocabulary size more during the study than participants with lower ability to present an academic topic.

The first result is consistent with numerous previous studies (e.g. Al-Nujaidi, 2003; Schmitt & Schmitt, 2011; Laufer, 1992; Qian, 1999, 2002) that found a positive relationship between vocabulary size and reading comprehension, and supports the common argument that sufficient vocabulary knowledge is needed for adequate text comprehension. The second result finds mixed support in the previous literature. While Hamzah et al. (2009) and the current study found a positive relationship between note taking and vocabulary size, Komol & Sripetpum (2011) found no such relationship. Interestingly, our third result finds that learners who engaged in note taking more regularly increased their vocabulary size less over the course of the study than participants who reported using this strategy less frequently. This finding, however, does not necessarily contradict our second result above. It seems that participants who frequently engaged in note taking had higher vocabulary sizes to begin with and thus less opportunity to increase their vocabulary size over the course of the study by means of the intermediate-level texts used during training. This view is consistent with Alahmadi's (2015) observation that some VLS did not seem to influence a learner's vocabulary knowledge when the student had reached a certain level of vocabulary size. The fourth result is consistent with Koizumi and In'nami (2013) finding of a significant relationship between learners' vocabulary knowledge and their ability to express themselves fluently. Adolphs and Schmitt (2003, p. 425) also noted the role of vocabulary size on influencing speaking ability when they concluded that "more vocabulary is necessary in order to engage in everyday spoken discourse than was previously thought. The implication is that a greater emphasis on vocabulary development is necessary as part of aural improvement." However, while these previous studies suggest a relationship between speaking ability and vocabulary size, our results suggest a relationship between the ability to talk about an academic topic and vocabulary learning. One possibility is that learners with superior presentation skills also have a higher willingness to speak (Heidari, 2019) and thus engaged in more conversations in the L2 over the course of the study, which could have contributed to their larger increase in vocabulary knowledge. However, additional correlation analyses

suggest that this is unlikely. The current study finds neither a significant correlation between the ability of talking about an academic topic and using English outside of the classroom ($t = 1.17$, $df = 59$, $p = 0.25$) nor between using English outside of the classroom and an increase in vocabulary size ($t = -1.49$, $df = 59$ $p = 0.14$).

5.9.4 Language skills and retaining inferred and translated words (RQ4)

The fourth research question investigated the potential relationship between participants' language skills and the amount of vocabulary learning that occurred through guessing and dictionary look-up throughout the study. None of the self-rated language skills related significantly to how many of the target words participants learned during the training sessions through inferencing. For learning target words through dictionary use, we found that (1) participants who more frequently found needed information in a general text learned more of the target words through dictionary look-up than participants who report being able to do so less often. In addition, (2) participants who reported to more often being able to freely write their opinions learned fewer target words through dictionary use than participants who reported being able to do so less often. The first result is consistent with Knight (1994) who found a positive relationship between reading comprehension and dictionary consultation. It is possible that learners who are good at finding information in texts are also good at finding appropriate translations when using a dictionary. The second finding is more puzzling. It seems reasonable that one's ability to freely write their opinions may be unrelated to vocabulary acquisition through dictionary use, but it is not immediately clear how writing ability should relate to less learning through dictionary use. More studies are needed to see if this effect can be confirmed and, if so, what may be causing it.

5.10 Conclusion

The current results highlight that vocabulary acquisition through inferencing, but not through dictionary look-up, depends on learners' familiarity with this strategy. Interventions that familiarize learners with inferencing strategies may therefore positively impact word learning in a foreign language. Furthermore, reading comprehension and note taking seem to relate to vocabulary size and vocabulary acquisition in complex ways. Overall, we suggest that familiarity with inferencing

strategies can benefit learners and that the relationship between note taking and vocabulary acquisition warrants further investigation.

Compliance with Ethical Standards

The authors declare that they have no conflict of interest.

CHAPTER SIX

General Discussion

6.1 Introduction

This thesis consists of three interrelated studies which generally focused on the lexical learning process in a Saudi context. The first study aimed to investigate VLS usage of the examined learners and its relationship to their lexical knowledge by highlighting participants' individual learner styles and how dissimilar learner styles might impact vocabulary knowledge. The second study explored the influence of lexical inferencing and lexical translation on the initial vocabulary acquisition and retention by applying a within-participant design. The third study investigated the potential effect of VLS usage and learners' level in the four language skills on the growth of lexical knowledge and attainment of novel vocabulary items over the course of the study.

This chapter summarises the major findings and discussions of the experimental work presented in chapters 3-5. The specific findings of each study have already been discussed in the discussion sections in the respective chapters. This chapter therefore attempts to draw from all prior discussion sections to present an overview of the most important outcomes that come from exploring the vocabulary learning process in a Saudi context. Moreover, this chapter will connect the outcomes of the individual studies to the general literature review, both empirically and theoretically. The following discussions will be in the form of themes or areas. Specifically, each section shall discuss the main outcomes of each study in the current thesis and link that to the relevant literature, concepts and theories introduced in the general introduction.

6.2 Participants' lexical knowledge

Exploring the lexical knowledge of the examined undergraduate and postgraduate Saudi learners indicated their relatively limited breadth of vocabulary knowledge. This finding is in-line with most studies conducted in Saudi contexts (e.g. Al-Akloby, 2001; Al-Hazemi, 1993; Al Qahtani, 2005; Alsaif, 2011; Masrai, 2015; Alhazmi, 2018). This issue could be linked to several reasons, such as the late start for learning English (grade 5, 11 years old), the applied teaching methods, and teachers' qualifications/experiences

and/or classroom situations (Alsaif, 2011). Reviewing English textbooks designed by the Minister of Education in Saudi Arabia provides the impression that learning and retaining vocabulary is not a primary aim for the presented units. For instance, units in these English textbooks usually focus on reading comprehension and a novel grammatical rule to be learned. Al-Akloby (2001) and Alsaif (2011) highlighted this issue and suggested an evaluation of teachers' and textbook designers' instruction methodology.

Moreover, introducing English at an earlier age in Saudi formal schools can assist in increasing learners' input and therefore expanding their vocabulary knowledge. Another potential reason for the relatively low lexical knowledge is the lack of word cycling, i.e. regularly revising vocabulary. Language instructors can present relevant lexical items, but a lack of revision by students may lead them back to the starting point. Al-Akloby (2001) highlighted that, "once the words are logged, little is done with them" (Al-Akloby, 2001: 157). Learners' motivation towards English language learning could be a possible reason for the limited vocabulary knowledge.

In light of current findings, vocabulary learning strategies (VLS) seem to play a beneficial role in learning new lexical items. The first study showed a relationship between some strategies used and students' vocabulary size. Moreover, both the second and third studies showed that usage of inferencing or translation techniques can also lead to an increase in lexical knowledge. Based on the prior findings, curriculum designers might consider the idea of introducing VLS to students at an early stage as a useful tool to expand their lexical knowledge. It is true that some strategies were found to be more effective than others, but, any explicit instruction of VLS should not be focused on specific strategies to be obtained. Rather, students should be introduced to a variety of strategies. The reason behind this suggestion is to give students wider opportunities to become familiar with and examine each and every strategy.

Another possibility for the relatively low lexical knowledge among participants across studies can be connected to the applied vocabulary breadth size tests, as they may underestimate learners' vocabulary knowledge. The X_Lex by Meara & Milton (2003) and the XK_Lex by Al-Masrai & Milton (2012) both use the methodology of including non-real or pseudo-words to estimate the amount of guessing by a learner, thereby adjusting the final score of a learner's breadth of vocabulary knowledge. This could lead to a lower score for a learner, or even a score of zero if all pseudo-words were selected. Secondly, the average vocabulary size for undergraduate learners in the first study was

1976 (using X_Lex), while it was 3331 words on average for undergraduate participants in the second study (using XK_Lex). According to Alsaif (2011), the reason for the discrepancy in results between X_Lex and XK_Lex could be the amount of vocabulary knowledge examined (5k compared to 10k, respectively). For instance, if a learner knows words in 6k or 7k bands of word knowledge, the X_Lex might underestimate his/her lexical knowledge as it does not cover the 6k and 7k bands. However, he also argued that the more this range expanded, the more students could be reported to have gained a higher level of lexical knowledge.

Many researchers have discussed the size of a learner's vocabulary and its relationship to their comprehension of authentic reading or spoken materials (Hu & Nation, 2000; Laufer, 1989, 1992; Nation, 2006; Laufer & Ravenhorst-Kalovski, 2010), with some researchers suggesting a lexical threshold for understanding L2 materials. However, the literature seems to provide contradictory findings. In an attempt to investigate the relationship between learners' reading comprehension in an academic context and their vocabulary knowledge, Laufer (1989) used two tests of academic reading, where academic texts were followed by comprehension questions. Results concluded that 95% of text coverage could lead a learner to scoring 55% (i.e. a passing score) in the applied reading comprehension tests. A similar study by Laufer (1992) indicated that knowledge of 3000 word families produces a passing score of 56% in the used standardised reading comprehension tests, while knowledge of 4000 and 5000 word families could lead to a score of 63% and 70%, respectively. Hu et al. (2000) suggest that an adequate understanding of a reading text, i.e. understanding the general idea of a text, could be obtained by 98% text coverage. Nation (2006) notes that in order to reach the level of 98% of text coverage, a learner needs to know 5000 word families and proper nouns, while knowledge of 3000 word families corresponds to 95% text coverage. Moreover, Laufer et al. (2010) suggested two lexical thresholds; a superlative one, where a knowledge of 8000 word families will lead to approximately 98% text coverage, and a minimal one, with between 4000 to 5000 word families on average to result in 95% text coverage. Recently, Luo (2014) suggested that vocabulary knowledge of 10,000 words leads to almost 95% text coverage in English. Generally, we might assume that knowledge of the 5000 most familiar words in English can lead to adequate comprehension of reading materials. However, in the current study, only postgraduate participants reached that level with a mean score of 5368 words in the breadth of vocabulary knowledge test. There are several possible reasons for this finding: The

postgraduate students were obtaining postgraduate degrees in an English-speaking country that required certain language skills for every international student. Moreover, these participants lived in the UK, and their exposure to the language through verbal and written communications is presumably larger than undergraduate participants', who did their degrees in an L1 environment.

The amount of vocabulary knowledge required to comfortably comprehend L2 speaking situations has been noted by different researchers. Consequently, multiple thresholds have been suggested for this purpose. Laufer (1989), for example, suggested understanding 95% of the encountered words to achieve an adequate comprehension level in speaking situations. Masrai (2015) suggested a knowledge of 2000 word families to reach the previous percentage. In an early study, Schonell et al. (1956) suggested a required knowledge of the 2000 most frequently used words in English to comprehend 99% of the spoken materials. This study was based on data collected from more than 2000 workers in Australia, mainly by recording their daily conversations. However, Schonell et al.'s (1956) findings are rather old and built on a relatively small corpus in comparison to recent corpora (Masrai, 2015). Adolphs and Schmitt (2003) suggested knowledge of 2000 word families to understand 95% of the spoken situations and 3000 word families to reach 96% of spoken lexical coverage. The findings were based on data collected from the Cambridge and Nottingham corpus of discourse in English (CANCODE), which consists of more than 5 million words. Recently, Dang and Webb (2014) suggested a knowledge of 3000 to 8000 word families, besides the knowledge of the Academic Word List (AWL) by Coxhead (2000), to gain 95% to 98% of spoken lexical coverage respectively. Overall, based on the prior literature, and with the exception of undergraduate participants in first study, all participants reached the suggested threshold of vocabulary knowledge to perform adequately in speaking situations. Again the relatively low vocabulary knowledge of undergraduate participants in the first study might be linked to the previously mentioned factors of a discrepancy in results between the applied breadth lexical knowledge tests.

6.3 Relationship between VLS Use and Lexical Knowledge

The role that vocabulary learning strategies play in the development of learners' breadth of vocabulary knowledge has been noted in different studies targeting the acquisition of distinctive languages. In English, for instance, Gu et al. (1996), Tılfarlıoğlu, &

Bozgeyik (2012), and Teng (2015) all highlighted a significant and positive relationship between VLS usage and learners' vocabulary knowledge. In L2 Spanish acquisition, Waldvogel (2013) found a positive association between VLS and learners' lexical knowledge across the 475 learners of Spanish at various levels of language knowledge. In line with this, findings from study 1 confirmed a positive relationship between the two factors. Results indicated that both groups of participants (undergraduates and postgraduates) showed a positive and significant relationship between vocabulary size and the strategies of *guessing the meaning from context* and *watching TV programs.* Interestingly, the strategy of inferring meaning from the provided context was the only strategy that was significant at the level of $p < 0.001$ among undergraduate students. Such a result has also been noted in findings such as Al Qahtani (2005) and Tanyer et al. (2014).

The correlation between lexical inferencing and vocabulary knowledge found in many studies (e.g. Azin et al., 2015; Shangarfam et al., 2013) raises the question about whether applying this strategy in particular increases lexical knowledge of a learner, or whether learners with higher vocabulary knowledge can easily use this strategy. Logically, in order to infer unknown words from a context, one should know most of the surrounding lexical items. As a consequence, one might assume that sufficient lexical knowledge is a prerequisite for inferencing meaning from context. Apart from the possibility of incorrect inferencing, guessing from context is considered as an effective and time-saving strategy (Alahmadi et al., 2018). Moreover, it has been argued that guessing can be a beneficial tool for vocabulary acquisition in general, as the process requires deep mental engagement with the target context through focusing on grammatical structures and the general meanings of surrounding words (Al-Hadlaq, 2003; Hulstijn, 2001). Such a process can strengthen the mental links between target words and already-known lexical items, consequently expanding learners' vocabulary knowledge (Richards, 1976). Nevertheless, Schofield (1999) claimed that the dictionary consultation strategy also involves such mental efforts, as learners pay attention to a word's spelling, form, and place in speech. This could further lead to vocabulary increase and retention. The effectiveness of both strategies shall be covered in the next sections.

The other factor which was found to positively relate to participants' vocabulary knowledge was watching TV programs. In general, an EFL learner has to obtain an approximate knowledge of 2,000 to 3,000 word families to comprehend spoken

materials (Masrai, 2015; Van Zeeland & Schmitt, 2013), a threshold which most participants in the current study obtained. Due to class-time restrictions, the strategy of watching target language materials outside of the classroom has been noted as a suitable method to learn L2 vocabulary (Webb & Nation, 2017). Moreover, it has been suggested that following this strategy could impact learners' vocabulary knowledge due to possible repeated encounters with low frequency lexical items (Webb & Rodgers, 2009). Furthermore, exposure to the L2 through watching subtitled movies has been considered as an essential source of L2 vocabulary acquisition among 10-11 years old learners, more so than reading books (Lindgren & Muñoz, 2013).

Many studies have highlighted the impact of watching TV programs on learners' lexical knowledge (e.g., Montero Perez, Peters, Clarebout, & Desmet, 2014; Neuman & Koskinen, 1992; Rodgers, 2013). Peters & Webb (2018), for instance, investigated incidental vocabulary learning through watching audio-visual materials among 63 undergraduate Dutch learners. Results highlighted considerable learning gains of the target lexical items through watching TV programs. In the same vein, Rodgers (2013) indicated that L2 adult participants were able to learn a comparable amount of target words by watching TV programs and reading. Again, such findings do not clearly indicate whether higher L2 vocabulary knowledge plays a role in being able to use this strategy and gaining its full benefits, which consequently expands learner's vocabulary size, or whether learners' familiarity with and use of this strategy lead to an increase in their lexical knowledge. Further research is needed to answer these questions. However, it would be important to note that using such a strategy seems to depend on learners' lexical inferencing skills, as spoken materials are usually too rapid to allow for dictionary consultation.

6.4 Individual Differences

The outcomes of the first study highlighted the possible effects of learners' VLS usage or learning styles on expanding their lexical knowledge. The applied cluster analysis has produced two different VLS profiles: overall frequent or infrequent VLS usage. We thereby concluded that it was frequency of VLS use rather than individual learner styles that influenced their vocabulary increase. In other words, students' learning preferences in terms of VLS, such as visual vs auditory or cognitive strategies vs social strategies, did not seem to impact on vocabulary growth.

Although some studies emphasise the role of learning styles on vocabulary acquisition, most studies in the literature could not find evidence for such a relationship. For instance, Sanaoui (1995) concluded that structured learning styles help learners acquire and retain lexical items more often than unstructured learning methods. In a similar vein, Spoon & Schell (1998) and Naimie, Siraj, Shagholi, & Abuzaid (2010) indicated that meeting individuals' learning preferences impacts their achievements. In contrast, Yeh & Wang (2003) investigated whether undergraduate learners' perceptual learning styles (e.g. visual or auditory) have an impact on vocabulary learning. Their results suggested no significant influence of learning style on vocabulary acquisition. Furthermore, Pashler et al. (2008) concludes that the "literature fails to provide adequate support for applying learning-style assessments in school settings" (p. 116), which is in line with our argument that requesting EFL teachers to cater to individual vocabulary learner styles may not be warranted. Nonetheless, the first study of this dissertation did find that learners who used more VLS also had larger vocabulary knowledge, such that a lack of learners' awareness for which VLS exist and which may work for them may hinder vocabulary acquisition. To overcome this, again, instructors and course designers might consider introducing VLS to students, so that they receive a general overview of VLS and can decide which VLS align with their learning styles and try to implement these VLS to gain full benefits.

The results also directed attention to a relationship between frequent use of VLS and higher vocabulary size, regardless of participants' educational levels (undergraduate and postgraduate). Such findings are in-line with Kojic-Sabo and Lightbown (1999), Memis (2018), and Teng (2015), who highlighted a positive relationship between the amount of VLS usage and learners' lexical knowledge. However, the current findings are in contrast with Lessard-Clouston (1996), who concluded there was a lack of evidence for the relationship between VLS usage and vocabulary growth. This might be due to different factors, such as participants' proficiency level and skillful and efficient use of VLS, as quantity did not always lead to desired achievement levels and quality of usage seems to play a dominant role. Overall, the highlighted role of frequent VLS usage on vocabulary acquisition, irrespective to learners' educational level, can be explained as follows. Firstly, learners' engagement level with VLS could lead to growth in their lexical knowledge (e.g. Alsaif, 2011; Gu & Johnson, 1996). Secondly, learners with a higher vocabulary size might reach a threshold of knowledge, allowing them to skillfully apply strategies such as inferring meaning from context or communicating

with native speakers. Therefore, the relationship between the amount of VLS usage and learners' vocabulary size should be worth exploring in future studies.

6.5 Word learning and retention through lexical inferencing vs. lexical translation

Study two has investigated whether the strategy of guessing meaning from context or using dictionary consultation would lead to better vocabulary retention levels over the duration of the study. Findings revealed that both examined strategies produced a comparable learning effect. In other words, both lexical inferencing and/or lexical translation lead to a similar vocabulary retention level. Such findings are in-line with prior studies comparing the effects of both techniques on lexical recall level (e.g. Çiftçi & Üster, 2009; Mondria, 2003; Zaid, 2009), and suggest that both strategies positively impact learners' vocabulary growth. Furthermore, Ali, Mukundan, Ayub & Baki (2011) have explored the efficiency of three lexical learning approaches (contextual clues, dictionary consultation, and Computer Assisted Language Learning) and their effect on vocabulary learning among ESL undergraduate participants. Results showed that, although there is a significant difference in the immediate post-test across the examined strategies, with a significantly higher mean score for dictionary consultation than for inferencing, there was no statistically significant difference in the delayed post-test, which is in line with the current findings. Ali et al. (2011) concluded that, in addition to the applied methods to acquire vocabulary, the amount of practice and the intervals of reinforcement could play a major role in the long-term retention of lexical items. Referring to the comparable amount of learning by the two examined methods (i.e. inferencing and translation) found in the current study, it seemed logical that both high- and low-level participants benefited from the usage of dictionary consultation, considering both their educational level and years of learning English as a foreign language. However, some studies have suggested a vocabulary knowledge threshold for successful inferencing (Laufer, 1997; Nassaji, 2006). Interestingly, the outcomes from the current study suggest that even participants with a below-average breadth of vocabulary knowledge, a suggested prerequisite for successful inferencing, have benefited from the inferencing strategy in retaining and building their vocabulary size. This could be connected to the quality of contextual cues provided in context or the learner's level of background knowledge (Van Zeeland, 2014). Moreover, it is believed

that factors such as the applied methodological approach, learners' vocabulary sizes, learning styles, and proficiency levels, or learners' motivation level to participate in a study might impact or cause discrepancy across studies' findings (see general discussion section of the second study for further explanations).

The current study attempted to reflect results of natural classroom settings, for example, in that it did not apply a meaning verification tasks to enhance retention after the target word is initially inferred to enhance retention. Instead, it tried to examined actual retention level without external intervention as in meaning verification. Although previous studies argued that meaning verification tasks could prevent false guessing while inferring meaning (Wesche & Paribakht, 2000), studies such as Mondria and Boer (1991) found no advantage of applying meaning verification for inferred words on retention levels; their results indicated that the meaning verification method did not influence the retention level of correctly guessed words compared to incorrectly guessed words. Moreover, using a similar method, Mondria (2003) concluded that, in addition to it being a time-consuming process, inferencing-plus-verifying did not lead to higher retention compared to lexical translation. Nonetheless, Azin et al.'s (2015) findings highlighted that their inferring-plus-verifying condition enhanced their learners' vocabulary retention level compared to the meaning-given condition. Interestingly, outcomes from the current study highlight that participants who were able to guess meaning correctly during the training sessions showed higher learning effects than learners with less successful guessing attempts throughout the training. The current results thus suggest that incorrect guesses can lower learning outcomes so that for certain learners a guessing-plus-verifying strategy may be beneficial. Other learners may sufficiently benefit from guessing alone, for example, those who can naturally apply inferencing strategies successfully, such as backward clues, i.e. using the meanings of words preceding the target word, to guess word meaning (Chern, 1993). Furthermore, the provided context usually contains enough information to assist in the guessing process. Additionally, learners' background knowledge is considered as a frequently-used tool to obtain meaning from context (Cai & Lee, 2010; Haastrup, 1989).

In contrast to the current findings, it has been suggested that lexical translation is more effective in improving vocabulary knowledge compared to lexical inferencing (e.g. Amirian & Momeni, 2012; Prince, 1996; Zou, 2016). In addition, Sadighi & Ghalebi (2015) examined the relationship between knowledge sources applied in inferencing and vocabulary retention among EFL undergraduate learners. They indicated that, although

93% (14 out of 15) of the examined words were recalled when using dictionary consultation compared to 66% (30 out of 45) for inferencing, the findings should not ignore the important role that inferencing plays in expanding learners' vocabulary size. Nonetheless, inferring target words' meanings from provided context has been noted for its superiority as a strategy compared to dictionary consultation, with a substantial role in learners' lexical knowledge (e.g. Akpınar et al., 2015; Azin et al., 2015; Shokouhi & Askari, 2010; Shangarfam et al., 2013). Alsaif (2016), for instance, investigated the impact of contextual guessing methods and dictionary consultation on ESL participants' vocabulary retention levels. Post-test results indicated that inferencing has a significant influence on learners' vocabulary retention level and beyond the impact of translation. In general, the literature usually links the degree of deep learning or engagement with provided materials and the ability to learn or recall them (e.g. Craik & Lockhart, 1972; Craik & Tulving, 1975; Hulstijn, 2001). In this context, researchers have mainly debated which of the two strategies (inferencing or translation) leads to deeper processing, eventually resulting in higher retention levels. Grace (1998), for instance, claimed that regardless of the fact that translation is a time-consuming strategy, the feature of directly linking novel lexical items with their L1 translations can promote higher recall levels. In a similar vein, dictionary consultation has been argued to provide knowledge of a target word that goes beyond its meaning, including information regarding synonyms, pronunciation etc., all of which can enhance a word's retention process (Zou, 2016). On the other hand, inferencing is believed to afford a deep cognitive process as, in order to determine the exact meaning of a lexical item, a learner has to apply multiple strategies, such as noting a word's form, type, affixes, and/or link it to their background knowledge and the other words in the context (Van Parreren, 1992; Azin et al., 2015). Overall, it seems that both strategies provide a suitable portion of cognitive processing that facilitates the retention process (see section 6.7. for further information).

6.6 Language skills and breadth of lexical knowledge

The third study explored the possible relationship between participants' performances within the four language skills (listening, speaking, reading, and writing) and their breadth of vocabulary knowledge. The results revealed four general indications: Firstly, participants who reported to frequently recognize the main ideas in a reading text had a higher vocabulary size than their counterparts, who indicated less regular application of

this strategy according to pre-test outcomes. Such a finding can be described as unsurprising and in-line with most studies in literature (e.g. Albrechtsen, Haastrup & Henriksen, 2008; Laufer, 1992; Ouellette, 2006; Qian, 1999, 2002; Schmitt et al., 2011). In addition, Stæhr (2008) found a robust correlation between reading comprehension and learners' lexical capacity. Specifically, reading comprehension revealed the highest correlation with vocabulary knowledge (0.83) and vocabulary size explains about 72% of the variance in being able to score at or above average in the reading test. Milton (2013) noted that correlations between reading and lexical knowledge are usually higher than correlations between aural skills. He linked that to the possibility that oral language skills may involve more common and less 'sophisticated' words than written text. Alternatively, the nature of vocabulary breadth tests (usually in a written format) might play a role in directing this relationship. The current finding, however, is not an exception and clearly highlights the prior found relationship between skillful reading ability and learners' breadth of vocabulary knowledge.

The second finding was a positive relationship between vocabulary size and an aspect of writing skills (taking notes during lectures), indicating that participants who regularly reported using this skill had higher lexical knowledge than learners who used this strategy less often prior to the training sessions. Generally, the relationship between writing skills and learners' lexical knowledge has been noted in different studies (e.g. Astika, 1993; Daller & Phelan, 2007; Engber, 1995). Specifically, and in-line with this finding, Hamzah et al. (2009) discovered that the strategy of note-taking is frequently used by their participants and also highly correlated to their vocabulary knowledge. In contrast, Alsaif (2011) could not confirm such a finding. However, the current positive result could be linked to participants' vocabulary and educational levels: undergraduate English major students might be in a position to successfully and frequently engage in note-taking.

The third finding interestingly indicated that students who engaged in note-taking more often were building their vocabulary knowledge less when compared to their counterparts with less frequent usage of this strategy, according to the delayed post-test. However, this should not necessarily be considered a contradiction with the second finding, as participants who benefited less from the usage of note taking had already reached a certain level of lexical knowledge; it is possible that such a strategy no longer influenced their vocabulary knowledge growth (Alahmadi, 2015). Such a claim seems to be supported by the current findings. In addition, Garza & Harris (2017) indicated that

some vocabulary learning strategies seemed to lose their effectiveness at certain points due to the level of knowledge the learner had gained.

The fourth finding highlighted a significant relationship between how learners rate their ability to present an academic topic and the increase of their lexical knowledge during the course of the study compared to participants who did not report high ratings for that ability. The significant connection between speaking ability in general and breadth of vocabulary knowledge was noted in the literature (e.g. Adolphs & Schmitt, 2003; Koizumi & In'nami, 2013; Milton et al., 2010). The current result, moreover, adds to the previous literature the relationship between one specific aspect of speaking skill (i.e. presenting an academic topic) and an increase of learners' vocabulary knowledge over the course of the study. It should be noted that due to the lack of studies comparing speaking skills in general and the ability to present an academic topic in particular with the increase of learners' vocabulary size, the following lines shall discuss the relationship between the ability to speak in general and learner's lexical knowledge. Koizumi and In'nami (2013), investigated the relationship between learners' lexical knowledge and speaking proficiency among Japanese EFL learners. Outcomes highlighted that speaking fluency in an interview task is highly correlated to learners' breadth of lexical knowledge.

In terms of vocabulary knowledge, it seemed that the current study participants have reached suggested thresholds for successful communication. For instance, Adolphs & Schmitt (2003) considered a breadth of word knowledge of the 2000 most frequently-used words as an indicator to achieve 95% of spoken coverage in the target language. The breadth of vocabulary knowledge of the current study participants meets their suggested lexical threshold.

While previous findings highlighted the relationship between speaking skill in general and vocabulary acquisition, the current findings indicated a relationship of a particular aspect of speaking ability (presenting an academic topic) and learners' lexical knowledge. A potential explanation for such a finding could be linked to learners with a higher presentation ability, i.e. learners who are more comfortable speaking with others in the L2 or in front of an audience; it is possible that these participants practice their English regularly outside the classroom and that resulted in a larger increase in their vocabulary size. An additional applied correlation analysis to explore this, however, could not support the prior claim. There was neither a significant correlation between the ability of talking about an academic topic and using English outside of the classroom

nor between using English outside of the classroom and an increase in vocabulary size. It seems that the reasons for the relationship between speaking about an academic topic and an increase in vocabulary size needs to be investigated further.

6.7 Processing depth and retention from inferencing and dictionary consultation

Several researchers (e.g. Craik & Tulving, 1975; Hulstijn, 2001) have explored how the amount of deep mental processing of novel language materials might impact the recall level of those materials in language learners. The attempts to investigate this assumption have produced numerous theories for how deep or shallow processing influences the retention level. Craik & Lockhart (1972) presented one of the early endeavours to express how the processing level of new materials can impact learners' recall level. As highlighted in section 6.5., some studies in the literature lead to better retention for either inferencing or dictionary consultation compared to the other, possibly due to different amounts of mental processing involved in each strategy (e.g. Grace, 1998; Azin et al., 2015). The current study, however, indicated that both methods of learning novel words produced comparable retention levels. This result is in line with both the Involvement Load Hypothesis (ILH) by Hulstijn and Laufer (2001) and the Technique Feature Analysis (TFA) by Nation and Webb (2011). According to these theories, both the lexical inferencing and dictionary consultation training applied in current study received a comparable, moderate to high score for processing depth (see chapter 4 for further explanations).

While the results from the second study were in line with the depth of processing theories as both strategies were predicted to and did yield a similar learning effect in terms of vocabulary learning, the obtained results are in contrast with studies that showed better efficiency of one strategy over the other in terms of retention (e.g. Shokouhi and Askari, 2010; Amirian and Momeni, 2012; Zou, 2016). These differences in results might be linked to the methodological approaches used. For instance, participants in the present study were not explicitly taught how to use a dictionary or provided with tips to infer words' meanings from context, but it attempted to obtain results in a more natural setting. In contrast, Amirian and Momeni (2012) explicitly informed their high school students about target words' meanings and taught them how to infer target words' meanings from context. The results showed that words which were

explicitly taught were learned better than their counterparts in the inferencing condition. Based on the provided methodological information, these results are likely not compatible with what the Involvement Load Hypothesis and the Technique Feature Analysis predict. Both theories would likely predict that participants engaging in inferencing should outperform participants in the meaning-given condition. Specifically, in terms of the ILH, the stages of search and evaluation do not apply to the meaning-given condition, as learners were informed about the words' meaning and did not need to compare or combine new lexical items with other words. This would likely lead to a lower score for the meaning-given condition compared to the inferencing condition. In terms of the TFA, the meaning-given condition receives no points for motivation or negotiation, and would therefore also likely lead to a lower score than the inferencing condition.

Participants in Azin et al. (2015) were either explicitly given the target words' meaning through explanations and definitions (control group) or saw the target words in original context and were asked to infer their meaning and then verify their inference (experimental group). Results indicated that the experimental group outperformed the control group in terms of retention. Again, the meaning given condition would not receive any points for the Involvement Load Hypothesis's categories of search and evaluation, as learners were given the meanings and the task therefore involved neither search efforts nor comparisons or combinations of the given meanings with other words in the context. Similarly, Azin et al.'s (2015) meaning given condition scores lower than the inferencing condition in the Technique Feature Analysis's categories of motivation and meaning negotiation. Azin et al.'s (2015) results are therefore compatible with the ILH and TFA.

It is important to mention that it was not possible to calculate an exact expected score according to the Involvement Load Hypothesis and the Technique Feature Analysis for Amirian and Momeni's (2012) and Azin et al.'s (2015) studies, as not all the needed methodological information was given in the articles. However, based on the methodological information that was provided, we can assume that both the Involvement Load Hypothesis and Technique Feature Analysis would predict that participants engaging in inferencing in Amirian and Momeni's (2012) and Azin et al's. (2015) studies should have outperformed participants in the meaning given conditions. It also needs to be noted that the unexpected results in Amirian and Momeni's (2012) study might be linked to their participants' proficiency level. Specifically, the

participants were high school students with possibly low vocabulary knowledge, which could have negatively impacted their attempts to infer meaning from context, even if they were explicitly taught inferencing strategies.

Overall, both the Involvement Load Hypothesis and the Technique Feature Analysis predict a comparable level of mental engagement for lexical inferencing and lexical translation in the current study and the current findings were in line with these theories' expectations or assumptions.

6.8 Implications for EFL learners and instructors

One of the major aims in this study, which has been highlighted in the prior sections, is to explain the role of learners' lexical knowledge in second language acquisition. Unsurprisingly, the results indicated a relatively limited breadth of vocabulary knowledge for the examined Saudi EFL learners. Their below-average vocabulary knowledge could slow their learning progress. This section endeavors to explore the potential reasons for this finding and propose practical solutions. Potential reasons can be summarized into two major influencing factors: lexical input and vocabulary learning strategies (VLS). Vocabulary input is a critical element of EFL learner's vocabulary growth and considered as a neglected area, as most studies explored the production of vocabulary among examined learners and ignored the possible shortcomings in the input, i.e. the instructors' speech in the classroom and the provided textbooks, which can substantially impact the level of learners' language production (Alsaif, 2011).

One of the major knowledge resources or inputs in foreign language classrooms is the teacher's talk. Language instructors' awareness of the role of vocabulary in EFL contexts, besides their skillful methods of delivering target lexical items, can positively influence their learners' vocabulary knowledge. Donzelli (2007), for instance, indicated that EFL teachers can introduce a larger number of lexical items than textbooks do; this would lead to a lexically rich classroom environment. According to Arishi (1984, cited in Al-Otaibi, 2004), teachers' talk represents almost 65% of the Saudi classroom environment, while students' talk represents only 11%. This highlights the role of the instructor's talk as a major source of vocabulary in the Saudi EFL classroom. Moreover, Alsaif (2011) investigated the quality of lexical production by Saudi teachers in the classroom and indicated that, in general, it's a poor lexical environment, as around 92% of teachers' talk - which accounted for 80% of the whole classroom talk - was limited to

the 2,000 most frequent words in English. As a consequence, it is recommended that teachers should expand their lexical production and use more words from the 3,000 and 4,000 bands instead of recycling the most frequent 2000 words. This suggestion is not intended to decrease the significance of the most frequent 2000 words, but words beyond this limit could additionally impact the quality of learners' outcomes (Nation, 2001; Schmitt et al., 2011).

Skillful teachers with awareness of the significant role of lexical knowledge in an EFL context should present and revise more lexical items than can be found in students' textbooks (Donzelli, 2007). Therefore, teachers should be encouraged to present more relevant vocabulary in the target lessons in addition to the suggested items in textbooks. This method, besides regular revision of already presented vocabulary, should expand learners' lexical knowledge. In the same vein, teachers' talk or input should not be much beyond or below the learners' level. For instance, if an instructor uses too many lexical items that are beyond his/her students' level, then the acquisition process may be too difficult and less beneficial. Contrarily, the teacher could underestimate their students' lexical knowledge and exclusively present already known vocabulary, and thus the input will not add novel knowledge to the learner. In line with this, Krashen (1985) presented the notion of comprehensible input, which refers to delivering language input that is slightly above learners' current knowledge. In light of this, teachers should have some knowledge of their students' lexical abilities. This could be achieved by applying a vocabulary knowledge test or reviewing their progress report from the preceding educational level. The prior suggestions could enhance the instructor's role as one of major sources of knowledge in the classroom.

Textbook input is considered as an essential source of vocabulary in the EFL classroom. Considering its role as a major source of language input in general, and vocabulary in particular, textbook designers can take into consideration the type of vocabulary presented in terms of frequency and relation to learners' areas of interest. In a similar vein, Thornbury (1999) argued that most designed textbooks' topics lack the ability to engage students cognitively. In addition, the choices of target words should include lexical items from frequent and infrequent word ranges, so that – as highlighted earlier – students do not only encounter words that they already know. Aside from this, the recycling, i.e. the repeated mention, of presented words will increase learnability. Furthermore, Webb & Chang (2012) suggested a vocabulary learning target at each unit or year to raise students' awareness of target lexical items, which could motivate them

to view the value of their learning at the end of the course. However, according to Alsaif (2011), the absence of any theoretically rational justification for lexical selection in most course books' materials has made these resources a target of criticism. Instead, vocabulary in textbooks should be selected based on an obvious theoretical rational. In addition, there should be a clear methodology for how these target words should be introduced and eventually evaluated. The recent findings in the field of applied linguistics could be used as a source for suggested modifications. This proposal may be economically inefficient, but the Minister of Education could update textbooks annually based on recent findings rather than regularly designing entirely new course books to meet expectations, as is currently the case.

Vocabulary learning strategies have been noted in the current study as an optional tool for learning more lexical items inside and outside the classroom. Therefore, EFL curriculum designers are encouraged to offer these strategies to learners, so that they can effectively apply these strategies to increase their lexical knowledge. Those strategies can be presented to students at earlier stages of learning to provide an overview for the tools and to assist them in applying them efficiently. However, one of the reasons that this method was applied in the current study is the educational level and years of learning English that are assumed to help them apply those techniques naturally. The current suggestion that regular usage of VLS benefits learners was driven by the finding that participants with a wider breath of vocabulary knowledge were frequent users of VLS in general. However, it should be noted that solely presenting students with VLS is not the only solution to overcome the learners' poor lexical knowledge in the Saudi context. Careful instruction and close observation by teachers is equally important, especially at lower stages of language learning. Hamzah et al. (2009) state that "a good knowledge of the strategies and the ability to apply them in suitable situations might considerably simplify the learning process of new vocabulary for students" (Hamzah et al., 2009: 42). Moreover, curriculum designers and teachers should take into consideration learners' individual abilities: If a strategy is beneficial for one learner, this does not mean that it will be equally beneficial for another. Even though the current study did not find any impact of learners' styles on their vocabulary knowledge, this factor is worth considering. Alsaif (2011) suggested that, when selecting learning strategies, it is important to note that different strategies may not work equally well for all students. As a result, a good strategy may be to introduce students to a variety of VLS, so that they can select and use the ones that work best for them personally.

Language acquisition is not just about knowledge, but about being able to use this knowledge to communicate. While learners are a core factor in the educational system in general, a focus on learners is especially important in the case of language acquisition. Despite this, previous studies have indicated that teachers dominate the majority of talk in the classroom, and learners only had minor opportunities to participate in classroom talk in a Saudi context (Alsaif, 2011). It is therefore recommended that learners are encouraged to participate in classroom talk in order to build their confidence in language usage and to practice the presented lexical items. Curriculum designers should also expand the learners' role by providing more and varied classroom activities in textbooks. Similarly, the teachers should revise the presented words through regular classroom conversations that allows for usage of the target items. Furthermore, Walsh (2002) indicated that in order to increase learner's talk in the classroom, teachers could offer opportunities for self-expression, and seek and encourage clarifications from learners. This can lead to a greater involvement in the process of language learning on the part of the learner and maximise their learning potential (Musumeci, 1996; Peng & Woodrow, 2010). The simple act of asking students if they understood can also be a useful tool to increase understanding, as some students might be afraid or embarrassed to ask (Liestman, 1992). Moreover, there are some factors that can increase learner talk in classroom, such as reducing the group size, discussing familiar topics, encouraging pair work and the usage of open-ended questions (De Léger & Storch, 2009; Cao & Philp, 2006; Zhong, 2013; Vongsila & Reinders, 2016).

6.9 Study limitations

Overall, the current study has successfully accomplished its target objectives. Nevertheless, a number of limitations should be noted. First, the current study used the two vocabulary knowledge tests X_Lex by Meara & Milton (2003) and XK_Lex by Al-Masrai & Milton (2012). Although both tests have been noted for their validity and reliability, the followed Yes/No format in these tests have been a subject of some criticism. For instance, Read (2007) mentioned that, vocabulary breadth size tests based on multiple choice format (i.e. introducing target word in a brief non-defining sentence followed by four potential meaning) are considered to present a clear indication that each word is actually recognised. In contrast, in a Yes/No format test, the learners are

only required to state whether or not they know the word. This relies on learners' honesty and judgment and might not provide clear insight that a learner is actually recognising the target lexical item. Moreover, the mathematical process applied in X-Lex and XK-Lex to deduct from the learner's total score based on how many non-words were selected could underestimate learner's lexical knowledge (see chapter two for further information on the method of score calculation). Therefore, Read (2007) suggested a simple calculation that, we only deduct responses of non-words from yes responses to calculate learner's vocabulary size. Furthermore, pseudoword or non-word selection in Yes/No vocabulary size tests has been criticised for not being "linguistically neutral" (Read, 2000: 129). Particularly, pseudowords may be particularly easy to identify as a non-word based on its form. In other cases, it might be very difficult to recognise as a pseudoword even for native speakers (Meara & Jones, 1988). For instance, the word 'callisthemia' seemed easy to identify as a pseudoword, while a word such as 'plaudate' could be assumed as a real word. The lack of an ideal criterium of pseudoword difficulty level might be considered as a shortcoming in Yes/No vocabulary tests. Due to the potential limitation in the current study of adopting Yes/No lexical knowledge tests (i.e. X-Lex & XK-Lex), future projects with similar aims could use other vocabulary tests with alternative methodological procedures to calculate learner's vocabulary knowledge to see whether or not that produces similar conclusions.

Second, an additional limitation in terms of the two applied vocabulary size tests is the difference in frequency bands tested. While the X_Lex (Meara & Milton, 2003) tests the first five frequency bands (1,000 – 5,000 words), which may restrict or reduce learner's actual lexical knowledge, the XK_Lex (Al-Masrai & Milton, 2012) tests the first ten frequency bands (1,000 – 10,000 words) and may thus more adequately capture learners' vocabulary size. Previous studies have shown that the XK_Lex may yield higher estimates of vocabulary knowledge compared to the X_Lex for comparable groups of participants (Meara & Milton, 2003; Al-Masrai & Milton, 2012). The current studies confirm this in that undergraduate learners in the first study showed smaller vocabulary sizes using the X_Lex compared to a similar group of undergraduate learners in studies 2 and 3, which showed higher lexical knowledge using the XK_Lex. As mentioned above, this could be due to the amount of vocabulary knowledge examined across the two tests (Alsaif, 2011). Consequently, it may be advisable to use a vocabulary knowledge test that covers a wider range of vocabulary sizes to overcome any potential issues in terms of restricting learners' actual word knowledge.

Third, the small number of female participants (only 14 students across three universities) could be taken as a limitation in the current study. The regulations of the Ministry of Education in Saudi Arabia prevents male researchers from personally communicating with female participants. Therefore, the researcher delivered study instructions through an internal TV system, and female staff did the actual data collection. Together with administration requirements that limited the period of data collection, this hindered recruitment of female participants. Furthermore, the researcher could not personally observe whether female participants followed the procedures as requested or not, and had to rely on other staff for this.

Finally, the current research was quantitative and did not have a qualitative component. Adding a qualitative component, such as personal interviews, could have painted a more complete picture, especially in terms of participants' language skills and VLS usage. Specifically, the VLS questionnaire focuses on quantity of use, i.e. how often participants used a certain VLS, and Cohen (1998) points out that questionnaires may either overestimate or underestimate participants' VLS use. Interviews could also have provided additional information regarding the quality of VLS use, which some researchers consider to be more important than quantity of use (Codó, Dans, & Wei, 2008; Winchester, 1999).

6.10 Suggestions for further research

The current study confirmed the relatively low lexical knowledge of EFL Saudi learners found in many previous studies (e.g., Al-Akloby, 2001; Al-Hazemi, 1993; Al Qahtani, 2005; Alsaif, 2011; Masrai, 2015; Alhazmi, 2018). Future studies could therefore explore in more depths the reasons for such low vocabulary knowledge in this particular learner group. Specifically, the learners' point of view has so far only rarely been investigated, and future studies focusing on learners' views and perceived enablers and barriers, also in terms of the provided curriculum and teaching methods, would be most welcome. Such findings could help educators, EFL instructors and curriculum designers to gain insight into learners' problems and hopefully provide learners with more suitable materials and methods for vocabulary acquisition.

Another interesting avenue for further investigation is the repeatedly mentioned issue that correlation does not equal causation. The current study has found significant correlations between some VLS strategies (e.g., guessing meaning from provided

context and watching TV programmes) and participants' vocabulary knowledge. Such relationships have also been noted in previous studies (e.g. Al Qahtani, 2005; Alsaif, 2011). Future studies could explore whether applying those techniques lead to lexical growth or whether learners with relatively larger vocabulary knowledge simply use these strategies more frequently.

In a similar vein, the researcher observed that almost all participants relied on electronic dictionaries or dictionary applications on their smart phones to find the meaning of words when requested to use a dictionary. Future studies could explore whether learners are using such electronic dictionaries to their full advantage. Moreover, electronic dictionaries differ in terms of the information that they provide the learner. Future studies could explore whether the variety of information offered (e.g., translation equivalents only, synonyms or antonyms, example sentences etc.) influences vocabulary acquisition.

Finally, the third study highlighted that familiarity with inferencing strategies could positively impact learners' lexical acquisition. This result warrants further exploration, for example, as to whether learners need to be introduced to inferencing techniques at an early stage of their learning journey or whether it suffices to rely on their natural use of the strategy. Similarly, the current study found a complex relationship between various VLS and vocabulary knowledge, such that future studies are needed to confirm the results found here.

6.11 Conclusions

The current study has been guided by three main perspectives noted in this thesis. Firstly, investigating Saudi undergraduate and postgraduate students' VLS usage and its relationship to their lexical knowledge and whether individual learner styles have an impact on their vocabulary knowledge. Secondly, exploring the potential influence of lexical inferencing and lexical translation on participants' initial lexical attainment and retention. Thirdly, examining the possible influence of participants' VLS usage and level in the four language skills on their lexical development and attainment of the presented vocabulary items over the specified duration of the study. Multiple approaches of assessment have been applied to achieve the prior aims (i.e. VLS questionnaires, standardised breadth vocabulary knowledge tests, an English language self-assessment questionnaire and reading texts).

The aforementioned tools are assumed to provide a deep understanding and address the current gap in the literature in general and in a Saudi context in particular regarding how VLS usage and familiarity, individual learning styles, prior vocabulary size and level in the four language skills could influence the examined participants' lexical acquisition and growth when engaging in inferencing and dictionary use though a within-participant design.

Generally, this thesis has shown that postgraduates had overall larger lexical knowledge and used more strategies that considered lexical items in their sentence and discourse contexts than undergraduates. Inferring meaning from context was correlated highly with postgraduate and undergraduate learners' breadth lexical capacity. Furthermore, participants did not vary enough in terms of their learning styles to justify asking teachers to cater to individual learning styles. The strategies of inferencing and dictionary consultation had a similar impact on vocabulary acquisition during the course of the study. Additionally, prior lexical knowledge, the skills needed for learning during training, reading comprehension and post-study vocabulary knowledge are potential factors to explain the amount of learning that occurred for both the particular words trained and in terms of vocabulary knowledge overall. Ultimately, learners' familiarity with inferencing strategies can positively impact the word learning process, and both reading comprehension and note taking seem to relate to lexical knowledge and vocabulary acquisition in complex ways, warranting further investigation.

Bibliography

Abdi, S. (2016). *Determining the validity of a web-based, self-rating checklist assessment of vocabulary knowledge*. University of South Carolina.

Abraham, L. B. (2008). Computer-mediated glosses in second language reading comprehension and vocabulary learning: A meta-analysis. *Computer Assisted Language Learning*, *21*(3), 199–226. https://doi.org/10.1080/09588220802090246

Ackerman, P. L., & Ellingsen, V. J. (2014). Vocabulary overclaiming — A complete approach: Ability, personality, self-concept correlates, and gender differences. *Intelligence*, *46*, 216–227. https://doi.org/10.1016/j.intell.2014.07.003

Adolphs, S & Schmitt, N. (2003). Lexical Coverage of Spoken Discourse. *Applied Linguistics*, *24*(4), 425–438. https://doi.org/10.1093/applin/24.4.425

Ahangari, S., & Abbasi Dogolsara, S. (2015). Comparing the Effect of Using Monolingual versus Bilingual Dictionary on Iranian Intermediate EFL Learners' Vocabulary Learning. *English Language Teaching*, *8*(6), 141–149. https://doi.org/10.5539/elt.v8n6p141

Ahmed, M. (1988). *Vocabulary Learning Strategies: A Case Study of Sudanese Learners of English.* Unpublished PhD thesis, University College of North Wales Bangor.

Akpınar, K. D, Aşık, A, & Vural, A. S. (2015). The Relationship between the Effectiveness of Vocabulary Presentation Modes and Learners' Attitudes: Corpus Based Contextual Guessing, Dictionary Use, and Online Instruction. *The Asian EFL Journal Quarterly March 2015 Volume 17, Issue*, *17*(90), 90–115. Retrieved from https://www.researchgate.net/profile/Kadriye_Akpinar/publication/281765931_The_relationship_between_the_effectiveness_of_vocabulary_presentation_modes_and_learners'_attitudes_Corpus_based_contextual_guessing_dictionary_use_and_online_instruction/links/56a

Al-Akloby, S. A. A. (2002). Teaching and learning English vocabulary in Saudi Arabian public schools: An exploratory study of some possible reasons behind students' failure to learn English vocabulary.

Al-Hadlaq, M. S. (2003). Retention of words learned incidentally by Saudi EFL learners through working on vocabulary learning tasks constructed to activate varying depths of processing.

Al-Hazemi, H. (1993). *Low-level EFL vocabulary tests for Arabic speakers*. Swansea University.

Al-Masrai, A, & Milton, J. (2012). The vocabulary knowledge of university students in Saudi Arabia. *Perspectives TESOL Arabia*, *19*(3), 13–19.

Al-Masrai, A. (2009). *Measuring the English vocabulary size of Saudi university students: Validating a new 10,000 word vocabulary size test*. Unpublished MA thesis. Swansea University, Swansea, UK.

Al-Mutawa, Y. (2013). *Estimating the EFL vocabulary size of learners in school and university in Saudi Arabia: Validity of X_Lex vocabulary size test.* Unpublished MA thesis, Swansea University.

Al-Nujaidi, A. H. (2003). *Relationship Between Vocabulary Size, Reading Strategies, and Reading Comprehension of Efl Learners in Saudi Arabia*. Oklahoma State University.

Al-Otaibi, S. (2004). *The effect of positive Teacher Talk on students' performance, interaction and attitudes: A case study of female students at the College of*

Languages and Translation. King Saud University, Riyadh, Saudi Arabia.
Al Qahtani, M. (2005). *The use of vocabulary learning strategies by EFL learners at three different educational levels*. Unpublished PhD thesis. University of Essex.
Alahmadi, A. (2015). *Exploring Vocabulary Learning Strategies of Saudi undergraduateEFL students at King Abdulaziz University and its relationship to their vocabulary Size*. Unpublished MA thesis. Bangor University.
Alahmadi, A., & Foltz, A. (2020a). Effects of Language Skills and Strategy Use on Vocabulary Learning Through Lexical Translation and Inferencing. *Journal of Psycholinguistic Research*, 1–17. https://doi.org/10.1007/s10936-020-09720-9
Alahmadi, A., & Foltz, A. (2020b). Exploring the effect of lexical inferencing and dictionary consultation on undergraduate EFL students' vocabulary acquisition. *PLOS ONE*, *15*(7), 1–25. https://doi.org/10.1371/journal.pone.0236798
Alahmadi, A., Shank, C., & Foltz, A. (2018). Vocabulary Learning Strategies and Vocabulary Size: Insights from Educational Level and Learner Styles. *Vocabulary Learning and Instruction*, *7*(1), 14–34. https://doi.org/10.7820/vli.v07.1.alahmadi
Alavi, S. M., & Kaivanpanah, S. (2006). Cognitive and meta-cognitive vocabulary learning strategies across fields of study. *Pazhuhesh-e Zabanha-Ye Khareji*, *27*, 83–105.
Albrechtsen, D., Haastrup, K., & Henriksen, B. (2008). *Vocabulary and writing in a first and second language: Processes and development*. Springer.
Aldhahi, M., Davies, L., & Fernández-Parra, M. (2017). Investigating the Relationship Between Vocabulary Size and Cultural Competences in Englsih-arabic Translation. *Athens Journal of Philolgy. Vol*, *4*(1), 21–52.
Alhazmi, K. (2018). *Arabic EFL Learners' Low-level Reading Difficulties: Processing problems or Knowledge problems?* Unpublished PhD thesis, Swansea University.
Ali, Z., Mukundan, J., Ayub, A. F. M., & Baki, R. (2011). The effectiveness of using contextual clues, dictionary strategy and computer assisted language learning (call) in learning vocabulary. *International Journal of Business and Social Research*, *1*(1), 136–152.
Alkhofi, A. (2015). Comparing the receptive vocabulary knowledge of intermediate-level students of different native languages in an intensive English program.
Alqurashi, N. (2013). *Vocabulary learning strategies of Saudi undergraduate EFL students at Taif University and its relation to their vocabulary size.* Unpublished MA thesis. Anglia Ruskin University.
AlSaif, A. (2011). *Investigating vocabulary input and explaining vocabulary uptake among EFL learners in Saudi Arabia*. Unpublished PhD thesis. Swansea University.
Alsaif, A., & Masrai, A. (2019). Extensive Reading and Incidental Vocabulary Acquisition: The Case of a Predominant Language Classroom Input. *International Journal of Education and Literacy Studies*, *7*(2), 39–45.
Alsaif, S. (2016). *A study of vocabulary development of ESL leaners' recall and retention using smartphones dictionary applications and contextual guessing approach.* Unpublished Master dissertation. University of Liverpool, Liverpool, UK.
Alyami, M., & Mohsen, M. A. (2019). The Use of a Reading Lexicon to Aid Contextual Vocabulary Acquisition by EFL Arab Learners. *Journal of Psycholinguistic Research*, 1–19.
Amirian, S. M. R., & Momeni, S. (2012). Definition-based Versus Contextualized Vocabulary Learning. *Theory and Practice in Language Studies*, *2*(11), 2302–2307. https://doi.org/10.4304/tpls.2.11.2302-2307

Anderson, J. (1990). *Cognitive psychology and its implications.* New York: W.H. Freeman and company.

Anderson, R C, & Freebody, P. (1981). Vocabulary knowledge. In 1. T. Guthrie (Ed.), Comprehension and teaching: Research reviews (pp. 77-117). Newark. *DE: International Reading Association*.

Anderson, Richard C, Wilson, P. T., & Fielding, L. G. (1988). Growth in Reading and How Children Spend Their Time Outside of School. *Reading Research Quarterly*, *23*(3), 285–303. https://doi.org/10.1598/rrq.23.3.2

Anglin, J. (1993). Vocabulary Development: a Morphological Analysis: Monographs of the Society for Research in Child Development.(Serial No. 238). Chicago: University of Chicago Press.

Asher, C. (1999). Using dictionaries in the GCSE examination of modern foreign languages: Teachers' views and learners' performance. *Studies in Modern Languages Education*, *7*(1), 59–67.

Astika, G. G. (1993). Analytical Assessments of Foreign Students textquotesingle Writing. *RELC Journal*, *24*(1), 61–70. https://doi.org/10.1177/003368293024001O4

Azin, N., Biriya, R., & Sardabi, N. (2015). The Effect of Inferencing the Meaning of New Words from Context on Vocabulary Retention by Iranian EFL Learners. *Theory and Practice in Language Studies*, *5*(6), 1280–1285. https://doi.org/10.17507/tpls.0506.22

Baayen, R. H. (2008). *Analyzing linguistic data: A practical introduction to statistics using R.* Cambridge: Cambridge University Press.

Baayen, R Harald. (2008). *Analyzing linguistic data: A practical introduction to statistics using R*. Cambridge University Press.

Bachman, L. F., Palmer, A. S., & others. (1996). *Language testing in practice: Designing and developing useful language tests* (Vol. 1). Oxford University Press.

Baddeley, A. D. (1997). *Human memory: Theory and practice*. Psychology Press.

Baharudin, H., & Ismail, Z. (2014). Vocabulary Learning Strategies and Arabic Vocabulary Size among Pre-University Students in Malaysia. *International Education Studies*, *7*(13), 219–226.

Barnawi, O. Z., & Al-Hawsawi, S. (2017). English Education Policy in Saudi Arabia: English Language Education Policy in the Kingdom of Saudi Arabia: Current Trends, Issues and Challenges. In *English language education policy in the Middle East and North Africa* (pp. 199–222). Springer. https://doi.org/10.1007/978-3-319-46778-8_12

Bauer, L., & Nation, P. (1993). Word Families. *International Journal of Lexicography*, *6*(4), 253–279. https://doi.org/10.1093/ijl/6.4.253

Baumann, J. F., Edwards, E. C., Boland, E., & Font, G. (2012). Teaching word-learning strategies. *Vocabulary Instruction: Research to Practice*, 139–166.

Beck, Isabel, & McKeown, M. (1991). Conditions of vocabulary acquisition. In *In R. Barr, M.L. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), Handbook of reading research* (pp. 789–814). Mahwah, NJ: Erlbaum.

Belsley, D. A., Kuh, E., & Welsch, R. E. (2005). *Regression diagnostics: Identifying influential data and sources of collinearity* ((Vol. 571)). Hoboken, New Jersey: John Wiley & Sons.

Benjamini, Y., & Hochberg, Y. (1995). Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, *57*(1), 289–300. https://doi.org/10.1111/j.2517-6161.1995.tb02031.x

Bensoussan, M., & Laufer, B. (1984). Lexical Guessing in Context in EFL Reading Comprehension. *Journal of Research in Reading*, *7*(1), 15–32. https://doi.org/10.1111/j.1467-9817.1984.tb00252.x
Bialystok, E. (1978). A theoretical model of second language learning. *Language Learning*, *28*(1), 69–83.
Bogaards, P., & Laufer, B. (Eds.). (2004). *Vocabulary in a second language.* Amsterdam: John Benjamins.
Bogaards, P., & Laufer, B. (2004). *Vocabulary in a second language: Selection, acquisition, and testing* (Vol. 10). John Benjamins Publishing.
Bonk, W. J. (2000). Second Language Lexical Knowledge and Listening Comprehension. *International Journal of Listening*, *14*(1), 14–31. https://doi.org/10.1080/10904018.2000.10499033
Bremner, S. (1999). Language learning strategies and language proficiency: Investigating the relationship in Hong Kong. *Canadian Modern Language Review*, *55*(4), 490–514.
Brown, G., & Yule, G. (1983). *Discourse analysis*. Cambridge: Cambridge university press.
Brown, C. (1993). Factors affecting the acquisition of vocabulary: Frequency and saliency of words. *Second Language Reading and Vocabulary Learning*, *2*(1), 263–286.
Brown, T. S., & Perry, F. L. (1991). A Comparison of Three Learning Strategies for ESL Vocabulary Acquisition. *TESOL Quarterly*, *25*(4), 655. https://doi.org/10.2307/3587081
Brysbaert, M., Stevens, M., Mandera, P., & Keuleers, E. (2016). How Many Words Do We Know? Practical Estimates of Vocabulary Size Dependent on Word Definition, the Degree of Language Input and the Participant's Age. *Frontiers in Psychology*, *7*, 1116. https://doi.org/10.3389/fpsyg.2016.01116
Cai, W., & Lee, B. P. H. (2010). Investigating the effect of contextual clues on the processing of unfamiliar words in second language listening comprehension. *Australian Review of Applied Linguistics*, *33*(2), 18.1-18.28. https://doi.org/10.2104/aral1018
Cai, W., & Lee, B. P. H. (2012). Processing unfamiliar words: Strategies, knowledge sources, and the relationship to text and word comprehension. *Canadian Journal of Applied Linguistics*, *15*(1), 122–145.
Cain, K., Oakhill, J., & Lemmon, K. (2004). Individual Differences in the Inference of Word Meanings From Context: The Influence of Reading Comprehension, Vocabulary Knowledge, and Memory Capacity. *Journal of Educational Psychology*, *96*(4), 671–681. https://doi.org/10.1037/0022-0663.96.4.671
Cameron, L. (2001). Teaching languages to children. *Cambridge: Cambridge University*.
Cao, Y., & Philp, J. (2006). Interactional context and willingness to communicate: A comparison of behavior in whole class, group and dyadic interaction. *System*, *34*(4), 480–493.
Carroll, J. B., & others. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. Cambridge University Press.
Carton, A. S. (1971). *Inferencing: A process in using and learning language*. na.
Catalan, R. M. J. (2003). Sex differences in L2 vocabulary learning strategies. *International Journal of Applied Linguistics*, *13*(1), 54–77. https://doi.org/10.1111/1473-4192.00037
Çelik, S., & Toptaş, V. (2010). Vocabulary learning strategy use of Turkish EFL

learners. *Procedia - Social and Behavioral Sciences*, *3*(1), 62–71. https://doi.org/10.1016/j.sbspro.2010.07.013
Chamot, A. U., & O'Malley, J. M. (1987). The Cognitive Academic Language Learning Approach: A Bridge to the Mainstream. *TESOL Quarterly*, *21*(2), 227-249. https://doi.org/10.2307/3586733
Chamot, A. U. (2004). Issues in language learning strategy research and teaching. *Electronic Journal of Foreign Language Teaching*, *1*(1), 14–26.
Chan, A. Y. W. (2012). Cantonese ESL learners' use of grammatical information in a monolingual dictionary for determining the correct use of a target word. *International Journal of Lexicography*, *25*(1), 68–94.
Chapelle, C. A. (1989). Construct definition and validity inquiry in SLA research. In L. F. Bachman & A. D. Cohen (Eds.), *Interfaces between Second Language Acquisition and Language Testing Research* (pp. 32–70). Cambridge University Press. https://doi.org/10.1017/cbo9781139524711.004
Chapelle, C. A. (1999). Validity in language assessment. *Annual Review of Applied Linguistics*, *19*, 254–272. https://doi.org/10.1017/s0267190599190135
Charrad, M., Ghazzali, N., Boiteau, V., & Niknafs, A. (2014). NbClust Package: finding the relevant number of clusters in a dataset. *Journal of Statistical Software*, *61*(6), 1–31. https://doi.org/10.18637/jss.v061.i06
Chegeni, N., & Tabatabaei, O. (2014). Lexical inferencing: The relationship between number and density of lexical items and L2 learners' reading comprehension achievement. *Journal of Language Teaching and Research*, *5*(2), 306–312.
Chen, C., & Truscott, J. (2010). The Effects of Repetition and L1 Lexicalization on Incidental Vocabulary Acquisition. *Applied Linguistics*, *31*(5), 693–713. https://doi.org/10.1093/applin/amq031
Chen, Y. (2017). Dictionary use for collocation production and retention: A CALL-based study. *International Journal of Lexicography*, *30*(2), 225–251.
Chern, C.-L. (1993). Chinese students' word-solving strategies in reading in English. *Second Language Reading and Vocabulary Learning*, 67–85.
Chiu, L.-L., & Liu, G.-Z. (2013). Effects of Printed, Pocket Electronic, and Online Dictionaries on High School Students' English Vocabulary Retention. *The Asia-Pacific Education Researcher*, *22*(4), 619–634. https://doi.org/10.1007/s40299-013-0065-1
Christison, M. (2003). Learning styles and strategies. In *In D. Nunan (Ed.), Practical English language teaching* (pp. 267–288). New York.: McGraw-Hill.
Chujo, K. (2004). Measuring Vocabulary Levels of English Textbooks and Tests Using a BNC Lemmatised High Frequency Word List. In *English Corpora under Japanese Eyes* (pp. 231–249). Brill Rodopi. https://doi.org/10.1163/9789004333758_013
Çiftçi, H., & Üster, S. (2009). A comparative analysis of teaching vocabulary in context and by definition. *Procedia - Social and Behavioral Sciences*, *1*(1), 1568–1572. https://doi.org/10.1016/j.sbspro.2009.01.275
Coady, J., & Huckin, T. (1997). *Second Language Vocabulary Acquisition: A rationale for pedagogy*. Cambridge University Press. https://doi.org/10.1017/cbo9781139524643.014
Coady, J., & Huckin, T. (Eds). (1997). *Second language vocabulary acquisition.* Cambridge: Cambridge University Press.
Coady, J. (1997). L2 vocabulary acquisition: A synthesis of the research. *Second Language Vocabulary Acquisition*, 273–290.
Cobb, T. (n.d.). Range for texts v.3. Retrieved from https://www.lextutor.ca/vp/comp/

Cobb, T. (1997). Is there any measurable learning from hands-on concordancing? *System*, *25*(3), 301–315. https://doi.org/10.1016/s0346-251x(97)00024-9
Cobb, T., & Horst, M. (2001). 20 Reading academic English: Carrying learners across the lexical threshold. *Research Perspectives on English for Academic Purposes*, 315–329.
Codó, E., Dans, L., & Wei, M. G. M. (2008). Interviews and questionnaires. *The Blackwell Guide to Research Methods in Bilingualism and Multilingualism*, 158–176.
Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2012). Learning styles and pedagogy in post-16 learning. A systematic and critical review. 2004. *London, England: The Learning and Skills Research Centre (LSRC)*.
Cohen, A. D. (1998). *Strategies in using and learning a second language.* Essex: Addison Wesley.
Cohen, Andrew D. (2014). *Strategies in learning and using a second language*. Routledge.
Committee, B. (2003). Basic Word List Revision Committee. List of 8000 Basic Words. Japan Association of College English Teachers (JACET).
Cook, L. K., & Mayer, R. E. (1983). Reading Strategies Training for Meaningful Learning from Prose. In *Springer Series in Cognitive Development* (pp. 87–131). Springer New York. https://doi.org/10.1007/978-1-4612-5519-2_4
Corpus, C. I. (2000). CANCODE. Retrieved February 28, 2020, from http://www.cambridge.org/elt/corpus/cancode.htm
Coxhead, A. (2000). A New Academic Word List. *TESOL Quarterly*, *34*(2), 213–238. https://doi.org/10.2307/3587951
Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, *11*(6), 671–684. https://doi.org/10.1016/s0022-5371(72)80001-x
Craik, F. I., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, *104*(3), 268–294. https://doi.org/10.1037//0096-3445.104.3.268
D'Anna, C. A., Zechmeister, E. B., and Hall, J. W. (1991). Toward a Meaningful Definition of Vocabulary Size. *Journal of Reading Behavior*, *23*(1), 109–122. https://doi.org/10.1080/10862969109547729
Daller, H., & Phelan, D. (2007). What is in a teacher's mind? Teacher ratings of EFL essays and different aspects of lexical richness. *Modelling and Assessing Vocabulary Knowledge*, 234–244.
Dang, T. N. Y., & Webb, S. (2014). The lexical profile of academic spoken English. *English for Specific Purposes*, *33*, 66–76.
David, A. (2008). Vocabulary breadth in French L2 learners. *Language Learning Journal*, *36*(2), 167–180. https://doi.org/10.1080/09571730802389991
Davies, M. (2004a). BYU-BNC: The British National Corpus. Retrieved December 1, 2019, from https://www.english-corpora.org/bnc/
Davies, M. (2004b). BYU-BNC: The British National Corpus. Available at: https://www.english-corpora.org/bnc/.
De Chazal, E., & Rogers, L. (2013). *Oxford Eap: A Course in English for Academic Purposes. B1+. Intermediate*. Oxford University Press.
de la Garza, B., & Harris, R. J. (2017). Acquiring foreign language vocabulary through meaningful linguistic context: Where is the limit to vocabulary learning? *Journal of Psycholinguistic Research*, *46*(2), 395–413.
De Ridder, I. (2002). Visible or Invisible Links: Does the Highlighting of Hyperlinks

Affect Incidental Vocabulary Learning, Text Comprehension, and the Reading Process? *Language Learning and Technology*, *6*(1), 123–146.
de Saint Léger, D., & Storch, N. (2009). Learners' perceptions and attitudes: Implications for willingness to communicate in an L2 classroom. *System*, *37*(2), 269–285.
Dixon, R. M. W., & Aikhenvald, A. Y. (2002). *Word: A cross-linguistic typology*. Cambridge University Press.
Donzelli, G. (2007). Foreign language learners: words they hear and words they learn: A case study. *ELIA: Estudios de Lingü{\'\i}stica Inglesa Aplicada*, (7), 103–125.
Dörnyei, Z. (1994). Motivation and motivating in the foreign language classroom. *The Modern Language Journal*, *78*(3), 273–284.
Dunn, R. (1984). Learning style: State of the science. *Theory into Practice*, *23*(1), 10–19.
Dziemianko, A. (2010). Paper or electronic? The role of dictionary form in language reception, production and the retention of meaning and collocations. *International Journal of Lexicography*, *23*(3), 257–273.
Dziemianko, A. (2014). On the presentation and placement of collocations in monolingual English learners' dictionaries: Insights into encoding and retention. *International Journal of Lexicography*, *27*(3), 259–279.
El Guabassi, I., Bousalem, Z., Al Achhab, M., Mohajir, E. L., Eddine, B., & others. (2019). Identifying learning style through eye tracking technology in adaptive learning systems. *International Journal of Electrical & Computer Engineering (2088-8708)*, *9*.
Ellis, N. C. (1995). The psychology of foreign language vocabulary acquisition: Implications for CALL. *Computer Assisted Language Learning*, *8*(2), 103–128. https://doi.org/10.1080/0958822940080202
Ellis, N. C. (2005). At the interface: Dynamic interactions of explicit and implicit language knowledge. *Studies in Second Language Acquisition*, *27*(2), 305–352.
Ellis, R. (1985). *Understanding second language acquisition*.
Engber, C. A. (1995). The relationship of lexical proficiency to the quality of ESL compositions. *Journal of Second Language Writing*, *4*(2), 139–155.
Eyckmans, J. (2004). *Measuring receptive vocabulary size. Reliability and validity of the Yes/No vocabulary test for French-speaking learners of Dutch*. Utrecht: LOT.
Ezza, E. Y., & Saadeh, Z. (2011). Dictionary as a major resource for EFL course in pronunciation.
Fan, Y. M. (2003). Frequency of Use, Perceived Usefulness, and Actual Usefulness of Second Language Vocabulary Strategies: A Study of Hong Kong Learners. *The Modern Language Journal*, *87*(2), 222–241. https://doi.org/10.1111/1540-4781.00187
Fillmore, L. W. (1983). The language learner as an individual: Implications of research on individual differences for the ESL teacher. *On TESOL*, *82*, 157–173.
Fitzpatrick, T. (2007). Productive vocabulary tests and the search for concurrent validity.
Fleming, N & Bonwell, C. (2001). A Guide to Learning Styles. Retrieved November 21, 2019, from http://vark-learn.com/the-vark-questionnaire/
Fleming, N. D. (1995). I'm different; not dumb. Modes of presentation (VARK) in the tertiary classroom. In *Research and development in higher education, Proceedings of the 1995 Annual Conference of the Higher Education and Research Development Society of Australasia (HERDSA), HERDSA* (Vol. 18, pp. 308–313).
Folse, K. (2008). Teaching vocabulary is not the writing teacher's job. In *Writing*

Myths: Applying Second Language Research to Classroom Teaching (pp. 1–17). Ann Arbor: University of Michigan Press.
Folse, K. S. (2006). The Effect of Type of Written Exercise on L2 Vocabulary Retention. *TESOL Quarterly*, *40*(2), 273–293. https://doi.org/10.2307/40264523
Folse, K. S., & Briggs, S. J. (2004). *Vocabulary myths: Applying second language research to classroom teaching*. University of Michigan Press Ann Arbor.
Francis, W., & Kucera, H. (1982). Frequency analysis of English usage.
Frantzen, D. (2003). Factors affecting how second language Spanish students derive meaning from context. *The Modern Language Journal*, *87*(2), 168–199.
Fraser, C. A. (1999). Lexical processing strategy use and vocabulary learning through reading. *Studies in Second Language Acquisition*, *21*(2), 225–241.
Freebody, P., & Anderson, R. C. (1983). Effects on text comprehension of differing proportions and locations of difficult vocabulary. *Journal of Reading Behavior*, *15*(3), 19–39.
Fu, I. (2005). *Student approaches to learning Chinese vocabulary*. Virginia Tech.
Garcia, S. S. (2012). *Dictionary use in L1 writing*. PhD Thesis, University of Essex, UK.
Gardner, D. (2007). Validating the construct of word in applied corpus-based vocabulary research: A critical survey. *Applied Linguistics*, *28*(2), 241–265.
George, S. (2014). *A Comparative Study of Measures of Vocabulary Knowledge and IELTS Proficiency Scores as Potential Predictors of Academic Performance*. Swansea University.
Ginther, A., & Yan, X. (2018). Interpreting the relationships between TOEFL iBT scores and GPA: Language proficiency, policy, and profiles. *Language Testing*, *35*(2), 271–295. https://doi.org/10.1177/0265532217704010
Gohar, M. J., Rahmanian, M., & Soleimani, H. (2018). Technique Feature Analysis or Involvement Load Hypothesis: Estimating Their Predictive Power in Vocabulary Learning. *Journal of Psycholinguistic Research*, *47*(4), 859–869. https://doi.org/10.1007/s10936-018-9568-5
Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*(4), 597–606.
Goulden, R., Nation, P., & Read, J. (1990). How large can a receptive vocabulary be? *Applied Linguistics*, *11*(4), 341–363.
Grabe, W., & Stoller, F. (1997). Reading and vocabulary development in a second language. In *In J. Coady & T. Huckin (Eds.), Second language vocabulary acquisition* (pp. 99–122). Cambridge: Cambridge University Press.
Grace, C. A. (1998). Retention of word meanings inferred from context and sentence-level translations: Implications for the design of beginning-level CALL software. *The Modern Language Journal*, *82*(4), 533–544.
Greaney, V. (1980). Factors related to amount and type of leisure time reading. *Reading Research Quarterly*, 337–357.
Gu, P. Y. (2003). Vocabulary learning in a second language: Person, task, context and strategies. *TESL-EJ*, *7*(2), 1–25.
Gu, P. Y., & others. (2018). Validation of an online questionnaire of vocabulary learning strategies for ESL learners. *Studies in Second Language Learning and Teaching*, *8*(2), 325–350.
Gu, Y. (2013). Vocabulary learning strategies. In *In C. A. Chapelle (Ed.), The encyclopedia of applied linguistics.* Blackwell Publishing.
Gu, Yongqi, & Johnson, R. K. (1996). Vocabulary Learning Strategies and Language Learning Outcomes. *Language Learning*, *46*(4), 643–679.

https://doi.org/10.1111/j.1467-1770.1996.tb01355.x
Gyllstad, H. (2007). *Testing English collocations: Developing receptive tests for use with advanced Swedish learners*. Språk-och litteraturcentrum, Lunds universitet.
Haastrup, K. (1989). The learner as word processor. *AILA Review*, *6*, 34–46.
Haastrup, K. (1990). Developing learners' procedural knowledge in comprehension. *Foreign/Second Language Pedagogy Research*, *64*, 120–133.
Haastrup, K. (1991). *Lexical inferencing procedures, or, talking about words: Receptive procedures in foreign language learning with special reference to English* (Vol. 14). Gunter Narr Verlag.
Hamzah, M. S. G., Kafipour, R., & Abdullah, S. K. (2009). Vocabulary learning strategies of Iranian undergraduate EFL students and its relation to their vocabulary size. *European Journal of Social Sciences*, *11*(1), 39–50. Retrieved from https://www.researchgate.net/profile/Reza_Kafipour/publication/228801062_Vocabulary_Learning_Strategies_of_Iranian_Undergraduate_EFL_Students_and_its_Relation_to_their_Vocabulary_Size/links/558d52b408ae97d8e423bc08/Vocabulary-Learning-Strategies-of-Irania
Handbook., C. (2002). Certificate of proficiency in English handbook: Specifications and sample papers for revised examination from December 2002. *University of Cambridge. Local Examinations Syndicate.*
Harley, B., & Hart, D. (2000). Vocabulary Learning in the Content-oriented Second-language Classroom: Student Perceptions and Proficiency. *Language Awareness*, *9*(2), 78–96. https://doi.org/10.1080/09658410008667139
Hatami, S., & Tavakoli, M. (2013). The Role of Depth versus Breadth of Vocabulary Knowledge in Success and Ease in L2 Lexical Inferencing. *TESL Canada Journal*, *30*(1), 1–21. https://doi.org/10.18806/tesl.v30i1.1123
Hayati, M., & Fattahzadeh, A. (2006). The effect of monolingual and bilingual dictionaries on vocabulary recall and retention of EFL learners. *The Reading Matrix*, *6*(2), 125–134.
Haynes, M. (1984). Patterns and perils of guessing in second language reading. *On TESOL*, *83*, 163–176.
Hazenberg, S., & Hulstun, J. H. (1996). Defining a minimal receptive second-language vocabulary for non-native university students: An empirical investigation. *Applied Linguistics*, *17*(2), 145–163.
Hedge, T. (2001). *Teaching and learning in the language classroom* (Vol. 5). Oxford, UK: Oxford University Press.
Heidari, K. (2019). Willingness to Communicate: A Predictor of Pushing Vocabulary Knowledge from Receptive to Productive. *Journal of Psycholinguistic Research*, 1–18.
Henning, G. (1987). *A guide to language testing: Development, evaluation, research*. Newbury House Cambridge, MA.
Henriksen, B., Albrechtsen, D., & Haastrup, K. (2004). The relationship between vocabulary size and reading comprehension in the L2. *Angles on the English-Speaking World*, *4*(1), 129–140.
Henson, R. K., & Hwang, D.-Y. (2002). Variability and prediction of measurement error in Kolb's learning style inventory scores a reliability generalization study. *Educational and Psychological Measurement*, *62*(4), 712–727.
Hindmarsh, R. (1980). *Cambridge English lexicon: a graded word list for materials writers and course designers*. Cambridge University Press.
Hirai, A. (1999). The relationship between listening and reading rates of Japanese EFL learners. *The Modern Language Journal*, *83*(3), 367–384.

Hirsh, D., Nation, P., & others. (1992). What vocabulary size is needed to read unsimplified texts for pleasure? *Reading in a Foreign Language*, *8*, 689.
Honey, P., & Mumford, A. (1986). *The Manual of Learning Styles.* Maidenhead: Peter Honey.
Hsueh-Chao, M. H., & Nation, P. (2000). Unknown vocabulary density and reading comprehension. *Reading in a Foreign Language*, *13*(1), 403–430.
Hu, H. M., & Nassaji, H. (2016). Effective vocabulary learning tasks: Involvement Load Hypothesis versus Technique Feature Analysis. *System*, *56*, 28–39. https://doi.org/10.1016/j.system.2015.11.001
Huckin, T, Haynes, M., & Coady, J. (1993). Second language reading and vocabulary learning. Norwood. *NJ: AbleX*.
Huckin, Thomas, & Coady, J. (1999). Incidental vocabulary acquisition in a second language. *Studies in Second Language Acquisition*, *21*(2), 181–193. https://doi.org/10.1017/S0272263199002028
Hue, H. C., & Nation, P. (2000). Unknown word density and reading comprehension. *Reading in Foreign Language*, *13*(1), 403–430.
Hughes, A. (1989). *Testing for Language Teachers.* Cambridge: Cambridge University Press. York: Cambridge University Press. Gunter Narr Verlag.
Hulstijn, J. H. (1992). Retention of Inferred and Given Word Meanings: Experiments in Incidental Vocabulary Learning. In *Vocabulary and Applied Linguistics* (pp. 113–125). London: Palgrave Macmillan UK. https://doi.org/10.1007/978-1-349-12396-4_11
Hulstijn, J. H. (2001). Intentional and incidental second language vocabulary learning: A reappraisal of elaboration, rehearsal and automaticity. In *In P. Robinson (ed.), Cognition and second language instruction.* (pp. 258–286). New York: Cambridge University Press. Gunter Narr Verlag.
Hulstijn, J. H., & Laufer, B. (2001). Some Empirical Evidence for the Involvement Load Hypothesis in Vocabulary Acquisition. *Language Learning*, *51*(3), 539–558. https://doi.org/10.1111/0023-8333.00164
Hulstijn, J. H., Schoonen, R., de Jong, N. H., Steinel, M. P., & Florijn, A. (2012). Linguistic competences of learners of Dutch as a second language at the B1 and B2 levels of speaking proficiency of the Common European Framework of Reference for Languages (CEFR). *Language Testing*, *29*(2), 203–221. https://doi.org/10.1177/0265532211419826
Hummel, K. M. (2010). Translation and short-term L2 vocabulary retention: Hindrance or help? *Language Teaching Research*, *14*(1), 61–74.
Janebi Enayat, M., Amirian, S. M. R., Zareian, G., & Ghaniabadi, S. (2018). Reliable Measure of Written Receptive Vocabulary Size: Using the L2 Depth of Vocabulary Knowledge as a Yardstick. *SAGE Open*, *8*(1), 1–15. https://doi.org/10.1177/2158244017752221
Jenkins, J. R., Matlock, B., & Slocum, T. A. (1989a). Two approaches to vocabulary instruction: The teaching of individual word meanings and practice in deriving word meaning from context. *Reading Research Quarterly*, 215–235.
Jenkins, J. R., Matlock, B., & Slocum, T. A. (1989b). Two Approaches to Vocabulary Instruction: The Teaching of Individual Word Meanings and Practice in Deriving Word Meaning from Context. *Reading Research Quarterly*, *24*(2), 215–235. https://doi.org/10.2307/747865
Jordaan, H. (2011). Semantic processing skills of Grade 1 English language learners in two educational contexts. *South African Journal of Education*, *31*(4), 518–534. https://doi.org/10.15700/saje.v31n4a281

Kamimoto, T. (2005). The effect of guessing on vocabulary test scores: A qualitative analysis. In *15th conference of The European Second Language Association EUROSLA, Dubrovnik, Croatia* (pp. 14–17).
Kant, I. (1908). Critique of pure reason. 1781. *Modern Classical Philosophers, Cambridge, MA: Houghton Mifflin*, 370–456.
Kilgarriff, A. (2006). BNC database and word frequency lists. *Http://Www. Itri. Brighton. Ac. Uk/~ Adam. Kilgarriff/Bnc-Readme. Html*.
Kinsella, K. (1995). Understanding and empowering diverse learners in ESL classrooms. *Learning Styles in the ESL/EFL Classroom*, 170–194.
Knight, S. (1994). Dictionary Use While Reading: The Effects On Comprehension and Vocabulary Acquisition For Students Of Different Verbal Abilities. *The Modern Language Journal*, *78*(3), 285–299. https://doi.org/10.1111/j.1540-4781.1994.tb02043.x
Koda, K. (1989a). The effects of transferred vocabulary knowledge on the development of L2 reading proficiency. *Foreign Language Annals*, *22*(6), 529–540.
Koda, K. (1989b). The Effects of Transferred Vocabulary Knowledge on the Development of L2 Reading Proficiency. *Foreign Language Annals*, *22*(6), 529–540. https://doi.org/10.1111/j.1944-9720.1989.tb02780.x
Koizumi, R., & In'nami, Y. (2013). Vocabulary knowledge and speaking proficiency among second language learners from novice to intermediate levels. *Journal of Language Teaching and Research*, *4*(5), 900–914.
Kojic-Sabo, I., & Lightbown, P. M. (1999). Students' approaches to vocabulary learning and their relationship to success. *The Modern Language Journal*, *83*(2), 176–192. https://doi.org/10.1111/0026-7902.00014
Kolb, D. A. (1984). Experiential Learning. Englewood Cliffs, NJ: PrenticeHall. Inc.
Kolb, D. A. (1985). *Learning Style Inventory*. Boston: McBer & Co.
Komol, T., & Sripetpun, W. (2011). Vocabulary learning strategies employed by undergraduate students and its relationship to their vocabulary knowledge. In *The 3rd International Conference on Humanities and Social Sciences April 2, 2011 Faculty of Liberal Arts, Prince of Songkla University* (pp. 1–18). Faculty of Liberal Arts, Prince of Songkla University.
Kozhevnikov, M. (2007). Cognitive styles in the context of modern psychology: toward an integrated framework of cognitive style. *Psychological Bulletin*, *133*(3), 464–484.
Krashen, S. (1989). We Acquire Vocabulary and Spelling by Reading: Additional Evidence for the Input Hypothesis. *The Modern Language Journal*, *73*(4), 440–464. https://doi.org/10.1111/j.1540-4781.1989.tb05325.x
Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. Addison-Wesley Longman Ltd.
Kremmel, B. (2016). Word Families and Frequency Bands in Vocabulary Tests: Challenging Conventions. *TESOL Quarterly*, *50*(4), 976–987. https://doi.org/10.1002/tesq.329
Kremmel, B., & Schmitt, N. (2016). Interpreting Vocabulary Test Scores: What Do Various Item Formats Tell Us About Learners' Ability to Employ Words? *Language Assessment Quarterly*, *13*(4), 377–392. https://doi.org/10.1080/15434303.2016.1237516
Kroll, J. F., & Curley, J. (1988). Lexical memory in novice bilinguals: The role of concepts in retrieving second language words. *Practical Aspects of Memory*, *2*(8), 389–395.
LaBontee, R., & others. (2019). Questionnaire instrumentation for strategic vocabulary

learning in the Swedish as a second language learning context. *Studies in Second Language Learning and Teaching*, *9*(2), 313–348.
Lakens, D. (2017). Equivalence Tests. *Social Psychological and Personality Science*, *8*(4), 355–362. https://doi.org/10.1177/1948550617697177
Laufer, B. (1997). The Lexical Plight in Second Language Reading: Words You Don'tKnow, words You Think You Know, and Words You Can't Guess. In M. Richards, J. and Long (Ed.), *Second language vocabulary acquisition: A rationale for pedagogy* (pp. 20–35). Cambridge University Press.
Laufer, Batia. (1989). What percentage of text-lexis is essential for comprehension. *Special Language: From Humans Thinking to Thinking Machines*, *316323*.
Laufer, Batia. (1991). Knowing a word: What is so difficult about it. *English Teachers' Journal*, *42*, 82–88.
Laufer, Batia. (1992). How much lexis is necessary for reading comprehension? In *Vocabulary and applied linguistics* (pp. 126–132). Springer.
Laufer, Batia. (1994). The lexical profile of second language writing: Does it change over time? *RELC Journal*, *25*(2), 21–33.
Laufer, Batia. (1996). The lexical threshold of second language reading comprehension: What it is and how it relates to L1 reading ability. *Approaches to Second Language Acquisition*, 55–62.
Laufer, Batia. (1997). What's in a word that makes it hard or easy? Intralexical factors affecting the difficulty of vocabulary acquisition. *Vocabulary: Description, Acquisition and Pedagogy*, 140–155.
Laufer, Batia. (1998). The development of passive and active vocabulary in a second language: Same or different? *Applied Linguistics*, *19*(2), 255–271.
Laufer, Batia, & Goldstein, Z. (2004). Testing Vocabulary Knowledge: Size, Strength, and Computer Adaptiveness. *Language Learning*, *54*(3), 399–436. https://doi.org/10.1111/j.0023-8333.2004.00260.x
Laufer, Batia, Melamed, L., & others. (1994). Monolingual, bilingual and'bilingualised'dictionaries: Which are more effective, for what and for whom. In *Euralex 1994 proceedings* (pp. 565–576).
Laufer, Batia, & Paribakht, T. S. (1998). The relationship between passive and active vocabularies: Effects of languagelearning context. *Language Learning*, *48*(3), 365–391.
Laufer, Batia, & Ravenhorst-Kalovski, G. C. (2010). Lexical Threshold Revisited: Lexical Text Coverage, Learners' Vocabulary Size and Reading Comprehension. *Reading in a Foreign Language*, *22*(1), 15–30.
Laufer, Batia, & Shmueli, K. (1997). Memorizing new words: Does teaching have anything to do with it? *RELC Journal*, *28*(1), 89–108.
Lee, J.-W., & Schallert, D. L. (1997). The relative contribution of L2 language proficiency and L1 reading ability to L2 reading performance: A test of the threshold hypothesis in an EFL context. *Tesol Quarterly*, *31*(4), 713–739.
Lessard-Clouston, M. (1996). ESL vocabulary learning in a TOEFL preparation class: A case study. *Canadian Modern Language Review*, *53*(1), 97–119.
Levenston, E. A. (1979). Second language acquisition: Issues and problems. *Interlanguage Studies Bulletin*, *4*(2), 147–160.
Lew, R. (2012). How Can We Make Electronic Dictionaries More Effective? In *In Granger, Sylviane and Magali Paquot (eds.), Electronic Lexicography.* Oxford: Oxford University Press.
Lewis, M. (1993). *The lexical approach* (Vol. 1). Language Teaching Publications Hove.

Li, M., & Kirby, J. R. (2014). The effects of vocabulary breadth and depth on English reading. *Applied Linguistics*, *36*(5), 611–634.
Li, X. (1988). Effects of Contextual Cues on Inferring and Remembering Meanings of New Words. *Applied Linguistics*, *9*(4), 402–413. https://doi.org/10.1093/applin/9.4.402
Liang, P., & Xu, D. (2015). The Contribution of Dictionary Use to the Production and Retention of the Middle Construction for Chinese EFL Learners. *International Journal of Lexicography*, *30*(1), 85–107.
Liestman, D. (1992). Implementing library instruction for international students. *PNLA Quarterly*, *56*(2), 11–14.
Lin, D. T. A., Pandian, A., & Jaganathan, P. (2017). Facilitating Learner Autonomy: Reading and Effective Dictionary Use for Lexical Development. *The Reading Matrix: An International Online Journal*, *17*(2).
Lindgren, E., & Muñoz, C. (2013). The influence of exposure, parents, and linguistic distance on young European learners' foreign language comprehension. *International Journal of Multilingualism*, *10*(1), 105–129.
Liu, N., & Nation, P. (1985). Factors affecting guessing vocabulary in context. *RELC Journal*, *16*, 33–42.
Liu, J. (1998). *The effects of three methods of vocabulary instruction on second language learning at the college level*. School of Education. University of Missouri--Kansas City.
Liu, T.-C., Fan, M. H.-M., & Paas, F. (2014). Effects of digital dictionary format on incidental acquisition of spelling knowledge and cognitive load during second language learning: Click-on vs. key-in dictionaries. *Computers & Education*, *70*, 9–20. https://doi.org/10.1016/j.compedu.2013.08.001
Lujan, H. L., & DiCarlo, S. E. (2006). First-year medical students prefer multiple learning styles. *Advances in Physiology Education*, *30*(1), 13–16.
Luo, J. (2014). A comparative study of word frequency and text coverage between English and Chinese for college English vocabulary acquisition. *Journal of Language Teaching and Research*, *5*(5), 1192.
Lynch, T., and Mendelsohn, D. (2002). Listening. In *In N. Schmitt (Ed), An introduction to applied linguistics* (pp. 194–210). London: Arnold.
Ma, Q. (2009). *Second language vocabulary acquisition* (Vol. 79). Bern: Peter Lang.
Malmkjær, K. (1998). *Translation & language teaching: Language teaching & translation*. Saint Jerome Publications.
Manyak, P. C. (2004). " What Did She Say?": translation in a primary-grade English immersion class. *Multicultural Perspectives*, *6*(1), 12–18.
Marefat, H., & Shirazi, A. M. (2003). The impact of teaching direct learning strategies on the retention of vocabulary of EFL learners. *The Reading Matrix*, *3*(2).
Masrai, A. M. (2016). The influence of morphological knowledge on lexical processing and acquisition: The case of Arab EFL learners. *Ampersand*, *3*, 52–60.
Masrai, A. (2015). Investigating and explaining the relationship between L1 mental lexicon size and organisation and L2 vocabulary development. *Unpublished PhD Thesis, Swansea University*.
Masrai, Ahmed. (2020). Can L2 Phonological Vocabulary Knowledge and Listening Comprehension be Developed Through Extensive Movie Viewing? the Case of Arab EFL Learners. *International Journal of Listening*, *34*(1), 54–69. https://doi.org/10.1080/10904018.2019.1582346
Masrai, Ahmed, & Milton, J. (2015). An investigation of the relationship between L1 lexical translation equivalence and L2 vocabulary acquisition. *International*

Journal of English Linguistics, *5*(2), 1–7.
Masrai, Ahmed, & Milton, J. (2017). Recognition vocabulary knowledge and intelligence as predictors of academic achievement in EFL context. *TESOL International Journal*, *12*(1), 128–142.
Masrai, Ahmed, & Milton, J. (2018). Measuring the contribution of academic and general vocabulary knowledge to learners' academic achievement. *Journal of English for Academic Purposes*, *31*, 44–57. https://doi.org/10.1016/j.jeap.2017.12.006
McCarthy, M. (2001). An interview with Professor Michael McCarthy. *Cambridge Connections, Interviewer*, *2*(1).
McCarthy, Michael. (1990). *Vocabulary*. Oxford University Press.
McLean, S., Hogg, N., & Kramer, B. (2014). Estimations of Japanese university learners' English vocabulary sizes using the vocabulary size test. *Vocabulary Learning and Instruction*, *3*(2), 47–55. https://doi.org/http://dx.doi.org/10.7820/vli.v03.2.mclean.et.al
Meara, P. (1989). Matrix models of vocabulary acquisition. *AILA Review*, *6*, 66–74.
Meara, P. (1996). The vocabulary knowledge framework. *Vocabulary Acquisition Research Group Virtual Library*.
Meara, P., & Buxton, B. (1987). An alternative to multiple choice vocabulary tests. *Language Testing*, *4*(2), 142–154.
Meara, P., & Jones, G. (1988). Vocabulary Size as a Placement Indicator. In *In P. Grunwell (eds.) Applied Linguistics in Society. Papers from the Annual Meeting of the British Association for Applied Linguistics (20th) September 1987.* (pp. 80–87). Nottingham, England, United Kingdom: ERIC.
Meara, P. M., & Milton, J. (2003). *X-lex: the Swansea levels test*. Express Publishing.
Melka, F. (1997). Receptive vs. productive aspects of vocabulary. *Vocabulary: Description, Acquisition and Pedagogy*, *33*(2), 84–102.
Memis, M. R. (2018). The Relationship between Vocabulary Learning Strategies and Vocabulary of Learners of Turkish as Foreign or Second Language. *Educational Policy Analysis and Strategic Research*, *13*(4), 164–185.
Miller, P. (2001). Learning Styles: The Multimedia of the Mind. Research Report.
Milton, J, Wade, Jo & Hopkins, N. (2010). Aural word recognition and oral competence in a foreign language. In *Chacón-Beltrán, R., Abello-Contesse, C., del Mar Torreblanca-López, M. editors. Insights into non-native vocabulary teaching and learning.* (pp. 83–98). Bristol: Multilingual Matters.
Milton, J, & Hopkins, N. (2005). Aural lex. *Swansea University*.
Milton, J. (2009). *Measuring second language vocabulary acquisition* (Vol. 45). Multilingual Matters.
Milton, J. (2013). Measuring the contribution of vocabulary knowledge to proficiency in the four skills. *C. Bardel, C. Lindqvist, & B. Laufer (Eds.) L*, *2*, 57–78.
Mondria, J.-A. (2003). The effect of inferring, verifying, and memorizing on the retention of the L2 word meanings. *Studies in Second Language Acquisition*, *25*(4), 473–499. https://doi.org/10.1017/S0272263103000202
Mondria, J.-A., & Boer, M. W.-D. (1991). The effects of contextual richness on the guessability and the retention of words in a foreign Language1. *Applied Linguistics*, *12*(3), 249–267.
Montero Perez, M., Peters, E., Clarebout, G., & Desmet, P. (2014). Effects of captioning on video comprehension and incidental vocabulary learning. *Language Learning and Technology*, *18*(1), 118–141.
Moradkhan, D., & Mirtaheri, S. (2011). The relationship between Iranian EFL learners'

perceptual learning styles and their Teachers' Teaching styles. *Journal of English Studies*, *1*, 41–52.
Morrison, L. (1996). Talking about words: A study of French as a second language learners' lexical inferencing procedures. *Canadian Modern Language Review*, *53*(1), 41–75.
Musumeci, D. (1996). Teacher-learner negotiation in content-based instruction: Communication at cross-purposes? *Applied Linguistics*, *17*(3), 286–325.
Na, L., & Nation, I. S. P. (1985). Factors affecting guessing vocabulary in context. *RELC Journal*, *16*(1), 33–42.
Nagy, W E. (1997). On the role of context in first and second language acquisition. *Vocabulary: Description, Acquisition, and Pedagogy*, 64–83.
Nagy, William E, & Herman, P. A. (1987). Breadth and depth of vocabulary knowledge: Implications for acquisition and instruction. *The Nature of Vocabulary Acquisition*, 19–35.
Naimie, Z., Siraj, S., Abuzaid, R. A., & Shagholi, R. (2010). Did you cook your lesson based on right recipe?(Accommodating the Students Preferences in Class). *Procedia-Social and Behavioral Sciences*, *2*(2), 383–387.
Nakagawa, S., Johnson, P. C. D., & Schielzeth, H. (2017). The coefficient of determination R2 and intra-class correlation coefficient from generalized linear mixed-effects models revisited and expanded. *Journal of The Royal Society Interface*, *14*(134), 1–11. https://doi.org/10.1098/rsif.2017.0213
Nassaji, Hossein. (2003). L2 vocabulary learning from context: Strategies, knowledge sources, and their relationship with success in L2 lexical inferencing. *Tesol Quarterly*, *37*(4), 645–670.
Nassaji, HOSSEIN. (2006). The Relationship Between Depth of Vocabulary Knowledge and L2 Learners' Lexical Inferencing Strategy Use and Success. *The Modern Language Journal*, *90*(3), 387–401. https://doi.org/10.1111/j.1540-4781.2006.00431.x
Nation, I. (2006). How Large a Vocabulary is Needed For Reading and Listening? *Canadian Modern Language Review*, *63*(1), 59–82. https://doi.org/10.3138/cmlr.63.1.59
Nation, I. S. P. (1983). Testing and teaching vocabulary. In *Guidelines, 5 (1)* (pp. 12–25).
Nation, I. S. P. (1990). *Teaching and learning vocabulary.* Boston, MA: Heinle & Heinle Publishers.
Nation, I. S. P. (1997). L1 and L2 Use in the Classroom: A Systematic Approach. *TESL Reporter*, *30*(2), 19–27.
Nation, I. S. P. (2007). Fundamental issues in modelling and assessing vocabulary knowledge. In *In H. Daller, J. Milton & J. Treffers-Dalle (Eds.), Modelling and assessing vocabulary knowledge* (pp. 33–43). Cambridge: Cambridge University Press.
Nation, I. S. P. (2013). *Learning vocabulary in another Language*. Cambridge: Cambridge University Press.
Nation, I. S. P. (2001). *Learning vocabulary in another language*. Ernst Klett Sprachen.
Nation, I S P. (2008). Teaching Vocabulary: Strategies and Techniques. Boston, MA: Heinle Cengage Learning. University Press.
Nation, I S P, & Beglar, D. (2007). A Vocabulary Size Test. *The Language Teacher*, *31*(7), 9–13.
Nation, I S Paul. (1984). *Vocabulary lists: Words, affixes, and stems*. University of Wellington, New Zealand: English Language Institute.

Nation, Ian S P, & Webb, S. A. (2011). *Researching and analyzing vocabulary*. Heinle, Cengage Learning Boston, MA.
Nation, P., & Kyongho, H. (1995). Where would general service vocabulary stop and special purposes vocabulary begin? *System*, *23*(1), 35–41.
Nemati, A. (2009). Memory vocabulary learning strategies and long-term retention. *International Journal of Vocational and Technical Education*, *1*(2), 14–24.
Neuman, S. B., & Koskinen, P. (1992). Captioned television as comprehensible input: Effects of incidental word learning from context for language minority students. *Reading Research Quarterly*, *27*(1), 95–106.
Newton, J. (1995). Task-based interaction and incidental vocabulary learning: a case study. *Second Language Research*, *11*(2), 159–176. https://doi.org/10.1177/026765839501100207
O'Dell, F. (1997). Incorporating vocabulary into the syllabus. *Vocabulary: Description, Acquisition and Pedagogy*, 258–278.
O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition.* Cambridge: Cambridge University Press.
Ormrod, J. E. (2003). Educational Psychology: Developing Learners, 6th. *Upper Saddle River, NJ: Merrill Prentice Hall*.
Ouellette, G. P. (2006). What's meaning got to do with it: The role of vocabulary in word reading and reading comprehension. *Journal of Educational Psychology*, *98*(3), 554–566.
Oxford Advanced Learners Dictionary. (2010). Retrieved April 1, 2016, from http://www.oxfordadvancedlearnersdictionary.com/dictionary/idiom.
Oxford, R. (1990). *Language learning strategies that every teacher should know*. Englewood Cliffs, NJ: Newbury House.
Oxford, R. L. (2003). Language learning styles and strategies: An overview. *Learning Styles & Strategies/Oxford, GALA*, *2003*, 1–25.
Oxford, R. L. (2016). *Teaching and researching language learning strategies: Self-regulation in context*. Routledge.
Pany, D., Jenkins, J. R., & Schreck, J. (1982). Vocabulary instruction: Effects on word knowledge and reading comprehension. *Learning Disability Quarterly*, *5*(3), 202–215.
Paribakht, T. S., & Wesche, M. (1999). Reading and "incidental" L2 vocabulary acquisition: An introspective study of lexical inferencing. *Studies in Second Language Acquisition*, *21*(2), 195–224.
Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest*, *9*(3), 105–119.
Peng, J.-E., & Woodrow, L. (2010). Willingness to communicate in English: A model in the Chinese EFL classroom context. *Language Learning*, *60*(4), 834–876.
Peters, E., & Webb, S. (2018). INCIDENTAL VOCABULARY ACQUISITION THROUGH VIEWING L2 TELEVISION AND FACTORS THAT AFFECT LEARNING. *Studies in Second Language Acquisition*, *40*(3), 551–577. https://doi.org/10.1017/S0272263117000407
Piotrowski, T. (1989). Monolingual and bilingual dictionaries: fundamental differences. *Learners' Dictionaries: State of the Art*, 72–83.
Prichard, C. (2008). Evaluating L2 readers' vocabulary strategies and dictionary use. *Reading in a Foreign Language*, *20*(2), 216–231.
Prince, P. (1996). Second Language Vocabulary Learning: The Role of Context versus Translations as a Function of Proficiency. *The Modern Language Journal*, *80*(4), 478–493. https://doi.org/10.1111/j.1540-4781.1996.tb05468.x

Qian, D. (1999). Assessing the roles of depth and breadth of vocabulary knowledge in reading comprehension. *Canadian Modern Language Review*, *56*(2), 282–308.
Qian, D. D. (2002). Investigating the relationship between vocabulary knowledge and academic reading performance: An assessment perspective. *Language Learning*, *52*(3), 513–536.
Qian, D. D. (2004). Second language lexical inferencing: Preferences, perceptions, and practices. *Vocabulary in a Second Language: Selection, Acquisition and Testing*, 155–169.
Rashidi, N., & Khosravi, N. (2010). Assessing the Role of Depth and Breadth of Vocabulary Knowledge in Reading Comprehension of Iranian EFL Learners. *Journal of Pan-Pacific Association of Applied Linguistics*, *14*(1), 81–108.
Read, J. (2000). *Assessing vocabulary.* Cambridge: Cambridge University Press.
Read, John. (1988). Measuring the vocabulary knowledge of second langauge learners. *RELC Journal*, *19*(2), 12–25.
Read, John. (1997). Vocabulary and testing. In *N. Schmitt & M. McCarthy (eds.), Vocabulary description, acquisition, and pedagogy.* (pp. 303–319). Cambridge: Cambridge University Press.
Read, John. (2007). Second language vocabulary assessment: Current practices and new directions. *International Journal of English Studies*, *7*(2), 105–126.
Reid, J. M. (1995). *Learning styles in the ESL/EFL classroom.* ERIC.
Richards, J. C., & Renandya, W. A. (Eds.). (2002). *Methodology in language teaching: An anthology of current practice.* Cambridge: Cambridge University Press.
Richards, J. C. (1976). The role of vocabulary teaching. *TESOL Quarterly*, 77–89.
Roche, T., & Harrington, M. (2013). Recognition vocabulary knowledge as a predictor of academic performance in an English as a foreign language setting. *Language Testing in Asia*, *3*(1), 12. https://doi.org/10.1186/2229-0443-3-12
Rodgers, M. P. H. (2013). English language learning through viewing television: An investigation of comprehension, incidental vocabulary acquisition, lexical coverage, attitudes, and captions.
Rubin, J. (1981). Study of Cognitive Processes in Second Language Learning. *Applied Linguistics*, *2*(2), 117–131.
Rubin, J. (1987). Learner strategies: Theoretical assumptions, research history and typology. In *In Wenden, A. & Rubin, J (eds.), Learner strategies in language learning* (pp. 15–30). New York: Prentice-Hall International.
Ruutmets, K. (2005). *Vocabulary learning strategies in studying English as a foreign language*. University of Tartu.
Sadighi, F., & Ghalebi, R. (2015). On the Relationship between Knowledge Sources Used in Inferencing and Vocabulary Acquisition in Second Language context. *Journal of Academic and Applied Studies*, *5*(5), 12–23.
Safian, N. H., Malakar, S., & Kalajahi, S. A. R. (2014). Exploring vocabulary learning strategies used by UPM TESL undergraduates. *Advances in Language and Literary Studies*, *5*(5), 1–4.
Sanaoui, R. (1992). *Vocabulary learning and teaching in French as a second language classrooms.* Unpublished PhD Thesis, University of Toronto, Canada.
Sanaoui, Razika. (1995). Adult learners' approaches to learning vocabulary in second languages. *The Modern Language Journal*, *79*(1), 15–28.
Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics*, *11*(2), 129–158.
Schmitt, N., & McCarthy, M. (1997). *Vocabulary: Description, acquisition and pedagogy.* Cambridge University Press.

Schmitt, D., & Schmitt, N. (2011). *Focus on Vocabulary 2: Mastering the Academic Word List*. Pearson Education.
Schmitt, N. (1995). Vocabulary notebooks: theoretical underpinnings and practical suggestions. *ELT Journal*, *49*(2), 133–143. https://doi.org/10.1093/elt/49.2.133
Schmitt, N. (1997). Vocabulary learning strategies. In *Schmitt, N. and McCarthy, M.(eds). Vocabulary: Descriptive, Acquisition and Pedagogy.* (pp. 199–228). Cambridge: Cambridge University Press.
Schmitt, Norbert. (2000). *Vocabulary in language teaching*. Ernst Klett Sprachen.
Schmitt, Norbert, Jiang, X., & Grabe, W. (2011). The percentage of words known in a text and reading comprehension. *The Modern Language Journal*, *95*(1), 26–43.
Schmitt, Norbert, Schmitt, D., & Clapham, C. (2001). Developing and exploring the behaviour of two new versions of the Vocabulary Levels Test. *Language Testing*, *18*(1), 55–88. https://doi.org/10.1177/026553220101800103
Scholfield, P. (1999). Dictionary use in reception. *International Journal of Lexicography*, *12*(1), 13–34. https://doi.org/10.1093/ijl/12.1.13
Schonell, F., Meddleton, I., Shaw, B., Routh, M., Popham, D., Gill, G., & Stephens, C. (1956). *A study of the oral vocabulary of adults: an investigation into the spoken vocabulary of the Australian worker*. University of Queensland Press.
Seashore, R. H., & Eckerson, L. D. (1940). The measurement of individual differences in general English vocabularies. *Journal of Educational Psychology*, *31*(1), 14.
Shamshirian, M. (2015). Assessing the effect of utilizing monolingual and bilingual dictionaries on EFL learners' vocabulary. *Language in India*, *15*(7), 175–188.
Shangarfam, N., Ghorbani, N., Safarpoor, E., & Maha, M. (2013). The comparative impact of lexical translation and lexical inferencing on EFL learners' vocabulary retention. *Management Science Letters*, *3*(12), 2889–2908. https://doi.org/10.5267/j.msl.2013.11.008
Shaw, G., & Marlow, N. (1999). The role of student learning styles, gender, attitudes and perceptions on information and communication technology assisted learning. *Computers & Education*, *33*(4), 223–234.
Shen, Z. (2008). The roles of depth and breadth of vocabulary knowledge in EFL reading performance. *Asian Social Science*, *4*(12), 135–137.
Shokouhi, H., & Askari, H. (2010). The effect of guessing vocabulary in reading authentic texts among pre-university students. *Arizona Working Papers in Second Language Acquisition and Teaching*, *17*, 75–89.
Shultz, T. R. (1982). Rules of causal attribution. *Monographs of the Society for Research in Child Development*, *47*(1), 1–51.
Skehan, P. (1986). Cluster analysis and the identification of learner types. In *In V. Cook (Ed.), Experimental mental approaches to second language acquisition* (pp. 81–94). Oxford: Pergamon.
Soderland, S., Etzioni, O., Weld, D. S., Reiter, K., Skinner, M., Sammer, M., … others. (2010). Panlingual lexical translation via probabilistic inference. *Artificial Intelligence*, *174*(9–10), 619–637.
Spoon, J. C., Schell, J. W., & others. (1998). Aligning student learning styles with instructor teaching styles. *Journal of Industrial Teacher Education*, *35*, 41–56.
Stæhr, L. S. (2008). Vocabulary size and the skills of listening, reading and writing. *Language Learning Journal*, *36*(2), 139–152.
Stæhr, L. S. (2009). Vocabulary knowledge and advanced listening comprehension in English as a foreign language. *Studies in Second Language Acquisition*, *31*(4), 577–607.
Stern, H. H. (1975). What can we learn from the good language learner? *Canadian*

Modern Language Review, *31*(4), 304–319.
Sternberg, R. J., Grigorenko, E. L., & Zhang, L. (2008). Styles of learning and thinking matter in instruction and assessment. *Perspectives on Psychological Science*, *3*(6), 486–506.
Stewart, J. (2014). Do Multiple-Choice Options Inflate Estimates of Vocabulary Size on the VST? *Language Assessment Quarterly*, *11*(3), 271–282. https://doi.org/10.1080/15434303.2014.922977
Stoffer, I. (1997). University foreign language students' choice of vocabulary learning strategies as related to individual difference variables.
T\ilfarl\io\uglu, F. F. Y., & Bozgeyik, Y. (2012). The Relationship between vocabulary learning strategies and vocabulary proficiency of English language learners. *International Journal of Applied Linguistics and English Literature*, *1*(2), 91–101.
Tanyer, S., & Ozturk, Y. (2014). Pre-service English teachers' vocabulary learning strategy use and vocabulary size: a cross-sectional evaluation. *Journal of Language Teaching and Research*, *5*(1), 37–46.
Teng, F. (2015). Assessing the Relationship between Vocabulary Learning Strategy Use and Vocabulary Knowledge. *PASAA: Journal of Language Teaching and Learning in Thailand*, *49*, 39–65.
Thornbury, S. (2002). *How to teach vocabulary.* Harlow: Longman.
Thornbury, Scott. (1999). Window-dressing vs cross-dressing in the EFL sub-culture. *Folio*, *5*(2), 15–17.
Tseng, F. (2009). EFL Students'" Yahoo!" Online Bilingual Dictionary Use Behavior. *English Language Teaching*, *2*(3), 98–108.
Tuan, L. T. (2011). An Empirical Research on Self-learning Vocabulary. *Theory & Practice in Language Studies*, *1*(12), 1688–1695.
Van Parreren, C. S. (1992). Individual Differences in Vocabulary Acquisition: A Qualitative Experiment in the First Phase of Secondary Education. In *Vocabulary and Applied Linguistics* (pp. 94–101). London: Palgrave Macmillan UK. https://doi.org/10.1007/978-1-349-12396-4_9
Van Zeeland, H. (2014). Lexical inferencing in first and second language listening. *The Modern Language Journal*, *98*(4), 1006–1021.
Van Zeeland, H., & Schmitt, N. (2013). Incidental vocabulary acquisition through L2 listening: A dimensions approach. *System*, *41*(3), 609–624.
Vermeer, A. (2004). The relation between lexical richness and vocabulary size in DutchL1 and L2 children. In *In P. Bogaard and B. Laufer (Eds.), Vocabulary in Second Language* (pp. 173-189.). Amesterdam: Benjamins Publishing Company.
Vermeer, Anne. (2001). Breadth and depth of vocabulary in relation to L1/L2 acquisition and frequency of input. *Applied Psycholinguistics*, *22*(2), 217–234.
Vermes, A. (2010). Translation in foreign language teaching: a brief overview of pros and cons. *Eger Journal of English Studies*, *10*(1), 83–93.
Vermunt, J. (1994). Inventory of learning styles in higher education: Scoring key for the inventory of learning styles in higher education. *Tilburg, Netherlands: Tilburg University Department of Educational Psychology*.
Vongsila, V., & Reinders, H. (2016). Making Asian learners talk: Encouraging willingness to communicate. *RELC Journal*, *47*(3), 331–347.
Vonkova, H., Papajoanu, O., & Stipek, J. (2018). Enhancing the Cross-Cultural Comparability of Self-Reports Using the Overclaiming Technique: An Analysis of Accuracy and Exaggeration in 64 Cultures. *Journal of Cross-Cultural Psychology*, *49*(8), 1247–1268. https://doi.org/10.1177/0022022118787042
Waldvogel, D. A. (2013). The Relationships between Vocabulary Learning Strategies

and Vocabulary Size among Adult Spanish Foreign Language Learners. *Journal of Language Teaching & Research*, *4*(2).
Walsh, S. (2002). Construction or obstruction: Teacher talk and learner involvement in the EFL classroom. *Language Teaching Research*, *6*(1), 3–23.
Wang-Taylor, Y., & Milton, J. (2019). Predicting international students' academic success with vocabulary and intercultural communicative competence. *Journal of Applied Linguistics*, (32), 83–101. https://doi.org/https://doi.org/10.26262/jal.v0i32.7533
Wang, L. (2007). Word Association: Second Language Vocabulary Acquisistion and Instruction. *TESL Reporter*, *40*(1), 49–66.
Webb, S. (2008). Receptive and productive vocabulary sizes of L2 learners. *Studies in Second Language Acquisition*, *30*(1), 79–95.
Webb, S. A. (2012). Learning vocabulary in activities. In H. Widodo & A. (eds) Cirocki (Eds.), *Innovation and creativity in ELT methodology* (pp. 121–133). New York: NY: Nova.
Webb, S., & Nation, P. (2017). *How vocabulary is learned*. Oxford University Press.
Webb, S., & Rodgers, M. P. H. (2009). Vocabulary demands of television programs. *Language Learning*, *59*(2), 335–366.
Webb, Stuart Alexander, & Chang, A. C.-S. (2012). Second language vocabulary growth. *RELC Journal*, *43*(1), 113–126.
Webb, W. B. (1962). The effects of prolonged learning on learning. *Journal of Verbal Learning and Verbal Behavior*, *1*(3), 173–182.
Wei, M. (2007). An examination of vocabulary learning of college-level learners of English in China. *Asian EFL Journal*, *9*(2), 93–114.
Weigand, E. (1998). Contrastive lexical semantics. In *In E. Weigand (Ed.), Contrastive lexical semantics.* (pp. 25–44). Amsterdam: John Benjamin.
Weigand, Edda. (1998). Contrastive lexical semantics. In *In E. Weigand (Ed.), Contrastive lexical semantics,* (Vol. 171, pp. 25–44). Amsterdam: John Benjamins Publishing.
Wenden, A. L. (1982). Learner strategies. *TESOL Newsletter*, *19*(5), 1–7.
Wesche, M. B., & Paribakht, T. (2009). *Lexical inferencing in a first and second language: Cross-linguistic dimensions* (Vol. 46). Multilingual Matters.
Wesche, M. B., & Paribakht, T. S. (2000). Reading-based exercises in second language vocabulary learning: An introspective study. *The Modern Language Journal*, *84*(2), 196–213.
Wilkins, D. (1972). *Linguistics and language teaching.* London: Edward Arnold.
Winchester, H. P. M. (1999). Interviews and Questionnaires as Mixed Methods in Population Geography: TheCase of Lone Fathers in Newcastle, Australia. *The Professional Geographer*, *51*(1), 60–67.
Wongsuphasawat, K., & Sittiprapaporn, P. (2018). Preferred learning styles of Thai learners in anti-aging and regenerative sciences. *Asian Journal of Medical Sciences*, *9*(6), 14–19.
Wright, J. (1998). *Dictionaries: Resource books for teachers*. Oxford: Oxford University Press.
Yayli, D. (2010). A think-aloud study: Cognitive and metacognitive reading strategies of ELT department students. *Egitim Arastirmalari-Eurasian Journal of Educational Research*, *38*(10), 234–251. Retrieved from https://www.researchgate.net/profile/Demet_Yayli/publication/286547114_A_Think-Aloud_Study_Cognitive_and_Metacognitive_Reading_Strategies_of_ELT_Depart

ment_Students/links/5715cae808ae0f1a39b1b0d2/A-Think-Aloud-Study-Cognitive-and-Metacognitive-Reading-Str
Yeh, Y., & Wang, C. (2003). Effects of multimedia vocabulary annotations and learning styles on vocabulary learning. *Calico Journal*, 131–144.
Zaid, A. M. (2009). A comparison of inferencing and meaning-guessing of new lexicon in contexts versus non-context vocabulary presentation. *The Reading Matrix*, *9*(1), 56–66.
Zarei, A. A., & Lotfi, P. (2013). The effect of dictionary type on the recognition and recall of concrete and abstract L2 vocabulary. *Roshd FLT*, *27*(2), 46–55.
Zarei, A. (2012). The effect of dictionary type on the recognition and recall of concrete and abstract L2 vocabulary.
Zhong, Q. M. (2013). Understanding Chinese learners' willingness to communicate in a New Zealand ESL classroom: A multiple case study drawing on the theory of planned behavior. *System*, *41*(3), 740–751.
Zou, D. (2016). Comparing Dictionary-induced Vocabulary Learning and Inferencing in the Context of Reading. *Lexikos*, *26*(1), 372–390. https://doi.org/10.5788/26-1-1345

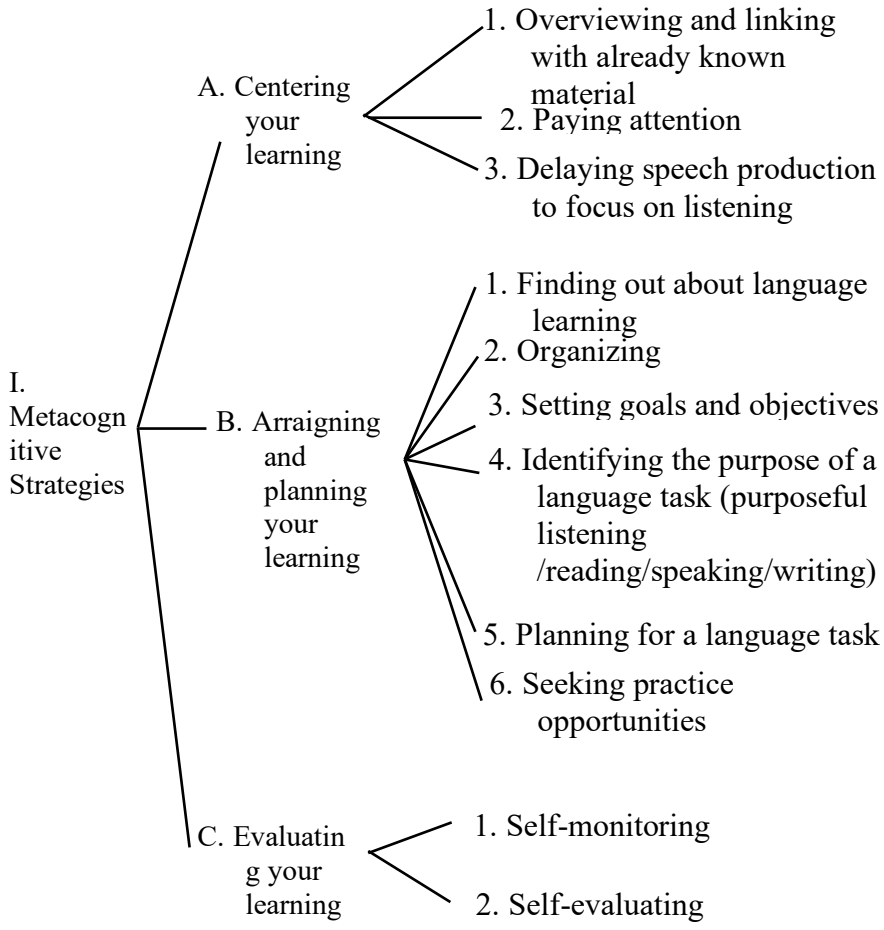
Appendixes

Appendix (A)

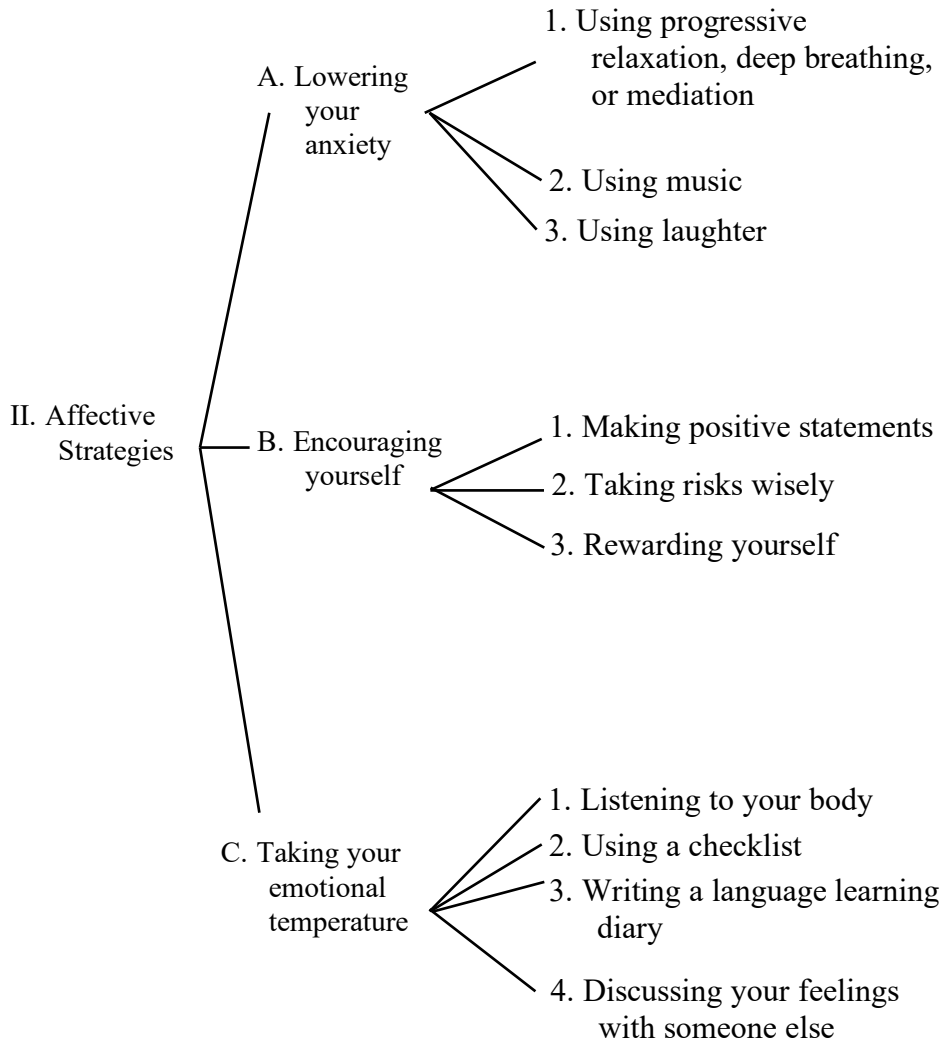
Oxford's (1990) taxonomy of LLS

INDIRECT STRATEGIES

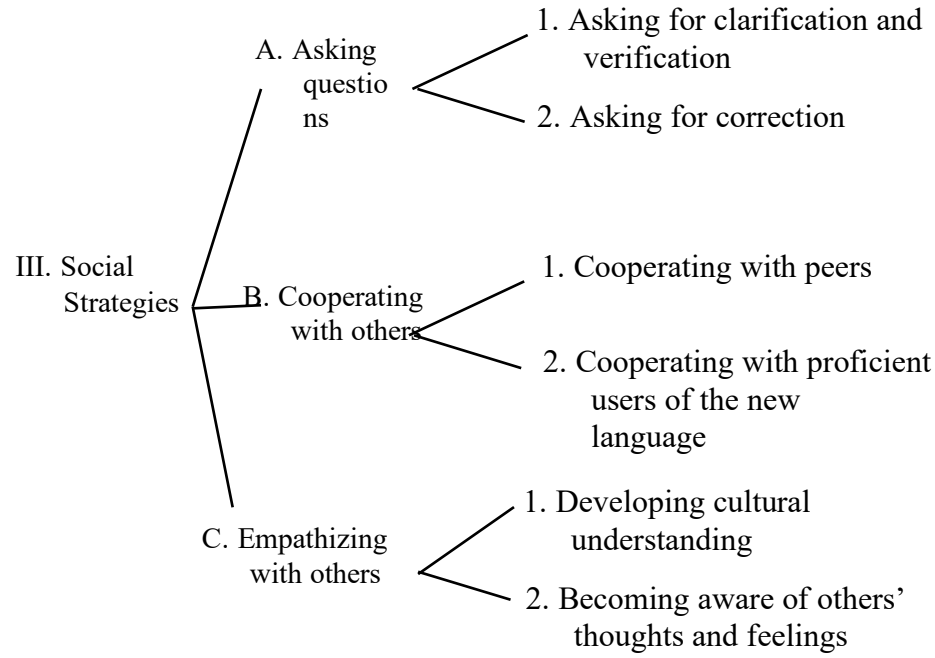
(Metacognitive, Affective, and Social Strategies)



Appendix (A) (Continued)

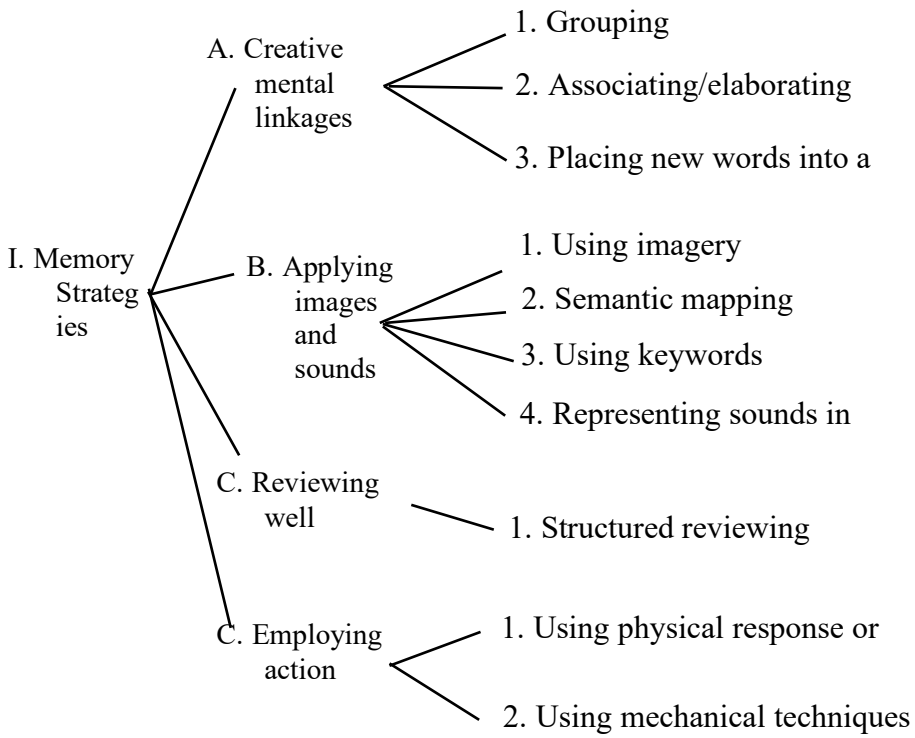


Appendix (A) (Continued)

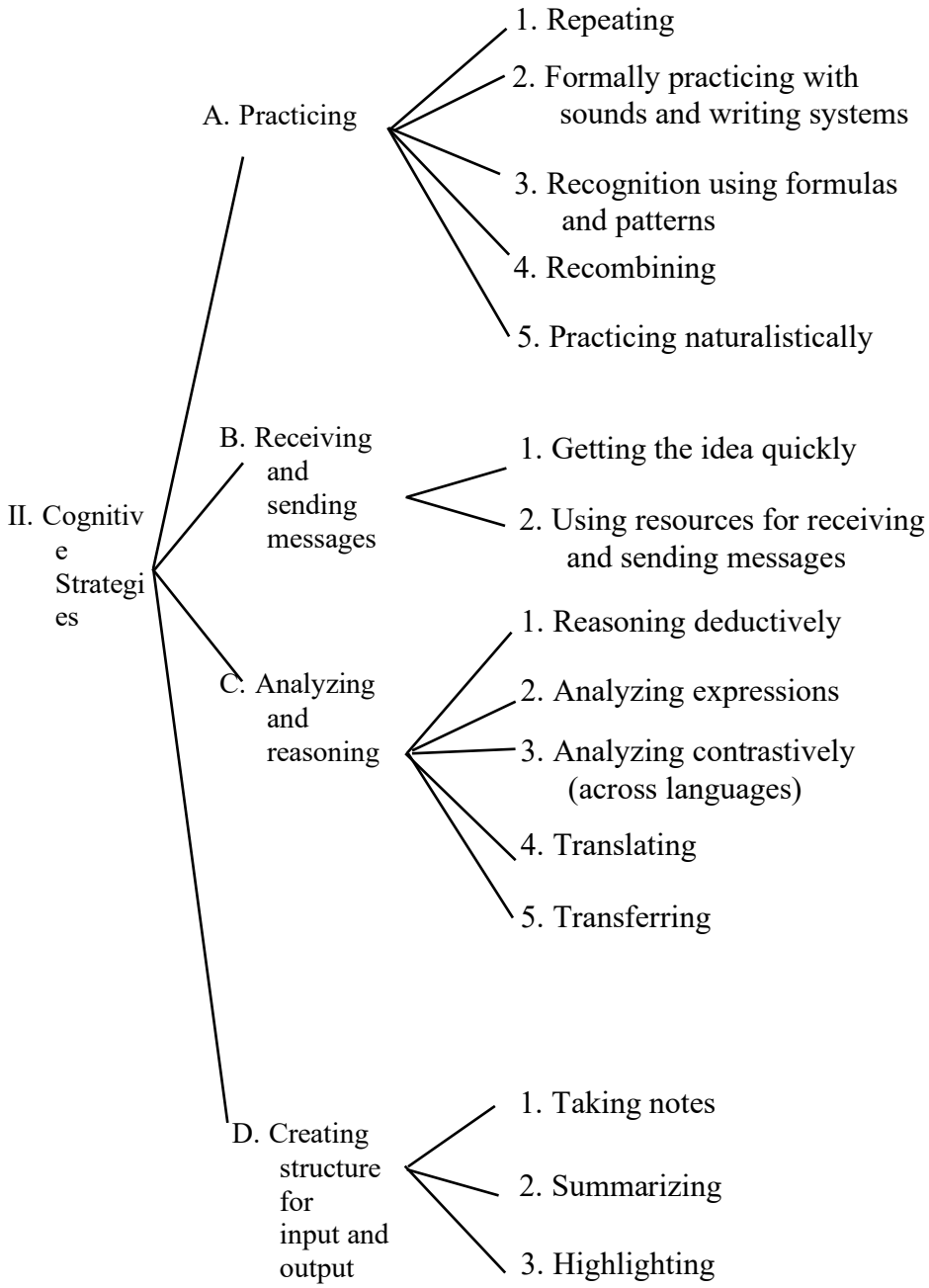


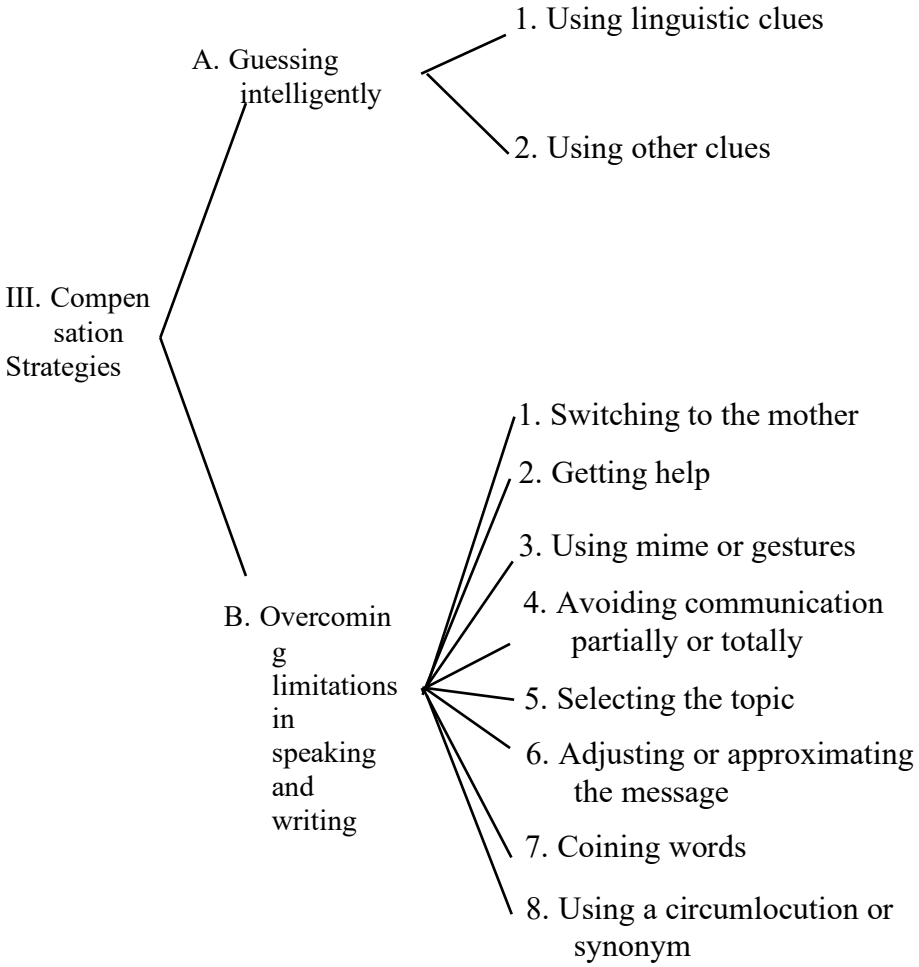
DIRECT STRATEGIES

(Memory, Cognitive, and Compensation Strategies)



Appendix (A) (Continued)





Adapted from (Oxford, 1990: 16-21)

APPENDIX (B)

Vocabulary Learning Questionnaire: Categories, strategies, items (by Gu, 2018: 349-350)

Category	Strategies	Items
Beliefs about vocabulary learning	Words should be memorized	1. Once the English words of all my native language meanings have been re-membered, English is learned.
		2. The best way to remember words is to memorize word lists or dictionaries.
		3. The purpose of learning a word is to remember it.
		4. A good memory is all you need to learn a foreign language well.
		5. Repetition is the best way to remember words
		6. You can only learn a large vocabulary by memorizing a lot of words.
	Words should be learned through use	7. The meanings of a large amount of words can be picked up through reading.
		8. Learners should pay attention to expressions (e.g., pick up) and collocations (e.g., heavy rain; strong wind) that go with a word.
		9. Learners can learn vocabulary simply through reading a lot.
		10. The least a learner should know about a word is its spelling, pronunciation, meaning, and its basic usage.
Metacognitive strategies	Selective attention	11. I know whether a new word is important in understanding a passage.
		12. I know which words are important for me to learn.
		13. When I meet a new word or phrase, I know clearly whether I need to remember it.
	Self-initiation	14. Besides textbooks, I look for other readings that fall under my interest.
		15. I wouldn't learn what my English teacher doesn't tell me to learn. (Reversed value)
		16. I only focus on things that are directly related to examinations. (Reversed value)
		17. I wouldn't care much about vocabulary items that my teacher does not ex- plain in class. (Reversed value)
	Guessing strategies	18. I make use of the logical development in the context (e.g., cause and effect) when guessing the meaning of a word.
		19. I use common sense and knowledge of the world when guessing the meaning of a word.
		20. I check my guessed meaning in the paragraph or whole text to see if it fits in.
		21. When I don't know a new word in reading, I use my background knowledge of the topic to guess the meaning of the new word
		22. I look for explanations in the reading text that support my guess about the meaning of a word.
		23. I make use of the grammatical structure of a sentence when guessing the meaning of a new word.
		24. I make use of the part of speech

			of a new word when guessing its meaning
Using dictionary	Dictionary strategies	25.	When I see an unfamiliar word again and again, I look it up.
		26.	When not knowing a word prevents me from understanding a whole sentence or even a whole paragraph, I look it up.
		27.	I look up words that are important to the understanding of the sentence or paragraph in which it appears.
		28.	I pay attention to the examples when I look up a word in a dictionary.
		29.	When I want to have some deeper knowledge about a word that I already know, I look it up.
		30.	When I want to know more about the usage of a word that I know, I look it up.
		31.	I check the dictionary when I want to find out the similarities and differences between the meanings of related words.
Taking notes	Choosing which word to put into notebook	32.	I make a note when I think the meaning of the word I'm looking up is commonly used
		33.	I make a note when I think the word I'm looking up is related to my personal interest.
		34.	I make a note when I see a useful expression or phrase.
	Deciding what information goes into notes	35.	I write down both the meaning in my native language and the English explanation of the word I look up.
		36.	I note down examples showing the usages of the word I look up.
		37.	I note down examples showing the usages of the word I look up.
Rehearsal	Use of word lists	38.	I go through my vocabulary list several times until I remember all the words on the list.
		39.	I make vocabulary cards and take them with me wherever I go.
		40.	I make regular reviews of new words I have memorized.
	Oral repetition	41.	When I try to remember a word, I say it aloud to myself.
		42.	When I try to remember a word, I repeat its pronunciation in my mind.
		43.	Repeating the sound of a new word to myself would be enough for me to remember the word.
	Visual repetition	44.	When I try to remember a word, I write it again and again.
		45.	I memorize the spelling of a word letter by letter.
		46.	I write both the new words and their translation in my native language again and again in order to remember them.
Encoding	Visual encoding	47.	I act out some words in order to remember them better (e.g., jump).
		48.	I create a picture in my mind to help me remember a new word.
		49.	To help me remember a word, I try to "see" the spelling of the word in my mind.
	Auditory encoding	50.	I put words that sound similar together in order to remember them.

		51. When words are spelled similarly, I remember them together. 52. When I try to remember a new word, I link it to a sound-alike word that I know.
	Use of word structure	53. When I learn new words, I pay attention to prefixes, roots, and suffixes (e.g., inter-nation-al). 54. I intentionally study how English words are formed in order to remember more words. 55. I memorize the commonly used roots and prefixes.
	Contextual encoding	56. When I try to remember a word, I also try to remember the sentence in which the word is used. 57. I put words in set expressions or sentences in order to remember them. 58. I remember a new word together with the context where the new word ap- pears.
Activation	Activation	59. I make up my own sentences using the words I just learned. 60. I try to use the newly learned words as much as possible in speech and writing. 61. I try to use newly learned words in real situations. 62. I try to use newly learned words in imaginary situations in my mind.

Appendix (C)

Schmitt's (1997) taxonomy of VLS

Strategy Group		Use (%)	Helpful (%)
Strategies for the discovery of a new word's meaning			
DET	Analyse part of speech	32	75
DET	Analyse affixes and roots	15	69
DET	Check for LI cognate	11	40
DET	Analyse any available pictures or gestures	47	84
DET	Guess from textual content	74	73
DET	Bilingual dictionary	85	95
DET	Monolingual dictionary	35	77
DET	Word lists	--	--
DET	Flush cards	--	--
SOC	Ask teacher for an LI translation	45	61
SOC	Ask teacher for paraphrase or synonym of new word	42	86
SOC	Ask teacher for a sentence including the new word	24	78
SOC	Ask classmates for meaning	73	65
SOC	Discover new meaning through group work activity	35	65
Strategies for consolidating a word once it has been encountered			
SOC	Study and practise meaning in a group	30	51
SOC	Teacher checks students' flash cards or word lists for accuracy	3	59
SOC	Interact with native speakers	--	--
MEM	Study word with a pictorial representation of its meaning	--	--
MEM	Image word's meaning	50	38
MEM	Connect word to a personal experience	37	62
MEM	Associate the word with its coordinates	13	54
MEM	Connect the word to its synonyms and acronyms	41	88
MEM	Use semantic maps	9	47
MEM	Use 'scales' for gradable objectives	16	62
MEM	Peg Method	--	--
MEM	Loci Method	--	--
MEM	Group words together to study them	--	--
MEM	Group words together within a storyline	--	--
MEM	Use new word in sentences	18	82
MEM	Group words together within a storyline	--	--
MEM	Study the spelling of a word	74	87
MEM			
MEM	Study the sound of a word	60	81

MEM	Say new word aloud when studying	69	91
MEM	Image word form	32	22
MEM	Underline the initial letter of the word	--	--
MEM	Configuration	--	--
MEM	Use Keyword Method	13	31
MEM	Affixes and roots (remembering)	14	61
MEM	Part of speech (remembering)	30	73
MEM	Paraphrase the word's meaning	40	77
MEM	Use cognates in the study	10	34
MEM	Learn the words of an idiom together	48	77
MEM	Use physical actions when learning a word	13	49
MEM	Use semantic feature grids	--	--
COG	Verbal repetition	76	84
COG	Written repetition	76	91
COG	Word lists	54	67
COG	Flash cards	25	65
COG	Take notes in class	64	84
COG	Use vocabulary section in your textbook	48	76
COG	Listen to tape of word lists	--	--
COG	Put English labels on physical objects	--	--
COG	Keep a vocabulary notebook	--	--
MET	Use English-Language media (songs, movies, newscasts, etc.)	--	--
MET	Testing oneself with word tests	--	--
MET	Use spaced word practice	--	--
MET	Skip or pass new word	41	16
MET	Continue to study over time	45	87
Strategy was not included on the initial list used in the survey			

Adapted from (Schmitt, 1997:207-8)

Appendix (D)

Inferencing taxonomy (by Carton, 1971, cited in, Haastrup, 1991: 239-244)

THE COMPLETE TAXONOMY

CONTEXTUAL CUES

CATEGORY	DEFINITION	EXAMPLE
I. The text	The informant makes use of the text	
1. One or two words from the immediate co-text	The informant makes use of one or two words from the immediate co-text of the test word; she chooses a word that is familiar. This is then taken as the point of departure of her reflections, which may be of a collocational nature	Test word: assessing Utterance:" well medicine – what can you do with medicine – test medicine – yes assessing is testing" Test word: bouts Utterance: "diarrhea and dysentery – that is also something to do with stomach troubles – complaints – what about various complaints"
2. The immediate co-text	The informant makes use of the sentence that contains the test word	Test word: squalor Utterance: "no it cannot mean conditions because we have that in"" conditions that they live under" you see"
3. A specific part of the co- text beyond the sentence of the test word	The informant refers to specific parts of the text other than the sentence of the test word, for instance to the sentence immediately following this	Test word: any of them Utterance: "if it fits well with the context when I read on"
4. Unspecified use of the text	The informant makes global use of the text without offering any definite reference	Test word: any of them Utterance:" this doesn't fit in with the rest"" I think it is from the context" " from the context – not from the word itself"

II. Knowledge of the world	The informant makes us e of her general knowledge of the world, including factual knowledge, attitudes, beliefs, prejudices and so on. What the informant proposes she cannot have taken exclusively from the text	Test word: unfathomable Utterance: "yes this has something to do with – in Africa they don't really know what they suffer from" Test word: affluence Utterance: "because in the rich world there are many mental diseases"

INTRALINGUAL CUES

CATEGORY	DEFINITION	EXAMPLE
I. The test word	The informant makes use of the features of the test word	
1. Phonology/ orthography	The informant uses phonological/ orthographic similarity. From the result and/or hypotheses there is no indication that the informant considers meaning	Test word: precipitating Utterance:" participating- the rhythm of the word- rhyme and all that"
2. Morphology a. Prefix	The informant uses prefixes or what she perceives as prefixes. Her pronunciation reveals whether she thinks of an English prefix, if she does not say so explicitly.	Test word: dissention Utterance: "that dis- - a prefix of contrast"
b. Suffix	The informant uses suffixes or what she perceives as suffixes	Test word: negligible Utterance:" that -ible suffix – something to do with - ly"
c. stem	The informant tries by removing the prefix and/or suffix to se as her source the word stem, or what she perceivers as the word stem	Test word: unfathomable Utterance: "let us try to remove the suffix unfathom"
3. Lexis	The informant puts forward and English word form and is moving towards meaning considerations	Test word: contributory Utterance: "contributory has something to do with

		contribute – what does it mean”
4. Word class	The informant converts the test word into a different world class, sets up lines of demarcation with the help of word classes, or identifies through word classes	Test word: squalor Utterance: “squalor- to squeal- try to change into a verb and make out something in that way”
5. collocations	The informant tries what her proposal “sounds like” or reminds herself of other expressions with the test word	Test word: refuse Utterance: “ it is like that one with refuse bills – do you remember it – thus I refuse bills”
6. semantics	The starting point is implicitly or explicitly and English word from, i.e. the lexical level. The informant puts forward reflections about meaning explicitly, or the nature of her oral and/ or written hypotheses makes it likely that such reflections are involved	Test word: contributory Utterance: “contributory has something to do with contribute – it means contributory” (medvir-kende)

Appendix (D) Continued

II. The syntax of the sentence	The informant uses the structure of the sentence in which the test word occurs	
1. The definite article	The informant makes use of the definite article in her interpretation of the sentence	Test word: squalor Utterance: "I can see now that what we arrived at – in cautiousness – is totally wrong – it is lack of food and money"
2. Co-ordinate adjectives	The informant makes use of the fact that the test word is co-ordinated with another adjective	Test word: precipitating Utterance:" if one sees it as a parallel to that contribu tory"
3. Prepositions	The informant makes use of prepositions in her interpretations	Test word: bouts Utterance:" now it says *of* dysentery and diarrhea that is bouts of – attacks"
4. Number	The informant makes use of the category of number in her interpretations	Test word: squalor Utterance: "I wonder if that is the singular or the plural number"
5. Miscellaneous	All cases that do not fit sub-categories 1-4	

Appendix (D) continued

INTERLINGUAL CUES

CATEGORY	DEFINITION	EXAMPLE
I. Li	The informant makes use of her first language, Danish	
1. Phonology/orthography	The informant uses phonetic/orthographic similarity. From the result and/or the hypotheses it is evident that informants do not consider meaning	Test word: waver Utterance: "hovers (swaever) or something like that- though it was a little like it" Test word: deficient Utterance: A: "something to do with definite – this is what it reminds me of" I: "what does it mean" A:" I don't know- just know that I've heard the word and then one just says it you know"
2. Morphology a. prefix	The informant uses Danish prefixes or what she perceives as prefixes	Test word: precipitating Utterance: A:"as to principle" I:" why?" A:" the word resembles It at the beginning"
3. Lexis	The informant proposes a Danish sounding word in the belief that it is authentic; or the informant proposes an authentic word but seems unaware about its meaning	Test word: indiscriminately Utterance: "discriminate somebody or something – I do not quite know"

4. Collocations	The informant considers a Danish equivalent of the test word and thinks aloud about potential collocations. She puts forward a hypothesis based on the part of the word's meaning potential that is activated by the collocation she happens to think of The informant tries out whether the proposed Danish word sounds right in a translation of the immediate context	Test word: hazards Utterance: "one says rash ("hasarderet korsel = rash driving") – hazards is rash" Test word: bouts Utterance: "instances of – you may say that – instances of this"
5. Semantics	The starting point is implicitly or explicitly a Danish word, i.e. the lexical level. The informant puts forward reflections about meaning explicitly, or the nature of her oral and/or written hypotheses makes it likely that such reflections are involved	Test word: hazards Utterance:" this has something to do with gambling or accidental occurrences or something like that – yes accidental occurrences" Test word: indiscriminately Utterance: "discriminate something – then it is as if you are inconsiderate towards somebody else – it must be inconsiderately" Test word: curative Utterance: "curing"

Appendix (D) continued

CATEGORY	DEFINITION	EXAMPLE
II. Ln	The informant makes use of her knowledge of other languages than her first language and the target language, English	Latin is used for the examples
1. General reflections a. Reflections about the origin of the word	The informant reflects on whether the test word comes from Latin, sounds as if it was Latin etc.	Test word: prevalent Utterance:" does it come from Latin?" Utterance: "it isn't Latin" Utterance: "also likewise valence – that sounds very Latin-like"
b. Test word pronounced in Ln	The informant quotes the Latin form that she believes the test word is derived from; or she Latinizes the test word	Test word: dissention Utterance: "dis plus sentire" Test word: "indigenous Utterance: "indigio" Test word: precipitating Utterance: "precipio"
2. Morphology a. Prefix	The informant uses prefixes or what she perceives as prefixes from Latin. Her pronunciation reveals whether she thinks of a Latin prefix, if she does not say so explicitly	Test word: prevalent Utterance: "it is also a prefix which we might make use of - this pre- "
3. Lexis	The informant puts forward a Latin word, or what she believes is a Latin word, and uses that as a starting point for reflections about meaning, i.e. she moves directly to the semantic level	Test word: dissension Utterance: "dissentio – that has something to do with going out "
4. semantics	The starting point is explicitly a Latin word, i.e. the lexical level. The informant puts forward reflections about meaning	Test word: dissension Utterance: "dissentio – that has something to do with going out"

Appendix (E)

English XK-Lex Vocabulary Test (by Al-Masrai and Milton, 2012, cited in, Al-Masrai, 2009: 82-83).

Please look at these words. Some of these words are real English words and some are not but are made to look like real words. Please tick the words that you know or can use. Here is an example.

Version: **A** **cat ✓** **EVST**

Score:

Your student number: **Thank you for**

your help.

New	commerce	Organise	Accuse	Victory
Gummer	Tindle	Wookey	Candish	Skave
Word	Dust	Fountain	Tend	Jewel
Near	nonsense	Movement	Landing	Reliable
Peace	Fond	Likely	Volume	Harden
Produce	Sweat	Provide	Tube	Sorrow
You	Cap	Castle	Liner	Dial
Wife	Worry	Steam	Previous	Enclose
Do	Plenty	Steady	Style	Sneeze
Add	Guide	Pole	Outline	Apparatus
Kilp	Broy	Orrade	Plaudate	Overend
Build	Pump	Guest	Keeper	Roast
Prosecutor	addict	Gulp	Idleness	Carnation
Samphirate	treadway	Darch	callisthemia	Mordue
Referral	detachment	Thud	Blizzard	Plaintively
Illuminate	unsure	Assassin	Rut	Gurgle
Gown	reinforcement	Wrench	Incessant	Heal
Verge	enlightenment	Backdrop	Blunder	go-between
Counsellor	workman	Unfold	springboard	common-law
Skipper	feudal	Upheaval	Shrapnel	Locket
Authorise	quartet	Animation	Skip	Nudge
Sour	psychic	Banish	Bastion	Anger
Neminary	Fallity	Treggle	Snape	Tearle
Holly	appropriation	Peninsula	Maroon	Contrive

Appendix (E) continued

English XK-Lex Vocabulary Test

Please look at these words. Some of these words are real English words and some are not but are made to look like real words. Please tick the words that you know or can use. Here is an example.

Version: **B** **cat ✓**

EVST Score:

Your student number: **Thank you for your help.**

make	**Advice**	**generous**	**Cure**	**Victory**
Anand	**Trudgeon**	**snell**	**hammond**	**arbus**
Turn	**perform**	**rabbit**	**Pat**	**Opponent**
Doubt	**Luck**	**cough**	**Court**	**Feast**
Start	**Fierce**	**sense**	**reaction**	**item**
Ready	**Strict**	**announce**	**workshop**	**fortune**
Person	**Collar**	**prepare**	**leadership**	**simplicity**
open	**wire**	**drag**	**reference**	**overlook**
Fact	**Comfort**	**sight**	**emphasise**	**scorn**
Sure	**Discipline**	**situation**	**seed**	**respect**
Widgery	**Inertible**	**loring**	**craddock**	**encopulate**
Write	**Pour**	**dive**	**calculate**	**junction**
Dependency	**Convergence**	**cape**	**tireless**	**cylinder**
Chibberv	**Fallology**	**atone**	**lebrucious**	**outpanner**
Descendant	**Alley**	**conscientious**	**eloquence**	**allure**
Playground	**Cutter**	**paw**	**spurt**	**atone**
Attachment	**Consultative**	**reap**	**recoup**	**ruby**
Hurdle	**Contamination**	**extremist**	**buoyancy**	**dicey**
Offering	**Hierarchical**	**adorn**	**squeak**	**coterie**
Denote	**cram**	**rejoin**	**sighting**	**conundrum**
Accumulation	**rivalry**	**admirer**	**Stout**	**chipboard**
Simplify	**shark**	**animated**	**Braid**	**barn**
Proom	**Skave**	**spalding**	**Coath**	**charlett**
Binary	**Severity**	**questionable**	**Breed**	**maggot**

Appendix (F)

List of target and control words used in the pre- and delayed post-test sessions. Target and control words were presented to participants in one list of 48 words, such that no more than three consecutive words were target or control words, respectively.

target words	control words
1. remarkably	1. existence
2. to encounter	2. industrial
3. rapidly	3. patchy
4. defined	4. argumentative
5. astonished	5. consumption
6. neatly	6. to differentiate
7. to compete	7. an expedition
8. glamorous	8. to be stunned by
9. diverse	9. incompatible
10. to distribute	10. to incur
11. to appreciate	11. concept
12. interior	12. to vie
13. prejudices	13. to complain
14. intentional	14. arrogant
15. to tolerate	15. lurking
16. stimulation	16. intervention
17. intellectual	17. vendor
18. ethnicity	18. to urge

19. to observe	19. to contend
20. to be involved in	20. spontaneous
21. to combine	21. leash
22. perception	22. to exhibit
23. representation	23. to be timid
24. to influence	24. a tip

Appendix (G)

Texts used in the two training sessions with target words underlined.

Text 1: Human societies - from the iceman to us

Imagine you were born some 300 years ago, in the year 1700. Although this is very recent in terms of the billions of years of the existence of planet Earth, you would still have been living in a remarkably different world. You would never have been to a shopping mall. You would never have encountered the world of cars, railways, airplanes, telephones, cameras, computers, and TVs. Welcome to the modern world! Life has certainly changed in 300 years, and sociology was born out of a concern with this rapidly changing character of the modern, industrial world: with were we have come from and where we are heading. For sociologists, the term society means "all the people who interact in a defined space and shared culture". In this sense, both a continent like Europe and specific individual countries such as Norway or Japan may be seen as society.

Even humans living thousands of years ago were members of early human societies. Evidence of this comes from the discovery of the Iceman. Examining the Iceman's clothes, scientists were astonished at how advanced this 'caveman's' society was. The iceman's hair was neatly cut. He wore a skilfully sewn leather coat with a grass cape that provided even greater protection from the weather. It is estimated that he died some 5,300 years ago, before a great empire existed in Egypt and before any society in Europe built a single city.

Choose the right answer for the following questions.

1. **300 years ago humans encountered**

a. Cars

b. Railways

c. Cameras

d. None of the above

2. Human beings' interaction in a particular place with common culture can be called

a. Continent

b. Country

c. Society

d. Europe

Text 2: Marketing's impact on consumers

For better or worse, we live in a world that is significantly influenced by marketers. We are surrounded by marketing stimuli in the form of advertisements, shops, and products competing for our attention and our cash. Much of what we learn about the world is controlled by marketers, whether through conspicuous consumption shown in glamorous magazine advertising or via the roles played by family members in TV commercials. Ads show us how we ought to act with regard to many diverse issues, including recycling, what we eat and drink, and even the types of house or car we desire.

In many ways, we are 'at the mercy' of marketers since we rely on them to sell us products that are safe and that perform as promised, to tell us the truth about what they are selling, and to price and distribute these products fairly. The role marketing plays in the creation and communication of popular culture is hard to ignore. However, many people fail to appreciate how much their view of the world – their film and music icons, the latest fashions in clothing, food, and interior design, and even the physical features that they find attractive in another person – is influenced by the marketing system. Product placement, whereby products and brands are used in popular movies or TV programs is an example of how companies command our attention.

Choose the right answer for the following questions.

1. **Marketers can get consumers' attention through…**

a. TV commercials

b. Newspapers advertisements

c. Showing their brands in popular movies

d. All the above

2. According to the text, the marketing system can affect…

a. Our shopping choices

b. TV programs

c. Friends

d. Movies

Text 3: Family

The family is the most important agent of socialization because it represents the centre of children's lives. Babies are almost totally dependent on others, and the responsibility of meeting their needs almost always falls on parents and other family members. At least until the start of schooling, the family is responsible for teaching children cultural values, attitudes, and prejudices about themselves and others.

Family-based socialization is not entirely intentional. Children learn continuously from the kind of environment that adults create for them. Whether children learn to think of themselves as strong or weak, smart or stupid, loved or simply tolerated, and whether they believe the world to be safe or dangerous, largely stems from this early environment that adults create.

Parenting styles aside, parenting attention is important in the social development of children. Physical contact, verbal stimulation, and openness from parents and all others all encourage intellectual growth.

The family also confers on children a specific social position; that is, parents not only bring children into the physical world, they also place them in society in terms of race, ethnicity, religion, and class. In time, all of these elements become part of a child's self-concept, or idea of him- or herself. Of course, some aspects of social position may change later on, but social standing at birth affects us throughout our lives.

Choose the right answer for the following questions.

1- Children receive most of their early learning from…

a. Neighbours

b. Friends

c. School

d. None of the above

2- Which of the following is at the heart of children's socialization system?

a. Social class

b. The family

c. Child's self-concept

d. Physical world

Text 4: Principles that define the cognitive level of analysis

When people are thinking about how best to solve a mathematical problem, trying to remember the title of a book, observing a beautiful sunset, telling a joke or story that they have heard, or thinking about what to do tomorrow, they are involved in cognitive processing. Cognitive psychology is a branch of psychology which is concerned with the structure and function of the mind. Cognitive psychologists are involved in finding out how the human mind comes to know things about the world and how it uses this knowledge. Cognitive neuroscience combines knowledge about the brain with knowledge about cognitive processes.

The mind can be seen as a set of mental processes that are carried out by the brain. Cognitive processes include perception, thinking, problem-solving, memory, language and attention. The concept of cognition refers to such processes. Cognition is based on a person's mental representations of the world, such as images, words, and concepts. These mental representations are based on experiences, for example, things that we can see, hear, feel or smell. People have different experiences and therefore they have different mental representation – for example, of what is right or wrong, or about what boys and girls can or cannot do. This will influence the way they think about the world and how they act in the world.

Choose the right answer for the following questions.

1. For the human brain, watching a football match is considered to be…

a. a joke

b. A mathematical problem

c. cognitive processing

d. a story

2. Each person has a _____ mental representation from others.

a. Single

b. Different

c. Similar

d. None of the above