AN INTERLANGUAGE STUDY OF LEXICAL PRIMING AND THE ACQUISITION OF ENGLISH VOCABULARY BY L1 THAI LEARNERS

Mrs. Suparuthai It-ngam

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy in English as an International
Language
Inter-Department of English as an International Language
Graduate School
Chulalongkorn University
Academic Year 2019

การศึกษาภาษาในระหว่างในการพร้อมรับการนึกรู้ศัพท์และการรับภาษาอังกฤษของผู้เรียนที่ใช้
ภาษาไทยเป็นภาษาที่หนึ่ง

นางศุภฤทัย อิฐงาม

Thesis Title   AN INTERLANGUAGE STUDY OF LEXICAL
                      PRIMING AND THE ACQUISITION OF ENGLISH
                      VOCABULARY BY L1 THAI LEARNERS
By   Mrs. Suparuthai It-ngam
Field of Study   English as an International Language
Thesis Advisor   Assistant Professor Sudaporn Luksaneeyanawin, Ph.D.

    Accepted by the Graduate School, Chulalongkorn University in Partial
Fulfillment of the Requirement for the Doctor of Philosophy

                                        .... Dean of the Graduate School
                        (Associate Professor THUMNOON NHUJAK, Ph.D.)

DISSERTATION COMMITTEE
                                        .... Chairman
                        (Associate Professor NATTAMA PONGPAIROJ, Ph.D.)
                                        .... Thesis Advisor
                        (Assistant Professor Sudaporn Luksaneeyanawin, Ph.D.)
                                        .... Examiner
                        (Assistant Professor APASARA CHINWONNO, Ph.D.)
                                        .... Examiner
                        (Assistant Professor THEERAPORN RATITAMKUL,
                        Ph.D.)
                                        .... External Examiner
                        (Assistant Professor Passapong Sripicharn, Ph.D.)

                        จุฬาลงกรณ์มหาวิทยาลัย
                        CHULALONGKORN UNIVERSITY

ศุภฤทัย อิฐงาม : การศึกษาภาษาในระหว่างในการพร้อมรับการนึกรู้ศัพท์และการรับภาษาอังกฤษของผู้เรียนที่ใช้ภาษาไทยเป็นภาษาที่หนึ่ง. (AN INTERLANGUAGE STUDY OF LEXICAL PRIMING AND THE ACQUISITION OF ENGLISH VOCABULARY BY L1 THAI LEARNERS) อ.ที่ปรึกษาหลัก : ผศ. ดร.สุดาพร ลักษณียนาวิน

งานวิจัยนี้มีจุดประสงค์เพื่อศึกษาการพร้อมรับการนึกรู้ศัพท์ที่แสดงถึงการรับคำศัพท์ภาษาอังกฤษของผู้เรียนชาวไทยโดยศึกษาจากการทดลองด้านการประมวลผลคำและระบบการจัดเก็บคำของผู้เรียน และเพื่อศึกษาปัจจัยที่ส่งผลต่อการรับคำศัพท์ภาษาอังกฤษของผู้เรียน

การวิจัยนี้เป็นการศึกษาภาษาในระหว่างของผู้เรียนชาวไทยในการรับคำศัพท์ โดยใช้การวิเคราะห์แบบตัดขวาง กลุ่มตัวอย่างสุ่มมาแบบเจาะจง จากนักศึกษาระดับปริญญาตรีชาวไทยที่อาศัยอยู่ในประเทศไทย โดยคัดเลือกกลุ่มตัวอย่างจากผลคะแนนที่ได้จากแบบสอบถามประสบการณ์การใช้ภาษาอังกฤษ 2 กลุ่ม ได้แก่ กลุ่มที่มีประสบการณ์การใช้ภาษาอังกฤษสูง (HE) และกลุ่มที่มีประสบการณ์การใช้ภาษาอังกฤษต่ำ (LE) จำนวนกลุ่มละ 45 คน รวม 90 คน ทุกคนเข้าร่วมการทดลองการตัดสินคำศัพท์(Lexical Decision Task-LDT, Rubenstien, Garfield & Millikan, 1970) และการเชื่อมโยงคำ (Word Association Task-WAT, McNeill, 1966) เพื่อศึกษาการประมวลผลคำและระบบการจัดเก็บคำ จากนั้นให้กลุ่มตัวอย่างทำแบบทดสอบความรู้คำศัพท์ (Nation & Beglar, 2007) และใช้คะแนนประสบการณ์การใช้ภาษาอังกฤษและปริมาณความรู้คำศัพท์ คัดเลือกกลุ่มตัวอย่างจำนวน 22 คน เพื่อการวิจัยเชิงคุณภาพในการศึกษาปัจจัยที่ส่งผลต่อการรับคำศัพท์ กลุ่มตัวอย่างนี้ จำแนกเป็น 4 กลุ่ม ได้แก่ กลุ่มที่มีประสบการณ์การใช้ภาษาอังกฤษสูงและรู้คำศัพท์จำนวนมาก (HE-LV), กลุ่มที่มีประสบการณ์การใช้ภาษาอังกฤษสูงแต่รู้คำศัพท์จำนวนน้อย (HE-SV), กลุ่มที่มีประสบการณ์การใช้ภาษาอังกฤษต่ำแต่รู้คำศัพท์จำนวนมาก (LE-LV), และกลุ่มที่มีประสบการณ์การใช้ภาษาอังกฤษต่ำและรู้คำศัพท์จำนวนน้อย (LE-SV) ผู้เข้าร่วมวิจัยในกลุ่มนี้ทำแบบบันทึกการเรียนรู้คำศัพท์และเข้าร่วมการสนทนากลุ่ม และตอบคำถามจากการสัมภาษณ์เกี่ยวกับแหล่งเรียนรู้ภาษาอังกฤษ ข้อมูลเชิงคุณภาพเหล่านี้ได้รับการวิเคราะห์เพื่อประเมินแนวทางการเรียนรู้ และการใช้แหล่งการเรียนรู้ต่างๆ ของผู้เรียน

ผลการศึกษาจากการทดลองการตัดสินคำศัพท์ (LDT) แสดงให้เห็นว่า เวลาปฏิกิริยา (reaction time) ของสิ่งเร้าประเภทคำที่มักปรากฏร่วมกัน (collocation) เร็วกว่าประเภทอื่น ผลการศึกษาจากการเชื่อมโยงคำ (WAT) พบว่า คำที่เก็บในคลังคำภาษาอังกฤษของผู้เรียนชาวไทยมักเชื่อมโยงกันด้วยความหมายและมโนทัศน์ กล่าวคือ คำที่เก็บไว้ใกล้กันในคลังคำมักมีความสัมพันธ์กันเชิงความหมาย และเชิงตำแหน่ง ผลการทดลองสนับสนุนแนวคิดของ Hoey (2005) ว่าคำที่มักปรากฏร่วมกัน เช่น *feel-pain* จะถูกเก็บไว้ใกล้กันในคลังคำ ผลการเปรียบเทียบระบบประมวลผลคำของกลุ่ม HE และกลุ่ม LE พบว่าเป็นไปตามสมมติฐาน คือ ผู้เรียนทั้ง 2 มีคลังคำที่แตกต่างกันและมีการเข้าถึงคำศัพท์ในคลังคำคนละรูปแบบ ผู้เรียนกลุ่ม HE มีแนวโน้มที่จะมีการเชื่อมโยงระหว่างคำในคลังคำที่มั่นคงกว่าผู้เรียนกลุ่ม LE เพราะผู้เรียนกลุ่ม HE สามารถผลิตกลุ่มคำที่มีความหมายเป็นจำนวนมากกว่าผู้เรียนกลุ่ม LE ในขณะที่ผู้เรียนกลุ่ม LE มีการผลิตกลุ่มคำที่แสดงถึงการถ่ายโอนจากภาษาแม่ ซึ่งเป็นลักษณะที่พบได้ทั่วไปในผู้เรียนที่อยู่ในประเทศที่ไม่ได้ใช้ภาษาอังกฤษในการสื่อสาร

ผลจากการศึกษานี้ยังแสดงให้เห็นว่ามีปัจจัยที่ส่งผลต่อการรับคำศัพท์ภาษาอังกฤษที่สำคัญ 4 ประการ คือ ระดับประสบการณ์การใช้ภาษาอังกฤษ ปริมาณความรู้คำศัพท์ วิธีการเรียนคำศัพท์ และทัศนคติต่อภาษาอังกฤษ สำหรับผู้เรียนที่มีประสบการณ์การใช้ภาษาอังกฤษสูง (HE) มีการประมวลผลคำดีกว่าผู้เรียนที่มีประสบการณ์การใช้ภาษาอังกฤษต่ำ (LE) ในคลังคำของผู้เรียนกลุ่ม HE-LV, กลุ่ม HE-SV, และกลุ่ม LE-LV ซึ่งรู้คำศัพท์จำนวนมากพอสมควร (มากกว่า 3,000 คำ) มีการเชื่อมโยงระหว่างคำตามความหมาย และเป็นการเชื่อมโยงที่คล้ายคลึงกับลักษณะการเชื่อมโยงคำในคลังคำของเจ้าของภาษา ผู้เรียนกลุ่มนี้สามารถเรียนรู้ได้ด้วยตนเองจากการสื่อสารภาษาอังกฤษจากแหล่งเรียนรู้ต่าง ๆ โดยเฉพาะอย่างยิ่ง ผู้เรียนกลุ่ม HE-LV ซึ่งมีทัศนคติที่ดีต่อภาษาอังกฤษ คือ มีความรักภาษา, มีแรงจูงใจ และมีความเชื่อมั่นในความสามารถของตนเอง เป็นกลุ่มที่ประสบความสำเร็จในการรับคำศัพท์ภาษาอังกฤษมากที่สุด

สาขาวิชา	ภาษาอังกฤษเป็นภาษานานาชาติ	ลายมือชื่อนิสิต ....
ปีการศึกษา	2562	ลายมือชื่อ อ.ที่ปรึกษาหลัก ....

5887805420 : MAJOR ENGLISH AS AN INTERNATIONAL LANGUAGE

KEYWORD: lexical priming, vocabulary acquisition, interlanguage study, L2 mental lexicon

Suparuthai It-ngam : AN INTERLANGUAGE STUDY OF LEXICAL PRIMING AND THE ACQUISITION OF ENGLISH VOCABULARY BY L1 THAI LEARNERS . Advisor: Asst. Prof. Sudaporn Luksaneeyanawin, Ph.D.

The present study explored English vocabulary acquisition of L1 Thai learners. The lexical priming, which implies the lexical access, was examined to illustrate the vocabulary acquisition. The organization of the mental lexicon and the lexical processing of Thai learners were examined using the lexical priming experiments. The factors affecting the vocabulary acquisition were also investigated through qualitative approach.

The present interlanguage study is a cross-sectional research that compared the English vocabulary acquisition of the learners with different degrees of language exposure. The sample groups were selected by stratified random sampling. They were Thai undergraduates who were living in Thailand. The English Language Exposure (ELE) Questionnaires were distributed to 620 students, then 90 students were selected by their English language exposure scores. High Exposure (HE) group and Low Exposure (LE) group were the top 45 students with the highest exposure scores, and the bottom 45 students with the lowest scores accordingly. Two psycholinguistic tasks, i.e., Lexical Decision Task-LDT (Rubenstien, Garfield & Millikan, 1970) and Word Association Task-WAT (McNeil, 1966) were conducted to explore the organization of the mental lexicon and the lexical processing of these two groups of participants. The participants also took the Vocabulary Size Test (Nation & Beglar, 2007) to measure their vocabulary knowledge. Twenty-two participants who had different degrees of language exposure and vocabulary size were selected as the focus group to take part in the qualitative investigation of the factors affecting vocabulary acquisition. There were 4 sub-groups: the HE-group with large vocabulary size (HE-LV), the HE-group with small vocabulary size (HE-SV), the LE-group with large vocabulary size (LE-LV), and the LE-group with small vocabulary size (LE-SV). They were to complete the vocabulary learning journal and were interviewed. The responses related to language learning resources were reported and their quality of the exposures was evaluated.

The findings from the LDT showed that the average reaction time of the collocation was faster than the non-collocation and nonword. The findings from the WAT exhibited that words were stored closely based on meanings-or grammatically related positions. The findings showed that words were mainly associated to each other by meanings and concepts. The results partly support (Hoey, 2005) that, in a part of the mental lexicon, the frequently co-existing words (e.g., *feel-pain*) are stored closely together. The comparison between the HE-group and LE-group confirmed the hypothesis that the 2 groups of learners had different structures of the mental lexicon organization, and different paths in lexical access of the L2 words. The HE-group seemed to have the stronger links between words in the L2 mental lexicon than the LE-group with faster response rates and fewer errors in LDT. The HE-group was able to produce a greater number of meaningful chunks in WAT than the LE-group. The LE-group exhibited some L1 transfer which is commonly found in L2 learners who were from the non-English speaking countries.

The results from the qualitative study of factors related to vocabulary acquisition showed 4 main factors related to their acquisition, i.e., degrees of language exposure, vocabulary size, vocabulary learning methods, and attitudes towards English language. The lexical processing of the HE-group was more proficient than the LE-group. The results also showed that, with the sufficient numbers of words (at least 3,000 words), the organization of the mental lexicon of the HE-LV, HE-SV, and LE-LV were meaning-based, which is similar to native speakers. The learners who had quite a large vocabulary size were able to manage their autonomous learning from language learning resources. With good attitudes towards English language (affection, high-motivation and self-esteem), the HE-LV learners seem to be the most successful group in vocabulary acquisition.

Field of Study:	English as an International Language	Student's Signature ....
Academic Year:	2019	Advisor's Signature ....

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

List of tables

List of figure

CHAPTER I
INTRODUCTION

1.1 Background of the study

The acquisition of vocabulary deals with acquiring meaning and form of words (Nick C Ellis, 2002). Learners acquire new words via utterance or written texts to which they are exposed. For L2 learners, the exposure to English language plays an important role in their acquisition (Schmitt, 2019). Living in non-English speaking countries, the input language can be varied. Learners are exposed to English words used either properly or improperly. According to Nick C Ellis (2002), the vocabulary acquisition deals with the frequency of encountering words and chunks. The more often learners encounter some words, the higher possibility that these words are acquired. The exposure to the recurring words could be considered a '*natural*' lexical priming which affects the lexical processing of the mental lexicon.

The term 'priming' is originally used in psycholinguistic studies (Taft, 1991). The priming experiment concerns the presentation of two stimuli: prime word and target word (Gass & Mackey, 2012). In the priming task, the participants are presented with stimuli to which they need to give a response. The assumption is that the response to the target word is influenced by the prime. This is due to the organization of the words in the mental lexicon- i.e., the mental dictionary where the information of the words is kept. The information of the target word will be accessed quickly when the prime is stored closely to it. The response will take longer when the pair of prime and target word is not stored closely together in the mental lexicon. In previous mental lexicon studies, lexical priming engages with either semantic or syntactic features orthographically and phonologically (Dong, Gui, & MacWhinney, 2005; Newman, Ratliff, Muratore, & Burns Jr, 2009; Novick, Kim, & Trueswell, 2003).

The term lexical priming was later used to name a corpus-based theory, 'Lexical Priming Theory' (M. Hoey, 2005). While the term 'lexical priming' in psycholinguistics is related to an experimental task in lexical access, the Lexical Priming Theory focuses on the encounter of words in natural contexts, e.g., reading books, watching movies, having conversations. M. Hoey (2005) proposes that, when people encounter the words, they face a group of words. When they repeatedly see

these words with the linguistic and contextual information, they expect the words to appear in a particular situation. In other words, the information of recurring words and their co-existences are kept in the mental lexicon. The term 'lexical priming' used in Hoey's theory (2005) implies the lexical access which is the process that the lexical item is accessed in one's mind. The Lexical Priming Theory relates to lexical access-i.e., the lexical processing in the mental lexicon. The theory was developed from the corpus-driven studies and has been supported by several descriptive corpus studies (Goatly, 2017; Pace-Sigge, 2017; Patterson, 2016; Q. Xu, 2015), and a few applied-psycholinguistic studies in L1 and L2 metal lexicon (Cangır, Büyükkantarcıoğlu, & Durrant, 2017; Durrant & Doherty, 2010; Sonbul & Schmitt, 2013). The studies in L2 mental lexicon have been conducted in the English speaking countries. There is a lack of "lexical priming" study in L2 mental lexicon of learners who are in non-English speaking contexts.

To study vocabulary acquisition, examining the mental lexicon is one of the major issue (Jiang, 2004; Juffs, 2009; Singleton, 2016; Verspoor & Schmitt, 2013). Recent studies on mental lexicon were predominantly conducted with the proficient L2 learners and/or the L2 learners with high degrees of English language exposure: advanced adult L2 learners in the U.S (Jiang, 2002, 2004), proficient L2 learners living in the U.K (Conklin & Schmitt, 2012), and Swedish advanced learners (Gyllstad & Wolter, 2016). These studies compared the language processing between the advanced L2 learners and the native speakers. In Thailand, there have been studies on mental lexicon with different groups of students. Booranaprasertsook (2007) examined L1 lexical processing of impaired (blind and deaf) learners and normal Thai learners. Further studies have examined the mental lexicon of Thai learners with different degrees of exposure: organization of L1 mental lexicon (Wong-aram, 2011) and L2 language processing (Ayudhya, 2002; Sudasna, Luksaneeyanawin, & Burnham, 2002). Fernández and Schmitt (2015) propose that language exposure is a crucial factor for L2 vocabulary acquisition, especially for learners in non-English speaking countries. To fill the gap, the present study examines the lexical access (mental organization and lexical processing) of Thai learners with different degrees of language exposure and investigates the factors affecting vocabulary acquisition.

1.2 Research Questions

There are 3 research questions. Research question 1 and 2 deal with the lexical processing (lexical access). Research question 3 is related to the factors that affect the lexical access and the organization of the mental lexicon. The questions are set as follows:

1. What are the organization and the lexical processing in the English mental lexicon of Thai learners?

2. What are the similarities and differences between the mental lexicon of Thai learners with low and high English language exposure?

3. What are the factors affecting the acquisition of English vocabulary by Thai learners?

1.3 Objectives of the Study

The objectives of this study are:

1. To examine the organization and the lexical processing in the English mental lexicon of Thai learners through the lexical decision task and word association task.

2. To compare the mental lexicons of Thai learners with low and high language exposure.

3. To investigate the factors affecting the acquisition of English vocabulary by Thai learners.

1.4 Statement of Hypotheses

1. The frequently co-occurring words are stored closely in the English mental lexicon of Thai learners.

2. The learners with low and high language exposure have different mental lexicon, and different paths in lexical access of L2 words.

3. The factors affecting the acquisition of English vocabulary by Thai learners are degree of English language exposure, vocabulary size, English language learning activities, and vocabulary learning methods.

1.5 Scope of the Study

1. The present study examines the English vocabulary acquisition of Thai undergraduate students who are studying English language in a university in Thailand.

2. The English vocabulary investigated in this study includes the frequently co-occurring words since they can reflect the complex organization of the mental lexicon and the lexical access. The set of words was selected from the New General Service List (new-GSL) developed by Economic and Social Research Council (ESRC) Centre for Corpus Approaches to Social Science (CASS), Lancaster University (Brezina & Gablasova, 2013).

1.6 Definition of Terms

1.6.1 Interlanguage (IL) refers to a unique language system created by learners which shares neither characteristics of a learner's native language nor the target language (Selinker, 1972). In this study, IL deals with the examination of the performance of two groups of Thai learners with different degrees of English exposure. It has been proven in previous studies that the degree of language exposure affects the language performance (Ayudhya, 2002; Chaitawin, 1997; Jangarun & Luksaneeyanawin, 2016; Kijkar, 2004; Modehiran, 2005; Nimphaibule, 1996; Pongprairat & Luksaneeyanawin, 2013; Sertthikul, 2004; Sudasna et al., 2002; Tarnisarn, 2011; Thaworn, 2011; Wong-aram, 2011; Worathumrong & Luksaneeyanawin, 2016). This study is considered a cross-sectional research in which the high-exposure learners and the low-exposure learners are hypothesized to have different mental lexicon.

1.6.2 Lexicon, lexical item, word, and vocabulary are synonymous in the way that they are related to the collection of words (Caro & Mendinueta, 2017; Jackson & Amvela, 2007). Singleton (2016) points out that, in linguistics, lexicon refers to the aspects of a language which are related to words. Word is the most general term which can be considered either vocabulary or lexical item. The difference between the terms is the contexts. 'Vocabulary' is commonly used in the context of learning and teaching (Elgort, 2011; Elgort & Warren, 2014; I. Nation, 2013; Schmitt, 2008; Yamamoto, 2014). Unlike vocabulary, a lexical item is commonly used in the investigation of vocabulary acquisition, corpus linguistics studies, language processing, etc.(Brezina & Gablasova, 2013; Elgort, 2011; Elgort & Warren, 2014).

1.6.3 Lexical priming refers to a lexical processing in our minds according to the theory proposed by Michael M. Hoey (2005). In psycholinguistics, lexical priming

refers to the experiment where two stimuli are presented as a prime and a target word. This method is used as a tool to explore semantic and syntactic memory, as well as semantic and syntactic preparation in vocabulary search. According to M. Hoey (2005), lexical priming is the situation when a person repeatedly encounters certain English words and tends to acquire these words with collocations, colligations, and semantic associations. Based on the Lexical Priming Theory, such priming occurs in natural contexts, e.g. reading books, watching movies, seeing advertisements with English words, etc. In the present study, lexical priming implies lexical access- i.e., the retrieval of word information in the mental lexicon in lexical decision task (LDT) with priming, and word association task.

1.6.4 Mental lexicon is the dictionary in our minds which contains specific organization of memory of words (Aitchison, 2012; Carroll, 2007; M. Taft, 1991). Based on their classical study, Collins and Loftus (1975) proposes that words are stored in the mental lexicon as a web in a specific place in our minds called lexicon. When we know a word, we know its form and meaning (Nick C Ellis, 1997). Such knowledge provides links from one word to another. For example, the word '*red*' is believed to be stored closely to the color word '*pink*', the homonym '*read*', the concept-linked word '*fire*', and the associative word '*light*'.

1.6.5 Lexical access refers to the process by which the information of a word is retrieved in our minds (Carroll, 2007; Singleton, 1999; M. Taft, 1991). For example, when someone hears or see the word '*red*', the information about its sound, spelling and meaning, and the contexts of using this word are activated. Such context includes the link with other words in the mental lexicon.

1.6.6 Stimulus Onset Asynchrony (SOA) refers to a measure used in the psychological experiments to indicate the period of time when the first stimulus starts, followed by the second stimulus (Harley, 2013). The SOA set in the present study denotes the automatic processing. The reaction time (RT) which is the time spent by the participants to respond to the stimulus presented with the specific SOA, is measured. The fast reaction time signifies the close relationship between the first stimulus and the second stimulus in the mental lexicon.

1.6.7 English vocabulary acquisition is reflected through the lexical processing and the organization of the mental lexicon. (Nick C Ellis, 1997, 2002) points out that

the acquisition of a word deals with its form and meaning. In the present study, the acquisition focuses on the written form of a word and its meaning.

1.6.8 English language exposure is the experience of English language which learners have. The experience includes the use of English at home and schools, all kinds of language learning activities, and the intensive English language exposure (e.g. English camps, summer schools in English speaking countries, etc.).

1.6.9 Vocabulary size refers to the knowledge of written forms and meanings of English words. According to (I. Nation, 2013), the vocabulary size is the number of words that learners know, which can be measured through different kinds of tests: receptive test and productive test.

1.6.10 L1 Thai learners refers to undergraduate students who are Thai native speakers. They are L2 learners of English language. These learners are not living in English speaking contexts so they are commonly exposed to English in the classrooms and through different activities.

1.7 Significance of the Study

The present study is expected to shed light on the following areas.

1.7.1 Lexical Priming Theory

M. Hoey (2005) proposes that words are primed to be used in the way that individuals encounter the world. The assumption was drawn from language corpora of L1 English speakers. It is believed that priming occurs when the speakers are attentive to the high-frequency collocations and try to generalize them. The present study provides evidence and implications of priming with L2 speakers.

1.7.2 L2 mental lexicon

The present study exhibits the lexical processing and organization of English mental lexicon of L2 learners who are in a non-English speaking context. The findings show the similarities and differences of the lexical processing in learners with different degrees of exposure. It shows the universality of the L2 mental lexicon which is infinite and can differ depending on individual's exposure to the language learnt.

1.7.3 Interaction among research in second language acquisition, corpus linguistics, and psycholinguistics

The present study examines the English vocabulary acquisition in L1 Thai learners by utilizing psycholinguistic experiments- i.e., lexical decision task and word association task. Besides, the Lexical Priming Theory grounded in corpus linguistics is proven by the psycholinguistic experiments. The method and findings contribute to studies in second language acquisition, corpus linguistics, and psycholinguistics.

1.7.4 English vocabulary acquisition and learning

This study explores the factors affecting vocabulary acquisition. The findings provide a guideline for teachers to optimize L2 vocabulary acquisition and to support EFL learners to effectively learn from the resources around them.

CHAPTER II
THE REVIEW OF LITERATURE

The review includes five related areas: 1) mental lexicon, 2) lexical priming, 3) acquisition of English vocabulary, 4) interlanguage studies on vocabulary acquisition, and 5) the factors affecting vocabulary acquisition. The first section is related to the concept of mental lexicon. In the next section, the concept of lexical priming related the mental lexicon is reviewed and discussed. The vocabulary acquisition section focuses on the concepts of key terms, and the factors affecting the acquisition. Then the concept of interlanguage and related studies are explored. The last section presents the previous studies in L1 and L2 lexical processing and the interlanguage studies on vocabulary acquisition. In each section, previous studies are also reviewed to explore the research design and major findings.

2.1 Mental lexicon

The objective of the present study is to examine the L2 lexical processing and the organization of L2 mental lexicon. In this section, the related literature of the mental lexicon is reviewed. This section deals with five areas: the concept of the mental lexicon, organization of the mental lexicon, lexical access, lexical access and its models, and L1 and L2 mental lexicons.

2.1.1 Concept of the mental lexicon

Singleton (2016) points out that, in linguistics, lexicon refers to the aspect of a language which is related to words. In this sense, lexicon may be defined as the lexical aspect of a language. Such aspect includes the orthography, phonology, morphology, and meaning of words in the language. In SLA, different parts of the lexicon have been investigated separately (Juffs, 2009). In psycholinguistics, the lexicon frequently refers to the mental lexicon or the stock of words in a person's mind (Roelofs, Dijkstra, & Gerakaki, 2013; Singleton, 1999, 2016; M. Taft, 1991; Verspoor & Schmitt, 2013).

Mental lexicon and mental dictionary are interchangeably used to refer to the store of words in the human mind words (Aitchison, 2012; Carroll, 2007; M. Taft, 1991). Aitchison (2012) defines mental dictionary as a reference or lexical entry for every single lexical item that a language user employs. He further illustrates that the 'dictionary' in the human's mind is different from a book dictionary by the

organization and content. A book dictionary provides a list of words in alphabetical order. The patterns of words stored in our mental dictionaries are dissimilar. For example, when someone makes an error for the word '*grew*', the expected words picked are unlikely to be '*grey*' or '*grenade*' which are close to '*grew*' alphabetically. Meaning plays a significant role in how words are organized in our mental dictionary. Possible responses could be '*grow*' or '*farm*'. Aitchison claims that words can be infinitely added to the lexicon so that the mental dictionary is changeable. Mental lexicon focuses on memory where word knowledge is stored. (Carroll, 2007; M. Taft, 1991). The lexicon is a permanent memory of word knowledge-i.e., phonological, syntactic, morphological, semantic knowledge (Carroll, 2007) and a specialised memory system is separated from storage of world concepts (M. Taft, 1991). The lexicon is a store of factual knowledge about words like a specific type of database that is a coherent collection of linguistic data. According to Carroll (2007), the organization of memory stored in the mental lexicon is viewed as either hierarchical or interconnected. There are models of semantic network used for explaining how our internal lexicon is organized- i.e., hierarchical network models and spreading activation models.

2.1.2 Organization of the mental lexicon

The organization of the mental lexicon is assumed to be a semantic network of interconnected elements (Carroll, 2007). Such elements concern concepts or nodes connecting to other elements in different ways (Carroll, 2007). Two classical semantic networks are hierarchical network models and spread activation models.

The early studies on semantic network conducted by Collins and Quillian (1969) suggested that an individual word is stored in a particular node with taxonomic attributive relations to other nodes. In this model, the taxonomic relations include hyponymy, hypernymy, and coordination. The attributive relations refer to the characteristics of a single word in the network. Figure 1 illustrates the organization of words stored in the mental lexicon. For example, when a person needs to decide if '*a canary is yellow*' is true, he or she starts at the canary node and search for the properties stored. On the other hand, to confirm that '*a canary can fly*', a person will retrieve the information from the above level.
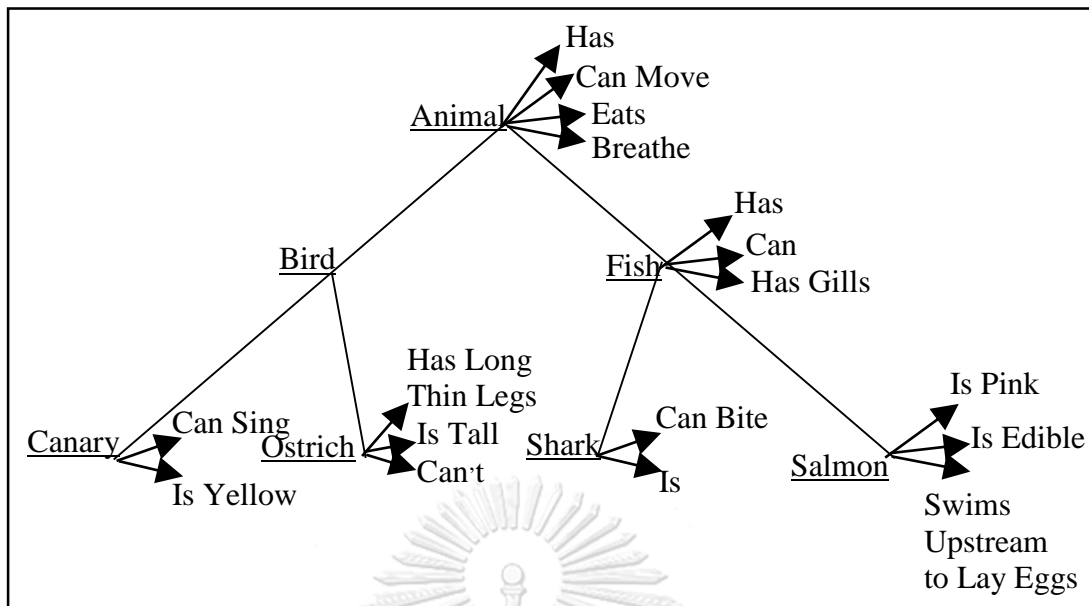
Figure 1 Illustration of the hierarchical network model (Collins & Quillian, 1969, p.241)

However, it is difficult to point out that 'the properties of a word' would be hierarchically retrieved. Imagine a person sees the word '*yellow*' in the sentence '*a canary is yellow*' and starts judging the truth of the sentence from this word. There will be an additional hierarchical network for that person to consider. It is possible that the words are stored in a different pattern.

Assuming that the network is like a web instead of a hierarchy, the spreading activation model is introduced. This model suggests that a word is interconnected with several words in parallel. Collins and Loftus (1975) point out that the more properties the two words share, the closer in the network they are. A word is interlinked with other words at different thresholds. As shown in Figure 2, the word '*red*' can be linked to '*vehicles*' like '*car*', '*truck*', or '*bus*'. When the word '*red*' is primed, the activation that spreads to '*fire engine*' will prime other vehicles. This model seems to make more sense than the hierarchical one; unfortunately, Collins and Loftus's (1975) model paid little attention to phonological, syntactic, and morphological aspects of a word. For example, the concept of the color '*red*' associates with other concepts like fire engine or flower. Consider '*red*' as a word. It is a free morpheme, open-class word, and contains phonemes /r/, /e/, and /d/.
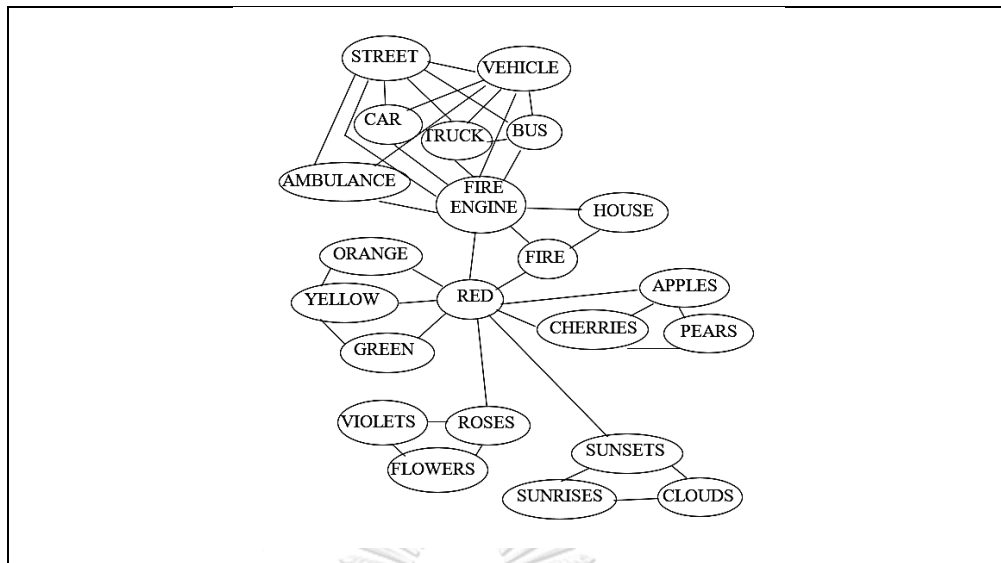
Figure 2 Spreading Activation Model (Collins and Loftus, 1975, p.412)

The network of mental lexicon has been modeled either as a hierarchical or interconnected network. The stage when we access the words in our mental store or the process of words retrieval is being described and examined by scholars.

2.1.3 Lexical Access

Lexical access refers to the process of accessing the information of words (Carroll, 2007; Singleton, 1999; Taft, 1991). Taft (1991) defines lexical access as the retrieval of cognitive representation of the words in the human mind. He views that the 'access' is the matching between functional characteristics of the words in the mental lexicon and the input. Carroll (2007) proposes that the activation of word's meaning can be in several ways. He points out that when a word in our lexicon is found, the linguistic properties are available for use- i.e., meaning, spelling, pronunciation, its relationship to other words, and other related information.

Scholars have tried to describe how we access a word and its linguistic properties (K. Forster, 1976; Morton & Patterson, 1980). Classical models related to the process of lexical access include search model, logogen model, and cohort model.

2.1.3.1 Search model. This word recognition system is divided into different components- i.e., by orthographic properties and phonetic properties of a word (K. Forster, 1976). To some extent, the process is like looking up the definition of a word from a book dictionary. We scan the alphabetically listed headwords in bold type until we find our target item. However, our mental dictionary does not store merely

orthographic information of a word. When a person hears a word, it requires a different starting point for accessing the lexical item in the mental dictionary. As shown in Figure 3, there are different channels in which a word can be retrieved- i.e., orthographic, phonological, and syntactic and semantic routes.

Orthographic Access File	Phonological Access File	Syntactic/Semantic Access File	
….	….	….	
….	….	….	
cat	[kat]	CAT	
….	….	….	

	Cat		chair	
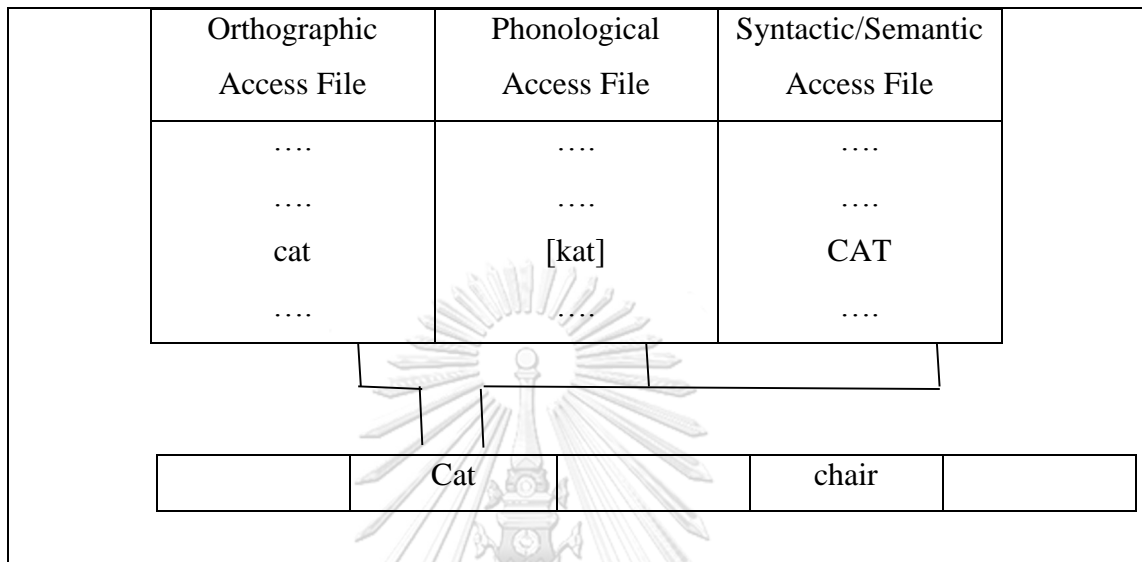
Figure 3 Forster's search model (Forster, 1976, p. 268, Figure 4)

Based on experimental findings, Forster (1976) claimed that the high frequency words are likely to be searched and found in the faster stage than those of low frequency. If a person hears (or sees) the word '*furniture*', he or she may think of '*sofa*', '*chair*', '*table*' rather than '*sideboard*'. The search starts with the most frequently seen or heard word in the list.

The lexical access operation deals with semantic priming or the context effect. For example, a person refers to the linguistic meaning and the context of a word to identify (1) and (2).

*(1) I want to buy furniture. May be a new **armchair** for my reading time.*

*(2) *He bought new furniture. It's a blue **blouse** for his wife.*

With word knowledge, a person should be able to accept (1) but against the truth of (2). Although both (1) and (2) are grammatically correct, '*furniture*' is not the hypernym of '*blouse*'.

Singleton (1999) points out that this model lacks an explanation for the semantic cross-reference. It cannot explain the phenomenon when context supports or

distract the lexical retrieval process. For example, to understand sentence (3), a person needs to refer to the pragmatic meaning or non-linguistic meaning of '*armchair*'.

(3) *Don't be an **armchair** critic.*

2.1.3.2 Logogen Model. The logogen model suggests that a word stored in the lexicon is considered a logogen which specifies a variety of words' attributes (semantic, orthographic, phonological, etc.). A logogen is a specialized recognition unit of a word. To retrieve a word, sensory input and context information are detected (Carroll, 2007). Such word will be recognized when it reaches the certain threshold level which could be different from the levels of other words.

Morton and Patterson (1980) examined how a word is activated through the (auditory and visual) input analysis processes. Figure 4 is the revised logogen model presenting the connectivity between two categories of inputs. The assumption is that the auditory input and the visual input facilitate the word identification differently. The information of the stimulus is categorized via either visual input or auditory input. Morton and Patterson (1980) propose that there are three ways to obtain the phonological code for the given visual word. The first way is sending the information directly to the output system. The second way is to categorize the words in the visual input logogen system. Then the information is sent to the cognitive system where the semantic properties can be found. Via this route, the information from the cognitive system is sent to the output logogen system. Finally, the appropriate phonological code is reached. The third way is to treat the stimulus as a sequence of graphemes which are combined by rule into a phonological code.
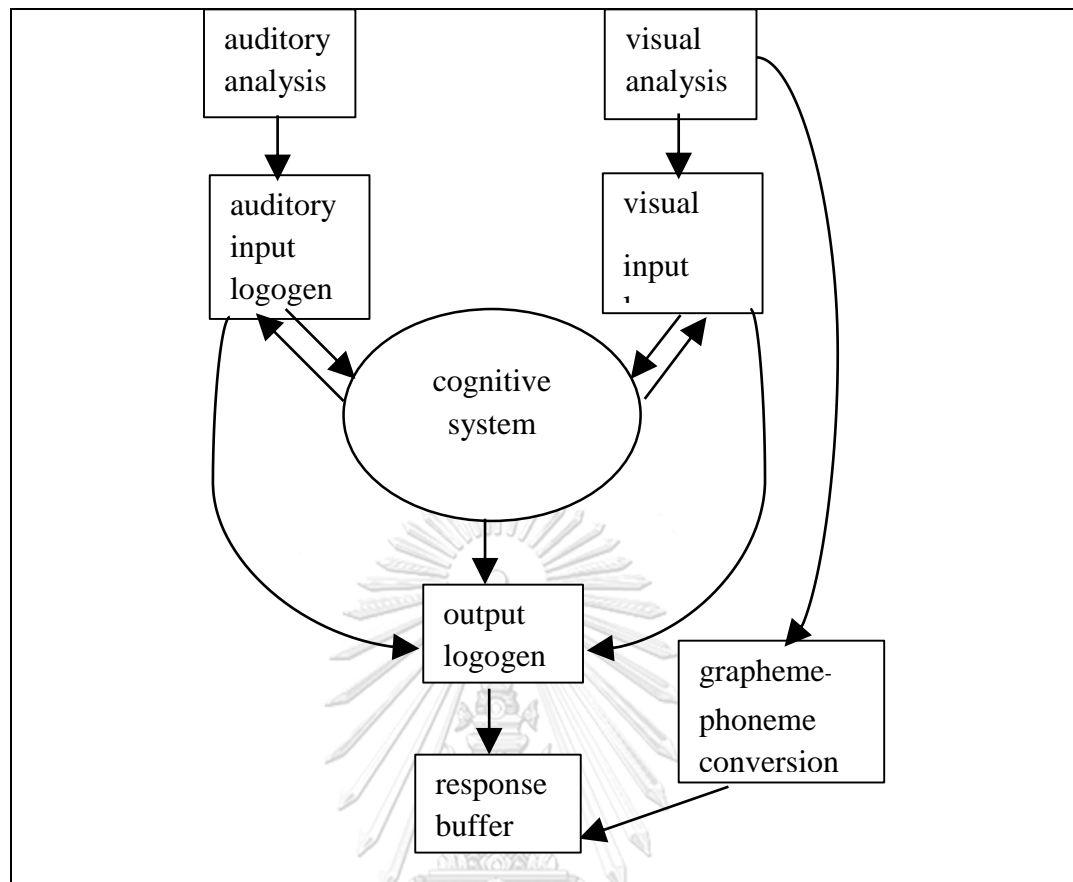
Figure 4 Logogen model based on Morton and Patterson (1980, p.95)

The landmark achievement of this model is the ability to pronounce visually or auditorily nonwords. In their study, Morton and Patterson (1980) found that the subjects were able to read aloud the nonwords being seen for the first time. However, Singleton (1999) argued that either nonwords or real words can be read aloud without reaching the threshold level of real lexical items stored in the lexicon.

2.1.3.3 Cohort Model. Cohort model contains the good properties of search model and logogen model (Carroll, 2007). Word recognition starts with the initial sound of words which is a bottom-up process like the assumption of search model. It is assumed that a group of words are processed in parallel before the target word is determined. This is similar to logogen model in which there are candidate words before enough sensory input and contextual information is given. The limitation of this model is that the focus is solely on spoken word recognition. M. Taft and Hambly (1986) extended Morton's cohort model to suggest that initial phonemes activate the

word recognition. Singleton (1999) argues that end of words can be another way to access the lexical items.

It seems that all models have been revised and challenged by scholars over time. To justify which one best describes the lexical access, there is no definite answer yet. One property that these models share is that the information of a word is accessed when the sufficient input is provided. Besides, the input that activates the process could be different, e.g. sound, spelling, and sentence structure. The present study concerns L2 mental lexicon concepts of L1 and L2 mental lexicons, so that concepts and previous related research are reviewed in the following section.

2.1.4 L1 and L2 mental lexicons

L1 and L2 lexicon are separately stored but communicate with each other (Dong et al., 2005; Singleton, 1999; Sudasna et al., 2002; Wolter, 2001). The communication may occur either between individual L1 and L2 lexical nodes or via conceptual store. Singleton (1999) points out that L1 and L2 systems vary from individual to individual. In addition, he views that meaning plays a crucial role in the lexical acquisition of L1 and L2. Proficiency and experience in L2 were the factors affecting the relationship between L1 and L2 mental lexicons (Sudasna et al., 2002). The researchers examined bilingual mental lexicon operations and found that L2 speakers with high proficiency did not refer to L1 lexicon for the lexical accessing. In contrast, both L1 and L2 mental lexicons of lower proficiency L2 speakers need to cooperate before a word is being accessed. Further, the experience in L2 affected the lexical access. For a person with low L2 experience, the word is retrieved via L1 system and the L2 word is retrieved via lexical link.

2.1.5 Previous studies in language processing

In this part, the objectives, methodologies and findings of the research on language processing are summarized and discussed. The details and discussions presented below are divided by the samples (L1, L1 vs. L2, and L2). The selected research deals with collocation acquisition because the present study aims to investigate the frequently co-occurring words which can be called a lexical collocation.

Many studies on L1 processing aim to explore the organization of the mental lexicon among natives of different languages- i.e., English speakers (Durrant &

Doherty, 2010; Teresa Fitzpatrick, 2007; Jones & Golonka, 2012), Thai speakers (Booranaprasertsook, 2007; Wong-aram, 2011), and Turkish speakers(Cangır et al., 2017). Most studies are conducted with adults possibly because adults' mental lexicon is mature. The collocations are syntagmatic so that the structure of language in the samples' brains should be fully developed. Only one study examined children who were 13-17 years old (Booranaprasertsook, 2007). This study is not directly focused on the collocation. It aims to investigate the lexical-semantic system in blind, deaf, and normal children. It means that it is possible to examine the organization of lexicon in L1 young people. The methodologies used to examine the language processing in L1 speakers are homogeneous. Word association task (WAT) and lexical decision task (LDT) were employed. The findings suggested that word association task is able to reveal the organization of mental lexicon in the L1 individuals (Fitzpatrick, 2007). A numbers of studies employed lexical decision tasks to examine the collocational processing in L1 speakers (Cangır et al., 2017; Durrant & Doherty, 2010; Jones & Golonka, 2012).

The studies conducted by Cangır et al. (2017), Durrant and Doherty (2010), and Jones and Golonta (2012), used lexical decision tasks to examine the lexical priming. Durrant and Doherty (2010), and Jones and Golonta (2012) investigated the priming effect in L1 speakers of English. The findings of these two studies are controversial. Durrant and Doherty (2010) investigated the lexical processing of the high frequency words in L1 speakers. The findings failed to confirm that high frequency collocations are stored closely together in the mental lexicon. The limitation of this study may be the selection of collocations. In contrast, Jones and Golonta (2012) examined lexical priming of word pairs in different relations (i.e., integrative, thematically related, and taxonomically related). The finding showed that there were the priming effects. The findings from Cangır et al. (2017) study were in the same direction with those of Jones and Golonta (2012). The researchers investigated the collocational processing in L1 Turkish speakers' mental lexicon. This study supported the Lexical Priming Theory that there was a collocational priming effect in L1 speakers.

Fitzpatrick (2007) employed 2 word association tasks to examine the association of words in L1 mental lexicon. The cue words used in the tasks were taken

from the Academic Word List (Coxhead, 2000). This study could not prove that there is a homogeneity of responses among native speakers of English. The findings showed that the responses of the group were not homogeneous, but the individuals' responses were consistent and predictable. The phenomenon possibly occurred because of the selection of the cue words (stimuli). There are 10 bands in this list ranked by the frequency. Fitzpatrick (2007) reported that 10 words from each frequency band were selected. It means that there was a number of selected words (stimuli) which the native speakers did not encounter frequently. This may result in the variation of the responses. The researcher also stated that the list of cue words contained a few abstract nouns. It could be assumed that the semantic networks of the abstract nouns in the L1 mental lexicon are difficult to define. There is a variety of networks among L1 speakers. For the studies on L2 mental lexicon, the abstract nouns should be avoided. The stimuli (cue words) should be concrete and high-frequency words.

While the studies in L1 focused on the organization of mental lexicon, the objectives of the studies conducted with non-native speakers were varied: to explore adult's retention of collocation from exposure (Durrant & Schmitt, 2010), to compare intralexical knowledge of L1 on the L2 collocation acquisition (Wolter & Gyllstad, 2011), to investigate the lexical processing (Conklin & Schmitt, 2012; Gyllstad & Wolter, 2016), to compare the acquisition of new words in 2 learning conditions (Sonbul & Schmitt, 2013), and the production of L1 and L2 word associations in bilingual speakers (Tess Fitzpatrick & Izura, 2011).

Durrant and Schmitt (2010) conducted a study with L2 speakers living in the United Kingdom. They investigated the retention of information about the words appear together in L2 adult learners. Three learning conditions (single presentation, verbatim presentation, varied repetition) were considered as the exposure for L2 learners. All the collocations were adjective-noun pairs. All of the participants completed the naming task immediately after the training sessions ended. It has to be noted that it was a lab-based learning. The training phases lasted for only 7-15 minutes. The learning sessions were provided prior to the experiment. The participants were asked to do the naming task. The findings showed that learners retained information of the collocations that they were exposed to. The fluency-

oriented repetition of individual sentences has a strong influence on collocation learning. Had the study been a delayed test to measure the retention, the claim would have been much stronger.

Another study that includes a training session was conducted by Sonbul and Schmitt's (2013). In their study, the participants (natives and non-natives of English language) learned the collocations comprised of the medical terms (which were very low frequency words) and the associative words (which were high frequency words). The participants read the same text containing the target collocations (medical terms + high-frequency words) for a period of time. Either native or non-native participants were divided into three groups and received three treatments, i.e., enriched, enhanced, and decontextualized, arranged in different orders. The differences among three conditions are the presentation of the input (target collocations). While the enriched condition refers to the input, a passage that contained five embedded collocations, the same set of collocations were highlighted in the enhanced condition. For the decontextualized condition, the same target collocations were explicitly taught in isolation. This is the strength of this research design. All learning conditions were equally treated by the counterbalance method. The findings of this study did not reveal the automatic priming effects. The limitations may be the selection of medical terms which may be known by some participants. The medical terms contain Latin and Ancient Greek prefixes and suffixes. L2 participants who knew Latin or Greek possibly knew some words prior to the training of this study. They might have a network of such known words with other words in their mental lexicon. The findings showed that explicit learning plays a much more prominent role in L2 vocabulary acquisition. The performance in the decontextualized condition was the most outstanding. To gain the vocabulary knowledge, the enhanced condition seems to be a better method than the enriched condition. Not much difference between L1 and L2 speakers for explicit knowledge was found. No significant difference was found for the enriched condition. Both L1 and L2 speakers seem to benefit from explicit learning.

The studies that did not include the training sessions had different objectives, i.e., comparing the lexical processing of collocations in L1 speakers with L2 proficient learners (Conklin & Schmitt, 2012; Gyllstad & Wolter, 2016), and

highlighting the impact of L1 on L2 processing (Wolter & Gyllstad, 2011). These three studies employed different tasks to discover language processing. Wolter and Gyllstad (2011) utilized a lexical decision task to explore such processing. Conklin and Schmitt (2012) employed the self-paced reading to examine how the participants processed the information of the formulaic languages e.g. '*to let off steam*'. It is observed that Conklin and Schmitt (2012) did not employ the lexical decision task as Wolter and Gyllstad (2011) did because the formulaic languages were quite long. Gyllstad and Wolter (2016) used the semantic judgment task which was very similar to the lexical decision task. The presentation of the collocation (e.g. *write a letter*) was presented at a time for a while (4,000 ms.) and the participants needed to decide if the collocations were natural and meaningful. The findings of these three studies suggested the processing of the collocations in different aspects. The results from the lexical decision task used in Wolter and Gyllstad's (2011) suggested how the verb + noun collocations were organized in the mental lexicon. What Conklin and Schmitt (2012) concluded was the speed of reading and the comprehension of the formulaic languages. Gyllstad and Wolter (2016) concluded that the collocations are likely to be stored closely together. However, the examination of collocations in their study was not considered an automatic processing as the participants needed to access the information of all the words they see at a time and linked them (e.g. *write a letter*). To discover the organization of words in the mental lexicon of L2 learners, the lexical decision task is compulsory.

Additionally, Fitzpatrick and Izura (2011) examined the language processing in bilingual speakers employing 2 word association tasks and a lexical decision task. The researchers employed a word association task in L1 (Spanish) and another one in L2 (English). The lexical decision task was conducted to measure the response times of L1 words (Spanish). Half of these words were translation equivalent to English (L2) and were used in the English word association task. It can be observed that the findings from words association task (L2) and the lexical decision task were able to reveal the reliability of this study. The results suggested that the information of the words was retrieved faster when the stimuli and the responses had complex associations- i.e., by form and meaning (*postman - postbox*) or by meaning and collocation (*spider - web*) in L1 and L2. It could be assumed that the information of

the words is accessed more quickly when such words have more complicated networks in the mental lexicon. The researchers found similar results in L1 and L2 responses. This is probably due to the proficiency of the participants. In this study, the participants were Spanish learners of English who were living in the UK at that time. They were likely exposed to English language sufficiently to be able to produce L1 responses.

In L2 processing studies, the participants were commonly adults in the English speaking contexts (Conklin & Schmitt, 2012; Durrant & Schmitt, 2010; Fitzpatrick & Izura, 2011; Gyllstad & Wolter, 2016; Sonbul & Schmitt, 2013; Wolter & Gyllstad, 2011). There is a lack of research examining L2 learners in the non-English speaking context. There is a variety of tasks and methodologies because of the varying objectives. The studies that focused on the contributions to vocabulary learning methods provided the learning sessions for the subjects (Durrant & Schmitt, 2010; Sonbul & Schmitt, 2013) prior to the elicitation/tasks. Either the elicitation, i.e., gap fill tasks and multiple choice task, or the reaction tasks (lexical decision task and self-paced reading) were employed to examine the language processing.

As mentioned earlier, the objectives of the studies on language processing in L2 learners were with various objectives. Most studies were conducted with the native speakers and non-native speakers (Conklin & Schmitt, 2012; Gyllstad & Wolter, 2016; Sonbul & Schmitt, 2013; Wolter & Gyllstad, 2011). The main objective is to measure the native-likeness of the participants. However, there were some studies that did not include native speakers which is possibly because of the objectives of the studies, i.e. collocation learning in L2 learners (Durrant & Schmitt, 2010), and production of word association in bilingual speakers (Fitzpatrick & Izura, 2011). It depends on the objectives of the studies that determine whether or not to include the native speakers.

In sum, the studies on language processing were widely conducted with L1 and L2 speakers. There is a lack of the study in Thai learners of English. It is worth examining how the collocations are stored in these learners' mental lexicon. To explore the mental lexicon, lexical priming is one of the method widely used. The next section presents the concept of lexical priming, Lexical Priming Theory and previous related studies.

2.2 Lexical Priming

The concept of lexical priming and the Lexical Priming Theory are reviewed as related to language learning. Besides, methodology in the priming studies is extensively reviewed to support the research design in Chapter three.

2.2.1 Concept of Lexical Priming

Priming is a method used to investigate language processing. According to Gass and Mackey (2007), priming refers to the experiment in which two stimuli are presented as a prime and a target one. In the lexical decision task, after the prime is shortly presented, the subject has to identify the target word by pressing the buttons. It is assumed that the primed word activates the information of the target one. The response time to the target word indicates the relationship between these two words in the subject's mental lexicon. The fast response time of a pair implies that the prime and the target word are stored closely together in the mental lexicon.

Scholars have employed several kinds of priming: masked priming, syntactic priming, repetition priming, and semantic priming. Gass and Mackey (2007) exemplified two types of priming-i.e., masked priming and syntactic priming. The masked priming was developed by K. I. Forster, Davis, Schoknecht, and Carter (1987) to minimize the strategic factor. In the experiment, the prime is presented in a very short period of time (50 ms) so that the subjects do not register its appearance. It is called masked priming because each stimulus is preceded by a forward-masking stimulus (##########) for a period of time (e.g., 500 milliseconds). Although the subjects cannot clearly see the target words, it is assumed that the information of such words in the mental lexicon is activated. The syntactic priming is the experiment in which subjects (the speakers) have a tendency to repeatedly use syntactic information of the word they have heard or seen previously in their accessing process. The other two types of priming used in psychological experiments include repetition priming and semantic priming. They were employed to examine the memory of brain for particular sets of words (Taft, 1991). Repetition priming is a technique which presents target words to the subject twice. The semantic priming focuses on the related meaning of the prime and the target words which is conducted to examine the semantic network of the words stored in the mental lexicon. In psycholinguistic studies, lexical priming has been employed to investigate how specific lexical items

are stored in the mental lexicon (Jiang, 2004; Lowder, Choi, & Gordon, 2013; Newman et al., 2009; Novick et al., 2003; Yamashita & Jiang, 2010). The lexical priming conducted in these studies was semantic priming, the priming with proper nouns, nouns, and verb. Like other kinds of priming, the lexical priming concerns the prime and the target. The distinction is lexical priming engages with either semantic or syntactic features. This study employs semantic priming because it aims to investigate the lexical access of the frequently co-occurring words.

2.2.2 Lexical Priming Theory

A corpus linguist, Michael Hoey (2005), proposes that lexis is prioritized and other linguistic features are attached with the lexical items. Hoey's Lexical Priming Theory provides us an alternative view of the interaction between lexis and grammar based on the textual phenomenon, i.e., using the authentic data. According to Hoey (2005), "every word is primed for the use in a discourse as a result of the cumulative effects of an individual's encounters with the word". He views that the appearance of lexis as collocation is considered a psycholinguistic phenomenon. When we encounter the words, we face the lexical bundles (a group of words). Frequently seeing a group of words make us believe how a word should appear in a particular condition. When we produce a language, the lexical items are selected with their meanings and grammatical functions that we are primed to. Hoey (2005) illustrates that we acquire words from context and social interaction. A particular position of lexis in the text is even selected based on the experience and prior knowledge of the authors (Hoey & O'Donnell, 2008).

Hoey (2005) proposes that the appearance of co-text features found in the language corpora is related to the lexical access which is the language processing in the mental lexicon. The co-text features: collocation, colligation, semantic association, and semantic prosody, are used to investigate the meanings of the lexis in specific conditions. While collocation refers to co-occurrence words that frequently appear together, colligation concerns the association of a grammatical word or a word sequence (Hoey, 2005). Based on Halliday's concept of sentential position, Hoey (2005) views that colligation can be defined as the positioning of a word or word sequence within a sentence or a paragraph. Apart from the co-selection of adjacent words, a word or a word sequence may prefer to appear or avoid appearing to occur in

particular grammatical structures. For example, based on the corpora of L1 speakers, *'that winter'* is always in the past tense, meanwhile '*in the winter*' is used only half the time in the past tense (Pace-Sigge, 2013). The concept of 'semantic association' feature is similar with the 'semantic preference' (Sinclair, 1999) and the 'semantic prosody'(Louw, 1993), but they give different senses. The semantic preference refers to the choices that the co-selected words appear with the particular meanings (Sinclair, 1999). It focuses on the semantic relationship between words, whereas the semantic prosody relies on the negative or positive expressions. Semantic prosody engages spoken expression with attitudinal meaning or pragmatic sense of co-occurrences (Louw, 1993). According to Hoey (2005), the semantic association deals with the existence of a word or word sequence associated in the mind of the language users with a semantic class or the psychological preference between the users and the words. Semantic association seem to be a broader concept than semantic preference and semantic prosody.

2.2.3 Lexical Priming Theory and Language Learning

According to Hoey (2005), the Lexical Priming Theory can contribute to L2 learning in that we should provide the best priming to facilitate the learning. He proposes that the focus on the data and the authenticity of data are crucial. L2 learners need to focus on the lexical patterns and generalize these words. L2 learners should be exposed to authentic data at the threshold of their competence. Based on Krashen's Input Hypothesis, reinforcing the existing priming and allowing new priming require the learning materials at the threshold of learners' competence. L2 learners are best primed when the authentic data come in letter sequences and sound sequences. Language learners should be lexically primed twice, written and spoken.

Two influential factors on L2 learning concern L1 transference and the contexts (Hoey, 2005). L1 priming can facilitate L2 learning. Learners use their L1 knowledge to help them learn new L2 vocabulary. Semantic associations and colligations of such new words will be considered if they are equivalent to L1. Likewise, Jiang (2002) and Lee and Magoro (2013) found that learners benefited from L1 use in L2 instruction. Another inevitable factor on L2 vocabulary learning is the contexts. Hoey (2005) believes that there is no distinction between native and non-native speakers when they learn new vocabulary. Instead, how language learners

experience the lexical items (whether in L1 or L2) distinguish the priming effect. Being in the English speaking country seems to be an influential factor for language learners. Yamashita and Jiang (2010) examined the impact of L1 on collocation acquisition of Japanese learners and found that the amount of exposure to L2 affected the acquisition. Once the learners are in the English speaking context for a period of time, they experience the use of collocations and may generalize these lexical items. For L2 learners who have no chance to be in the English speaking environment, the language use in the textbooks is considered as an expansive English exposure for L2 learners (Q. Xu, 2015).

2.2.4 Studies Related to Lexical Priming

In this section, previous studies on the organization of lexicon and the lexical access which employ lexical priming are reviewed.

2.2.4.1 Lexical Priming and the Organization of the Mental Lexicon. The selected research presented in this part deals with modeling the mental lexicon and the use of lexical priming as a method to examine lexical storage and lexical access. The designs and findings of the research in modeling L1 and L2 lexicon are discussed.

Two well-known semantic network models are the hierarchical network model (Collins & Quillian, 1969, 1970)and the spread activation model (Collins & Loftus, 1988). Collins and Quillian (1970) conducted 2 experiments (lexical decision tasks) and created the hierarchical network model. In the first experiment, the researchers constructed lists of dogs, birds, and animals. All the selected words were defined as animals in the Thorndike-Barnhart Beginning Dictionary. Equal numbers of positive and negative words were included in each list. With timing, participants saw each word only once and had to decide if it belongs to a category. In the second experiment, the words were categorized twice. The words were grouped into two related categories, a smaller and larger category. Each word was shown on the screen for a short period of time (all in the same apparatus). Similar to Experiment 1, the participants had to make a decision on the category of each instance. The response time was measured. The findings showed that the difference of categorization times for the words in the small and larger categories was not significant. The category size did not affect the categorization time. The researchers pointed out that the factor that might affect the categorization time was the semantic confusability. Collins and

Loftus (1988) conducted four experiments: production experiments, multiple-category experiment, sentence-verification experiment, and several categorization experiments and proposed that the links between words in the mental lexicon are spreading. In the first experiment, production experiments, the subjects were asked to produce instances in a category that began with a given letter or was characterized by an adjective. The second experiment, i.e., multiple-category experiment was conducted by having subjects make decision if the given words belonged to a category. The sentence-verification experiment was a true-false reaction time technique. The last experiment was a categorization experiment which focused on the reaction time in the categorization tasks. The subjects rated the typicality of instances in each category. The use of several tasks in this study could reflect the validity of the study and showed that the assumption was drawn from different aspects of lexical processing.

Recent studies on mental lexicon organization tend to be conducted in a similar process (Krishnan & Tiwari, 2008; Vitevitch & Goldstein, 2014). The subjects were commonly trained how to use the software and computer beforehand. Then they were presented with the stimuli and timed for their responses. The difference was how the subjects are exposed to the stimuli, either orthographically (Krishnan & Tiwari, 2008) or auditorily (Vitevitch & Goldstein, 2014). In their studies, Vitevitch and Goldstein (2014) employed the perceptual identification task. The subjects were asked to identify a stimulus word presented in a background of white noise. The accuracy of responses to keywords and non-words were compared. In addition, other elicitation tasks were used to model the network. Borodkin et al. (2016) employed semantic fluency tasks which required the participants to give different words that are fruits, vegetables, and animals in their L1 and L2. Then the small-world network modeling methodology or word-net was conducted to analyze the given words. The network starts with nouns as a node. The link between a node and other words represents that phenomenon where a given noun possibly activates the information of the other words.

One of the elicitation tasks widely used to investigate the organization of mental lexicon is word association task (WAT). To do this task, the subjects are commonly presented with a word (stimuli) and then they are asked to produce the first word that comes to their minds (Gass & Mackey, 2007). The association examined

can be semantic network, syntactic relationship, collocational knowledge, or completeness of a phrase.

A number of researchers have used WAT to compare L1 and L2 mental lexicon organization (Tess Fitzpatrick & Izura, 2011; Tresselt & Mayzner, 1964; Wolter, 2001). There were studies that used the WAT to examine the organization of mental lexicon: Khazaeenezhad and Alibabaee (2013) with Iranian learners of English, and Xinyue and Nannan (2014) with Chinese students. Most studies were conducted with proficient L2 learners. There was one study in which participants were Chinese learners with low English proficiency (Hui, 2011). To make sure that the participants knew all the test items, the researchers conducted the pilot study with a group who had similar characteristics with the participants. The word frequency of all test items was taken from the British National Corpus. Fitzpatrick's (2007) classification of WAT responses was used to analyze the data because it is designed for examining L2 mental lexicon. The findings revealed that the low proficiency learners produced mainly form-based responses. The semantic network was not fully developed.

In Thailand, Booranaprasertsook (2007) employed the word association task to examine the lexical-semantic system in the Thai language used by the visually impaired, auditorily impaired, and the normal students. The participants were asked to name the word related to the stimuli. The researcher selected the stimuli from the textbooks used by the participants. The association was classified as meaning-based and non-meaning-based. The meaning-based was subcategorized into lexical semantic and context semantic. There were 2 supplementary experiments conducted to support the main experiment (WAT), i.e., definition experiment and comparison experiment. The results indicated that the mental organization structures of the two groups of impaired students were not identical. The visually impaired tend to rely on lexical-semantic system the same way as normal students; meanwhile, the auditorily impaired tend to rely on the context.

The traditional classification of responses includes paradigmatic, syntagmatic, and clang (phonological link to the stimuli) responses. The paradigmatic responses are semantically related. The subcategories include synonyms, antonyms, subordinates, and co-ordinates. The syntagmatic responses can be either sequential relations or

collocations. Fitzpatrick (2007) proposed another classification believing that it is more appropriate for analyzing L2 mental lexicon. There are 4 categories: meaning-based responses, position-based responses, form-based responses, and erratic responses. Table 1 shows the details of the classification. According to Fitzpatrick (2007), the response is meaning-based associated when it relates with the stimulus word by definition (synonym) , lexical set (coordinate, meronym, antonym, hyponymy), and a conceptual relation. The position-based association refers to the responses that follow or precede the stimulus word. According to Fitzpatrick's (2007) classification, the response could either directly follow or precede the stimulus word or have some words in between. The form-based association includes the responses that have orthographic or phonetic similarities with the stimulus words and the prefix or affix of the stimuli. The other responses are the blanks and the errors. The erratic responses are the words that have no relation with the stimuli.

Table 1 Fitzpatrick's (2007) Classification of WAT responses

Category	Subcategory	Definition	Example
Meaning-based association	Defining synonym	-x means the same as y	empty-vacant
	Specific synonym	-x can mean y in some specific contexts	cold-uncomfortable
	Lexical set/ context related	-x/y are the same lexical set (coordinate, meronym, antonym, hyponymy)	cat-animal
	Conceptual related	-x and y have some other conceptual link	charity-kind
Position-based association	Consecutive xy collocation	-y follows x directly (includes compounds)	hot-dog
	Consecutive yx collocation	-x follows y directly (includes compounds)	weight-paper
	Other collocational association	-y follows/precedes x in a phrase, but with words in between	bird-(get the)-worm
Form-based association	Change of affix	-y is x plus or minus a prefix or affix	scared-scary
	Similar form only	-y looks or sounds similar to x but there is no other similar association	very-berry
Others	Erratic association	-y has no decipherable association to x	hamburger-swim
	Blank	-no response give	

To summarize, word association task is mostly employed by the researchers to examine the organization of L1 and L2 mental lexicon. The next section presents the use of lexical priming to investigate the lexical access.

2.2.4.2 Lexical Priming and the Lexical Access. Multiple studies investigating lexical access have employed lexical priming. As mentioned earlier, lexical priming can be either syntactic priming or semantic priming. An exemplification of the syntactic priming study was conducted by Novick et al. (2003). The researchers conducted 2 experiments: fast-priming reading and lexical priming in online spoken language comprehension. The fast-priming reading experiment is a combination of priming technique with the online measure of sentence processing. The effect of the prime on the sentence processing was explored. The experiment was conducted with 36 adult native speakers at a university in the United States. The participants read the sentences which had syntactic ambiguity. The self-paced reading time was measured and analyzed. Then the second experiment, the online spoken language comprehension, was used to examine the effect of the lexical priming. It was conducted with 16 participants. The eye-movement pace of the participants when they hear the conversation was examined. The findings suggested that word recognition tended to play an important role in the grammatical analysis of the sentences.

The present study employs semantic priming to investigate the English collocation acquisition of Thai learners. Previous studies related to semantic priming of L1 and L2 speakers are reviewed in detail to create a strong background in the research design of the present study. Two studies conducted with L1 speakers of English are reviewed to formulate the designs (Hutchison et al., 2013; Jones & Golonka, 2012).

Jones and Golonka (2012) conducted a series of LDT to examine the priming effects of word pairs in different relations- i. e. , integrative (e. g. *fruit—cake*) , thematically related (e.g. *party—cake*), and taxonomically related (e.g. *muffin—cake*). All items were limited into noun-noun condition to control for extraneous variables. Different Stimulus Onset Asynchronies (SOAs) were used to examine the response times. The finding showed that there were distinct patterns of correlations among the three relations. The difference between integrative pairs (e. g. , turkey bacon) and

thematic pairs (e.g., eggs bacon) was more obvious than the difference between the thematic and taxonomic pairs.

Hutchison et al. (2013) conducted a Semantic Priming Project. It was a large-scale empirical study which employed a speeded naming task and a lexical decision task to collect data from 768 participants who participated in the lexical decision task and the pronunciation task. All of them were native speakers of English from different universities in the United States. There were 512 out of 768 participants in the lexical decision task. There were 1,661 target words following related and unrelated primes. The experiment included 2 sessions having 830 or 831 words in each section. Each participant was presented with all of the items. The presentation included a fixation cross presented for 500 ms., and a prime word in uppercase letters presented for 150 ms. Next, a blank screen appeared for either 50 or 1,050 ms. The participants needed to look at the screen and make the decision whether it was a word or a nonword. For the pronunciation task, there were 256 participants. The participants were presented with a set of stimuli and they had to produce a word that came to their minds. When the program detected the voice, the responses were recorded. The findings of this study became a large database available at an Internet-based repository. The information about prime-target can be searched and used for research. It has to be noted that the presentation of the prime and target in the LDT were quite long (831 items). The objective of this study is to create the database so that they had to conduct the long experiment. The researchers pointed out that the normal length of the LDT were from 100 to 200 items. Any users of the database should acknowledge this point because the length of the experiment could cause the priming effect.

Two cross-language priming studies conducted with L2 learners were reviewed to examine the findings and the presentation of LDT (Dong et al., 2005; Jiang & Forster, 2001).

Jiang and Forster (2001) conducted a series of experiments to examine the priming effects across languages. The Chinese late learners of English were the participants in this study. They were adult Chinese students who studied at a university in the United States. The first experiment had 2 tasks: a mask priming task and an episodic recognition task. The participants were asked to sit in front of the screen and complete two tasks in different orders. There were 64 stimuli (Chinese-

English translation pair) , 32 unrelated English control items and 32 Chinese nonwords. To make sure that the participants knew all test words, all selected words had high frequency. 32 test words out of 64 were trained prior to taking the test. As all participants had to do two tasks, the researchers counterbalanced the lists for LDT and episodic task comprising 32 pairs in each. The sequence of the LDT was a set of 10 hash marks (500 ms.), a prime (50 ms.), a blank interval (50 ms.), a backward mask with a row of hash marks (150 ms.), and then the target (500 ms.). For the episodic recognition task, the participants studied new words and had their memory tested about the learned words. The second experiment was a semi-replication of the first one. The difference was a study phase for the participants who did the episodic task. The third experiment was very similar to the first one, but there was a variation of stimulus onset asynchrony-SOA (50 ms. and 250 ms.). The 4th experiment was like the first experiment but the prime was Chinese (L1) instead of English (L2). The 5th experiment replicated the 4th. The SOA in the 5th (250 ms.) was longer than the 4th (50 ms.). The findings indicated that the L1 and L2 linked lexical items may be connected in two levels. The first link is the shared conceptual representations. Another is the direct link between L1 and L2 with translation equivalents.

Dong et al.(2005) examined the conceptual organization of the bilingual mental lexicon. There were 2 experiments: lexical decision task (LDT) and the semantic closeness ranking task. The first experiment was conducted with 17 Chinese undergraduate students who were around 21-22 years old. All of the participants were English majors at a university in China. In the LDT, the participants' task was to decide as quickly and accurately as possible if the words presented on the screen are real word. The presentation included an asterisk (1,000 ms.), a blank screen (20 ms.), a prime (160 ms.), a blank screen (40 ms.), and the target word presented until the participants responded to it. The stimuli were in 6 conditions: word + primitive (*grasp–with*), word + default value (*kick–foot*), word + preferred conceptual value (*cure–doctor*), word + preferred conceptual value of the words which are the objects (*taste–food*), word + taxonomic value (*whisper–speak*), and word + antonym (*take–give*). This experiment compared the priming effects of these 6 conceptual relations in all the within-language and cross-language conditions (English–Chinese; Chinese–English; English–English; Chinese–Chinese) . The findings showed that the

associative priming effects were larger than the form priming effects. The results also suggested that there was a shared conceptual system in bilingual mental lexicon. Experiment 2 was conducted to investigate the extent of meaning overlap in a partially separated store. There were 4 groups of participants with different language backgrounds: first-year English majors, third-year English majors, monolingual Chinese adults, and native speakers of English who were either teaching English or studying Chinese in the same university. The participants had to rank the closeness of meaning to the given head words. The results showed that the learners of English with higher proficiency and more exposure to English language tended to rely on L2 conceptual system more than the low-proficient groups.

The interesting issue in Jiang and Forster's study (2001) was the stimulus onset asynchronies (SOA) and the storage of L2 words. Another point to be considered is the SOA. The presentation duration of prime in Dong et al. (2005) was slightly different from Jiang and Forster (2001) (160 ms. and 50 ms.). Both studies used a very short period of time to allow only automatic processing to happen.

The use of nonwords in the LDT should be explored. K. I. Forster et al. (1987) conducted a study using masked priming and repetition priming to examine if there were form effects in the lexical access. The experiments were conducted with undergraduate students who were native speakers of English. The first experiments dealt with misspelled words (non-words). To produce non-words, two medial letters were transposed, e. g. *answer* → *antwer, garden* → *garpen, hospital* → *holpital, widnow* → *wingow*. In this study, the prime was in the lower-case letters and the target was in the upper-case letters. The target words were 6-10 letters length. There were 40 high frequency words and 40 low frequency words. The conditions included identical prime and target (*involved- INVOLVED*), transposed prime (*invovled-INVOLVED*), substituted prime (*invorved- INVOLVED*), and the unrelated prime which was the control condition (*capacity- INVOLVED*). There were additional 80 pairs of non-word prime and target in the same condition: identical (*lutnice-LUTNICE*), transposed (*luntice-LUTNICE)*, substituted (*lugnice-LUTNICE)*, and control (*predgen-LUTNICE)*. The subjects were presented with the set of prime and target words. They had to identify the target words by a keypress. The presentation of each item consisted of a forward mark, ########### (duration 500 ms.), the prime

(duration 60 ms.), and immediately followed by the target (duration 500 ms.). The results showed that the misspelled words produced priming effects in the transposed condition and substituted condition. The second experiment dealt with the length of the words. The condition was the substituted prime with target, e. g. *bontrast-CONTRAST, bamp-CAMP*, etc. The findings indicated that the information of the real words may be accessed when the participants encounter the nonwords which are in either transposed or substituted conditions.

In line with Forster et. al. (1987), Tamminen and Gaskell (2013) examined the possibility that nonwords are integrating in the mental lexicon. The unmasked and masked semantic priming were employed. The participants were native speakers of English. The SOA of the first experiment was quite long because it was the intended visible prime (200 ms.). The second experiment, masked priming, utilized standard priming (47 ms). The results showed that there are priming effects of real words and nonwords. It means that nonwords are able to be stored in the L1 mental lexicon. It is possible that the priming effects will be similar in L2 learners. To avoid the error of response, the present study generates the nonwords used in the LDT from the Australian Research Council (ARC) Nonword Database (Rastle, Harrington, & Coltheart, 2002).

It could be seen that the presentation of the experimental items and the SOA varied depending on the objectives of the studies. More studies concerning the Lexical Priming Theory that utilize priming tasks are reviewed in the following section.

2.2.4.3 Studies Related to Lexical Priming Theory

Lexical Priming Theory was utilized to investigate the linguistic phenomena e. g., analysis of metaphor (Patterson, 2016), turn-taking strategies in conversation (Pace-Sigge, 2017), humorous discourse (Goatly, 2017), vocabulary acquisition (Xu, 2015) and collocation learning and acquisition (Cangır et al., 2017; Durrant & Doherty, 2010; Sonbul & Schmitt, 2013). In Patterson's study (2016), Lexical Priming Theory was employed to explain the pattern metaphors used in a corpus comprised of 500 fiction and non-fiction works from British Nineteenth Century. The results showed that metaphoric language conveys grammatically and frequently co-occurring (collocation) priming. (Pace-Sigge, 2 0 1 7) examined the application of

textual colligation with the informal spoken data. The researcher tried to falsify Hoey's (2005) claim that the interlocutors are primed through repeated exposure. The data derived from British spoken corpora were analyzed to find the priming effects on turn-takings. The findings showed that turn-taking tended to follow the structured patterns rather than the non-fixed ones. Goatly (2017) examined the relationship between humorous discourse and the priming. The data were the jokes taken from COBUILD Bank of English corpus developed by Sinclair and his team. Goatly demonstrated that most of the jokes could be explained by the Lexical Priming Theory. The patterns of jokes revealed the priming of collocations, semantic set associations, grammatical functions, textual semantic associations, and grammatical category association. The exceptional cases in the jokes were found due to the creativity and defiance of jokes. It means that the Lexical Priming Theory is not fully applicable for humorous discourse. These three studies were corpus-based studies which examined different corpora to support the theory. There is another corpus-based study conducted to examine the acquisition of an English word '*give*' among Chinese learners (Xu, 2015) . The study aims to examine the priming effect in textbooks on Chinese learners' writing. The researcher created a corpus from English textbooks being used nationwide and compared the use of the word ' give' in the learner corpus. The findings showed that Chinese learners of English were primed by English textbooks.

Three studies investigating the priming in collocation acquisition and learning were from the same group of researchers (Cangır et al., 2017; Durrant & Doherty, 2010; Sonbul & Schmitt, 2013). At the time conducting the research in lexical priming, Philip Durrant was a researcher working with Norbert Schmitt. Their expertise deals with corpus linguistics and vocabulary acquisition and learning. The studies conducted by this group of researchers tended to support Hoey' s Lexical Priming Theory by utilizing (applied) psycholinguistic tasks.

Durrant and Doherty (2010) conducted a study to examine the extent to which the high frequency collocations defined by the British National Corpus can display the mental priming of native speakers of British English. The semantic priming effects of collocation in the lexical decision tasks were examined. There were 2 experiments which were lexical decision tasks. The participants were a group of 30 students in a

university in the United Kingdom who were natives of British English. The experiment items used in these 2 experiments were selected from BNC using the mutual information method. The items were in 4 conditions: low frequency, moderate frequency, high frequency, and high frequency with strong association. The strength of association was determined by the information from the Edinburgh Association Thesaurus (Kiss, Armstrong, Milroy, & Piper, 1973), the experiment was a word association task (i.e., participants gave the first 3 words that came to their minds after seeing the stimuli). The nonwords were taken from ARC Nonword Database (Rastle et al., 2002). The difference between the first and the second experiment was the duration of priming as well as masked prime. The presentation of Experiment 1 included a fixation point (+) presenting for 1,500 ms. followed by a prime (600 ms.), and immediately by the target (1,000 ms.). The findings showed that there were the priming effects on the frequent condition and associated frequent condition. The duration of the prime presentation was much faster in Experiment 2. The presentation consisted of a fixation point (1,500 ms.), a set of mask ###### (500 ms.), a lower-case letters prime (60 ms), and the upper-case letters target (1,000 ms). Surprisingly, the results showed that there was no priming effect in all condition in this experiment. The researchers concluded that lexical decision task may not be sufficient to make the assumption that native speakers were psychologically primed by the frequently co-occurring words. This is the very first empirical study conducted to prove the Lexical Priming Theory. Unfortunately, the results showed that the priming effect was not significant in the second experiment which dealt with automatic processing. The selection of test items is possibly the cause of the failure to support the theory. In the first experiment, the conditions deal with the frequency and the strength of the association. The syntagmatic condition should also be considered as affecting the priming condition.

The following reviewed study focused on the collocation acquisition. Sonbul and Schmitt (2013) examined how natives and non-natives of English language acquire collocations in different conditions- i.e., explicit teaching and implicit learning. The participants were native speakers of English and advanced non-native speakers who were in a British university. In this study, the participants were divided into three groups to receive different treatments: enriched, enhanced, and

decontextualized. The researchers had all read the same text containing the target collocations. The researchers conducted 2 experiments. The first experiment was conducted with native speakers who were undergraduate students. The stimuli were the medical collocations because they are unlikely to be known without medical training. The stimuli selection criteria were (1) transparency and not technically loaded, (2) low frequency of the collocation in the BNC; and (3) first word of the collocation is polysemous. In the experiment, the participants read a passage conveying target collocations. The participants were divided into three groups to receive different treatments: enriched, enhanced, and decontextualized. In the enriched condition, the target words are not explicitly presented. The same words are emphasized in the enhanced condition. The target words were presented to the participants only in the explicit teaching condition (decontextualized). The measures included a form-recall test (cloze test), a form recognition test (multiple-choice), and a lexical decision task. Like Durrant and Doherty's study (2010), the nonwords were selected from the ARC Nonword Database (Rastle et al., 2002). All nonwords were pronounceable and orthographically legal. The stimuli were ordered in 3 counterbalanced lists. Each list consisted of 15 (exposed) collocations, 15 control collocations, and the fillers (pairs of a nonword and word). The SOA included a presentation of a fixation point (2,000 ms.), prime (150 ms.), and the target presented upon to response time. The design of experiment 2 was a mirror of experiment 1 except the modification of collocations to suit the competence of non-native speakers. The participants were 43 postgraduate students in the United Kingdom. The adjustment was on the collocation. All collocations were checked if they are in the most frequent 3000 lemmas in BNC or to the General Service List (West, 1953). The findings showed that explicit learning was crucial for vocabulary acquisition of L2 learners. The support to the Lexical Priming Theory was that non-native speakers were capable of acquiring collocation like native speakers do. However, the participants in this study were proficient learners of English who were living in the English speaking environment. The evidence on collocation processing of non-native speakers with different degrees of exposure to English is needed.

The study on the theory was a study on the collocation priming in Turkish (Cangır et al., 2017). The researchers employed LDT to investigate the L1 lexical

processing. The participants were 41 native speakers of Turkish who were undergraduate students and lecturers of universities in Turkey. There were 3 conditions of the test items: collocation (test condition), non-collocation (compared condition), and fillers (control condition). The DMDX software (K. I. Forster & Forster, 2003), 2003), a Windows-based program, was used to conduct the LDT. The participants looked at the computer screen and made decision about the words they saw by pressing a key button. The presentation of each item consisted of an asterisk (duration 500 ms.), a forward mark, ##########, (duration 200 ms.), the prime (duration 100 ms.), and immediately followed by the target. Their response times to each condition were analyzed and compared. The findings showed that there was a priming effect for Turkish L1 users.

The previous studies tended to support the Lexical Priming Theory in different aspects of language acquisition. Most assumptions were drawn from the L1 speakers (of English and Turkish). A study conducted with L2 learners was with the advanced group who were living in the United Kingdom. To the best of this researcher's knowledge, there is a lack of lexical priming study conducted with L2 learners who are in non-English speaking context or EFL learners with different degrees of exposure to English language. It is worth investigating if the theory is applicable for EFL context.

It can be noticed that there are similarities and differences in the previous studies employed lexical decision task (LDT). As presented in Table 2, the studies that examined the lexical processing use similar patterns of presentation, but employed different sets of SOA due to specifications of each priming tasks and the objectives of the studies. In general, there is a presentation of fixation point for approximately 500 ms., followed by a prime word for 50 – 250 ms. A very short period of blank screen (50 ms.) is commonly presented prior to the appearance of the target word.

Table 2 The design of LDT presentation in the lexical priming studies

Researchers	Studies (participants)	Fixation point display	Prime word	Blank screen (+mask)	Target word
Hutchison et al. (2013)	Semantic Priming Project (native speakers)	500 ms	150 ms	50 ms 1,050 ms*	-
Jiang and Forster (2001)	cross-language priming mask priming (advanced Chinese learners)	#1 500ms #2 500ms #3 500ms #4 500ms #5 500ms	#1 50 ms #2 50 ms #3 250 ms #1 50 ms #5 250 ms	#1 50 ms (+150 ms.) #2 50 ms (+150 ms.) #3 50 ms (+150 ms.) #4 50 ms (+150 ms.) #5 50 ms (+150 ms.)	#1 500 ms. #2 500 ms. #3 500 ms. #4 500 ms. #5 500 ms.
Dong et al. (2005)	cross-language priming (advanced Chinese learners)	1,000 ms (+blank screen 20 ms)	160 ms	40 ms	Response time
Durrant and Doherty (2010)	Lexical processing with high frequency words (native speakers)	#1 1,500 ms #2 1,500 ms	#1 60 ms #2 (mask 500 ms) 60 ms	-	1,000 ms.
Sonbul and Schmitt (2013)	Collocation acquisition (NS vs. NNS)	2,000 ms	150 ms	-	Response time
Cangır et al. (2017)	Collocation priming in Turkish (L1 Turkish)	500 ms	(mask 200 ms) 100 ms	-	Response time

It can be seen that the word association task and lexical decision task have been widely used to examine the lexical processing. The particular presentation pattern of the priming tasks can be adjusted depending on the design of the study.

2.3 Acquisition of English vocabulary

Definitions of key terms and concept of vocabulary acquisition are presented in this section.

2.3.1 Definitions and concepts of words, vocabulary, lexical items, and collocation

As the linguistic terminologies, lexis and word are used interchangeably (Michael Hoey & O'Donnell, 2008; Singleton, 2016). Barcroft, Sunderman, and Schmitt (2011) describe that 'lexis' is an Ancient Greek word, which refers to all words in the language. Lexis can be referred to as word, vocabulary, or a lexical item.

The term 'word' could be considered as the smallest meaningful unit of a language. Lyons (1968) defines a word as the combination of letters (or sounds) with particular meaning and function. Plag (2003) and Saeed (2009)'s identification of 'word' are consistent with Lyons (1968).

Plang (2003) points out that a word can be defined in terms of sound structure, its internal integrity, meanings, and sentence structure. He proposes that there are four main properties of English words. First, a word commonly has one main stress. Focusing on the stress, '*B'enjamin's*' is counted as a word as well as '*B'enjamin*'. '*Girlfriend*' is counted as a compound word with one main stress. It has to be noted that some types of words- i.e., function words, have no stress. Second, English words are indivisible units which cannot be intervened. For example, when the word '*chair*' is plural, we need to add the inflectional morpheme '*-s*' at the end. In English, we insert neither derivational nor inflectional morphemes in the middle of a word. Third, words are the smallest elements in a sentence. They cannot be further divided. The third property links with the last one, i.e. part of speech specification. Each word belongs to specific part of speech. Words are in the certain classes or syntactic categories.

Saeed (2009) explains that a word can be identified by its spelling, sounds, meaning, and grammatical functions. Due to the polysemy and homonymy phenomena, he pointed out that it is controversial to categorize a word based on only one linguistic aspect. Classifying a word by spelling or sound can be problematic if the word has more than one meaning like '*book*'. Another problem is when the same word belongs to different grammatical categories. Saeed (2009) uses the example of the word '*heat*' which can be either a noun or a verb.

(4) *This heat is oppressive.*

(5) *We've got to heat the soup.* (Saeed, 2009, p. 59)

In (4) the word *'heat'* is a noun which means very hot weather. On the other hand, the same word in (5) refers to the action of raising the temperature of something. Saeed (2009) points out that '*heat*' is listed as a word in a dictionary.

It is likely that we need to consider at least two properties (i.e. sound and spelling) to classify a string of letters or a combination of sounds as one word.

The concept of 'word' is not equal to 'vocabulary'. According to the online Cambridge Dictionary, vocabulary refers to all the words that exist in a particular language or subject. It means that vocabulary is not commonly used to talk about a single word but all the words in a language. For example, '*by*', '*and*', and '*large*' are three English words and '*by and large*' is counted as a phrase. All of them are English vocabulary which contains different meanings and functions. According to the online Collins COBUILD, vocabulary is a list of words in addition to phrases, abbreviations, and inflectional forms, usually arranged in alphabetical order and defined or otherwise identified, as in a dictionary or glossary. Therefore, vocabulary and word are not the same. We count all the words and phrases in a language as the 'vocabulary'.

Another term relates to words and vocabulary is lexical item. A lexical item can be either a word or a group of words- i.e., phrase or chunk. 'Vocabulary' is commonly used in the context of learning and teaching (Elgort, 2011; Elgort & Warren, 2014; Halliday & Yallop, 2007; I. Nation, 2013; Schmitt, 2008; Yamamoto, 2014). Unlike vocabulary, a lexical item is commonly used in the investigation of vocabulary acquisition, corpus linguistics studies, language processing, etc. (e.g, Brezina & Gablasova, 2013; Elgort, 2011; Elgort & Warren, 2014).

The present study focuses on the vocabulary acquisition of English collocation so it is necessary to define the term collocation used in this study. Wray (2002) points out that collocation has been referred to as the multi-word units, clusters, lexical bundles, etc. Collocation is a group of words which can be considered as one lexical item or one lexeme. For example, the phrase '*take off*' is a lexeme containing 2 independent morphemes (*take* and *off)*. Not limited to the fixed combination of words like this phrase, collocations can be any group of words found to be frequently co-occurring. Parkinson (2015) distinguishes the term 'collocation' considered from the phraseological perspective and the frequency-based perspective. The phraseological view contemplates collocation as fixed idioms, restricted set of words, or a free

combination of words. From the frequency based perspective, collocation refers to a group of words frequently occurring together. As the present study deals with the degree of English language exposure and vocabulary acquisition, the concept of collocation from the frequency-based view is employed.

2.3.2 Concept of Vocabulary Acquisition

When a child learns his/her first word, e.g. 'water', he/she doesn't see the spelling. The child only hears people around him/her say the word 'water' and matches it with an object (possibly some water in a cup), the environment (e.g., in the kitchen), and the situation (e.g., The child is having his/her meal). As this child knows what 'water' means, it could be counted that he/she acquires this word. According to Ellis (1997, 2002), acquiring a word can be considered in two aspects, i.e., acquisition of its form (phonology and orthography) and acquisition of its meaning (semantic and conceptual properties). Levelt (1989) discusses that a word stored in our mental lexicon has a lexical entry. Each lexical entry has 4 types of linguistic information: semantics, syntax, morphology, and form (written or spoken). It means that there must be a link between the sound, spelling, and meaning of a word to claim that we acquire it.

This link is not easily built. The frequency seems to play an important role of the vocabulary acquisition. Ellis (1997, 2002) points out that a word's form is acquired when we repeatedly encounter (see or hear) it and patterns of multi-word units or chunks. To acquire a word's meaning, the mapping between concept of the new L2 word and the pre-existing concept or the L1 translation equivalent words is involved (Ellis, 1997, 2002). To examine the vocabulary acquisition, the frequency of encountering words and the linguistic information of the words play important roles.

Recent studies in vocabulary acquisition tend to be on collocation (the frequently and repeatedly co-occurring words (Fernández & Schmitt, 2015; Lin, 2014; Phoocharoensil, 2014; Sonbul & Schmitt, 2013; R. Xu, Mao, & Liu, 2012). N. C. Ellis and Wulff (2012) propose that L2 adult learners may be able to fluently use prefabricated language or expressions commonly used in communication. This may be a good way to learn new vocabulary by starting with the frequently co-occurring words. Like young children acquire a language, N.C. Ellis and Wulff (2012) point out that L2 adult learners may acquire a collocation as a single unit. It has to be noted that

acquiring as a unit means that the learners are able to use the formulaic language, but they are unable to identify the grammatical structure embedded within. This implies that the collocation is stored in L2 adult learners' mental lexicon as one unit. Several studies support this idea by examining the acquisition of collocation in advanced non-native learners of English (Gyllstad & Wolter, 2016, Sonbul & Schmitt, 2013; Wolter & Gyllstad, 2011). To the best of this reseracher's knowledge, there is no study in English collocation conducted with low proficient learners of English.

2.3.3 Previous Studies on Vocabulary Acquisition

The present study examines the acquisition of English vocabulary through the association of words stored in the lexicon. One type of the association is considered to be a lexical collocation. In this section, the related research on vocabulary acquisition employing different methods: psycholinguistic experiments, corpus-based studies, and different tasks in second language acquisition, is reviewed.

Two studies conducted by the same group of researchers employed the psycholinguistic tasks to investigate the vocabulary acquisition (Elgort, 2011; Elgort & Warren, 2014). Elgort (2011) conducted a study to examine the effects of explicit and implicit vocabulary acquisition. The advanced L2 learners were taught a set of pseudo words. Then they were asked to do the LDT to investigate their acquisition of vocabulary. The participants completed 3 tasks: prime lexicality, repetition priming, and semantic priming. The findings showed that the lexical access for the learned words was more automatic than for the control words. Another study conducted by Elgort and Warren (2014) utilized LDT to investigate to what extent the L2 learners acquire vocabulary from reading. The findings showed that the individual differences (age, L2 lexical proficiency, L1 gender, learning strategies, and levels of enjoyment), and the lexical and text characteristics affected the acquisition.

The present study examines if the frequently co-occurring words (lexical collocation) are stored closely together in the mental lexicon. In other words, the study explores the acquisition of collocation through the lexical processing. Previous studies on collocation acquisition are reviewed.

The objectives of the selected studies on collocation acquisition include the use of collocations in conversations of L1 speakers (Lin, 2014), comparison between the academic writing in L1 and L2 (Chen & Baker, 2010; Durrant & Schmitt, 2009),

the examination of L2 learners' behaviors (Fernández & Schmitt, 2015; Pereyra, 2015; Phoocharoensil, 2014; and Xu, Mao & Liu, 2012), and the investigation of L2 learners' knowledge (Detdamrongpreecha, 2014; Malikamas & Pongpairoj, 2005; Suwitchanphan & Phoocharoensil, 2014). A variety of instruments were used due to the objectives of the studies.

Lin's (2014) study was a corpus-driven study which aimed to compare two English language corpora- i.e., iTV corpus (subtitles of freely accessible television programs) and the spoken data on the British National Corpus (BNC). The findings showed that spoken data in two corpora were quite parallel, especially for the factual, drama, and comedy genres. It has to be noted that BNC corpus is not up-to-date. It might be a bit overclaimed to conclude that the internet television was a good representation of collocations in everyday use.

There has been a trend in examining written production of L2 learners. This paper discussed two research studies on academic writing of L2 learners in the English speaking contexts (Chen & Baker, 2010; Durrant & Schmitt, 2010). These studies were corpus-based studies. The difference was that Chen and Baker (2010) analyzed the data from two existing corpora (the Freiburg-Lancaster-Oslo/ Bergen (FLOB) corpus and British Academic Written English (BAWE) corpus) which contained either L1 or L2 written productions. Durrant and Schmitt (2010) created new learner corpora for the academic written production of L1 and L2 students who were in the United Kingdom. The findings of these studies were in the same direction. The use of certain collocations in native speakers and non-native speakers (who have high-proficiency) were similar. Both Chen and Baker (2010) and Durrant and Schmitt (2009) found that native speakers produced a wider range of collocations than non-natives. Durrant and Schmitt (2009) suggested that although the non-native group did not use a variety of collocations and very little of collocations in low frequency, their use of high-frequency collocations was comparable with the native speakers. It has to be noted that the L2 written productions investigated in these studies were high proficient learners of English. It could be implied that the non-native speakers had lower exposure to a variety of collocations. They were exposed to the same set of collocations from the same sources of language, e.g., reading academic texts. It is

observed that the collocations used to examine the acquisition of L2 learners should be the high-frequency ones.

The studies on collocation acquisition in L2 were conducted as a corpus-based study (Phoocharoensil, 2014), the experiments (Pereyra, 2015; Xu et al., 2012), and a survey (Fernández & Schmitt, 2015) . Similar with the studies discussed earlier, Phoocharoensil (2014) investigated the academic writing of L2 learners and analyzed the patterns of collocations. The difference was the sample group. His study included two groups of Thai learners of English (high-proficiency group and low-proficiency group) . This study aimed to examine how L1 influences the production of L2 collocations. It is not necessary to include the data from native speakers. Instead, the researcher had two native speakers rate the use of collocations. He also consulted different dictionaries to check the accuracy of collocations used by the participants. It makes the analysis reliable. Another interesting point of the design is the comparison of collocation used by high proficient learners and the low proficient group which illustrates the characteristics of native-likeness.

There were two experimental studies on collocations conducted as a quasi-experimental study (Pereyra, 2015) and an action research in a Chinese college (Xu, et al., 2012) . These two studies included reading-related activities to examine the acquisition of collocation. Pereyra (2015) had the participants voluntarily read the extensive reading resources- i. e. , graded readers, as much as they liked. The researcher used many instruments to examine the acquisition of the collocations-i.e., tests, reading diary, questionnaire, and interview. The good point was that the lexical chunk knowledge test was administered several times to measure the progress of the acquisition. Other instruments were employed to observe the learners' behaviors. In their study, Xu et al. (2012) aimed to employ the lexical approach to optimize collocation knowledge of L2 learners. The main input was the explicit teaching of collocation. The learning dealt with the analysis of the reading texts and different repetition exercises. The findings suggested a positive attitudes of learners towards learning English collocations. The use of reading materials suggested that reading is a crucial form of language exposure for learners in non-English speaking context. The findings of both studies indicate that reading is crucial for the acquisition of collocation.

Fernández and Schmitt (2015) conducted a study to examine the acquisition of English collocation by groups of Spanish learners who had different degrees of language exposure. The researchers did not provide the participants with any input. They administered an English language exposure questionnaire and a productive test of collocation knowledge to a group of Spanish learners of English in Spain. The findings showed a high correlation between extensive reading activities and the collocation knowledge.

A number of studies investigated Thai learners' knowledge of collocation. Either perception or production tests were employed. Mallikamas (2005) conducted a study with a group of undergraduate students studying in the same faculty. Detdamrongpreecha (2014) and Suwitchanphan and Phoocharoensil (2014) examined the learners in different programs where the use of English as a medium of instruction varied- i.e., English program, international program, and non-English program. The learners in these programs were believed to have different degree of exposure to English language.

The perception task used in previous studies was the multiple choice task (Malikamas & Ponpairoj, 2005; Detdamrongpreecha, 2014). The production tests and a task used to examine the collocation knowledge were gap filling task (Malikamas & Pongpairoj, 2005), Productive Collocational Proficiency Test (Detdamrongpreecha, 2014), Gap-Filling Test, Collocation Selection Test, and Descriptive Written Task (Suwitchanphan & Phoocharoensil, 2014). The findings showed that Thai leaners had a wide range of problems with collocations. Malikamas and Ponpairoj (2005) pointed out that grammatical collocations, e.g., preposition + adjective (*at large*), verb + preposition (*prey on*), and verb + to infinitive (*continue to*). These collocations are the composition of an open class word with a closed class word, which can be noticed that they include the function words (closed class word). One function word can be matched with the different content words (open class word) in many ways. It could be assumed that the links between the function words and the content words in the mental lexicon are not as strong as the links between content words which are considered lexical collocations (e.g. *high wind, make a decision*). Among different types of the lexical collocation, Detdamrongpreecha, (2014) and Suwitchanphan and Phoocharoensil (2014) found that Thai learners had difficulties with certain types of

collocation. In Detdamrongpreecha, (2014), the findings showed learners achieved the higher scores in noun-noun collocation test than the adjective-noun and verb-noun. There was no example of collocations provided in this study. It is unclear why learners performed better in the noun-noun collocation test. Suwitchanphan and Phoocharoensil's study (2014) examined the use of adjective + noun collocation in Thai leaners who were in English and non-English program. The results revealed that the learners in the non-English program performed better than those in the English program. The researchers point out that being exposed to English language is not sufficient to acquire collocations. Learners need to practice using collocations. The acquisition of collocation among Thai learners has been well studied; however, there is a lack of research that employs psycholinguistic approach.

2.4 Interlanguage Studies on Vocabulary Acquisition

The concept of interlanguage and related studies on vocabulary acquisition are reviewed in this section.

2.4.1 Concept of Interlanguage

According to Selinker (1972), learners create a unique language system, known as Interlanguage (IL) which shares neither characteristics of the learner's native language nor the target language. IL contains systematic errors which are rule-governed. These errors could be shifted over time due to different variables, e.g., training, exposure to native language, etc. Selinker proposed five psychological processes: language transfer, transfer-of-training, strategies in L2 learning, strategies in L2 communication, and overgeneralization of target language linguistic materials. Language transfer refers to the fossilizable items, rules and subsystems which occur in the interlanguage performance due to the effect of the native language. Either positive or negative transfer have the effects on L2 learning to some extent. Transfer-of-training occurs as a result of the textbook and teachers. It reflects the assumption of learners from what and how they have been taught. Another process, strategies of second-language learning, is what learners employ when they conduct their learning. Learners' use of strategies can be varied due to different factors, e.g., learning style, motivation, gender, age, etc. Apart from learning, the strategies of second-language communication concern a process used by L2 learners. Such strategies are the techniques that learners use to overcome their communication problems. However,

learners may ignore the correct form of language when they use these strategies. The last process is overgeneralization of target language linguistic material which refers to the wrong assumption of learners about some rules and semantic features of the target language.

2.4.2 Interlanguage Studies on Vocabulary Acquisition

Three interlanguage studies in vocabulary acquisition were presented to support the assumption that the use of vocabulary in L2 learners is unique and varied depending on levels of proficiency. Such phenomenon occurs because of several factors, e.g., social-cultural background, exposure to English language, gender, etc. The high proficient L2 learners are believed to be more native-like than the less proficient group.

Dawaele and Pavlenko's (2002) study showed that advanced learners did not use English at the same level as native do. They examined the factors affecting the use of English emotion words by L1 Russian speakers. There are two groups of Russian learners: learners of English who studied in Russia (EFL learners) and the learner of English who were in the United States (ESL learners). They were asked to watch a film containing the stimuli. The three-minute film has a sound track but no dialogue. After they watched the film, each participant was asked to narrate the story. The narrations were transcribed and analyzed to find the list of emotion words. The findings showed that the frequency of emotion word tokens produced by the EFL learners and ESL learners was not significantly different. However, the ESL learners were able to produce a variety of emotion lemmas. It could be assumed that the experience in the English speaking country is related with the vocabulary knowledge growth. The performance of the EFL learners and ESL learners was compared with the native speakers of English. The findings showed that the range emotion lemmas produced by native speakers was wider than the L2 learners. It could be assumed that the ESL learners were the proficient users of English emotion words who tended to be more native-like than the EFL learners.

Wander (2018) conducted an interlanguage study on vocabulary acquisition among L2 learners. The researcher investigated English vocabulary by Dutch learners who were grouped into different levels of proficiency. The secondary school students who were asked to do three tests, i.e., translation test, a judgment task, and an analysis

test (analyzing the meanings of pseudo words from affixes). The experiments were conducted to compare the L2 learners who were very proficient and less proficient. The findings showed that the learners in the high-proficiency group performed better in using L2 morphological types. Wander (2018) conducted another study with the advanced learners of English studying at the universities in the Netherlands. A priming experiment was used to explore the vocabulary acquisition of this group of learners. The results support Selinker's interlanguage concept that proficient learners of English were better in using L2 morphology types.

Sridhanyarat (2018) examined the English vocabulary acquisition of Thai learners with high proficiency group and the less proficiency group. The researcher employed a receptive task and a productive task to examine the knowledge of grammatical and lexical collocations. The findings suggested that the performance of the high-proficiency group was slightly different from the lower-proficiency group. While the high group did well in the verb-preposition task, the less proficient learners had difficulty with all types of collocations (verb-preposition, adjective-preposition, verb-noun, and adjective-noun collocations). The results confirm the distinction between the learners with different L2 competence.

2.5 Factors Affecting Vocabulary Acquisition

The factors reviewed in this section include exposure to English language, vocabulary size, Krashen's affective filter hypothesis, and meta-learning.

2.5.1 Exposure to English Language

The degrees of language exposure tend to have an effect on L2 learner's language performance. Fernández and Schmitt (2015) examined the acquisition of English collocation by Spanish learners. The researchers developed a questionnaire to examine the degrees of English engagement. The findings showed that there was a relationship between knowledge of collocations and the opportunities to be exposed to language. Reading, watching TV and films, and online social networking were found as the useful learning resources for L2 learners living in non-English speaking countries (EFL contexts). Similar with Spanish, Thai learners who had high exposure tended to perform better in different language tasks.

Under the Center for Research in Speech and Language Processing (CRSLP), Chulalongkorn University, Thailand, the relationship between the exposure to English language and the language performance was extensively proven. The studies on pronunciation (Chaitawin, 1997; Kijkar, 2004; Nimphaibule, 1996; Pongpairat & Luksaneeyanawin, 2013; Sertthikul, 2004; Tanisarn, 2011), syntax (Thaworn, 2011), semantic (Jang-arun & Luksaneeyanawin, 2016) , pragmatic (Modehiran, 2005; Worathumrong & Luksaneeyanawin, 2016) , and lexical processing (It-ngam & Luksaneeyanawin, 2018; Sudasana, Luksaneeyanawin, Burnham, 2001; Sudasana, 2002; Wong-Aram, 2011) clearly found the effect of the degrees of exposure on L2 learners' performance. The participants who were exposed to English in the higher level performed better than those with fewer experiences. An English Language Exposure (ELE) Questionnaire was developed by this group of researchers working with Luksaneeyanawin to examine the degrees of English language exposure. Although the questionnaire has been adjusted depending on the objectives of a particular study, it is proved that a higher degree of English knowledge can be obtained by more contact hours with English language. The present study examines the effect of exposure on the vocabulary acquisition.

2.5.2 Word Frequency and the Vocabulary Size

Word frequency has been widely used in vocabulary learning and researching. West (1953) developed a list of high frequency word called General Service List. There are 2,000 head words in this list. There are attempts to improve the list of high frequency words for learning, teaching and researching- i.e., New General Service List (new-GSL) by Lancaster University (Brezina & Gablasova, 2013) and the New General Service List (NGSL) developed by Brown (2014). These recent word lists were developed based on the idea that learners of English should have up-to-date words selected from what are currently used by speakers of English language. The lists are promoted to be used for developing teaching materials, testing, and learning resources. The size of these two lists is similar. The NGSL has 3,000 words while the new-GSL has 2,500 words. It is noticed that the number of words in all three lists is very similar. There are approximate 2,000 – 3,000 high frequency words. Based on Nation (2013), high frequency words cover approximately 98% of running words in the texts. Nation (2013) points out that high frequency words are worth learning (and

memorizing for the meaning) because the coverage of these words is wide. Learners have high tendency to repeatedly encounter the frequent words. Nation (2013) suggests that L2 learners need to know at least 2,000 -3,000 words to be able to communicate, read, or use English language fluently.

To learn new words (which are the high frequency words), Nation (2013) recommends deliberate learning. It is the attentive learning for which learners need to contribute times to memorize words via different activities. Several vocabulary learning activities could be done to reinforce the learners, e.g., keyword technique, 4-3-2 or reading graded readers. Elgort (2011) and Yamamoto (2014) found that deliberate learning facilitates vocabulary acquisition in adult learners. Similarly, Subon (2016) examined if direct vocabulary instruction works well with L2 learners in Malaysia. The researcher found that the vocabulary size of students in all groups (beginner, intermediate, advanced) significantly increased. For the low frequency words, Nation (2013) suggests that learners should not waste their time memorizing them. There are approximately 20,000 – 30,000 words which are low frequency words. However, these words cover only 2-3% of running words in the text. Learners had better spend their time to practice vocabulary learning strategies like guessing from the context (Nation, 2013).

2.5.3 The Affective Filter Hypothesis

The Affective Filter Hypothesis was originally proposed by Dulay and Burt (1977). It was then incorporated in the Five Hypotheses about Second Language Acquisition (Krashen, 1982): (1) the acquisition-learning distinction, (2) the natural order hypothesis, (3) the Monitor hypothesis, (4) the input hypothesis, and (5) the Affective Filter hypothesis. The Affective Filter Hypothesis deals with the way that three affective variables (motivation, self-confidence, and anxiety) facilitate the L2 acquisition. Integrative motivation is a type of motivation that engages L2 acquisition. Having integrative motivation, L2 learners are interested in learning language and they are willing to experience the language in their daily lives (Gardner, 1988). The L2 acquisition tends to happen easily with the learners who have integrative motivation, self-confidence, and low anxiety. According to Krashen (1982), the affective filter is conceived to have different levels, i.e., weak or strong, depending on the attitudes. Krashen points out that having strong positive attitudes leads to low

affective filter. When the affective filter is low, the acquisition potentially occurs from the comprehensible input. Besides, he views that the affection facilitates the delivery of the input which is the primary causative factor of the acquisition. With the low affective filter, it is possible that learners who learn English as a foreign language (EFL) maximize the acquisition. In the present study, the participants were learners living in the EFL context. The learners whose performance in the experiments was better tend to have positive attitudes towards English language. The Affective Filter Hypothesis will be discussed in Chapter 5 to support the investigation of factors affecting the vocabulary acquisition.

2.5.4 Meta-learning

Bialik, Bogan, Fadel, and Horvathova (2015) propose that learners in the twenty-first century need to be able to identify what information can be learnt and which should be relevant to the concept that they are looking for. For example, a learner who found some unknown words frequently in a book he/she read should be able to look for the meanings of these words from the appropriate resources, e.g., online dictionary. Biggs (1985) describes the meta-learning as a state when the learner is aware of and takes control of their learning. Meta-learning promotes the process of self-reflection and learning how to learn. Jackson* (2004) proposes that meta-learning is a sub-concept of metacognition and self-regulation. It is a characteristic of active learners, which refers to the thought about their own learning and the behaviors that engage them to the learning. As for language learning, meta-learning refers to the ability to spell out how one learns. To investigate the factors affecting vocabulary acquisition, the relationship between the lexical processing and meta-learning, which is a learning method, should be found in the group of high achievers.

In sum, the review of literature illustrates a clear picture of lexical priming, as a tool in psycholinguistic studies and the related theories. The concept of vocabulary acquisition is presented along with the previous studies in lexical processing and vocabulary acquisition. The interlanguage studies related to vocabulary acquisition are reviewed. The last part presents the factors affecting vocabulary acquisition: English language exposure, vocabulary size, affection, and the meta-learning. In the next chapter, the design of the study is described.

CHAPTER III
RESEARCH DESIGN

The present study is a mixed method design, in which the experiments were conducted to test the hypotheses and a qualitative study was carried out to find the factors affecting English vocabulary acquisition of Thai learners. There were seven instruments in this study: Lexical Decision Task (K. Forster, 1976; K. I. Forster & Bednall, 1976; K. I. Forster et al., 1987; O'Connor & Forster, 1981; Marcus Taft & Forster, 1975, 1976), Word Association Task (McNeill, 1966), English Language Exposure Questionnaire (Centre for Research in Speech and Language Processing (CRSLP), vocabulary learning journal, Vocabulary Size Test (I. S. P. Nation & Beglar, 2007), interview, and observation. Each instrument was selected for the stratified random sampling of the learners, and to answer the research questions and screen the participants.

3.1 Population and Samples

3.1.1 Population

Thai learners of English refer to the undergraduate students who study English courses at Burapha University, Thailand. Most students have learnt English for over 12 years. They graduated from different kinds of schools, e. g., Thai schools in a regular program or English program, international schools, bilingual schools. They had to take English courses for at least nine credits at the university. The Thai language is used in their everyday lives. Based on the results of the pilot study, learners' degrees of language exposure were diverse ranking from very high exposure to very limited. The exposure to English language could be the instruction, language learning activities conducted outside the classroom, or experience in the English speaking environment.

3.1.2 Sample Group

The participants in this study were sampled with the stratified random sampling method. In the academic year 2018, there were approximately 30,000 undergraduate students who studied at Burapha University. Six hundred and twenty out of thirty thousand were asked to complete the English Language Exposure Questionnaire (Appendix A) voluntarily. There are 20 different faculties at the university, which can be grouped into three disciplines: health sciences, humanities

and social sciences, and science and technology. Approximately 200 students from each discipline were randomly selected to join the survey. The responses were rated by the scoring criteria (Details are in 3.2.1 and Appendix C). The participants were ranked by the scores from the lowest to the highest exposure (See details in Table 9 in 3.3.1). Figure 5 below illustrates the sample group selection process.
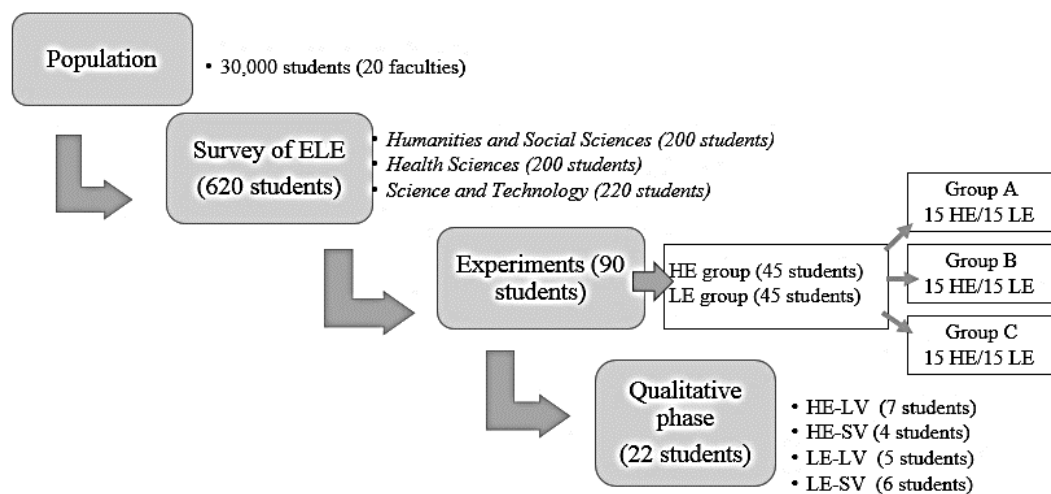
Figure 5 Sample group selection process

Out of 620 students who volunteered, 90 students were selected according to their English Language Exposure scores (45 high exposure students and 45 low exposure students). They were invited to be the participants in the experiments and the qualitative phase. These participants were 19 to 20 year-old students from different faculties- i.e., Logistics, Engineering, Management and Tourism, Humanities and Social Sciences, Sciences, Informatics, and Music and Performing Arts. To avoid the effects of hand preference, all experiment participants were right-handed.

To counterbalance, these 90 students were divided into three groups to use different sets of experimental items in the lexical decision task or (K. Forster, 1976; K. I. Forster & Bednall, 1976; K. I. Forster et al., 1987; O'Connor & Forster, 1981; Marcus Taft & Forster, 1975, 1976), namely groups A, B, and C. There were 30 participants in each group. Equal numbers of students with high exposure and low exposure were selected to each group by convenience. One group contained 15 students who have the highest English exposure scores (above the 75th of percentile)

and 15 students who have the lowest scores (below the 25th of percentile). The high exposure group are referred to as the HE-group and the low exposure group are the LE-group. These 90 students also did the word association task-WAT and the Vocabulary Size (I. S. P. Nation & Beglar, 2007).

Twenty-two out of these 90 participants who had distinctive degrees of language exposure and size of vocabulary were selected. These participants were divided into four groups: (1) the HE participants with large vocabulary size (HE-LV), (2) the HE participants with fairly small vocabulary size (HE-SV), (3) the LE participants with large vocabulary size (LE-LV), and (4) the LE participants with small vocabulary size (LE-SV). All of them were invited to write the vocabulary learning journal and to participate in the interviews.

3.2 Instruments

There were seven instruments in this study: English Language Exposure-ELE Questionnaire (Centre for Research in Speech and Language Processing-CRSLP), lexical decision task or LDT (K. Forster, 1976; K. I. Forster & Bednall, 1976; K. I. Forster et al., 1987; O'Connor & Forster, 1981; Marcus Taft & Forster, 1975, 1976), and word association task or WAT (McNeill, 1966), vocabulary learning journal, Vocabulary Size Test (I. S. P. Nation & Beglar, 2007), interview, and observation. They were used to select the participants and answer different research questions.

The ELE-Questionnaire was used for stratified random sampling of the participants for the experiments. There are two reasons to select this questionnaire. The first reason is the statements in the ELE-Questionnaire were developed for Thai learners. The second reason is the findings from many previous studies employing this questionnaire showed that this questionnaire was able to differentiate learners' performance in various linguistic tasks.

To answer research question 1 and 2, the LDT and WAT were conducted. These tasks have been widely used by scholars (Cangır et al., 2017; Durrant & Doherty, 2010; Teresa Fitzpatrick, 2007; Tess Fitzpatrick & Izura, 2011; Jones & Golonka, 2012; Sonbul & Schmitt, 2013; Wolter & Gyllstad, 2011) to examine the lexical processing and the organization of mental lexicon. In the present study, the

results from the LDT and WAT were compared to justify with lexical access of L2 mental lexicon.

Research question 3 contributes to the answers and the factors affecting vocabulary acquisition. Previous studies employed different instruments to examine the acquisition: English language exposure questionnaire and a productive test of collocation knowledge (Fernández and Schmitt, 2015), observations and focus group (R. Xu et al., 2012), English proficiency test, collocation knowledge test, reading diary, questionnaire, and interview (Pereyra, 2015). Questionnaire can give a lot of information about language background, learning activities, and the intensive English language exposure. To support the findings from the questionnaire, vocabulary learning journal and interview were used to collect data about vocabulary learning behaviors and attitudes towards vocabulary learning. The findings from these three instruments were compared and synthesized to find the influential factors.

Besides, the Vocabulary Size Test (I. S. P. Nation & Beglar, 2007) was employed to evaluate the vocabulary knowledge of the participants and to group the interview participants. Nation's Vocabulary Size Test was employed because it is a standardized test widely used by scholars. The test developer provides the testing manual which allows us to proctor the test properly. It is convenient to administer and score.

The description of the instruments is divided into 3 groups based on the phases of data collection: sampling, psycholinguistic tasks, and examining the factors affecting vocabulary acquisition.

3.2.1 Instrument Used for Sampling

The ELE-Questionnaire was employed to select the sample group. The questionnaire has been adopted by Luksaneeyanawain (2001) at the Center for Research in Speech and Language Processing (CRSLP), Chulalongkorn University, and many researchers working with her (Chaitawin, 1997; Jangarun and Luksaneeyanawin, 2016; Kijkar, 2004; Modehiran, 2005; Nimphaibule, 1996; Pongprairat, and Luksaneeyanawin, 2013; Sertthikul, 2004; Sudasana, Luksaneeyanawin, Burnham, 2001; Tarnisarn, 2011; Thaworn, 2011; Wong-aram, 2011; Worathumrong and Luksaneeyanawin, 2016). The questionnaire is used to measure the amount of time learners spent doing different activities that engage

English language. The high degree of language exposure refers to a lot of experience in using English in different situations (for study and recreational activities) and contexts (with family, friends, or other people). The researchers found that the degree of English language exposure underpins the students' performance in different linguistic tasks. The performance of learners with high degree of language exposure possesses the characteristics of nativelikeness.

There are three parts in the questionnaire: (1) information about English language experience and the amount of exposure at home and school, (2) information about the amount of time spent on all kinds of learning methods (formal education, extracurricular, and self-practice activities), and (3) intensive English language exposure. The first section relates to the amount of time that English language is used at home and the schools. The second section deals with the activities done in English either in the class or out-of-class. The respondents were asked to specify the frequency of doing each activity. The last section is about the experience in tutoring, traveling, and taking English courses abroad. The respondents were asked to rate how much time they spent in the English speaking environment.

Appendix A is the version of the ELE-Questionnaire used in the present study which is adapted from the versions used in the dissertations of Worathamrong (2016) and Wong-aram (2011). The second section of the questionnaire, which relates to the information about the amount of time spent on all kinds of learning methods- i.e., formal education, extracurricular and English self-practice activities, was revised. Some items were replaced because there is no sound lab or English club at Burapha University. The new items focus more on vocabulary exposure as follows:

- Item 3 "Have you ever looked up new words in the dictionary when you do activities?".

- Item 9 "Have you ever gone to see concerts using English language?"

- Item 13 "Have you ever read bulletin boards, bill boards, or other kinds of sign written in English?"

Based on the scoring criteria, the total raw score of this questionnaire is 194 points. Appendix B is the scoring criteria. The raw scores were calculated into weighted scores as follows.

Table 3 Scoring of the ELE-Questionnaire

Parts	Raw scores	Weighted Scores
Part 1: Activities related to formal learning at home and schools	37	35
Part 2: Activities related to informal learning	100	30
Part 3: Activities in intensive training and learning	67	35
Total	194	100

The weighted scores were used to select the learners with high and low English language exposure to be the sample group. To aid low proficient learners, the questionnaire was translated into Thai (see Appendix B).

3.2.2 Tasks Used in the Experiment Phase

The lexical decision task and word association task were used to explore the lexical access processing.

3.2.2.1 Lexical Decision Task (LDT)

The lexical decision task (LDT) is a psycholinguistic task which is conducted through a software called DMDX (K. I. Forster & Forster, 2003). The crucial part of this task is the development of the experimental items which is presented in this section.

3.2.2.1.1 The DMDX Software

The DMDX Software was developed by K. I. Forster & Forster (2003) to measure the reaction time to the stimuli. Under the assumption that, in the mental lexicon, if the elements of a collocation are stored more closely to each other than those of non-collocation, the reaction time of the collocation should be less. The LDT (K. Forster, 1976; K. I. Forster & Bednall, 1976; K. I. Forster et al., 1987; O'Connor & Forster, 1981; Marcus Taft & Forster, 1975, 1976) was used to examine the semantic priming effect of verb (prime) on noun (target). The task was presented on a laptop computer running DMDX software (K. I. Forster & Forster, 2003) with the word presenting in the center of the screen (see Figure 6).
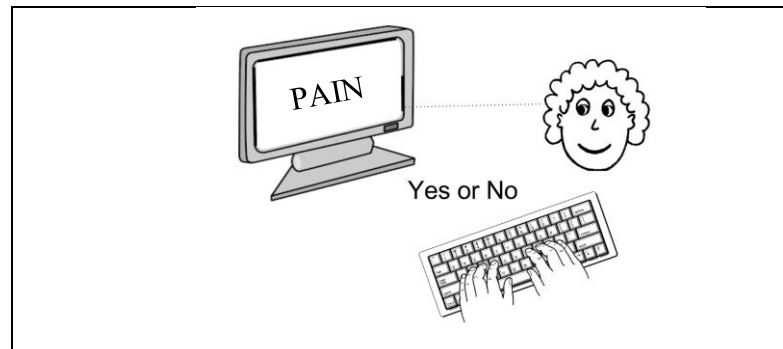
Figure 6 Lexical decision task

The present study focuses on the automatic lexical processing with priming. The assumption is that the brain can register the information of the primed words without conscious attention. In the LDT, the presentation of each prime word was very fast. As discussed in Table 2 (Chapter 2), the presentation of each experimental pair includes the display of fixation point (500 milliseconds), the initial word of prime (100 milliseconds), blank screen (50 milliseconds), and the target word (until response or by 2,000 milliseconds). The participants were asked to specify if the target was a word or a nonword by pressing the response buttons. Figure 7 is the presentation sequence for items on the LDT. The fixation point consists of 8 asterisks displayed in the same location as the subsequent prime words and target words. For example, the prime 'feel' is presented after the asterisks for 100 milliseconds and follow by a blank screen for 50 milliseconds. After that, the target word 'PAIN' is presented until the response time.
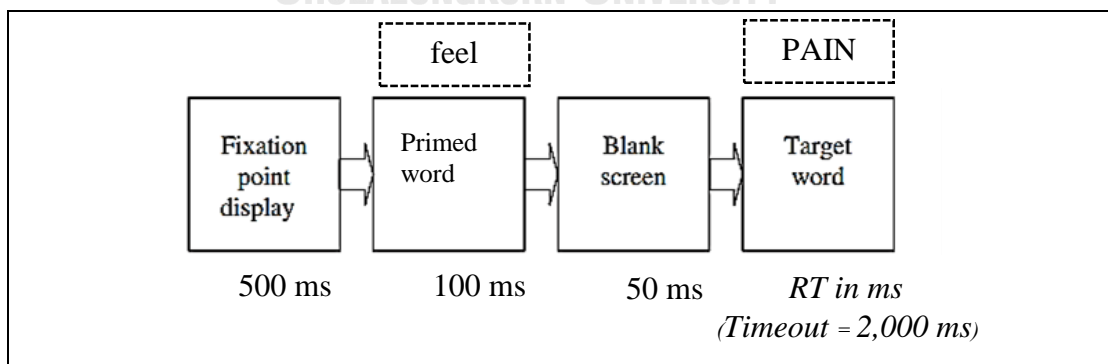
Figure 7 Presentation sequence for items on the LDT.

The program presents the letters on the screen and reaction time when the participant reacts to the target word in milliseconds. The reaction time is used to

indicate how easily the information of the target word is accessed when it is primed by another word. The next section gives a detailed description of item development and provides the list of the test items.

3.2.2.1.2 Experimental Item Development

To explore if the frequently co-occurring words are stored closely together, the experiment items are designed to be the lexical collocation. All the prime and target pairs are a verb + noun collocation. There are two reasons to use only one type of collocation (verb + noun) in the experiment. The first reason is to control the extraneous variables. As done in previous studies (Cangir et al., 2017; Gyllstad & Wolter, 2016; Wolter & Gyllstad, 2011), one type of collocation gives more reliable results. The second reason is to prove Hoey's (2005) proposal, that is, people are primed by repeatedly encountering words with their collocation and colligation. It is hypothesized that words are stored in our minds semantically and syntactically. Examining the verb + noun collocations represents the organization of collocation and colligation in L2 mental lexicon.

To confirm that the collocation is strongly linked in the mental lexicon, two more conditions are included in the LDT- i.e., non-collocation (verb + noun), and the filler (verb + nonword). The initial word of each collocation is the prime. For example, '*feel*' is the prime for '*PAIN*' (target word). The same prime is used to coin the non-collocation pair (e.g., '*feel-DRUG*') and the filler (e.g., '*feel-GWANE*').

The researcher selected the high-frequency words to be the experimental items because some of the participants had very limited English vocabulary knowledge and English language exposure as shown in the pilot study. The Vocabulary Size Test (Nation, 2007) was distributed to the pilot group to measure participants' vocabulary knowledge. The group included 80 students with the distinctive degrees of exposure and very limited exposure. They were second-year Burapha University students from different faculties in the academic year 2016. The findings showed that, among the undergraduate students who studied in the same context, their vocabulary knowledge was extremely diverse. The learner who had the smallest vocabulary size knew only 600 words. Meanwhile, the learner who had the largest vocabulary size knew approximately 5,900 words. The results from the pilot study suggested that the stimuli used in the experiments must be very common and easy words. The researcher

selected the very high-frequency words because the participants have already seen or acquired them.

There are five steps to create the list of test items: (1) selecting the verbs, (2) finding the nouns, (3) norming the collocations, (4) finalizing the list of verb-noun, and (5) selecting the nonwords.

The first step was selecting 35 verbs from the New General Service List (new-GSL) , which was developed by ESRC Centre for Corpus Approaches to Social Science (CASS), Lancaster University (Brezina & Gablasova, 2013). It was one of the most recent reliable word lists at the time this study was conducted. This list provides the first 500 words that are most frequently and currently used around the world. It is assumed that the participants in this study (L2 learners with high and low exposure) should have encountered the selected verbs.

The second step was choosing the nouns used in the collocation condition and non-collocation condition. All the collocations used in this study were the association of verb and noun without function word, e.g. *hear stories*. The criteria to select the nouns were the length in letters (4-7 letter word) and the frequency of the collocations. The COCA (The Corpus of Contemporary American English) was used to find the nouns in collocation and non-collocation conditions. In the collocation condition, the associative words must be the most frequently co-occurring nouns with the selected verbs. The selected nouns for the non-collocation condition were taken from the first 500 New-GSL words which must never co-occur with the verbs or co-exist at the very low frequency. The combinations of verb and noun to be included in the non-collocation list were checked if they ever co-existed in the COCA. Table 4 presents the list of verbs and nouns in the collocation and the non-collocation conditions in this study.

Table 4 List of verbs and nouns in the collocation and the non-collocation conditions

Collocations Primes	Targets	Frequency of collocation in COCA (7,769 – 99 coexisted)	Non-collocations Primes	Targets	Frequency of collocation in COCA (6 - 0 coexisted)
1. help	people	3,125	help	month	0
2. give	birth	1,275	give	park	0
3. make	sense	7,769	make	type	0
4. have	time	6,046	have	year	0
5. keep	track	2,198	keep	crime	0
6. raise	money	2,536	raise	name	0
7. need	help	2,652	need	page	0
8. read	books	684	read	room	0
9. hold	hands	476	hold	home	0
10. build	bridges	248	build	finance	0
11. apply	glue	100	apply	trace	0
12. begin	video	7,452	begin	mistake	0
13. know	things	400	know	part	0
14. come	visit	151	come	truth	0
15. find	work	957	find	class	1
16. want	peace	318	want	gear	1
17. write	letters	439	write	health	1
18. leave	town	440	leave	piece	0
19. show	signs	465	show	garden	6
20. feel	pain	304	feel	drug	0
21. call	police	142	call	point	0
22. bring	water	236	bring	company	0
23. turn	head	123	turn	case	0
24. provide	support	680	provide	force	4
25. start	crying	176	start	climate	0
26. meet	demand	173	meet	scale	0
27. hear	stories	232	hear	major	2
28. watch	movies	253	watch	comment	0
29. create	jobs	1,443	create	right	2
30. break	thing	109	break	child	1
31. develop	skills	213	develop	club	0
32. produce	results	220	produce	school	1
33. grow	food	155	grow	paper	0
34. spend	hours	621	spend	rooms	0
35. choose	side	99	choose	reason	1

The third step, norming the collocations, was conducted to validate the selection of the test items in collocation and non-collocation conditions. It is possible that Thai learners of English may not be familiar with some high-frequency collocations. Norming was done by having six English lecturers who were native Thais teaching English language at universities in Thailand to rate if the pair of words in the list are collocations. The teachers are considered the representative of L2

learners in the EFL context. The rating was done to check the familiarity with the selected collocations.

The list of collocations and non-collocations were roughly reorganized into 2 sets (set A and set B) using Latin-square design. Three English lecturers were asked to rate set A and another group of three rated set B (see Table 5).

Table 5 Order of collocations and non-collocations in set A and B

	SET A		SET B	
	verb + noun	**conditions**	**verb + noun**	**conditions**
1.	meet demand	collocation	help people	collocation
2.	need page	non- collocation	leave thought	non- collocation
3.	hear stories	collocation	give birth	collocation
4.	read room	non- collocation	show signs	collocation
5.	hold home	non- collocation	make sense	collocation
6.	watch movies	collocation	feel drug	non- collocation
7.	create jobs	collocation	have time	collocation
8.	build finance	non- collocation	keep track	collocation
9.	apply trace	non- collocation	call point	non- collocation
10.	break things	collocation	bring company	non- collocation
11.	begin mistake	non- collocation	raise money	collocation
12.	develop skills	collocation	need help	collocation
13.	produce results	non- collocation	turn case	non- collocation
14.	know part	non- collocation	provide force	non- collocation
15.	grow food	collocation	start climate	non- collocation
16.	spend hours	collocation	meet scale	non- collocation
17.	come truth	non- collocation	read books	collocation
18.	find class	non- collocation	hold hands	collocation
19.	leave town	collocation	apply glue	collocation
20.	show garden	non- collocation	build bridges	collocation
21.	choose side	collocation	hear details	non- collocation
22.	help month	non- collocation	watch comment	non- collocation
23.	want gear	non- collocation	write letter	collocation
24.	write health	non- collocation	begin video	collocation
25.	feel pain	collocation	create right	non- collocation
26.	give park	non- collocation	break child	non- collocation
27.	call police	collocation	know things	collocation
28.	keep crime	non- collocation	come visit	collocation
29.	make type	non- collocation	develop club	non- collocation
30.	bring water	collocation	produce school	non- collocation
31.	have year	non- collocation	grow paper	non- collocation
32.	turn head	collocation	want peace	collocation
33.	raise name	non- collocation	write letters	collocation
34.	provide support	collocation	spend effect	non- collocation
35.	start crying	collocation	choose reason	non- collocation

The raters decided if the presented words were collocations. There were three options for each item: '*Yes*', '*Not sure', and 'No*'." The scoring criteria of the rating are as follows:

- The 'Yes'   answer was scored   1
- The 'Not sure' answer was scored   0
- The 'No'   answer was scored   -1

The fourth step was to finalize the list of verbs and nouns. The scores were calculated and used to select 30 pairs of verbs and nouns. The selected collocations were the pair of words that got at least 1 score in the collocation condition and -1 or lower scores in the non-collocation condition. For example, the collocation '*feel pain',* which got 3 and the non-collocation '*feel drug'*, which got -2 were selected. The scoring results are presented in the Appendix D. According to Table 6, the pair items number 1 to 30 were selected.

Table 6 Scoring results of the collocations and non-collocations

Collocations	Scores	Non-collocations	Scores
1. feel pain	3	feel drug	-2
2. call police	3	call point	-3
3. bring water	2	bring company	-3
4. turn head	3	turn case	-2
5. give birth	3	give park	-3
6. make sense	3	make type	-2
7. have time	3	have year	-2
8. keep track	3	keep crime	-2
9. need help	3	need page	-3
10. provide support	3	provide force	-1
11. meet demand	3	meet scale	-2
12. read books	3	read room	-3
13. hold hands	3	hold home	-2
14. watch movies	3	watch comment	-2
15. create jobs	2	create right	-3
16. build bridges	3	build finance	-2
17. break things	2	break child	-2
18. develop skills	3	develop club	-2
19. begin video	2	begin mistake	-2
20. grow food	3	grow paper	-3
21. spend hours	3	spend room	-2
22. come visit	1	come truth	-2
23. want peace	3	want gear	-1
24. write letters	3	write health	-1
25. leave town	3	leave peace	-3
26. show signs	3	show garden	-2
27. start crying	3	start climate	-3

Collocations	Scores	Non-collocations	Scores
1. know things	1	know part	-2
2. help people	3	help month	-3
3. hear stories	3	hear major	-1
4. choose side	3	choose reason	1
5. produce results	0	produce school	-3
6. raise name	0	raise money	2
7. find class	1	find work	0
8. apply trace	0	apply glue	-1

The pair items number 31 – 35 were excluded because they were not distinctively considered as a collocation or the non-collocation. For example, the pair item of the verb '*choose*' with noun '*side*' was scored 3 in the collocation, but the non-collocation '*choose reason*' was scored 1. There was a potential that some Thai learners recognize '*choose reason*' as collocation and it affects the reaction time in the LDT. As the same verb needs to be used for comparing the reaction time in the collocation and non-collocation conditions, recognize '*choose reason*' and '*choose side*' were removed from the list.

The last step was selecting the nonwords to form the fillers which were the combinations of verbs and nonwords. The verbs derived from the third step were used to form the pairs. The nonwords were taken from the Australian Research Council-ARC nonword database (Harrington & Coltheart, 2002). After the potential LDT was tried out with the pilot group, the list of nonwords was revised. The nonwords, which were not in the same length with the target words in collocation condition, were changed. For example, '*s*' was removed from the nonword '*corlds*'. Table 7 is the list of final experimental items used in the lexical decision task.

Table 7 Experimental items used in the lexical decision task

Collocations		Non-collocations		Fillers (nonwords)	
prime	target	prime	target	prime	target
feel	pain	feel	drug	feel	gwane
call	police	call	point	call	corld
bring	water	bring	company	bring	shorst
turn	head	turn	case	turn	glamp
give	birth	give	park	give	granx
make	sense	make	type	make	volm
have	time	have	year	have	grourn
keep	track	keep	crime	keep	bract
need	help	need	page	need	twint

Collocations		Non-collocations		Fillers (nonwords)	
prime	target	prime	target	prime	target
provide	support	provide	force	provide	jous
meet	demand	meet	scale	meet	phooze
read	books	read	room	read	steave
hold	hands	hold	home	hold	trox
watch	movies	watch	comment	watch	stilch
create	jobs	create	right	create	spact
build	bridges	build	finance	build	wrawpth
break	things	break	child	break	cuck
develop	skills	develop	club	develop	chigh
begin	video	begin	mistake	begin	swirst
grow	food	grow	paper	grow	vonx
spend	hours	spend	room	spend	chold
come	visit	come	truth	come	ghous
want	peace	want	gear	want	gloze
write	letters	write	health	write	gnuck
leave	town	leave	peace	leave	scoke
show	signs	show	garden	show	stromp
start	crying	start	climate	start	phryled
know	things	know	part	know	thwecs
help	people	help	month	help	oiced
hear	stories	hear	major	hear	chold

3.2.2.2 Word Association Task (WAT)

The WAT (McNeill, 1966) was conducted to investigate the organization of L2 learner's mental lexicon. The participants were presented with a word (cue word) at a time. After they saw the cue word, they were asked to write the first English word that comes to their minds in the response sheet. The assumption was the word that the participants wrote should be stored closely with the cue words in their mental lexicons.

The cue words used in this study include 30 verbs and 30 nouns used in the LDT so that the responses in the WAT could be compared with the LDT. All cue words (stimuli) are high-frequency words taken from the new-GSL (Brezina & Gablasova, 2013). There are two reasons to select the frequently occurring words. First, there is a high tendency that all participants have encountered them. The high-frequency words are words that appear much more often than other words in the different genres of texts. Second, Fitzpatrick (2007) suggested that the high-frequency words produce more predictable responses.

The WAT was tried out with a group of participants. The findings showed that most of the participants were able to fill in all words. The researcher decided to use all the words in the list and to explore the cause of giving blanks from the interview. The list of the stimuli is presented in Table 8.

Table 8 Cue words in the word association task

Verbs		Nouns	
1.	feel	1.	time
2.	call	2.	people
3.	bring	3.	company
4.	turn	4.	water
5.	give	5.	head
6.	make	6.	sense
7.	have	7.	type
8.	keep	8.	year
9.	need	9.	support
10.	provide	10.	book
11.	meet	11.	room
12.	read	12.	hand
13.	hold	13.	home
14.	watch	14.	job
15.	create	15.	child
16.	build	16.	food
17.	break	17.	paper
18.	develop	18.	hour
19.	begin	19.	health
20.	grow	20.	part
21.	spend	21.	month
22.	come	22.	point
23.	want	23.	story
24.	write	24.	school
25.	leave	25.	side
26.	show	26.	reason
27.	start	27.	piece
28.	know	28.	page
29.	help	29.	town
30.	hear	30.	garden

3.2.3 Instruments Used to Examine the Factors Affecting Vocabulary Acquisition

Four instruments, including Vocabulary Size Test (Nation & Beglar, 2007), vocabulary learning journal, interview questions, and observations, were used to examine the factors affecting the vocabulary acquisition.

3.2.3.1 Vocabulary Size Test

The Vocabulary Size Test (Nation & Belar, 2007) is designed to measure total receptive vocabulary size, which refers to the numbers of English words learners know. It measures the knowledge of written word form, form-meaning connection, and a small degree of concept knowledge. This proficiency test has several versions created for native speakers and non-native speakers. In the present study, the 14,000-word monolingual version (English only) was used. There are 140 multiple-choice items in the test. Ten items were selected from each 1,000 word family level. The words were sampled by frequency levels of the word family lists in the British National Corpus. It is pointed out that the sampling of word from each level is quite small, so the test does not reliably measure how well each word level is known. The goal is to use the total test score for estimating the vocabulary size. The total score has to be multiplied by 100 to get the total receptive vocabulary size. For example, a learner who gets a 45 score from the test knows approximately 4,500 words. The item stem consists of the word and a simple non-defining sentence which contains the word. The provided sentence is used to indicate the part of speech of the word, scope down the meaning, and hint the meaning of the word. Four choices are presented with the test stem. All distractors and the correct answer are the same part of speech. The example of a test item is presented below.

soldier: He is a soldier.

a. person in a business

b. student

c. person who uses metal

d. person in the army

The participant needs to choose the best choice that matches with the meaning of the word '*soldier*' in the given sentence (context).

In the present study, the aim of using this test is to find the relationship between vocabulary size and the acquisition of collocations (the lexical processing observed in the experimental phase).

3.2.3.2 Vocabulary Learning Journal

The vocabulary learning journal aims to explore how learners deal with new words encountered when doing English language learning activities, e.g., listening to

music, reading books, etc. The participants who attended the focus group interviews were asked to write a journal explaining their vocabulary learning behaviors. This journal includes 5 open-ended questions (See Appendix E) . To gain as much information as the participants can provide, writing the journal in Thai was allowed. There was no limit of time and length to write the journal.

3.2.3.3 Interview Questions

An indepth-interview was employed. The aim of conducting the interview is to explore factors that affect the English vocabulary acquisition of Thai learners

The questions were about learners' exposure to English language, the vocabulary learning, their attitudes towards English language, and their responses to the WAT. The questions are as follows:

1. *Exposure to the English language*

A. What do you like to do in your free time?

B. Do you use or encounter any English words in the activities? What are they?

C. How do you find English in your daily life? How do you use English in your study?

D. What do you read in English? Why do you read it? Is this an assignment from your teacher?

E. In your free time, do you read anything in English? What are they? Do you share what you read with anyone? Why do you read them?

2. *Vocabulary Learning*

A. When and where do you see English words?

B. What will you do you when you see unknown English words?

C. Is it necessary to find the meanings of these new words? Why?

D. What materials or websites do you frequently consult when you see unknown English words?

E. Do we need to try using new words we have faced when we use English? Why?

F. What is the best way to learn English vocabulary?

3. *Attitudes towards English Language*

A. What do you think about learning English language?

B. Do you think learning English is easier than learning other things such as calculation, statistics, cooking, drawing, and playing sports? Why? Or why not?

C. How is English important to your life?

4. Responses to the Word Association Task

A. Why did you think of this word when you see the word '*feel*', '*hear*'? (This question was adjusted depending on the respondents.) There were some follow up questions when the participants explained their responses.

3.2.3.4 Observations of the Related Resources

The observation refers to the investigation of the English language learning resources that the participants reported doing. The aim was to examine whether the English language was accurately and appropriately used in these resources. The list of the resources is derived from the interviews. The observed resources include the websites or applications that the participants frequently visited or used (e.g. Reddit), books and handouts that they read in English (e.g. coursebook, handout created by their lecturers), pages on Facebook or Instagram where English is used for learning and communication, songs or movies (they watched), and places around the university they commonly went and the use of English around the campus (e.g. a department store, buildings on campus). The criteria of observation are the types of resources and the quality of language used in particular resources.

In sum, the English Language Exposure Questionnaire was used to select the sample groups and describe the characteristics of Thai learners in learning English. The LDT and the WAT were used to investigate the lexical priming process. The Vocabulary Size Test, vocabulary learning journal, interview, and observations were used for investigating the factors affecting the vocabulary acquisition of different groups of learners with different degrees of English exposure and different vocabulary size.

3.3 Data Collection

The data collection was divided into 3 phases: survey and sampling, experiments, and the investigation on factors affecting vocabulary acquisition.
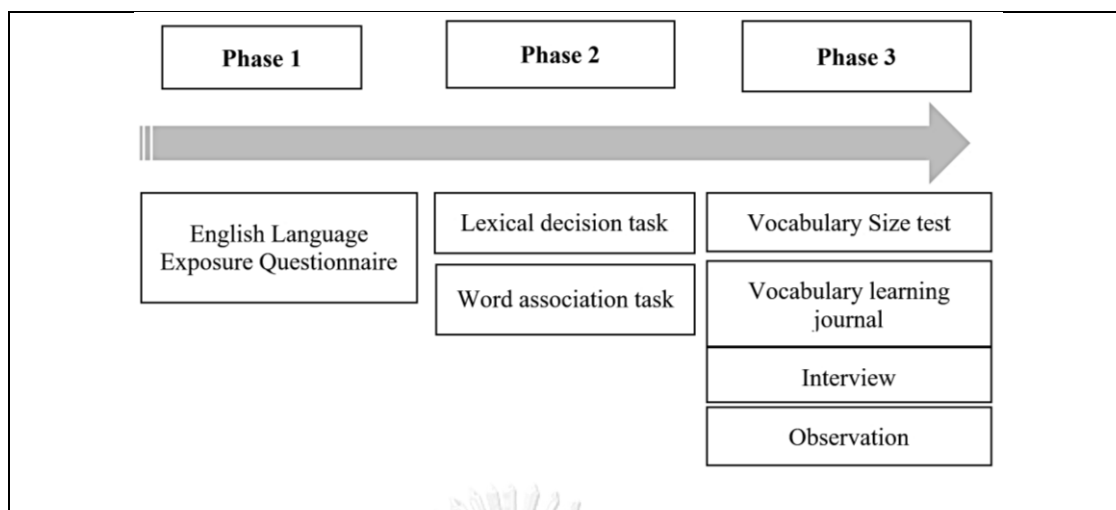
Figure 8 Data collection procedure

3.3.1 Survey and Sampling Phase

The first phase was conducted to stratified-random sample the participants with distinctive degrees of language exposure. Six hundred and twenty participants were randomly selected to complete the ELE-Questionnaire. They received an explanation about the objectives of the study and that their participations was voluntary. The participants spent approximately 20 to 30 minutes to complete the questionnaire. Based on the scoring criteria presented in the instrument section, the responses were rated. The average ELE scores of all participants are as follows.

Table 9 ELE scores of the participants (N = 620)

Raw Scores	Part 1 37	Part 2 100	Part 3 67	Total 207	Weighted Scores%
Mean	20.36	48.17	4.29	72.81	35.07
Standard Deviation	4.39	13.46	5.36	18.02	7.80
Minimum	9.00	8.00	0.00	19.00	12.81
Maximum	31.00	89.00	34.00	124.00	59.37

The findings show that the degree of exposure to English language among the group was extremely different (min = 12.81%, max = 59.37%, mean = 35.07%, S.D. = 7.80). The finding is consistent with the previous studies that employed the same questionnaire presented in Table 10 (Pongprairat, 2011; Tarnisarn, 2011; Wong-aram, 2011; Worathamrong, 2016). It could be noticed that the range of language exposure

is wide in all studies. In the present study, the average score of ELE is not high (35.07%). Most participants have very little experience in intensive exposure.

Table 10 Findings from the ELE-Questionnaire

	Pongprairat (2011) N =243	Tarnisarn (2011) N =284	Wong-aram (2011) N =330	Worathamrong (2016) N =120	Present study N =620
Scores (%)					
Mean	41.19	33.22	37.15	35.54	35.07
S.D.	7.28	27.45	8.75	11.93	7.80
Minimum	21.5	7.21	12.61	14.11	12.81
Maximum	57.5	54.95	72.67	58.26	59.37
Participants					
Nationality	Thai	Thai	Thai	Thai	Thai
Level of education	undergraduate students	High school (grade12)	undergraduate students	undergraduate students	undergraduate students
Fields of study	English language	-	history, languages, anthropology	psychology, education, engineering, and sports science	psychology, education, science, logistics, accounting, political law, informatics, humanities and social sciences, pharmacy, music and performing arts, and engineering

       As mentioned in the sample group section, the experiment participants, the HE-group and the LE-group, were selected from the scores of the questionnaire. Table 11 and Table 12 illustrate that the ELE scores of the HE-group and the LE-group were distinctive. An independent-sample t-test was conducted to compare the two groups. There was a significant difference in the average ELE scores between the HE-group (mean= 44.10, SD = 4.97) and LE-group (mean = 24.39, S.D. = 4.38); p = .00 < 0.05). The HE-group explicitly had a higher degree of English exposure than the LE-group. The lowest ELE scores in the HE-group were even higher than the highest score in the LE-group.

Table 11 The ELE scores of the HE-group and LE-group

	HE-group (n =45)	LE-group (n =45)
Mean	44.10	24.39
S.D.	4.97	4.38
Minimum	38.12	12.81
Maximum	59.37	31.17

Table 12 T-test Two-Sample Assuming Unequal Variances

	HE-group	LE-group
Mean	44.10	24.39
Variance	25.13	18.53
Observations	45.00	45.00
Hypothesized Mean Difference	0.00	
df	85.00	
t Stat	19.82	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.66	
P(T<=t) two-tail	0.00*	
t Critical two-tail	1.99	

Based on the scores of the questionnaire, 90 participants were selected for the experiments and the investigation of factors affecting vocabulary acquisition.

3.3.2 Experiment Phase

Based on the scores of the questionnaire, 90 participants (45 with high exposure and 45 with low exposure) participated in the experiments voluntarily. Every participant was paid one hundred baht after completing all the tasks. Individual participants were explained that they would be playing three English vocabulary activities. The first activity is the LDT. The participants looked at the letters on the screen and made the decision whether it was a word or not by pressing the button. In the second activity, Stroop task, the participant named the colors of the word aloud. This task was conducted to avoid the effect of priming on the WAT. The results from the Stroop task were not used in the present study. The last activity was the WAT, in which they looked at the word on the screen and wrote down the word that came to their mind on the response sheet. The response of WAT is open-ended because it activates complex association of words. The participants did the LDT before WAT so that the information being accessed in their minds was not overloaded.

3.3.2.1 Activity One: LDT

For the LDT, the participants were divided into three groups: A, B, and C. Each group consisted of 15 participants with the high English exposure scores (HE-group) and 15 participants who had the low scores (LE-group). Each group used a different set of experimental items listed in the Table 13. As mentioned in the instrument section, the same prime words were used to examine the response time of different target words presented in three conditions (collocation, non-collocation and fillers). The pair items in three conditions were combined in three counterbalance lists using Latin-Square design. No prime or target word was used more than once in each list.

As presented in the Table 13, there were three sets of the pair items containing 10 pairs of collocations, 10 non-collocations, and 10 combinations of words with nonwords (fillers). The items in three conditions were presented in random order. The participants were told that they were going to see the English words and nonwords. They had to decide as quickly as they could if the letters they saw on the screen were a word. Prior to the experiment, the participants practiced how to respond to the target words with the example set of words and nonwords. Their reaction time in the experiment was used to examine the organization of L2 mental lexicon. It took approximately 2-3 minutes to finish this task.

Table 13 Order of the experiment items in each set

SET A Participants group A (n=30; 15 HE and 15 LE)		SET B Participants group B (n =30; 15 HE and 15 LE)		SET C Participants group C (n =30; 15 HE and 15 LE)	
prime	**target**	**prime**	**target**	**prime**	**target**
feel	pain	feel	drug	feel	gwane
meet	phooze	come	ghous	meet	scale
read	steave	meet	demand	spend	hours
spend	room	read	books	break	child
come	truth	call	point	provide	jous
call	police	make	type	come	visit
hold	trox	want	gloze	hold	home
want	gear	have	year	watch	comment
write	health	hold	hands	need	twint
bring	water	show	stromp	want	peace
turn	head	keep	crime	write	letters

SET A Participants group A (n=30; 15 HE and 15 LE)		SET B Participants group B (n =30; 15 HE and 15 LE)		SET C Participants group C (n =30; 15 HE and 15 LE)	
prime	target	prime	target	prime	target
watch	stilch	watch	movies	read	room
leave	peace	write	gnuck	keep	bract
show	garden	create	jobs	leave	town
create	spact	build	bridges	create	right
need	help	need	page	give	granx
provide	support	spend	chold	make	volm
build	wrawpth	break	things	build	finance
start	climate	provide	force	show	signs
keep	track	leave	scoke	grow	paper
break	cuck	develop	skills	start	crying
develop	chigh	know	thwecs	have	grourn
know	part	give	park	begin	mistake
give	birth	begin	video	know	things
help	month	bring	company	call	corld
begin	swirst	start	phryled	hear	stories
hear	major	hear	chold	turn	glamp
grow	vonx	turn	case	develop	club
make	sense	grow	food	help	people
have	time	help	oiced	bring	shorst

3.3.2.2 Activity Two: Stroop Task

Stroop is a psycholinguistic task in which the participants say the color of the word out loud. In this study, the participants were asked to read aloud the name of colors, e.g., red, blue, green, and white. The colors of these words were different from the meaning of the words presented on the screen. For example, when a participant saw the word '*red*' in green color, they needed to say '*green*'. The students with high proficiency would have more interference from the color.
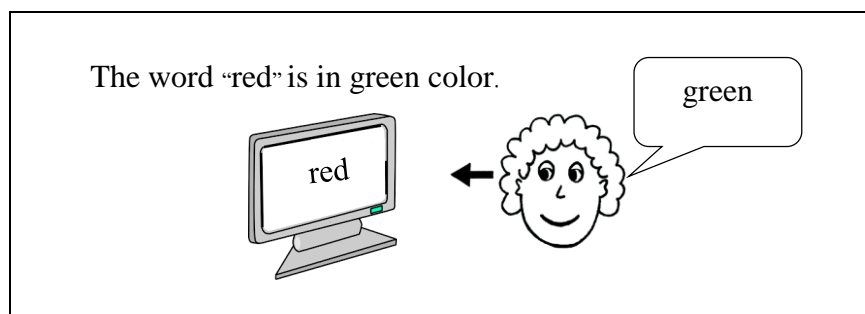
Figure 9 Stroop Task

3.3.2.3 Activity Three: WAT

After the Stroop task was completed, the participants took a rest for a few minutes. The participants were told that they were going to see 60 English words (Table 8). When each word was presented on the screen, the participants had to think of another English word and write the first word that came to their minds in the response sheet. The participants practiced responding to a few words before taking the task. When the participants were ready, a response sheet was distributed to the individual participant. The participants were explained in Thai to write the first English word they think of in the response sheet after seeing a given word on the screen. It was explained that there was no right or wrong answers, so they should not take a long time considering a response. This task took about 10 minutes.

3.3.3 The Investigation on Factors Affecting Vocabulary Acquisition Phase

After the participants completed the experiment tasks, they took the Vocabulary Size Test (Nation & Beglar, 2007). The participants spent around 20 minutes to finish the test. A few days or a week after that, 22 participants (7 HE-LVs, 4 HE-SVs, 5 LE-LVs, and 6 LE-SVs) were invited to join the focus group interviews. At one time, a group of three to five participants joined a focus-group interview. It has to be noted that the participants who have a very limited exposure and have very small vocabulary size tended to avoid the meeting. It could be assumed that they do not want to talk about learning English language as it is not in their favor. The learners with low exposure who agree to join the interview tended to be positive about English language. They admitted that they are not good at English, but they realized its necessity. The interviews were audio recorded and transcribed. The selected participants were asked to answer the questions in the vocabulary learning journal.

The researcher conducted the observations to examine the English language learning resources reported by the participants.

3.4 Data Analysis

The scores from the ELE-Questionnaire were calculated and weighted into percentage. The mean and standard deviation of the degree of English language exposure were analyzed. The scores of all participants were ranked to find 45 participants who have the highest scores and 45 of them who have the lowest scores among the 620 students who participated in the survey.

The data from the LDT were analyzed to find mean reaction time, standard deviation, and percentage of the error rates. The average response time on collocations, non-collocations, and combinations of words and nonwords (fillers) was analyzed and compared. Two-Way ANOVA was employed to compare the average response time among three conditions. The dependent t-test was used to compare response time between the HE-group and the LE-group.

Another set of data from the WAT was analyzed to categorize the associative words that the participants reported. To be able to form the types of association in the L2 mental lexicon, Fitzpatrick's (2007) classification of responses was utilized (Appendix F). This classification was selected because it was developed for analyzing L2 mental lexicon. Based on Fitzpatrick (2007), the responses are grouped into four types: meaning-based association (e.g., *empty-vacant, cold-uncomfortable, cat-animal, charity-kind*), position-based association (e.g., *hot-dog, weight-paper, bird-(get the)-worm*), form-based association (e.g., *scared-scary, very-berry*) and other types (e.g., *hamburger-swim* or no response given). In the present study, the researcher classified the responses of each participant and grouped them by level of language exposure (HE-group and LE-group). After that, the frequency of each type of responses was counted and translated into percentage. The ANOVA test was used to compare the responses between two groups of participants.

To explore the factors affecting the acquisition of vocabulary, all data from the ELE-Questionnaire, vocabulary learning journal, interview and observation, the Vocabulary Size Test, the LDT and WAT were examined. The ANOVA test was used to find the effect of the degrees of English language exposure on the lexical processing. The scores from the Vocabulary Size Test were calculated to figure the

vocabulary size of two groups of participant (HE-group and LE-group) and the average size. Based on the vocabulary size and the scores of the ELE-Questionnaire, twenty-two participants were invited to join the interview. To find the effect of the vocabulary size on the acquisition, the results from the LDT and WAT of the participants who have different vocabulary size and degrees of language exposure were examined. Content analysis was conducted to analyze the data from the vocabulary learning journal and the interviews. The data were coded by categories: vocabulary learning methods, exposure to English language, and the attitudes towards English language learning. The data from the observation were analyzed to find the quality of language input. The language learning resources reported by the participants were examined if the language used was degraded and appropriate for learners. The researcher identified the accuracy of language used in different resources, e.g., chat rooms of online games, handouts created by their lecturers, and songs.

The results on the lexical processing and organization of Thai learners and the comparison between the low and the high exposure learners are presented and discussed in Chapter 4. The factors affecting the vocabulary acquisition are reported in Chapter 5.

CHAPTER IV
THE LEXICAL PRIMING OF THAI LEARNERS

Chapter four deals with examining the lexical access and the organization in the English mental lexicon of Thai learners. The findings and discussion on the lexical priming are provided. As mentioned in Chapter 1, the lexical priming of the present study refers to the lexical access. Two psycholinguistics tasks, i. e., the lexical decision task (LDT) and the word association task (WAT), are used to prove the two hypotheses.

Hypothesis 1: The frequently co-occurring words are stored closely in the English mental lexicon of Thai learners.

Hypothesis 2: The learners with high and low language exposure have different mental lexicon, and different paths in lexical access of L2 words.

4.1 The Lexical Access of Thai Learners

The lexical access is examined through the lexical decision task (LDT). The reaction time from the LDT is used to indicate the distance between the prime and the target words in the mental lexicon. The fast response implies a close relationship between two words in the mental lexicon. As mentioned in Chapter three, there are three conditions in the LDT: collocation, non-collocation, and nonwords (fillers). The hypothesis is confirmed when the reaction time of the collocation is faster than other conditions with a statistical significance.

Table 14 Response time in milliseconds and errors in percentage of all participants (n=90).

Conditions	RTs (ms.)	Errors	SD	Min	Max
Collocation	878.87	15%	206.75	439.49	1511.18
Non-collocation	896.38	13%	220.08	386.65	1632.10
Non-words (fillers)	979.68	24%	233.96	404.58	1781.59

Table 14 illustrates the reaction time and percentage errors among three conditions. The results from ANOVA show that participants respond to the stimuli in the collocation condition faster than other conditions. The differences among mean reaction time of three conditions are significant ($F_{(2, 268)} = 5.49$, $p = 0.005$). The reaction time of the nonword condition is significantly different from collocation

condition (p = 0.002) and non-collocation condition (p = 0.000). The reaction time of the collocations is faster than the non-collocations with no significant difference (p = 0.578). The findings are consistent with the previous studies examining L1 Turkish speakers (Cangır et al., 2017) and L2 learners (Wolter & Gyllstad, 2011; Gyllstad & Wolter, 2016). The proportion of links between words in the mental lexicon as the lexical collocations could be large; however, it is possible that the other kind of association between words stored in the mental lexicon is also dominant.

As a cross-sectional interlanguage research, the lexical processing of two groups of learners with distinctive degrees of language exposure is investigated. In the present study, the learners with high exposure to English language are referred to as the HE-group and the learners with low exposure are the LE-group. The difference between the degree of language exposure of two groups is significant (HE-group's mean = 44.10%, SD = 4.97; LE-group's mean = 24.39%, SD = 4.38; p = .00).

The lexical processing of the HE-group and LE-group is compared through LDT. The findings show that the reaction time of these two groups are distinctive. The results from Two-way ANOVA exhibit that the difference between HE-group and LE-group is significant (F (2, 268) =14.98, p = 0.0001). The HE-group's response is faster than the LE-group's and the error rates of the HE-group are less than the LE-group in all three conditions (see Table 15).

Table 15 Comparison of the mean reaction time (milliseconds) and percentage of errors.

Conditions	HE-group (n = 45)		LE-group (n = 45)	
	RTs (ms.)	Errors (%)	RTs (ms.)	Errors (%)
Collocation	813.20	7%	933.94	21%
Non-collocation	830.40	5%	974.19	21%
Nonword (Fillers)	949.49	20%	1016.29	30%

The lexical processing of both groups is in the same pattern. The mean reaction time of the collocation is the faster than other conditions, non-collocation and nonword (See Table 15). The performance of both groups in the collocation condition is significantly faster than nonword (HE-group, t (44) = -3.69, p = 0.001; LE-group, t (44) = -2.28, p = 0.03). The average reaction time of non-collocation and nonword is

significantly different in the HE-group (t (44) = -3.61, p = 0.001). However, it is not distinctive in the LE-group (t (44) = -1.39, p = 0.17). The insignificance of the average reaction time in the LE-group could be a result of the limited chance to attentively encounter English words and the restricted vocabulary knowledge. It reflects that the LE-group has less strong L2 network of words.

The findings of the present study could be compared with Wolter and Gyllstad's (2011) that the faster reaction time in the collocation condition exhibit the characteristic of native-likeness. The performance of the HE-group exhibits the higher level of proficiency in lexical processing than the LE-group. The findings conform to the previous studies conducted in Thailand (Ayudhya, 2002; Sudasna et al., 2002; Wong-aram, 2011), which found the relationship between language exposure and language processing. The L2 processing of learners who have high degree of exposure tend to be faster and more proficient than the learners with limited language exposure.

Table 16 demonstrates that the reaction time to the collocation of both groups is slightly faster than the non-collocation. There is no significant difference between the reaction time of collocation and non-collocation in the HE-group; however, the difference in the LE-group is marginally significant (HE-group, t (44) = -0.83, p = 0.41; LE-group, t (44) = -0.19, p = 0.06). It could not be confirmed at this stage if the words are stored in mental lexicon as lexical collocation.

The errors were counted either when the participants gave no response (by 2000 milliseconds), or when the response was incorrect. It is obvious that the reaction time and the errors of the HE-group and the LE-group are dissimilar. The error rate of HE-group is much lower than the LE-group (collocation condition: HE= 7%, LE=21%; non-collocation condition: HE= 5%, LE=21%). It could be assumed that the links of the frequently co-occurring words in the English mental lexicon of HE-group are stronger than the LE-group. The performance of the HE-group exhibits higher proficiency in lexical processing than the LE-group. The findings are consistent with the previous studies conducted in Japan (Yamashita & Jiang, 2010) and Thailand Thailand (Ayudhya, 2002; Sudasna et al., 2002; Wong-aram, 2011) that the L2 processing of learners with high degree of language experience tend to be faster and more proficient than that of the learners with low exposure.

The performance of the HE-group and LE-group is in the same pattern. The reaction time to the collocations is faster than other conditions. The distinction is the HE-group respond to the stimuli faster than the LE-group in all conditions and produce fewer errors. This indicates that the HE-group has stronger links between the primed words and the target words than the LE-group.

It could be assumed that the frequently co-occurring words are stored closely in the mental lexicon. However, the results show that the processing of collocations is faster than the non-collocations with no significant difference in the HE-group. In other words, it could not be confirmed that the frequently co-occurring words (collocations) are stored more closely together in the mental lexicon than the non-collocations among the Thai learners. The collocation used in LDT is a fix-type, where the target words directly follow the prime. The lexical links in L2 mental lexicon are possibly not limited to only a lexical collocation. The other kinds of word association in the mental lexicon are revealed in the following section.

4.2 The Organization of L2 Mental Lexicon

The organization of the mental lexicon- i.e., the semantic network of words (Caroll, 2008), is explored through the WAT. The task requires the learners to produce an English word after they see the stimulus. For example, the learners are presented with the word '*feel*' and they need to write the first English word that comes to their minds in the response sheet, e.g. '*good*' or '*happy*'. The responses are analyzed using Fitzpatrick's (2007) classification: meaning-based association (e.g., *empty-vacant, cold-uncomfortable, cat-animal, charity-kind*), position-based association (e.g., *hot-dog, weight-paper, bird-(get the)-worm)*, form-based association (e.g., *scared-scary, very-berry*), and other responses (e.g., *hamburger-swim* or no response given).

The findings exhibit that the L2 lexical network is mainly meaning-based (34.03%). This evidence could explain the insignificant difference between the reaction time of the collocation and non-collocation in the LDT (section 4.1). Besides, having one third of responses as the position-based association (28.53%), the findings are consistent with LDT that many words are stored in the mental lexicon as collocations (see Table 16).

Table 16 The frequency of each classification (n=90).

Category	Numbers of responses (%)	
1. Meaning-based association	1,838	(34.03%)
2. Position-based association	1,541	(28.53%)
3. Form-based association	419	(07.76%)
4. Others	1,602	(29.67%)
Total	**5,400**	**(100 %)**

The findings are along the same line with the previous study that L2 learners mostly produce the meaning and position related responses (Fitzpatrick & Izura, 2011). In the present study, more than half of the responses are meaning-based (34.03%) and position-based (28.53%). Semantic and syntax play important roles in the mental lexicon. The organization of English words in the mental lexicon tends to have a strong semantic relationship and engages with the syntactic specifications of the words.

The findings of the present study partly support Hoey's (2005) claim, i.e., the perception and production of people for the specific collocated pairs in a particular context are due to the repeated encountering of the specific collocations. Hoey (2005) argues that being exposed to the pair of words frequently affect the memory of words in the mind. The claim implies that, having a syntactic link, the frequently co-occurring words are stored closely in the mental lexicon. As presented in Table 16 above, the largest numbers of word association in L2 mental lexicon are semantic-based rather than position-based.

In Fitzpatrick's (2007) study, the participants (L1 speakers) made other response (erratic association and blanks) fewer than 10%. As presented in Table 16, L2 learners left blanks and produced errors in a high proportion (29.67%). It could be discussed that the L2 network of Thai learners is not established well. The association of English words in L2 mental lexicon is not as strong as in L1.

Four types of responses are further analyzed into subcategories. Table 17 exhibits the responses in the subcategories of classification. Among all subcategories, the highest responses were the blanks (19.70%) and consecutive xy collocation (19.48%). The participants left blanks probably because they did not know the cue

words and did not want to guess. On the other hand, the consecutive association indicates the native-likeness where the learners can produce the words that are meaningful and grammatical in a short period of time.

Besides, the findings support Singleton (1999) that the conceptual store plays a role in L2 mental lexicon. Among four categories of meaning-based association, the participants mostly produce the conceptual-related words (17.80%). As well as the links of words by concept, the participants produce two consecutive types in the high proportion (xy collocation = 19.48%; yx collocation = 9.00%). It conforms to Hoey's (2005) claim that the collocated words are stored closely in the lexicon. The participants produce very limited numbers of form-based association (change of affix = 1.26%; similar form only= 6.50%). It is possible that the focus of vocabulary learning of the participants is meaning and usage rather than word formation so that the association of words in L2 lexicon is not mainly form-based.

Table 17 The responses in the present study (n=90).

Category	Subcategory	Example	No of responses (%)	
1.Meaning-based association	1.1 Defining synonym	*feel-emotion*	363	(06.72%)
	1.2 Specific synonym	*feel-touch*	74	(01.36%)
	1.3 Lexical set/ context related	*time-morning*	440	(08.15%)
	1.4 Conceptual related	*time-punctual*	961	(17.80%)
2.Position-based association	2.1 Consecutive xy collocation	*feel-good*	1,052	(19.48%)
	2.2 Consecutive yx collocation	*young-people*	486	(09.00%)
	2.3 Other collocational association	*someone-('s)-story*	10	(00.19%)
3.Form-based association	3.1 Change of affix	*call-calling*	68	(01.26%)
	3.2 Similar form only	*give-gave, bring-ring*	351	(06.50%)
4. Others	4.1 Erratic association	*bring-lazy*	539	(09.97%)
	4.2 Blank		1,064	(19.70%)

The fewest number of responses is 'other collocational association', a subcategory of the position-based association. This type of response refers to the words that commonly precedes or follows the stimulus word with some other words in between. There were only 10 responses found (see Table 18). It can be noticed that such collocational association is the combination of open-class words (content word) with close-class word (function word). They are meaningful chunks which can represent the proficiency of the lexicon. Conklin and Schmitt (2008) point out that the ability to produce chunks in a very short period of time is an indicator of native-likeness.

Table 18 The other collocational association responses

Stimulus words	Other collocational association
meet	nice to *meet* you
story	someone
hear	Do you *hear* me?
hear	more and talk
help	me please
make	it happen
hand	of someone
piece	piece of cake
side	by side
side	inside out

In the next part, the production of responses to the cue words by the HE-group and LE-group are investigated and compared. The findings show that the organization of the mental lexicon in the HE-group and LE-group exhibits the characteristics of learner's interlanguage. Figure 10 shows that the organizations of the HE-group and LE-group are distinctively different.
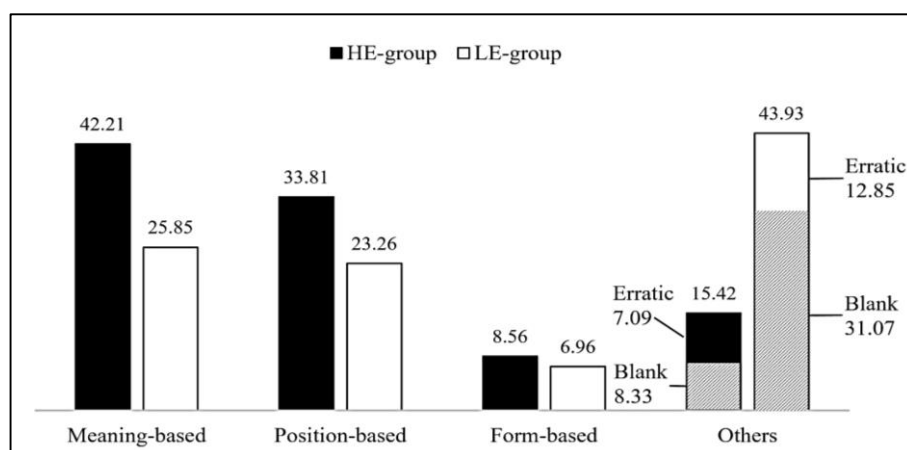
Figure 10 Types of responses in the HE and LE groups

The results from the Two-way ANOVA show that there is an effect of the degree of language exposure on the responses types in WAT. The difference between HE-group and LE-group is significant (p = 0.04). Most responses of the HE-group are meaning-related (42.21%) and position-related (33.81%) to the cue words. The findings conform to the studies in L1 speakers (Fitzpatrick, 2007; Hui, 2011). For the LE-group, the highest numbers of responses are the other types of responses, i.e., errors and blanks, (43.93%). The findings show that the LE-group produces many more blanks (31.07%) than the HE-group (8.33%). To further investigate the results, the participants are asked about the blanks in the focus-group interview. They report that, when they do not know the meanings of some words, they cannot think of other words. Some of them report that they know the words presented on the screen but they cannot think of other English words. It could be assumed that the L2 semantic network may not be established well in learners with low language exposure.

Both groups produce responses which are form-based associated with the cue words much fewer than other response types (HE-group= 8.07%; LE-group = 6.96%). This does not get along the line with Hui (2011) who found that the production of low-proficient Chinese learners is mainly form-based association. The researcher points out that such response production may be the result of the teaching method in China which focused on word-formation, e.g. *scare-scary*. As a result of transfer of training (Selinker, 1972), the network of English words in Chinese learners' mental lexicon is form-based. In the present study, the responses of the HE-group and the LE-group are related to the meanings and the embedded grammar of the words rather

than the sounds and spelling (forms). It could be assumed that different English experience and vocabulary learning methods affect lexical processing. The findings in Chapter 5 would be used to support this assumption.

The results show that the LE-group produces a lot of erratic responses. A certain numbers of the answers are a combination of English letters referring to Thai words. For example, when the participants see the word '*drink*' on the screen, they write '*Cha*' (a Thai word of '*tea*') in the response sheet. It indicates that the learners try to match the stimulus word with the other words stored in their L1 mental lexicon. The first words that come in their minds are from their L1 mental lexicon but employ the form (spelling) in the L2 mental lexicon. This supports Sudasana, Luksaneeyanawin, & Burnham's (2001) argument that L1 and L2 mental lexicons of low exposure learners cooperate when the information of an L2 words is accessed. On the contrary, the HE-group participants produce more than one English word in a limited time. For example, their quick response for the stimulus word '*side*' is '*inside out*'. It shows that the combination of words or phrases are stored very closely to each other in HE-group' mental lexicon. This goes along the same line with Wolter and Gyllstad (2016) who found that advanced L2 learners tend to store the combination of words closely together.

The comparison between two groups of learners reveal the characteristics of learner's interlanguage. Four main types of word association are subdivided: meaning-based association (defining synonym, specific synonym, lexical set/context related, and conceptual related), position-based association (consecutive xy collocation, consecutive yx collocation, and other collocation), form based association (change of affix, similar form only), and others (erratic association, blank). Table 19 exhibits that the types of responses and the production of chunks of the HE-group and LE-group are distinctive. Most of the responses in the HE-group are consecutive xy collocation, e.g. *time-out*, (23.40%). On the other hand, the LE-group mainly give blanks (31.07%) in the response sheet which reflects the lack of vocabulary knowledge.

Among the four subcategories of the meaning-based association, both groups mostly produce conceptual related responses (HE= 21.27%; LE = 14.33%). The findings conform to Singleton (1999) that two words are connected via the conceptual

stores in a part of L2 mental lexicon. Both groups produce the consecutive xy collocation, e.g., *time-out* (HE=23.40%; LE=15.63%) rather than the consecutive yx collocation, e. g., *summer-time* (HE= 10.41% ; LE= 7.59%). The findings also contribute to Langacker (1987) that the meaning of a word is conceptualized by different sort, e. g., perceptual experience, concept, and knowledge system. As the largest proportion of responses are related to concepts, it could be assumed that meanings of L2 words are characterized by learners' experience and their knowledge about the world as well as their L2 vocabulary knowledge.

Table 19 Numbers of responses in sub-categories(%)

Sub-categories	HE-group	LE-group	All
1. Meaning-based association			
1.1 Defining synonym	251 (9.29%)	112 (4.15%)	363 (6.72%)
1.2 Specific synonym	46 (1.69%)	28 (1.04%)	74 (1.36%)
1.3 Lexical set/ context related	269 (9.97%)	171(6.33%)	440 (8.15%)
1.4 Conceptual related	574 (21.27%)	387 (14.33%)	961 (17.80%)
2. Position-based association			
2.1 Consecutive xy collocation	623 (23.40%)	422 (15.63%)	1046 (19.37%)
2.2 Consecutive yx collocation	281 (10.41%)	205 (7.59%)	486 (9.00%)
2.3 Other collocation	9 (0.33%)	1 (0.04%)	10 (0.19%)
3. Form-based association			
3.1 Change of affix	34 (1.26%)	34 (1.26%)	68 (1.26%)
3.2 Similar form only	197 (7.30%)	154 (5.70%)	351 (6.50%)
4. Others			
4.1 Erratic association	192 (7.09%)	347 (12.85%)	539 (9.97%)
4.2 Blank	225 (8.33%)	839 (31.07%)	1063 (19.70%)
Total	**2,700 (100%)**	**2,700 (100%)**	**5,400 (100%)**

The results indicate that the pattern of links between words in the mental lexicon of the LE-group is similar with the HE-group. As presented in Figure 10, both groups mainly produce associative words which are meaning-based (HE= 42.21% ; LE= 25.85%) and position-based (HE= 33.81%; LE=23.26%). It could be seen that

the proportion of meaning-based association in the HE-group is much larger than the LE-group whose responses are mostly blanks. The LE-group possibly could not find the links of words or they do not even have enough of those words to be linked in their lexicon.

A few of the responses are 'other collocational association', a subcategory of the position-based association (HE=0.33%; LE=0.04%). Such responses refer to the word that commonly precedes or follows the stimulus word with some other words in between, e.g., *nice to meet you, Do you hear me?, help me please, make it happen, piece of cake, inside out*. Such collocational association is the combination of open-class words (content word) with closed-class word (function word). These meaningful chunks represent the proficiency of the lexicon. Conklin and Schmitt (2008) point out that the ability to produce chunks in a very short period of time is an indicator of native-likeness. The production of chunks in the HE-group suggests that their lexical processing is more proficient than the LE-group.

Both groups produce much fewer form-based association than other response types (HE-group= 8.07%; LE-group = 6.96%). The responses of the HE-group and the LE-group are rather related to the meanings and the positions of words than the sounds and spelling (forms). With different language experience, the lexical access could be different. This assumption is supported by Booranaprasertsook (2007) who found that semantic memory is related to episodic memory. In his study, one of the response to the word '*mother*' is '*swing*' because the experience of playing swing with mother is recalled.

The data are further analyzed to examine the responses to nouns and verbs in WAT. The findings show that the pattern of responses to nouns is different from verbs. Table 20 exhibits that among four categories, the responses to nouns (stimuli) are mainly meaning-based (41.89%). On the contrary, most of the responses to verbs (stimuli) have position-based association (36.79%).

Table 20 Numbers of responses to nouns and verbs and percentage (n=90).

Categorization	Nouns	Verbs
1.Meaning-based association	1,131 (41.89%)	707 (26.18%)
2.Position-based association	548 (20.29%)	993 (36.79%)
3.Form-based association	128 (04.75%)	291 (10.77%)
4.Others	893 (33.07%)	709 (26.26%)
Total	2,700 (100.0%)	2,700 (100%)

By means of the grammatical categorization, many verbs have strong bonding force with other words. Nouns are commonly categorized by prototypes or a group of similar instances, e.g. an object is called '*chair*' or '*furniture*'. The findings show that most nouns are stored closely together with other words in the mental lexicon by prototype (41.89%). It means that a noun is commonly related to other words by its meaning or concept e.g. '*time-morning*', '*water-river*', and '*room-home*'. It has to be noted that over one fifth of all responses to nouns are associated with position (20.29%). In other words, some links between nouns and other words engage morphosyntactic knowledge, e.g. '*time-out*', '*meet-you*', and '*bed-room*'.

As presented in Table 21, among all subcategories, the majority of responses to nouns are related to concepts or meaning (20.77%). Most of the responses to verbs concern meaning and grammatical order, e.g., '*feel-good*', '*call-me*', and '*write-it*', (consecutive xy collocation = 33.31%). It is intriguing that the proportion of conceptual-related responses to verbs is quite high (14.83%). It can be assumed that certain links between verbs and other words are meaning-based, e.g. '*write-hand*', '*meet-part*y', and '*give-take*'.

Such findings support Langacker (1987) that nouns and verbs should not be categorized by prototypes but by prototypes and by schemas. The meanings of verbs are conceptualized through the particular schemas. For example, the responses *'love', 'touch'*, '*hot*', and '*donut*' are produced as a result of the semantic and syntactic specifications of the verb '*feel*' (the cue word). It exemplifies that the bond between the verbs and other words in the mental lexicon is infinite. The verb '*feel*' can be linked to '*donut*' which seems to have neither syntactic nor meaning relations. The word '*donut*' is produced because of a personal conceptualization for the word '*feel*'.

Table 21 Numbers of responses to nouns and verbs in subcategories (%).

Categorization		Nouns	Verbs
1.Meaning-based association	1.1 Defining synonym	144 (05.34%)	219 (08.10%)
	1.2 Specific synonym	43 (01.57%)	31 (01.15%)
	1.3 Lexical set/ context related	383 (14.19%)	57 (02.11%)
	1.4 Conceptual related	561 (20.77%)	400 (14.83%)
2.Position-based association	2.1 Consecutive xy collocation	152 (05.63%)	899 (33.31%)
	2.2 Consecutive yx collocation	394 (14.59%)	92 (03.41%)
	2.3 Other collocational association	2 (00.07%)	2 (00.07%)
3.Form-based association	3.1 Change of affix	18 (00.66%)	50 (01.85%)
	3.2 Similar form only	110 (04.09%)	241 (08.92%)
4. Others	4.1 Erratic association	260 (09.64%)	278 (10.31%)
	4.2 Blank	633 (23.44%)	431 (15.95%)
	Total	2,700 (100.0%)	2,700 (100.0%)

Among three subcategories of the position-based association, most of the responses to nouns are consecutive yx collocation (14.59%), e. g. '*young-people',* '*special-type',* and '*new-year'.* In contrast, the majority of responses to the verbs is consecutive xy collocation (33. 31%), e. g., '*feel-happy*', '*time-out',* and '*make- money'.* As mentioned earlier, the responses are assumed to be stored closely to the cue words in the lexicon. It indicates that a large numbers of English words are stored in the lexicon as lexical collocation. In other words, a certain number of associations of words are meaningful and grammatical. The evidence supports Hoey' s (2005) claim that we often produce the collocated (meaningful) and colligated (grammatical) set of words as we keep them closely together in the mind.

Table 22 Numbers of responses to nouns and verbs by HE-group and LE-group (%)

	Nouns		Verbs	
	HE-group	**LE-group**	**HE-group**	**LE-group**
1.Meaning-based association	686	445	454	253
	(50.81%)	(32.96%)	(33.62%)	(18.74%)
2.Position-based association	325	223	588	405
	(24.07%)	(16.52%)	(43.58%)	(30.00%)
3.Form-based association	63	65	168	123
	(04.68%)	(04.81%)	(12.43%)	(09.11%)
4. Others	276	617	140	569
	(20.44%)	(45.70%)	(10.37%)	(42.15%)
Total	1,350	1,350	1,350	1,350
	(100%)	(100%)	(100%)	(100%)

Table 22 illustrates that the responses of HE-group and LE-group are in the same pattern. The majority of responses to nouns are meaning-based (HE-group=50.81% ; LE-group=32.96%). Most of the responses to verbs of both groups are position-based (HE-group=43.58% ; LE-group=30.00%). The findings illustrate the interlanguage phenomenon where the HE-group could produce more meaningful and grammatical responses than the LE-group in all types of association: meaning-based, position-based, and form-based. It is possible that the LE-group could not produce proper responses to many cue words due to the lack of vocabulary knowledge (nouns=45.70%; verbs=42.15%).

Table 23 provides more details of responses in subcategories. The majority of responses to nouns in both groups concerns the concepts or meaning of the cue words (HE-group=25.47% ; LE-group=16.07%). For example, the responses to the word '*type*' are '*animal*', '*woman*', '*people*', and '*car*'. Both groups mostly produce responses which are collocated and colligated with the given verbs (consecutive xy collocation: HE-group= 40.17% ; LE-group= 26.44%). For example, when the participants see the word '*keep*', their responses are '*calm*', '*out*', and '*look*'.

Table 23 Numbers of responses to nouns and verbs by HE-group and LE-group (%)

Sub-categories	Nouns		Verbs	
	HE-group (n=45)	LE-group (n=45)	HE-group (n=45)	LE-group (n=45)
1. Meaning-based association				
1.1 Defining synonym	97 (07.21%)	47 (03.48%)	154 (11.38%)	65 (04.81%)
1.2 Specific synonym	28 (02.04%)	15 (01.11%)	18 (01.33%)	13 (00.96%)
1.3 Lexical set/ context related	217 (16.09%)	166 (12.30%)	52 (13.85%)	5 (00.37%)
1.4 Conceptual related	344 (25.47%)	217 (16.07%)	230 (17.06%)	170 (12.59%)
2. Position-based association				
2.1 Consecutive xy collocation	86 (06.36%)	66 (04.89%)	542 (40.17%)	357 (26.44%)
2.2 Consecutive yx collocation	237 (17.56%)	157 (11.63%)	44 (03.26%)	48 (03.56%)
2.3 Other collocation	2 (00.15%)	0 (00.00%)	2 (00.15%)	0 (00.00%)
3. Form-based association				
3.1 Change of affix	4 (00.29%)	14 (01.04%)	30 (02.22%)	20 (01.48%)
3.2 Similar form only	59 (04.39%)	51 (03.78%)	138 (10.21%)	103 (07.63%)
4. Others				
4.1 Erratic association	88 (06.53%)	172 (12.74%)	103 (07.65%)	175 (12.96%)
4.2 Blank	188 (13.91%)	445 (32.96%)	37 (2.72%)	394 (29.19%)
Total	**1,350 (100%)**	**1,350 (100%)**	**1,350 (100%)**	**1,350 (100%)**

It is interesting that some conceptual related responses of the LE-group reflect the L1 transfer, e.g. '*make-work*' and '*eat-water*'. Based on Thai morphosyntactic feature, the word '*make*' which means '*do*' is followed by '*work*' according to grammar. Besides, the Thai word that means '*eat*' is often used with the word '*water*' in the informal situation as /kinñáam/ (*drink water*). It could be discussed that when the linguistic knowledge of the English word is not sufficient, the L2 semantic mapping is not successful.

Figure 11 illustrates the perception and recognition process of English words. When a cue word is presented in the WAT, the linguistic knowledge of the word: morphology and syntax, is activated. The participants would be able to produce the responses which are meaningful and grammatical to the cue words if there are sufficient numbers of words stored in their lexicon. Many errors produced by the participants could be a result of the knowledge of a word's meaning and its embedded grammar.
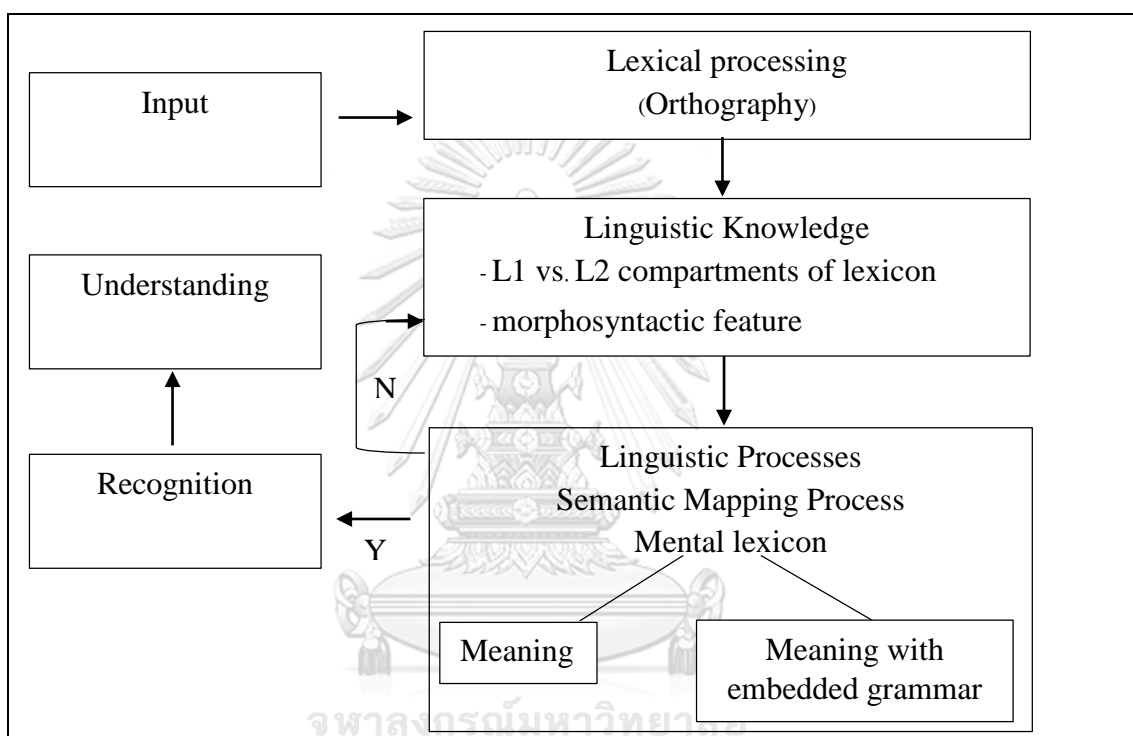

Figure 11Perception and recognition process(adapted from Luksaneeyanawin, (2007)

The assumption that the perception and recognition of words deal with linguistic knowledge is supported by Taft (1991). He points out that the semantic and syntactic characteristics of a word affect the lexical processing. Besides, Taft (1991) proposes that, to successfully access a word in the lexicon, the information of other linguistic properties of a word, i.e., auditory and orthographic features, is required. It can be implied that the lexical links between words in the lexicon of L2 learners who have insufficient knowledge of words tend to be weak.

The findings support hypothesis two that the learners with low and high language exposure have different mental lexicon, and different paths in lexical access of L2 words. The average reaction time of the HE-group and LE-group is significantly

different. The association of words concerns semantic and syntactic specifications rather than forms (either in the low or high exposure group). The organizations of mental lexicon in the two groups are dissimilar. While the HE-group could produce numerous associative words, the LE-group failed to do so. The strengths of the links between both groups are different, in which the semantic network in the HE-group tends to be stronger than that of the LE-group. Besides, individual theoretical lexicon is different and flexible. Theoretical grammar can be completed at a certain age; however, theoretical lexicon is non-finite. As long as new words could be acquired, the association between words in the mental lexicon could be changed and becomes complicated.

To summarize, this chapter exhibits lexical processing and the organization of mental lexicon of Thai learners as well as compares the performance of L2 learners with high and low English language exposure. The next chapter presents the influential factors on the acquisition of vocabulary.
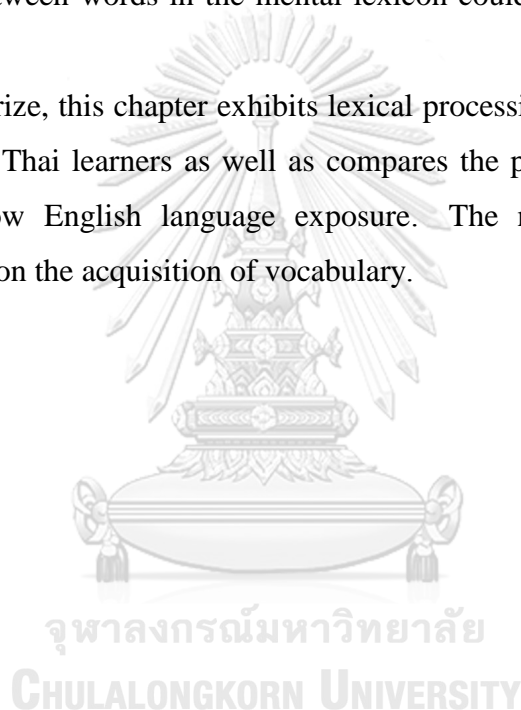
CHAPTER V
THE FACTORS AFFECTING THE VOCABULARY ACQUISITION

Chapter five deals with the factors affecting the English vocabulary acquisition. It is hypothesized that degrees of English language exposure, vocabulary size, vocabulary learning methods and attitudes towards English language are the influential factors of the acquisition. To explore the causative factors, the data from the psycholinguistic experiments (LDT and WAT), the ELE Questionnaire, and the qualitative study (the interviews, vocabulary learning journal, and observations) are examined.

In the present study, the lexical processing and organization of the mental lexicon illustrate the vocabulary acquisition. In Chapter 4, the acquisition of vocabulary is examined through two psycholinguistic tasks (LDT and WAT). The results show that the English mental lexicon of Thai learners is meaning-based. The words stored in the lexicon are associated by meanings and concepts. In addition, certain numbers of words are linked by meanings with the embedded grammar. The comparison between the HE-group and the LE-group suggests that learners with different degrees of language exposure have different paths of lexical access in L2 words. It can be assumed that the degrees of exposure affect the lexical access and the organization of the mental lexicon. Such findings support Fernández and Schmitt (2015), Peters (2017), and Schmitt (2019) that the degree of language exposure affects the vocabulary acquisition.

In this chapter, to find the effect of the vocabulary size, the relationship between the exposure and vocabulary size as well as the vocabulary size and the organization of the mental lexicon are explored. In addition, the effects of learning methods and attitudes towards English language are examined.

5.1 English Language Exposure and Vocabulary Size

As presented in Chapter 4, the degrees of language exposure affect the performance of learners in LDT and WAT. In other words, language exposure is an influential factor of the vocabulary acquisition. A number of studies found that the more learners engage with English language, the larger vocabulary size they have (Fernández & Schmitt, 2015; and Peters, 2017). The present study aims to explore if

the number of known words affects the lexical processing and the organization of the lexicon.

To investigate the effect of vocabulary size on the acquisition, the participants are grouped by the degree of language exposure and vocabulary size. Based on the score from the Vocabulary Size Test, the participants in the HE-group and the LE-group who have the largest and smallest vocabulary size are invited to participate in the qualitative study. There are four groups of the participants: (1) the HE-group with large vocabulary size (HE-LV), (2) the HE-group with small vocabulary size (HE-SV), (3) the LE-group with large vocabulary size (LE-LV), and (4) the LE-group with small vocabulary size (LE-SV). Each group is considered the representative of L1 Thai learners with different vocabulary sizes who engage in the English language learning activities in the classroom.

The profiles of the participants are presented in the following table.

Table 24 The participants' characteristics

| | ID | ELE Scores (%) | Vocabulary size (words) | WAT types | LDT average reaction time (ms.) and errors (%) | | | | | |
					collocation	error%	non collocation	error%	non words	error%
1	HE-LV1	38.28	6,900	F	919.44	0	1,258.03	0	1076.05	10
2	HE-LV2	53.48	4,600	P	702.60	0	674.95	0	1019.30	30
3	HE-LV3	56.63	4,400	B	621.46	20	675.81	20	794.86	10
4	HE-LV4	49.12	4,900	M	738.86	0	819.97	0	1093.40	10
5	HE-LV5	46.12	4,900	M	834.55	0	859.47	10	777.74	0
6	HE-LV6	49.21	4,400	M	1,322.12	10	1,130.98	0	1258.85	40
7	HE-LV7	39.13	4,700	M	1,001.95	10	773.58	0	810.74	10
	mean	47.42	4,971		877.28	6	884.68	4	975.85	16
	min	38.28	4,400		621.46	0	674.95	0	777.74	0
	max	56.63	6,900		1,322.12	20	1,258.03	20	1,258.85	40
	S.D.	6.85	875.05		235.28	8	225.40	8	184.89	14
8	HE-SV1	51.14	3,000	F	942.48	0	1,081.99	0	1066.05	40
9	HE-SV2	40.49	3,300	M	766.59	10	767.58	0	1232.24	10
10	HE-SV3	46.08	3,000	M	729.44	0	737.28	10	832.659	30
11	HE-SV4	39.50	3,500	M	628.73	0	711.55	0	1342.04	30
	mean	44.30	3,200		766.81	3	824.60	3	1,118.25	28
	min	39.50	3,000		628.73	-	711.55	-	832.66	10
	max	51.14	3,500		942.48	10	1,081.99	10	1,342.04	40
	S.D.	5.40	244.95		130.80	5	173.11	5	221.63	13

	ID	ELE Scores (%)	Vocabulary size (words)	WAT types	LDT average reaction time (ms.) and errors (%)					
					collocation	error%	non collocation	error%	non words	error%
12	LE-LV1	22.15	3,800	M	880.57	20	940.96	10	1011.66	10
13	LE-LV2	29.54	4,200	M	635.46	0	942.66	10	1152.95	30
14	LE-LV3	22.64	3,600	P	968.19	10	1,008.62	20	910.20	10
15	LE-LV4	27.18	3,300	M/B	1016.03	1	953.57	3	1063.48	1
16	LE-LV5	28.68	3,300	M	905.32	0	855.01	0	871.98	1
	mean	26.04	3,640		881.11	6	940.16	9	1,002	10
	min	5.40	3,300		131.80	-	173.12	-	871.98	1
	max	29.54	4,200		1,016.03	20	1,008.62	20	1152.95	30
	S.D.	3.44	378.15		147.24	9	55.05	7.73	114.01	12
17	LE-SV1	24.99	2,600	O	731.90	40	742.97	20	770.57	30
18	LE-SV2	20.35	1,900	P	859.89	10	994.81	20	1,146.72	40
19	LE-SV3	16.01	1,200	O	1,048.70	40	964.83	50	747.74	70
20	LE-SV4	22.50	1,900	M	1,163.07	3	1,393.27	2	1,509.79	2
21	LE-SV5	20.14	2,200	M	1,204.56	1	948.92	2	1,274.52	3
22	LE-SV6	18.04	2,100	B/O	1,317.31	2	1,632.10	4	1,202.18	5
	mean	20.34	1,983		1,054.24	16	1,112.82	16	1,108.59	25
	min	16.01	1,200		731.90	1	742.97	2	747.74	2
	max	24.99	2,600		1,317.31	40	1632.1	50	1,509.79	70
	S.D.	3.17	462.24		221.52	19	330.99	19	297.72	27

In the table above, the WAT types refer to the four categories of responses that each participant produced in the WAT: M (meaning-based association), P (position-based association), O (Erratic association), and B (Blank).

As presented in Table 24, the data from the ELE-questionnaire and Vocabulary Size Test reveal the characteristics of the participants. The learners are exposed to English language at different levels although they are in the same academic environment (min = 12.81%; max = 59.37%). For the vocabulary size, the findings show that the average is 3,205 words, but the range is wide (min = 700, max= 6,900). It shows that the vocabulary knowledge and the degrees of exposure of the participants are extremely varied.

The HE-LV and HE-SV are the groups of learners who have high degrees of language exposure (HE-LV mean= 47.42; HE-SV mean = 44.30) with different vocabulary size. The HE-LV group knows around 4,400 – 6,900 words, while the HE-SV group knows fewer than 3,500 words. The degrees of language exposure of the LE-LV and the LE-SV are similar (LE-LV mean = 26.04; LE-SV mean =20.34), but

their average vocabulary sizes' are completely different (LE-LV = 3,640 words; LE-SV = 1,983 words). It could be noticed that the vocabulary sizes of the HE-SV and LE-LV are overlapping although their degrees of exposure are distinctive. In addition to the degree of language exposure, other factors affecting the vocabulary growth are explored in 5.2.

The findings from the WAT illustrate the effect of the vocabulary size on the organization of the lexicon. The findings show that most of the responses produced by HE-LV, HE-SV, and LE-LV are meaning-based. In contrast, the responses types of the LE-SV are arbitrary. The HE-LV, HE-SV, and LE-LV groups know more than 3,000 words which is sufficient for effective communication (Nation, 2013). It can be discussed that the words are well associated in the lexicon when the learners have adequate vocabulary size. It implies that the degree of language exposure and the vocabulary size affect the organization of the mental lexicon. This supports Taft (1991) that the linguistic knowledge of words influences the lexical processing. The more known words stored in the mental lexicon, the stronger and more meaningful association between words occurs.

To examine the lexical processing, the reaction time is examined. The average reaction time among four groups is in the similar pattern. Among three conditions in the LDT, the average reaction time to the collocation condition is the fastest (HE-LV=877.28 ms.; HE-SV= 766.81 ms.; LE-LV=881.11 ms.; LE-SV=1,054.24 ms.). The performance of the first three groups (HE-LV, HE-SV, and LE-LV), who know more than 3,000 words, is similar. The reaction time of these three groups is much faster than the LE-SV who knows very limited words. It implies that the vocabulary size affects the lexical processing.

The findings from the vocabulary size test, LDT and WAT clearly exhibit that the English language exposure and knowledge of words play a role in the acquisition. The qualitative data collected from the interview, vocabulary learning journal, and observation are used to further explore the other factors affecting the vocabulary acquisition: learning methods and the attitudes towards English language.

5.2 Learning methods and attitudes towards English language

In 5.1, the findings show that the vocabulary size affects the lexical processing and organization of the mental lexicon. The findings from the previous section show that the HE-SV and LE-LV have different degrees of exposure but similar vocabulary size. There must be some factors which facilitate the vocabulary growth of the learners in the LE-LV, who have a limited degree of language exposure. The vocabulary learning methods that learners used and their attitudes towards English language are hypothesized to facilitate the vocabulary acquisition. The learning methods are examined through the interviews, vocabulary learning journal, and observations. The attitudes are revealed through the interviews.

5.**2**.**1 Vocabulary learning methods**.

The four groups (HE-LV, HE-SV, LE-LV, and LE-SV) are exposed to English language in the similar context (EFL) , but acquire new words differently. The findings from the qualitative study suggest that the learning methods that the learners used to tackle the language learning tasks include repetition, attention, and meta-learning. According to Webb and Nation (2017), attention and repetition facilitate the vocabulary growth. Learners acquire new words when they the repeatedly encounter the words and pay attention to them.

5.2.1.1 Repetition. The findings show that the participants who repeatedly encounter English language acquire English words through the activities that they often do. The individual HE-LV2 reports that she uses English all the time. English becomes a language that she feels comfortable to use for communicating with other people (either Thais or foreigners). Sometimes she talks with her Thai friends in Thai and they cannot understand it clearly, so that she needs to use English to elaborate. The transcription below is translated from Thai language. The original transcription can be found in Appendix J.

"Normally, I have some friends who I speak in English with because we don't understand what we say in Thai. (Laugh) It is like one sentence in Thai contains many meanings. So we need to explain in English." (T01)

It reflects that HE-LV2 frequently uses English language for communication. Most of HE-LV2's responses in the WAT are position-related to the cue words. It

means that the frequently co-occurring words are possibly stored closely together in her mind. This may be the result of the way she acquires new words and phrases from doing English-related activities. She reports that she uses English in doing almost everything. For example, she likes wakeboarding and most of the other wakeborders are foreigners. Among them, Thais also communicate in English.

" I often use English. Actually, I use English with almost everything. For example, when I wake board, most people are foreigners. Some Thai wakeboarders are familiar with English. I have some foreign friends. I tried to imitate what they said." (T02)

The findings support Webb and Nation (2017) that the frequency of being exposed to the language plays a role in acquiring vocabulary.

5.2.1.2 Attention to language. The attention refers to noticing vocabulary learning or the awareness of learners to learn new words. In the present study, attention deals with the cognitive domain. According to Sonbul and Schmitt (2013), explicit learning supports L2 vocabulary acquisition. The findings show that having attention to language exposure results in the organization of mental lexicon. It supports Webb and Nation (2017) that the learners need to pay attention to words unless the learners will not learn the new words they encounter.

Among four groups, the participants report doing similar activities in English, e. g. , reading textbooks and handouts, watching movies, listening to music, etc. Learners' attention to the activities seem to distinguish them and the organization of their mental lexicon. The findings from the WAT exhibit that the association of words in the mental lexicon of the HE-LV participants are meaning-based (HE-LV 4, 5, 6, 7) and position-based (HE-LV2). All HE participants do a lot of activities in English and they try to learn new words from the activities. HE-LV2 reports that she tries to learn some expressions when she has conversations with foreign friends. Her responses in the WAT are quite outstanding in that she could produce a lot of phrases and chunks. Another example is LE-LV1 who tries to learn from things around him, e.g. reading the labels of the products he buy. He reports that he wants to learn vocabulary and to know the content of the products. This individual is in the group of learners who have limited exposure to English language. Knowing quite a lot of English words could be

a result of the attention to learning from the English language resources found around him.

It has to be noted that the participants in this study are living in the non-English speaking country, EFL context. The examples above clearly suggest that learners who pay attentions to English words can make the most from their English experience. As long as EFL learners are aware that they can learn new words from the things around them, they acquire new words continuously. The findings support Hoey (2005) that L2 learners need to focus on the patterns of words appearing in particular contexts and generalize them. It could be implied that the effective way for EFL learners is to learn English vocabulary explicitly from a good quality resources with a certain level of exposure.

5.2.1.3 Meta-learning. The activities that the participants report doing in English are dependent on their personal interests, e.g., watching TV series or movies, online games, talking with foreign friends, reading novels and cartoons, listening to music, etc. Some of them report that they need to read texts and handouts written in English. EFL learners are surrounded by these resources which have different qualities. The findings from the observation show that some learning resources are good for learning (e.g. News reports, some movies, and novels); meanwhile, plenty of degraded learning resources can be easily found in different places. For example, the sign "*Please expect your seat belt*" (the word expect is translated from Thai word /khâːt/ which has 2 meanings: to expect or predict, and to fasten) is being used on the bus to inform the passengers to '*fasten'* their seat belts. Without sufficient knowledge of vocabulary and the ability to take control of their learning, some learners can possibly learn from such inaccurate use of English.

The findings of the present study exhibit that successful learners (HE-LV, HE-SV, and LE-LV) do meta-learning. The shared characteristics of successful learners include the sufficient knowledge of vocabulary and the strong links of words stored in the mental lexicon. The learners in these three group tend to have meta-learning- i.e., knowing and being able to spell out what they know and how to learn language (Biggs, 1985). The results exhibit that the learners know how to learn and regulate their learning.

The HE participants (HE-LV and HE-SV) report that they try to comprehend the meanings from the contexts when they find unknown words. When some unknown words frequently appear, the HE participants look up the meanings from an online dictionary, application, or Google Search. HE-LV5 and HE-LV6 know that some words are polysemous so that they need to find the right meanings for the specific contexts. HE-LV6 exemplifies that, when he does not understand the phrase '*no tea no shade*' heard in the TV program, he looks up for meaning from the Reddit (a community website where Americans share ideas). He visits this website because the program is American and the phrase should be used frequently among Americans. Besides, HE-LV2 explains that she tries to learn how to use new phrases heard from (Thai and foreign) friends. She checks the way people use the phrases from different websites to see how to use them appropriately.

"I remember the phrases that they spoke. In the first place, I asked them what I didn't understand. I looked through websites to check the correct ways of using the phrases. They do not fit in every situation." (T03)

It can be concluded that HE-LV participants encounter good examples of English language and manage to learn from them. They spend time watching programs or movies and talking to native speakers. These participants are able to manage and monitor their vocabulary learning. When they learn that an English words can be defined differently depending on the context, they seek to figure out the right meanings.

One of the participants in the LE-group views that memorizing helps when learning new words. LE-LV1 reports that he tries to memorize the words necessary for his study. LE-LV1 learns new words from games and lecture sheets. He tries to memorize them by putting the English words on the wall in his room. He sometimes looks up the meanings from an online website, e.g. Google Translate. It suggests that learners who have limited English exposure are able to optimize their language competency as long as they know how to learn and manage their learning from the accessible resources.

Many learners have the chance to be exposed to English language learning resources. Unfortunately, some learners did not know how to learn from them. LE-SV1 knows that she can learn vocabulary from watching movies, but she does not do

a lot of activities in English. She does not do anything outside the classroom to learn vocabulary for the test. She thinks that the best way to learn English language is to speak and use the vocabulary. It can be discussed that some learners misunderstand how to enhance English language competency. They do not endeavor to learn deliberately, but they hope to be able to communicate. Without sufficient knowledge of vocabulary, it is difficult to understand the language and to produce meaningful and grammatical chunks or words.

The effect of language exposure on the vocabulary acquisition can be explained with the Theory of Language in Communication (Luksaneeyanawin, 2007). The researcher proposes that a person is an encoder and a decoder at the same time (see Figure 12). As a decoder, we decrypt the auditory or visual linguistic information we receive by means of phonology or orthography. The data are then analyzed by the system and structure of word forms (morphology). As a word chunk, we analyze the structure (syntax) and comprehend the meaning (semantic) of it. Beyond the meaning of such linguistic forms, we need the context of communication to interpret what exactly the message means (pragmatic). When we become the encoder, the process reverses. The amount of English language contact makes EFL learners fluent encoders and decoders. The greater the degree of exposure they have, the more perceiving and producing language activities they do. When the high exposure learners have sufficient input, their performance becomes more native-like.
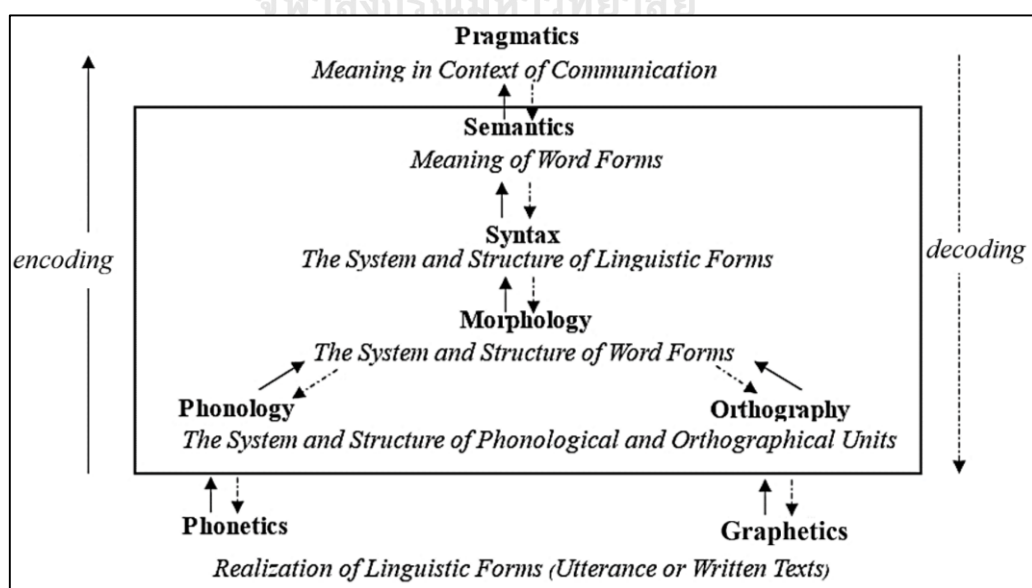

Figure 12 The Theory of Language and Communication (Luksaneeyanawin, 2007)

In addition, the learner needs to have mediation between interpersonal communication and intrapersonal communication to reach the optimal acquisition. Learners need to be able to encode the language from input (people, online community, and texts) . When learners are able to figure out that the decoding is obstructed and they can find the solution, this is considered meta-learning. For example, HE-LV5 and HE-LV6 report that they watch American TV series and do not understand some phrases. They try to look up the meanings from different resources and choose the meanings best fit to the contexts. This is an intrapersonal communication. Besides, some learners have interpersonal communication skills to help them encode the meanings of unknown words or phrases.

Apart from being exposed to English language with appropriate learning methods, and meta-learning, the attitudes towards English is also influential in the language acquisition.

5.2.2 Attitudes towards English Language.

Among the four groups of the participants in this phase, the attitudes towards English language of the HE-group (HE-LV and HE-SV) are distinctively positive. Most of the activities they do are in English. Unfortunately, the results show that the learners who feel uncomfortable with language learning and have no confidence with their ability avoid doing activities engaging English. Some participants in the LE-LV group and all in the LE-SV group do not like learning English in the classroom. The LE-LV group report that they do not do many activities in English, but that they try to learn from them. The findings support Krashen's (1982) Affective Filter hypothesis that the optimal acquisition occurs when learners have integrative motivation, self-confidence, and low anxiety. HE-LV and HE-SV learners could acquire vocabulary from the exposure effectively because they are not afraid of making errors and they enjoy learning and using English language. On the contrary, the LE-group members are quite worried about using English on their own.

The following section presents three major distinctions between the high-achievers (HE-LV, HE-SV, and LE-LV) and the LE-SV learners: the awareness of the necessity of English language, the dependence on classroom learning, and the affection toward English language.

5.2.2.1 The Awareness of the Necessity of English Language. All participants view that English language is very important to their lives. They need to use English at work and for communication. HE-LV5 and HE-LV6 have similar attitudes towards English. HE-LV5 views that English has become a second language of people around the world. It is a medium for communication. In her opinion, it is an advantage to be able to understand what people are talking about. She thought that people who deny learning English and are not interested in learning, should try harder.

" Nowadays, everyone speaks English as their second language. It is the language that has been used all over the world. People can communicate even if they are from different countries. From my point of view, it is our advantage if we can understand English. However, I don't know why someone doesn't want to learn English. I think they should try learning it because we can get many benefits from knowing English such as jobs or travelling." (T04)

HE-LV6 points out that English language gives us opportunity. English is mainly used for communication, especially at the workplace.

"I think knowing English makes more opportunities for life, like for working. Mainly, we use English for communication. Nowadays, everywhere is international." (T05)

Similarly, the LE-LV and LE-SV participants are aware that English language is important for their studies and the future jobs.

5.2.2.2 The Effect from Classroom and Teachers. The HE participants (HE-LV and HE-SV) have positive attitudes towards English language and realize that English is important to their lives. These learners are independent from their teachers. They pay attentions to the new words learnt in the classroom as well as seek to learn English words from other activities outside the classroom. In contrast, the LE-LV and LE-SV are more dependent on their teachers. Teachers seem to play an important role in the acquisition for the LE participants. Among the LE-group, their attitudes towards learning tend to be shaped by some discouraging situations. LE-LV2, LE-LV3, and LE-SV2 realize the importance of English; however, they tend to have a negative attitude towards English. LE-LV2 feels discouraged. She thinks that she is not good at English. To her, Thai teachers make her feel stress because they focus on

grammar. She feels uncomfortable to speak with them. She prefers learning with foreign teachers because they are nice.

" Discouraging. I'm not good at studying. Since I came here, I've never studied with native teachers. I studied with Thai teachers only. They always teach grammar. In speaking test, I was afraid to speak English with the teachers because they were Thai. Thai teachers heavily focus on grammar. Native teachers are more generous. They know that we can't speak perfectly." (T06)

" In high school, grammar was emphasized. When I studied with Thai teachers, they speak Thai. Thai teachers seem to emphasize the grammar rules." (T07)

LE-LV2 views that it is hopeless. She has spent over 10 years in school learning English, but she cannot communicate. In contrast, she could carry on some basic conversions in Chinese which she had learnt for only two months.

"I think studying Chinese one semester was faster than studying English for ten or twenty years. I mean, I can speak Chinese in one semester although I didn't have any background." (T08)

However, LE-LV2 is aware that English is important for her future. She knows that she needs to use English for job application and doing other things. She wants to go abroad, but she is not good at English. She does not want to lose opportunities in her life, so that she tries to improve her English.

"Now, everywhere needs English. I asked my sister. She said job interviews are in English. I want to have a chance to go to other countries but I'm not good at English. I missed some opportunities. I think I should put in more effort." (T09)

LE-LV3 has never enjoyed learning English since she was young. Her high school teachers focused on teaching grammar. She could not follow the lessons so that she did not enjoy learning. She reports that Chinese and Japanese languages are more interesting because she loves reading comic books which are written in these languages.

"I feel indifferent to English. I wasn't good at studying when I was a child. My high school teachers taught only grammar rules. I didn't like them and I didn't understand them. But, if it is Chinese or Japanese with some comic books, I like it. It is more interesting." (T10)

Similarly, the LE-SV participants report that they are not good in English. They views that their English teachers never encourage them to use English for communication. They fear learning English because of the teachers' teaching style which focuses on grammar. With such attitudes, the LE-SV participants seem to have low self-esteem.

5.2.2.3 Motivation and Self-esteem. The results suggest that the acquisition hardly occurs with low motivation or self-esteem. Webb and Nation (2017) point out that the degree of motivation to learn vocabulary in the EFL context could be greatly varied. Although the learners know the importance of English, only some of them try to learn new words.

LE-SV2 does not like English. She does not want to learn English, but she knows that it is necessary. Most people use English for communication. In her opinion, learning Chinese is more interesting because she likes watching Chinese TV series. She does not like learning English because it is all about memorizing grammar and vocabulary.

"I don't like English. I don't want to study English. I can't speak, but I have to study because most people use English. I like TV series and Chinese artists so I like Chinese language. I don't like studying English so I must remember vocabulary and know grammar rules." (T11)

The HE-LV1 and LE-SV1 and LE-LV1 feel afraid of speaking English. They worry that their accents were not good enough and they could not understand the foreigners. They know that they need English for communication; however, they are concerned that their productions contain a lot of errors.

HE-LV1 views English as an opportunity but he is concerned about the appropriateness of using English words in the specific contexts when talking with foreigners.

" I'm afraid of native speakers. When I use words, I might use too many words." (T12)

LE-LV1 reports that he is not sure if he could talk to foreigners.

"I'm not confident if what I say [in English] is what they want." (T13)

LE-LV1 realizes that English is very important, so he tries to use it in his daily life. For example, he sets the language in an online game in English because he wants to learn vocabulary.

"I sometimes want to learn new words. It changes my life. Also, language in online games is changed according to what I set. Another game, the Hard Stone, the language is changed." (T14)

LE-SV1 reports that she is afraid of English, but she likes it. She knows the benefits of English, but she feels uncomfortable to speak English. She reports that she can do reading in English well.

"I'm afraid of English but I like it. I know it is useful." (T15)

"In speaking, I'm not brave to do. But I can read texts." (T16)

Having limited exposure like LE-SV1; however, LE-LV1 seems to have more positive attitude towards learning English. He thinks that, with a clear goal, we can learn anything.

LE-SV5 and LE-SV3 report that they do not like learning English and they are not good at it. They cannot do the tests well and do not get good scores. LE-SV5 reports that he avoids playing games that include English. When he finds English narrations in the games he is playing, he skips them. This clearly shows that learners who have low self-esteem tend to avoid facing English language. LE-SV5 report that he wants to get better at English, but he thinks learning in the classroom cannot enhance his skills. He has no idea how to improve his English. This learner wants to be good at English; however, his self-esteem is quite low. He is not confident in his ability and he doesn't know how to manage the learning.

5.2.2.4 Affection. The results support Krashen's Affective Filter Hypothesis (1982) that the acquisition occurs when learners enjoy doing English language learning activities. Learners attentively learn new words from the activities because they have low anxiety and they are fond of doing particular activities. HE-LV1, who has the largest vocabulary size, tends to have a variety of ways to learn English. He reports that he learns English from doing the activities that he enjoys. He likes reading '*Manga*' (Japanese comic books) and he learns some words from doing this. As a Christian, he spends a lot of time listening to Christian sermons. He learns accent from listening to sermons. This results in his responses in the WAT. Most of the

responses are the homophones of the stimulus words. The links between words in his mental lexicon are mainly form-based.

Most participants in both groups- i.e., HE and LE, play online games. Some of them play games in English because they want to practice using English. Many of them play games in English because they need to chat with the foreigners in the games. The findings from the observation suggest that the English language being used is not Standard English. Broken English is commonly used among the gamers.

As mentioned earlier, most of the LE participants do not do a lot of English activities and many of them do not like English language. LE-LV3, LE-SV2, LE-LV2, LE-SV3, LE-SV4, and LE-SV5 report that they do not try to learn English language from the resources around them. They explain that the activities that they like to do in their free time do not require English. LE-SV3 reports that she does not like English because she could not get good grades. She is exposed to English outside class through her favorite activity, which is watching beauty reviews on YouTube. However, she does not see watching these reviews as learning English.

LE-LV3 said that she loves Chinese and Korean stars and they do not use English much. If her idols use English, she would follow them.

"If my favorite artists like speaking English, I might do like them." (T17)

LE-SV2 (who dislikes English) wants to learn English from the pleasure activities, e.g., watching movies.

" If I am required to do activities in English such as watching movies, it is interesting. But they must be what I like." (T18)

LE-LV2, who thinks that she is not good at English reports that she rarely used English in her daily life. She follows some English learning pages on Facebook, but does not pay much attention to them. She understands the English language used in the class, but when the class ends, she forgets it.

"I follow some Facebook pages that teach English. I set them as "See First". I read their contents. I rarely use English in daily life. I understand what is taught in the classroom. But I forget when I leave the class." (T19)

Although LE-LV2 wants to be good at English, her language ability is limited. She said that she asks her friends to translate the words or phrases for her because the meaning found in the dictionary are not clear.

" When I find unknown words, I ask my friends who are good at English for help. I will ask them when I don't understand the meanings in the dictionary." (T20)

LE-SV4 says that he neither loves nor hates English. He spends a lot of time playing games and learns new words from it. He tries to comprehend the meaning from reading the narration in the games. However, he finds that he misunderstand the pronunciation of the new words frequently.

" Speaking of English, I don't hate it. I feel indifferent. I play online games when I have free time. In the games, there are some English narrations. I guess the meanings from the context. Anyway, I often mispronounce some words." (T21)

It could be noticed that the learners who do not like English had difficulty to acquire the vocabulary. Some of them do not avoid encountering English language, but they do not know how to learn from it. Besides, many of them could not judge whether language they are exposed to (input) is qualified and appropriate.

The findings from the observation suggest that the quality of input seems to be varied. While HE-group is exposed to English used by native speakers (foreign friends and movies), the LE-group conceives that they can learn English vocabulary from online games.

The causative factors on the acquisition of English vocabulary are found to be related with each other. The current researcher proposes that the factors affecting the acquisition could be categorized into two groups: individual factors and external factors. The individual factors concern the degrees of language exposure, vocabulary knowledge, vocabulary learning methods and attitudes towards language learning. The external factor refers to the quality of input (exposure to English language) which can be the environment, media, and the teachers. Figure 13 illustrates the relationship between the factors affecting the English vocabulary acquisition of L1 Thai learners.
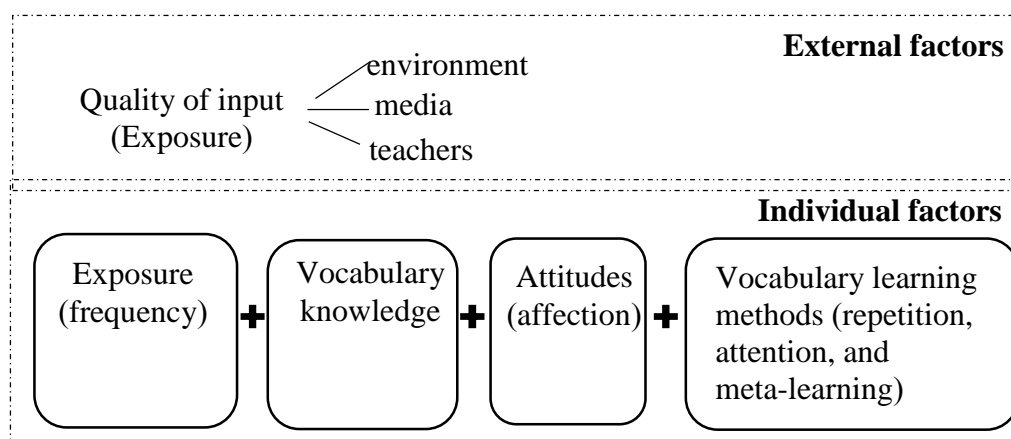
Figure 13 Factors affecting the English vocabulary acquisition

Among these factors, the degree of exposure and vocabulary size explicitly facilitate the acquisition. The learners who have sufficient language exposure and large vocabulary size (at least 3,000) tend to have fluent lexical processing and a strong semantic network in their mental lexicon. These learners employ three vocabulary learning methods, i.e. repetition, attention, and meta-learning. Further, the high exposure learners could easily acquire new words because they conduct the English-related activities with affection and attention. When they are fond of the activities they do and know how to learn English words or have meta-learning knowledge, they become even better users of English language. With the negative attitudes towards language learning, vocabulary learning seems to be obstructed. Many learners who are not enthusiastic about learning English avoid using English in their daily lives. It means that the opportunity to be frequently exposed to English words is limited.

In addition, the inaccurate use of English that the learners are frequently exposed to, e.g. chat rooms in online games, could give a negative effect on the vocabulary acquisition. The language used in the chat rooms is commonly casual. A lot of broken English is being used. The classroom atmosphere and the teachers also affect the vocabulary acquisition. Learners who have negative experience in language learning tend to seek no chance to enhance their vocabulary learning.

In summary, the factors affecting the English vocabulary acquisition include English language exposure, vocabulary knowledge, learning methods, and the attitude towards English language learning. The findings show that all participants are aware

of the importance of English language to their lives. They report that they need to use English for work and communication. However, not all participants try to make the most from the exposure. Some of them neither learn from it at all nor know how to learn from doing activities. It is clear that the participants with different degrees of language exposure acquire English vocabulary differently because of individual learning method and vocabulary knowledge. The findings from the LDT and WAT show that the HE-group's performance possesses the characteristic of the native-likeness. The factors that distinguish the HE-group from the LE-group are the quality of input (environment) and meta-learning. Learners in the HE-group are exposed to English use among native speakers. Besides, the HE-group could manage their learning effectively from the exposure. The learners in the LE-group realize that English is important for their future, but they prefer not to use it. Some learners in the LE-group view that English is not related to their personal interests. As English is not in their favor, learners in the LE-group mainly use English in the classroom and with the assignments from their teachers. They do not do the activities in English because they think that they are not good at English. The affection tends to play an important role in vocabulary acquisition of Thai learners. Both HE-group and LE-group do a variety of English language activities which are mainly dependent on their interests and their belief in their language ability, i.e., self-esteem.

The next chapter is the summary and overall discussion of the present study. The recommendation for future research is also provided.

CHAPTER VI
CONCLUSION AND DISCUSSION

The present study is a cross-sectional interlanguage research, which examines the lexical priming and the acquisition of English vocabulary in the two groups of learners with different degrees of language exposure. The assumption is that the high-exposure group is considered a high-proficiency group whose performance is better than the low-exposure group. In the present study, the term '*lexical priming*' implies the lexical access (a process occurs in the mental lexicon). The acquisition of vocabulary is investigated through two psycholinguistics tasks: lexical decision task and word association task. The factors affecting the acquisition are explored as well.

The participants of the study are undergraduate students who are native Thai speakers. The stratified random sampling technique was used to select the participants. English Language Exposure-ELE Questionnaire (Centre for Research in Speech and Language Processing-CRSLP) was distributed to 620 students. The score of the ELE Questionnaire was used to select the participants for the experiments. Forty-five students who had the highest scores ranked by the percentile were referred to as the high-exposure group (HE-group) and 45 students with the lowest scores ranked by the percentile were the low-exposure group (LE-group). Ninety participants (45 students in the HE-group and 45 students in the LE-group) completed the two psycholinguistic tasks voluntarily: the lexical decision task or LDT (Forster, 1976, 1989; Forster & Bednall, 1976; Forster & Davis, 1984; O'Connor & Forster, 1981; Taft & Forster, 1975, 1976) and word association task or WAT (McNeill, 1966). These two tasks were employed to investigate the lexical processing and the organization of the lexicon. To explore the factors affecting the acquisition of English vocabulary, the findings from the LDT and WAT were analyzed and discussed along with the findings from the Vocabulary Size Test (Nation & Belar, 2007), vocabulary learning journal, interview questions, and observations. Twenty-two out of 90 participants who completed the LDT and WAT were purposively selected. They were sub-divided into four groups: HE-group with large vocabulary size (HE-LV), HE-group with small vocabulary size (HE-SV), LE-group with large vocabulary size (LE-LV), and LE-group with small vocabulary size (LE-SV). These participants were asked to complete the vocabulary learning journal, Vocabulary Size Test (Nation &

Beglar, 2007) and participated in the focus-group interview. The researcher conducted an observation to further explore the language learning resources reported by the participants.

The following section deals with the discussion of the findings as related to the three research hypotheses. Then the theoretical and pedagogical implications are provided. The last section is the recommendation for future research.

6.1 The findings of the study

There are three research questions. Research question 1 and 2 deal with the lexical processing (lexical access). Research question 3 is related to vocabulary learning. The questions are set as follows:

1. What are the organization and the lexical processing in the English mental lexicon of Thai learners?

2. What are the similarities and differences between the mental lexicon of Thai learners with low and high English language exposure?

3. What are the factors affecting the acquisition of English vocabulary by Thai learners?

The hypotheses are formed accordingly. They are:

1. The frequently co-occurring words are stored closely in the English mental lexicon of Thai learners.

2. The learners with low and high language exposure have different mental lexicon, and different paths in lexical access of L2 words.

3. The factors affecting the acquisition of English vocabulary by Thai learners are degree of English language exposure, vocabulary size, English language learning activities, and vocabulary learning methods.

The findings are summarized by the research questions and hypotheses accordingly.

6.1.1 The organization and lexical processing of English mental lexicon in Thai learners

The results show that the frequently co-occurring words are stored closely in the English mental lexicon of Thai learners. Along the same lines with the study in L1

Turkish speakers (Cangir et al., 2017) and L2 learners' lexical processing (Wolter and Gyllstad, 2 0 1 1; Gyllstad and Wolter, 2 0 1 6), the average reaction time of the collocation (frequently co-occurring words) is faster than other conditions. It implies that, in a part of the mental lexicon, the words that frequently co-exist, e.g., *feel-good*, are stored closely together. The results from the LDT exhibit that the difference between the average reaction time of the collocation and the non-collocation is not significant. This suggests that the L2 words are not only linked by their co-existence.

The findings from the WAT show that the majority of responses are position-based, e.g., '*feel-good'* and meaning-based, e.g., '*feel-emotion'*, which is consistent with the previous study in L1 English speakers (Fitzpatrick, 2007). Semantics play an important role in the association. In the mental lexicon, the semantic relationship of words is strong and it sometimes requires the syntactic specifications of words. It conforms to Langacker's claim (1987) that the meanings of words engage semantic and syntactic specifications.

The participants in the present study produce slightly more responses that are meaning-related than the meaning and position related. The findings are along the same line with the study on the acquisition of collocation in L1 Thai learners. Detdamrongpreecha (2014) found that the performance of L1 Thai learners in noun-noun collocation, which can be considered as meaning-based association, is better than the verb-noun and adjective-noun (i.e., position-based association).

6.1.2 The Comparison between the Learners with High and Low Exposure to English Language

The lexical priming (lexical access) of learners with different degrees of exposure is explored through LDT and WAT. The findings show that the HE-group and LE-group have different mental lexicon and different paths in lexical access of L2 words. The average reaction time in three conditions: collocation, non-collocation, non-words, are in the same pattern. The participants in both groups respond to the collocation faster than the non-collocation, and nonword, which seems to be a universality feature among L1 and L2 speakers (Cangir et al., 2017; Durrant & Schmitt, 2009; Wolter & Gyllstad, 2011). The processing of the HE-group is much more proficient than the LE-group. The responses to all conditions of the HE-group

are much faster than the LE-group. Fewer errors are produced by the HE-group. The HE-group tends to have the stronger links between words than the LE-group (see Table 25).

Table 25 Performance of the HE-group and LE-group in LDT and WAT

	Conditions	HE-group (n = 45)		LE-group (n = 45)	
		RTs (ms.)	Errors (%)	RTs (ms.)	Errors (%)
LDT	Collocation	813.20	7%	933.94	21%
	Non-collocation	830.40	5%	974.19	21%
	Nonword (Fillers)	949.49	20%	1016.29	30%
		Number of responses (%)			
WAT	Meaning-based association	1139.8 (42.21%)		698 (25.85%)	
	Position-based association	909 (33.81%)		628 (23.26%)	
	Form-based association	231 (08.56%)		188 (06.96%)	
	Others (errors and blanks)	416.4 (15.42%)		1186 (49.93%)	

In addition, the findings from the WAT clearly show the different paths of the lexical access of the HE-group and LE-group. The majority of the association between words in the mental lexicon of the HE-group are meaning-based and position-based which is consistent with the production of L1 speakers (Fitzpatrick, 2007; Hui, 2011). In contrast, the LE-group members mainly give no response (31.07%) to the stimuli which means that they are uncertain and lack vocabulary knowledge. The LE-group also produce many more erratic responses than the HE-group (LE-group = 12.85%; HE-group = 7.09%). Some of the errors are the Romanization of Thai, e.g., *Cha* (the Thai word for 'tea'). When the information of an L2 words is accessed, L1 and L2 mental lexicons of low exposure learners cooperate (Sudasana, Luksaneeyanawin, & Burnham, 2001).

The lexical processing of the HE-group, who are considered to be more proficient language learners than the LE-group, possesses the characteristics of native-likeness. The lexical processing of the HE-group is more fluent than the LE-

group, i.e., the average reaction time of the HE-group is faster than the LE-group, the lexical. The HE-group's lexical network is similar to the native speakers. The major association of words in the mental lexicon is mainly based on semantic and morphosyntatic knowledge (Fitzpatrick, 2007; Hui, 2011). The findings are consistent with previous interlanguage studies in vocabulary acquisition that the high-proficiency learners' performance was better than the lower proficiency group in different aspects of vocabulary knowledge, e.g., performance of Ducth learners on different morphological types (Wander, 2018), and the ability to tackle the morphosyntactic tasks of Thai learners (Sridhanyarat, 2018) . The results of the present study support the interlanguage phenomenon that the lexical access of learners who have a high degree of exposure exhibits the native-likeness. The findings also support previous studies on exposure to English language that the degrees of exposure to English language enhances language performance (Chaitawin, 1997; Jang-arun & Luksaneeyanawin, 2016; Kijkar, 2004; Modehiran, 2005; Nimphaibule, 1996; Pongpairat & Luksaneeyanawin, 2013; Sertthikul, 2004; Tanisarn, 2011; Thaworn, 2011; Sudasana, Luksaneeyanawin, Burnham, 2001; Sudasana, 2002; Wong-Aram, 2011; Worathumrong & Luksaneeyanawin, 2016).

6.1.3 The Factors Affecting the Vocabulary Acquisition

The findings support the hypothesis that the English language exposure, vocabulary size, vocabulary learning method, and attitudes towards English language are the factors affecting the acquisition. As presented in 6.1.2, the degree of language exposure plays an important role in the lexical access. The L2 lexical network tends to be well established in the HE-group. The degrees of language exposure affect the vocabulary size. The learners who have more language exposure tends to have the larger vocabulary size than those who have limited exposure. Besides, the association between words in mental lexicon of Thai learners who know sufficient numbers of words (at least 3,000 words) is quite strong. These learners produced a lot of meaningful responses.

The effect of the learning methods and attitudes towards English language on the acquisition is found. Three influential learning methods including repetition, attention, and meta-learning are found to be effective. The repetition of exposing to

the target words is necessary for L2 vocabulary learning (Durrant and Schmitt, 2010). In the present study, the learners who have more exposure to the English language and try to use English language in daily lives are the HE-LVs. These learners have large vocabulary size and their lexical processing is more fluent than other groups. To strengthen the vocabulary acquisition, paying attention to the words that learners encounter is also crucial. Webb and Nation (2017) point out that the attention and repetition facilitate the vocabulary growth. The findings support Hoey's (2005) claim that the acquisition of vocabulary is successful when the encountered words are explicitly learnt. In the present study, learners (with either high exposure or low language exposure) who pay attention to vocabulary learning have large vocabulary size (more than 3,800 words). As presented in Chapter 5, the lexical access of the learners in the LE-group who are able to manage their language learning, is similar to the learners in the HE-group. These learners do meta-learning. The LE-LV learners employ different vocabulary learning methods to enhance their vocabulary knowledge, e.g., memorizing target words used in the courses, consulting different language learning resources and friends. In addition, the learners who have positive attitudes towards English language tend to have large vocabulary size and a well-established organization of mental lexicon. The successful learners (HE-LVs) are fond of doing things in English. They have high motivation and believe that they are able to learn English. The LE-SV learners whose association between words in the mental lexicon is arbitrary seem to be afraid of learning English language and do not have high motivation to learn. The LE-group (LE-LV and LE-SV) tend to be dependent on their teachers. They have limited chance to be exposed to English language because they are not eager to use English language outside the classroom. These learners only follow what the teachers assign them to use. The LE-LVs have advantage in vocabulary learning because they know how to learn. Having the knowledge of how to learn, i.e. meta-learning, the lexical processing of the LE-LVs is similar to the HE-group.

It has to be noted that all the factors are inter-related. With meta-learning, learners who are frequently exposed to English language are able to acquire English words effectively. In addition, when the learners have sufficient vocabulary knowledge, they are able to learn from different resources around them. With no

affection to language learning, neither learners with large nor small vocabulary sizes learn from exposure.

In summary, the English vocabulary acquisition is affected by either external factors (i.e., environment, media, and teachers) or the individual factors (i.e., degrees of exposure to language, vocabulary knowledge, attitudes toward English language, and learning methods). The external factors are related to the quality of input. The use of language by these external factors affects the acquisition of vocabulary. For the internal factors, it depends on the individual learner. Learners who have a lot of language exposure commonly have a large vocabulary size. These learners also have positive attitudes toward English language and use different methods to learn English.

6.2 Implications of the Study
The present study provides theoretical and pedagogical implications.

6.2.1 Theoretical Implications
The present study contributes to the Lexical Priming Theory, L2 mental lexicon as well as the knowledge in L2 vocabulary acquisition.

The findings partly support the Lexical Priming Theory (Hoey, 2005) that the collocated words are stored closely in the mental lexicon and connected via syntactic links. The storage of English words is assumed to be like a web, where the links between words are both semantically and syntactically connected. For example, the headword '*spend*' is stored closely together with its collocations (e.g. *time-money*). The words are also related to other words by meaning (e.g. *pay, give*, and *purse*) in L2 mental lexicon. The links between the collocations are strong in the mental lexicon of learners who have higher degree of English language exposure- i.e., have more opportunity to be primed, than the learners who have lower degrees of language exposure. The findings show that two dominant types of word association in L2 mental lexicon are position-based association and meaning-based association. It can be discussed that, for L2 learners, semantic specifications of words are primary. The results of the present study show that morphosyntactic knowledge plays a role in the organization of mental lexicon of the HE-LVs who are attentive to the use of collocations. It implies that these learners acquire frequently co-occurring words as a group because they focus on the use of them.

The results support Collins and Loftus's (1988) Spreading Activation Model. The semantic network is infinite and changeable. The findings show that learners produce different types of association between the English words in the mental lexicon: meaning-based, position-based, form-based, and other association (give blank or erratic responses). According to Taft (1991), word meaning entails linguistic knowledge of syntax, phonology, orthography, and morphology. The lexical network can be extended in different directions. For example, the word '*spend*' can be linked with '*time*' (semantic-syntactic relations) as well as '*spend-give*' (concept and semantic relations). It is conceived that association of words can be stronger when learners are aware of acquiring words and take control of learning English vocabulary.

The results underpin Ellis (1997, 2002) that acquiring vocabulary requires the frequency of exposure to a word and the co-existing words. The findings exhibit that the lexical access of the HE-group is more fluent than the LE-group. The HE participants have stronger links between words in the mental lexicon and are able to produce more collocations than the LE-group. Besides, the acquisition can be through either forms or meanings of words. The results show that participants who pay attention to forms (phonology and orthography) produce the target words that are homonyms or contain similar sounds with the cue words. The acquisition of L2 vocabulary engages the frequency of exposing to the input and the attention to the words they encounter.

6.2.2 Pedagogical Implications

Effective vocabulary acquisition in L2 learners engages explicit learning (Sonbul and Schmitt, 2013). In EFL contexts, learners are surrounded by degraded use of English language, so they need assistant from teachers. As teachers and facilitators, the vocabulary learning tasks and activities should be designed.

The learners are exposed to English language from doing different activities, but many of them cannot justify the quality of the input. Teachers should bring this topic into the classroom. There should be a lesson on how to select good English learning resources and how to enjoy learning from doing activities in English. Learners are aware that English language is important to their lives; however, they

need advice from teachers. Learners who try to learn English from the degraded resources may acquire incorrect or inappropriate use of English.

Learning collocations are recommended for L2 learners. Learners should be exposed to the frequently co-occurring words in the language learning materials and from the authentic resources, e.g. movies, songs, and news. High proficient learners commonly have good attitude towards learning and high motivation. With sufficient knowledge of words, they are able to learn from different learning resources. The teacher should encourage them to focus on the co-existence of words and explain how to examine the semantic and syntactice relationship between words. Some learners may be able to identify the semantic association or the pragmatic functions of the words. For low proficient learners, the teacher's job is to select the collocations and explain the semantic association of the words. L1 is required to aid low proficient learners to acquire new L2 words. Affixation needs to be taught because it aids the learners to understand the relationship between co-occurring words. In the mixed-ability class, lower proficient learners should be assigned to do a task with the high proficient learners. Based on Vygostky's (1978) principles on Zone of Proximal Development (ZPD) and scaffolding, learners are able to learn from their classmates with the support from the teacher. When the group of mixed-ability learners is conducting a language learning task, the teacher can assign different roles to learners and give suggestions to encourage them to learn.

Additionally, vocabulary lessons which promote lexical priming could be designed. The class activities that facilitate the learning of words meaning and the pattern of the co-occurring can be word games or error identification tasks. The teachers may provide some materials to activate learners to learn new words by linking them to other words meaningfully and grammatically. In addition, the learning materials can be authentic (i.e. related to learners' field of study or future work). Learners would easily engage with the meaningful tasks and learn how words should appear together meaningfully. Nation (2013) suggests that vocabulary learning activities should include repetition (drill) as well as the focus on the meaning and the use of words in contexts.

Another issue is about the teacher and learning atmosphere. The findings show that some learners have negative attitudes towards English due to the teaching style.

They view that teachers pay a lot of attention to grammar. Learners are eager to communicate in English, but they have never been given the chance to do so. In the classroom, the teacher is a role model for leaners. Teachers should be able to communicate in English fluently. When teachers talk to learners in English, communication occurs. Outside the classroom, learners who enjoy learning can acquire English from different activities, e.g. extensive reading, watching movies, listening to music, or participating in English camps.

The last issue is to explicitly train meta-learning. Knowing how to learn is necessary; unfortunately, it has been neglected. The findings of the present study show that the most successful learners do meta-learning. Learners with good attitudes do not always acquire English vocabulary effectively. In the classroom, teachers commonly explain the rules of language and provide learning activities. Teachers should help learners to identify the errors they created and guide them to correct those errors. Learners should be trained to set their goals of learning English and control their learning. Teachers should announce the outcome of each lesson that the learners need to meet. Learners should be able to design the methods of learning in order to achieve the goal. Further, they should practice vocabulary learning strategies to help them manage their learning effectively. The training can be varied depending on the learners. Learners with low exposure should be provided with simple English vocabulary learning activities that they can enjoy in order to build their self-efficacy. The proficient learners may take a short training on meta-learning to optimize their proficiency.

6.3 Limitation and Recommendation for Future Research

The limitation of the present study should be noted. The list of experimental items in LDT is limited to one type of lexical collocation- i.e., verb + noun. There are some other types of lexical collocation: adjective + noun and noun + noun. In future research, the list of items could be expanded to examine the lexical priming (lexical access) of different kinds of word association. The experimental words in LDT can be designed in parallel with WAT. In addition, the categorization of responses in the WAT seem to be overlapping. Some responses could be classified as having either meaning-based or position-based relationship (e.g., *telephone-call*). It contributes to

Langacker (1987) that a word can be conceptualized by different schemas. The verb 'call' is an action that can be related to 'telephone'; meanwhile, the syntactic specification of the noun 'telephone' requires the noun 'call' to follow and fit in as a lexical collocation. According to Langacker (1987), a word has different imagery dimensions (the way we define its meaning). It depends on personal categorization to assign the meaning and the syntactic relationship between 'telephone' and 'call' in the specific situation. The categorization in the present study was based on the bounding force of two words. The classification or responses in WAT should be redesigned in the future research.

The present study focuses on the written word recognition. Future research could be done to examine the phonological aspects of words. The sounds may also play an important role in the acquisition of L2 learners. Moreover, different kinds of collocation may be further explored. The intervention on collocation as well as material designed for learning collocation should also be developed.
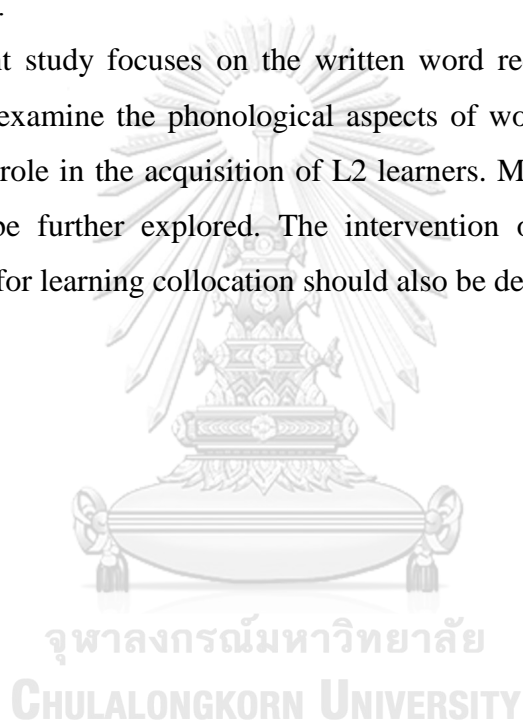
REFERENCES

Aitchison, J. (2012). *Words in the mind: An introduction to the mental lexicon*: John Wiley & Sons.

Ayudhya, P. S. N. (2002). *Models of mental lexicon in bilinguals with high and low second language experience: an experimental study of lexical access.* Chulalongkorn University,

Barcroft, J., Sunderman, G., & Schmitt, N. (2011). Lexis. In *The Routledge handbook of applied linguistics* (pp. 591-603): Routledge.

Bialik, M., Bogan, M., Fadel, C., & Horvathova, M. (2015). Character education for the 21st century: What should students learn. *Center for curriculum redesign. Boston: Massachusetts*, 23-180.

Biggs, J. B. (1985). The role of metalearning in study processes. *British journal of educational psychology, 55*(3), 185-212.

Booranaprasertsook, W. (2007). *Lexical-Semantic System in the Thai Used by the Visually Impaired and Auditorily Impaired.* Paper presented at the Chulalongkorn-Japan Linguistics Symposium, Chulalongkorn University.

Brezina, V., & Gablasova, D. (2013). Is There a Core General Vocabulary? Introducing the New General Service List. *Applied Linguistics, 36*(1), 1-22. doi:10.1093/applin/amt018

Cangır, H., Büyükkantarcıoğlu, S. N., & Durrant, P. (2017). Investigating collocational priming in Turkish. *Journal of Language and Linguistic Studies, 13*(2), 465-486.

Caro, K., & Mendinueta, N. R. (2017). Lexis, lexical competence and lexical knowledge: a review. *Journal of Language Teaching and Research, 8*(2), 205-213.

Carroll, D. W. (2007). *Psychology of Language*: Cengage Learning.

Chaitawin, B. (1997). The variation of production of the final consonant /l/ in English words: comparative study in the first year students with different English experience. *Science of language, 9*, 51-73.

Chen, Y.-H., & Baker, P. (2010). Lexical bundles in L1 and L2 academic writing. *Language Learning & Technology, 14*(2), 30-49.

Collins, A. M., & Loftus, E. F. (1975). A spreading-activation theory of semantic processing. *Psychological review, 82*(6), 407.

Collins, A. M., & Quillian, M. R. (1969). Retrieval time from semantic memory. *Journal of verbal learning and verbal behavior, 8*(2), 240-247.

Collins, A. M., & Quillian, M. R. (1970). Facilitating retrieval from semantic memory: The effect of repeating part of an inference. *Acta Psychologica, 33*, 304-314.

Conklin, K., & Schmitt, N. (2008). Formulaic sequences: Are they processed more quickly than nonformulaic language by native and nonnative speakers? *Applied Linguistics, 29*(1), 72-89.

Conklin, K., & Schmitt, N. (2012). The processing of formulaic language. *Annual Review of Applied Linguistics, 32*, 45-61.

Coxhead, A. (2000). A new academic word list. *TESOL quarterly, 34*(2), 213-238.

Detdamrongpreecha, D. (2014). The acquisition of basic collocations by Thai learners of English. *SDU Res. J, 10*(3), 37-53.

Dewaele, J. M., & Pavlenko, A. (2002). Emotion vocabulary in interlanguage. *Language Learning, 52*(2), 263-322.

Dong, Y., Gui, S., & MacWhinney, B. (2005). Shared and separate meanings in the bilingual mental lexicon. *Bilingualism: Language and Cognition, 8*(3), 221-238.

Dulay, H., & Burt, M. (1977). Remarks on creativity in language acquisition. *Viewpoints on English as a second language, 2*, 95-126.

Durrant, P., & Doherty, A. (2010). Are high-frequency collocations psychologically real? Investigating the thesis of collocational priming. *Corpus Linguistics and Linguistic Theory, 6*(2), 125-155.

Durrant, P., & Schmitt, N. (2010). Adult learners' retention of collocations from exposure. *Second language research, 26*(2), 163-188.

Elgort, I. (2011). Deliberate learning and vocabulary acquisition in a second language. *Language Learning, 61*(2), 367-413.

Elgort, I., & Warren, P. (2014). L2 vocabulary learning from reading: Explicit and tacit lexical knowledge and the role of learner and item variables. *Language Learning, 64*(2), 365-414.

Ellis, N. C. (1997). Vocabulary acquisition: Word structure, collocation, grammar, and meaning. In: Cambridge University Press.

Ellis, N. C. (2002). Frequency effects in language processing: A review with implications for theories of implicit and explicit language acquisition. *Studies in Second Language Acquisition, 24*(2), 143-188.

Ellis, N. C., & Wulff, S. (2012). Second Language Acquisition. In E. D. a. D. Divjak (Ed.), *Handbook of Cognitive Linguistics*: Walter de Gruyter GmbH & Co KG.

.

Fernández, B. G., & Schmitt, N. (2015). How much collocation knowledge do L2 learners have? *ITL-International Journal of Applied Linguistics, 166*(1), 94-126.

Fitzpatrick, T. (2007). Word association patterns: Unpacking the assumptions. *International Journal of Applied Linguistics, 17*(3), 319-331.

Fitzpatrick, T., & Izura, C. (2011). Word association in L1 and L2: An exploratory study of response types, response times, and interlingual mediation. *Studies in Second Language Acquisition, 33*(3), 373-398.

Forster, K. (1976). Accessing the mental lexicon. *New approaches to language mechanisms. Amsterdam: North Holland.*

Forster, K. I., & Bednall, E. S. (1976). Terminating and exhaustive search in lexical access. *Memory & cognition, 4*(1), 53-61.

Forster, K. I., Davis, C., Schoknecht, C., & Carter, R. (1987). Masked priming with graphemically related forms: Repetition or partial activation? *The Quarterly Journal of Experimental Psychology, 39*(2), 211-251.

Forster, K. I., & Forster, J. C. (2003). DMDX: A Windows display program with millisecond accuracy. *Behavior research methods, instruments, & computers, 35*(1), 116-124.

Gass, S. M., & Mackey, A. (2012). *Data elicitation for second and foreign language research*: Routledge.

Goatly, A. (2017). Lexical priming in humorous discourse. *The European Journal of Humour Research, 5*(1), 52-68.

Gyllstad, H., & Wolter, B. (2016). Collocational processing in light of the phraseological continuum model: Does semantic transparency matter? *Language Learning, 66*(2), 296-323.

Halliday, M. A. K., & Yallop, C. (2007). *Lexicology: a short introduction*: A&C Black.

Harley, T. A. (2013). *The psychology of language: From data to theory*: Psychology press.

Hoey, M. (2005). *Lexical Priming: A New Theory of Words and Language*: Routledge.

Hoey, M., & O'Donnell, M. B. (2008). Lexicography, grammar, and textual position. *International Journal of Lexicography, 21*(3), 293-309.

Hui, L. (2011). An investigation into the L2 mental lexicon of Chinese English learners by means of word association. *Chinese journal of applied linguistics, 34*(1), 62-76.

Hutchison, K. A., Balota, D. A., Neely, J. H., Cortese, M. J., Cohen-Shikora, E. R., Tse, C.-S., . . . Buchanan, E. (2013). The semantic priming project. *Behavior Research Methods, 45*(4), 1099-1114.

Jackson, H., & Amvela, E. Z. (2007). *Words, meaning and vocabulary: an introduction to modern English lexicology*: Bloomsbury Publishing.

Jackson*, N. (2004). Developing the concept of metalearning. *Innovations in Education and Teaching International, 41*(4), 391-403.

Jangarun, K., & Luksaneeyanawin, S. (2016). Discourse Connector Usage in Argumentative Essays by American and Thai University Students. *Journal of Pan-Pacific Association of Applied Linguistics, 20*(1), 95-112.

Jiang, N. (2002). Form–meaning mapping in vocabulary acquisition in a second language. *Studies in Second Language Acquisition, 24*(4), 617-637.

Jiang, N. (2004). Semantic transfer and its implications for vocabulary teaching in a second language. *The modern language journal, 88*(3), 416-432.

Jiang, N., & Forster, K. I. (2001). Cross-language priming asymmetries in lexical decision and episodic recognition. *Journal of memory and language, 44*(1), 32-51.

Jones, L. L., & Golonka, S. (2012). Different influences on lexical priming for integrative, thematic, and taxonomic relations. *Frontiers in human neuroscience, 6*, 205.

Juffs, A. (2009). Second language acquisition of the lexicon. *The new handbook of second language acquisition*, 181-209.

Khazaeenezhad, B., & Alibabaee, A. (2013). Investigating the role of L2 language proficiency in word association behavior of L2 learners: A case of Iranian EFL learners. *Theory and Practice in Language Studies, 3*(1), 108.

Kijkar, P. (2004). *The production and perception of English monophthongs by Thai speakers with different English-language experience.* . (Master's thesis.). Chulalongkorn University, Bangkok, Thailand.

Kiss, G. R., Armstrong, C., Milroy, R., & Piper, J. (1973). An associative thesaurus of English and its computer analysis. *The computer and literary studies*, 153-165.

Krashen, S. (1982). Principles and practice in second language acquisition.

Krishnan, G., & Tiwari, S. (2008). The Semantic Association in the Mental Lexicon. *JAIISH, 27*, 45-49.

Langacker, R. W. (1987). Nouns and verbs. *Language*, 53-94.

Levelt, W. (1989). ACL. In: MIT Press series in natural-language processing. Speaking: From intention to ….

Lin, P. M. (2014). Investigating the validity of internet television as a resource for acquiring L2 formulaic sequences. *System, 42*, 164-176.

Louw, B. (1993). Irony in the text or insincerity in the writer? The diagnostic potential

of semantic prosodies. *Text and technology: In honour of John Sinclair, 157*, 176.

Lowder, M. W., Choi, W., & Gordon, P. C. (2013). Word recognition during reading: The interaction between lexical repetition and frequency. *Memory & cognition, 41*(5), 738-751.

Luksaneeyanawin, S. (2007). Unfolding linguistics. In. Bangkok: Chulalongkorn University Printing.

Lyons, J. (1968). *Introduction to theoretical linguistics*: Cambridge university press.

Mallikamas, P., & Pongpairoj, N. . (2005). Thai learners' knowledge of English collocations. *HKBU Papers in Applied Language Studies 5*.

McNeill, D. (1966). A study of word association. *Journal of verbal learning and verbal behavior, 5*(6), 548-557.

Modehiran, P. (2005). *Correction making among thais and Americans: a study of cross-cultural and interlanguage pragmatics.* Chulalongkorn University,

Morton, J., & Patterson, K. (1980). Little words—no! *Deep dyslexia*, 270-285.

Nation, I. (2013). *Learning Vocabulary in Another Language Google eBook*: Cambridge University Press.

Nation, I. S. P., & Beglar, D. (2007). A vocabulary size test. *The Language Teacher, 31*(7), 9-13.

Newman, S. D., Ratliff, K., Muratore, T., & Burns Jr, T. (2009). The effect of lexical priming on sentence comprehension: An fMRI study. *Brain research, 1285*, 99-108.

Nimphaibule, S. (1996). *Variation of Thai air hostesses' pronunciation of the final consonant consonants (tʃ, dʒ, ʃ) in English words. .* (Mater's thesis). Chulalongkorn University, Bangkok, Thailand.

Novick, J. M., Kim, A., & Trueswell, J. C. (2003). Studying the grammatical aspects of word recognition: Lexical priming, parsing, and syntactic ambiguity resolution. *Journal of psycholinguistic research, 32*(1), 57-75.

O'Connor, R. E., & Forster, K. I. (1981). Criterion bias and search sequence bias in word recognition. *Memory & cognition, 9*(1), 78-92.

Pace-Sigge, M. (2013). The concept of lexical priming in the context of language use. *ICAME Journal, 37*, 149-173.

Pace-Sigge, M. (2017). Can Lexical Priming be detected in conversation turn-taking strategies? *Lexical Priming: Applications and Advances*, 93-120.

Parkinson, J. (2015). Noun–noun collocations in learner writing. *Journal of English for academic purposes, 20*, 103-113.

Patterson, K. J. (2016). The analysis of metaphor: To what extent can the theory of lexical priming help our understanding of metaphor usage and comprehension? *Journal of psycholinguistic research, 45*(2), 237-258.

Pereyra, N. (2015). Extensive Reading in Enhancing Lexical Chunks Acquisition. *The Reading Matrix: An International Online Journal, 15*(2).

Phoocharoensil, S. (2014). Exploring Learners. Developing L2 Collocational Competence. *Theory and Practice in Language Studies, 4*(12), 2533.

Plag, I. (2003). *Word-Formation in English*. Cambridge: Cambridge University Press.

Pongprairat, R., & Luksaneeyanawin, S. (2013). Degree of comprehensibility in Thai accented English rated by native speaker judges. *PASAA, 45*, 35-60.

Rastle, K., Harrington, J., & Coltheart, M. (2002). 358,534 nonwords: The ARC

nonword database. *The Quarterly Journal of Experimental Psychology Section A, 55*(4), 1339-1362.

Roelofs, A., Dijkstra, T., & Gerakaki, S. (2013). Modeling of word translation: Activation flow from concepts to lexical items. *Bilingualism: Language and Cognition, 16*(2), 343-353.

Saeed, J. I. (2009). Semantics, Blackwell. *Publishing, United Kingdom*.

Schmitt, N. (2008). Instructed second language vocabulary learning. *Language teaching research, 12*(3), 329-363.

Schmitt, N. (2019). Understanding vocabulary acquisition, instruction, and assessment: A research agenda. *Language Teaching, 52*(2), 261-274.

Selinker, L. (1972). Interlanguage. *IRAL-International Review of Applied Linguistics in Language Teaching, 10*(1-4), 209-232.

Sertthikul, S. (2004). *Production of Final /L/ in English Words in Thai And English Contexts by Thai Speakers with Different English-Language Experience.* (M.A. thesis.). Chulalongkorn University.,

Sinclair, J. (1999). The computer, the corpus and the theory of language.

Singleton, D. (1999). *Exploring the second language mental lexicon*: Ernst Klett Sprachen.

Singleton, D. (2016). *Language and the lexicon: An introduction*: Routledge.

Sonbul, S., & Schmitt, N. (2013). Explicit and implicit lexical knowledge: Acquisition of collocations under different input conditions. *Language Learning, 63*(1), 121-159.

Sridhanyarat, K. (2018). Thai learners' acquisition of L2 collocations: An interlanguage perspective. *GEMA Online® Journal of Language Studies, 18*(1).

Subon, F. (2016). Direct Vocabulary Instruction: The Effects of Contextualised Word Families on Learners' Vocabulary Acquisition. *Procedia-Social and Behavioral Sciences, 224*, 284-291.

Sudasna, P., Luksaneeyanawin, S., & Burnham, D. (2002). The Influence of Second Language Experience in the Pattern of Language Processing of the Bilingual Lexicon. *Manusya: Journal of Humanities, 5*(1), 79-95.

Suwitchanphan, P., & Phoocharoensil, S. (2014). Adjective+ noun collocational competence of L1 Thai learners: A comparative study of a regular program and an English program. *Asian Social Science, 10*(17), 210.

Taft, M. (1991). *Reading and the mental lexicon*. UK: Lawrence Erlbaum Associates Ltd.

Taft, M., & Forster, K. I. (1975). Lexical storage and retrieval of prefixed words. *Journal of verbal learning and verbal behavior, 14*(6), 638-647.

Taft, M., & Forster, K. I. (1976). Lexical storage and retrieval of polymorphemic and polysyllabic words. *Journal of verbal learning and verbal behavior, 15*(6), 607-620.

Taft, M., & Hambly, G. (1986). Exploring the cohort model of spoken word recognition. *Cognition, 22*(3), 259-282.

Tamminen, J., & Gaskell, M. G. (2013). Novel word integration in the mental lexicon: Evidence from unmasked and masked semantic priming. *The Quarterly Journal of Experimental Psychology, 66*(5), 1001-1025.

Tarnisarn, K. (2011). *The Relationship between 'English Language Experience' and Identification Ability of English Words with Vowels Reduction by Thai students. .*

(M.A. Thesis.). Chulalongkorn University.,

Thaworn, S. (2011). *Interpretation of Syntactic Ambiguity in English Sentences as Demonstrated by High and Low Competence Thai Learners. .* (M.A. Thesis.). Chulalongkorn University.,

Tresselt, M. E., & Mayzner, M. S. (1964). The Kent-Rosanoff word association: Word association norms as a function of age. *Psychonomic Science, 1*(1-12), 65-66.

Verspoor, M., & Schmitt, N. (2013). Language and the lexicon in SLA. *The Routledge encyclopedia of SLA*, 353-360.

Vitevitch, M. S., & Goldstein, R. (2014). Keywords in the mental lexicon. *Journal of memory and language, 73*, 131-147.

Vygotsky, L. (1978). Interaction between learning and development. *Readings on the development of children, 23*(3), 34-41.

Webb, S., & Nation, P. . (2017). *How vocabulary is learned*: Oxford University Press.

Webb, S., & Nation, P. (2017). *How vocabulary is learned*: Oxford University Press.

West, M. P. (1953). *A general service list of English words: with semantic frequencies and a supplementary word-list for the writing of popular science and technology*: Longmans, Green.

Wolter, B. (2001). Comparing the L1 and L2 mental lexicon: A depth of individual word knowledge model. *Studies in Second Language Acquisition, 23*(1), 41-69.

Wolter, B., & Gyllstad, H. (2011). Collocational links in the L2 mental lexicon and the influence of L1 intralexical knowledge. *Applied Linguistics, 32*(4), 430-449.

Wong-aram, P. (2011). A Comparison of Errors of Thai Students In The Formation Of English Words. *Damrong Journal, 10*(2), 87 - 115.

Worathumrong, S., & Luksaneeyanawin, S. (2016). Interlanguage Pragmatics Study of Compliments among Thai EFL Learners. *Journal of Pan-Pacific Association of Applied Linguistics, 20*(1), 157-182.

Wray, A. (2002). *Formulaic Language and the Lexicon*: Cambridge University Press.

Xinyue, Z., & Nannan, L. (2014). Exploring the Second Language Mental Lexicon With Word Association Tests. *Cross-Cultural Communication, 10*(4), 143.

Xu, Q. (2015). Lexical Priming Effects of Textbooks on EFL Learners' Use of" Give". *English Language Teaching, 8*(10), 123-132.

Xu, R., Mao, Z., & Liu, Y. (2012). Lexical Approach and Its Application in College English Classes. *Theory & Practice in Language Studies, 2*(10).

Yamamoto, Y. (2014). Multidimensional vocabulary acquisition through deliberate vocabulary list learning. *System, 42*, 232-243.

Yamashita, J., & Jiang, N. (2010). L1 influence on the acquisition of L2 collocations: Japanese ESL users and EFL learners acquiring English collocations. *TESOL quarterly, 44*(4), 647-668.

APPENDICES

Appendix A English Language Exposure Questionnaire (English version)

English Language Exposure Questionnaire

This questionnaire is used to collect data for the dissertation of a graduate student in English as an International Program, Graduate School, Chulalongkorn University. The researcher will not reveal your personal information to public. The data will be presented as a summary of research findings. The respondents have right to deny the participation at any time and participate in this project voluntarily. The cancellation of participation has no effect on the grade or scores of any courses.

Questionnaire No. _____

Part 1) Information about English language experience and the amount of its exposure at home and school, including English proficiency from past till present

A) Directions: Please answer by placing a checkmark (✓) or writing the answers according to your experiences.

1. Name _____Surname _____ Undergraduate year of study_____

2. Faculty _____ Major _____ University _____

3. Your high school is _____which is a public a private school.
   You studied in the ☐ regular program (Thai) ☐ English program ☐ International program

4. Your mobile phone number _____ email _____

5. You were born in ☐ Thailand   ☐ other countries (please specify) _____
   If you were born in other countries, you lived there for _____ month(s)/year(s).

6. The language(s) I usually speak at home. (Check all that apply)
   ☐ Thai language
   ☐ Dialect (s), i.e. Northeastern Dialect, Southern Dialect, (please specify) _____
   ☐ Foreign language (s) (please specify) _____

7. The language (s) I usually speak with my family members. (Check all that apply)
   (Ex: I usually speak English with my father)
   ☐ I speak Thai with _____.
   ☐ I speak _____ (please specify the dialect (s)) with _____
   ☐ I speak _____ (please specify the foreign language(s)) with _____.

8. Except Thai language, the language (s) I comfortably use is/are
   8.1 listening – speaking 1)_____ 2)_____ 3)_____
   8.2 reading – writing 1)_____ 2)_____ 3)_____

9. I started learning English since I was _____
   ☐ at home (home schooling before pre-school)   ☐ in pre-school ☐ in kindergarten
   ☐ in lower primary (year 1-3)   ☐ in upper primary (year 4-6)

B) Directions: Please place a checkmark (✓) to indicate your true experience at school and university

1. On average, my grade in English course at school and university is:

Grades / Levels	Grade 0 (F)	Grade 1 to 1.5 (D to D+)	Grade 2 to 2.5 (C to C+)	Grade 3 to 3.5 (B to B+)	Grade 4 (A)
At primary school					
At secondary school					
At university					

2. On average, my English teachers speak English to me in English courses:

Marks / Levels	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
At primary school					
At secondary school					
At university					

Part 2) information about the amount of time spent on all kinds of learning methods: formal education, extra curriculum and English self-practice activities

Directions: Please place a checkmark (✓) to indicate the extent to which you think you had/ have opportunities to expose to English in each of the following situations.

Never = 0% Rarely = 1-25% Sometimes = 26-50% Often = 51-75% Extremely often = 76-100%

Situation	Never	Rarely	Sometimes	Often	Extremely often
1. Have you every studied English with any foreign teacher at school or university?					
2. Have you ever studied other subjects in English? (except English)					
3. Have you ever look up new words in the dictionary when you do activities?					
11. Have you ever watched or listened to news in English?					
5. Have you ever played online games in English?					
6. Have you ever played any games using English language such as scrabbles or crosswords?					
7. Have you ever done self-practice by listening to English conversation?					
8. Have you ever listened to or sung English songs?					

Situation	Marks				
	Never	Rarely	Sometimes	Often	Extremely often
9. Have you ever gone to see concerts using English language?					
10. Have you ever watched movies, TV series or documentary in English?					
12. Have you ever given an English presentation?					
13. Have you ever talked with people in English?					
14. Have you ever had English post online social network such as Facebook or Twitter?					
15. Have you ever done online chat in English through social network such as Facebook messenger or Line?					
16. Have you ever read English messages, articles, or news via online social network like Facebook or Twitter, or from websites?					
17. Have you every studied English with any foreign teacher at school or university?					
18. Have you ever read texts written in English?					
19. Have you ever read bulletin boards, bill boards, or other kinds of sign written in English?					
20. Have you ever read magazines or newspaper written in English?					
21. Have you ever read novels, comic books or other kinds of books in English?					
22. Have you ever written a diary or short essays in English?					
23. Have you ever summarized or taken notes in English?					
24. Have you ever had any correspondence with the others, sending emails in English?					
25. Have you ever studied with foreign learners at schools or university?					

Part 3) Intensive English language experience

Directions: Please answer by placing a checkmark (✓) or writing the answers according to your experiences.

1. Have you ever taken intensive English course (s)? (Check all that apply)

☐ No.(Skip to question no.2)   ☐Yes, during the semester. ☐Yes, during the semester break.

1.1. Approximately, how many hours per week did you take English course?

☐ 1-3 hours/week   ☐ 3-6 hours/week   ☐ more than 6 hours/week

1.2. Your teacher (s) is/are (Check all that apply) ☐ Thai ☐ Foreigners

1.3. While studying English intensive class, how much do your teachers use English

language to communicate with you (speak or write in English)?

Marks / Teachers	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
Thai teacher (s)					
Foreign teacher (s)					

2. Have you ever been abroad in some English-speaking countries?
    ☐ No. (Skip to question no.3)
    ☐ Yes.
      1) I have been to __ for ☐ travelling ☐ attending summer camp/intensive course
                ☐ others (please specify)_____
      2) I have been to __ for ☐ travelling ☐ attending summer camp/intensive course
                ☐ others (please specify)_____
      3) I have been to __ for ☐ travelling ☐ attending summer camp/intensive course
                ☐ others (please specify)_____

2.1 How long did you stay in each country?

Lengths / Countries	Less than 1 week to 1 month	1 to 3 months	More than 3 months	More than 1 year
1st country				
2nd country				
3rd country				

2.2 During the stay (s) in the place (s) you reported above, which choice can indicate the average extent that you think you used English?

Lengths / Countries	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
1st country					
2nd country					
3rd country					

3. Have you ever done part-time jobs using English?

   ☐ No.

   ☐ Yes. (Please specify) 1)_____ 2)_____ 3)_____

4. Have you ever taken some English course(s) abroad or English summer camp (s) in English-speaking country?

   ☐ No.

   ☐ Yes. (Please specify) 1)_____ 2)_____ 3)_____

4.1 How long did you stay in each country?

Lengths / Countries	Less than 1 week to 1 month	1 to 3 months	More than 3 months	More than 1 year
1st country				
2nd country				
3rd country				

4.2 During the stay (s) in the place (s) you reported above, which choice can indicate the average extent that you think you used English?

Lengths / Countries	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
1st country					
2nd country					
3rd country					

Thank you very much for your kind cooperation

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

Appendix B English Language Exposure Questionnaire (Thai version)

แบบสอบถาม

ประสบการณ์การใช้ภาษาอังกฤษ

แบบสอบถามฉบับนี้ทำขึ้นเพื่อเป็นข้อมูลในงานวิจัยระดับดุษฎีบัณฑิต ของนิสิตหลักสูตร
ภาษาอังกฤษเป็นภาษานานาชาติ บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย ผู้วิจัยขอรับรองว่า จะเก็บข้อมูล
เฉพาะเกี่ยวกับผู้ตอบแบบสอบถามเป็นความลับ จะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย ผู้ตอบ
แบบสอบถามมีสิทธิ์ที่จะบอกเลิกการเข้าร่วมโครงการวิจัยนี้เมื่อใดก็ได้และเข้าร่วมโครงการวิจัยนี้โดยสมัครใจและ
การบอกเลิกการเข้าร่วมการวิจัยนั้นไม่มีผลต่อคะแนนหรือเกรดของรายวิชาภาษาอังกฤษใดๆที่จะพึงได้รับต่อไป

หมายเลขแบบสอบถาม..

**ส่วนที่ 1) ข้อมูลประสบการณ์การใช้ภาษาอังกฤษและปริมาณการสัมผัสกับภาษาที่บ้าน ในโรงเรียนและ
ผลสัมฤทธิ์จากอดีตจนปัจจุบัน**

A) กรุณาตอบโดยการทำเครื่องหมาย ✓ หรือเขียนคำตอบตามประสบการณ์จริงของท่าน

1. ชื่อ _____ นามสกุล _____ ระดับปริญญาตรี ชั้นปีที่ _____

2. คณะ _____ วิชาเอก _____ มหาวิทยาลัย _____

3. โรงเรียนที่ศึกษาระดับมัธยมปลายคือ _____ เป็นโรงเรียน ☐ รัฐบาล ☐ เอกชน

   ศึกษาในหลักสูตร ☐ปกติ (ภาษาไทย) ☐ สองภาษา (English Program) ☐ นานาชาติ (International
Program)

4. หมายเลขโทรศัพท์มือถือ _____ อีเมล์ _____

5. ท่านเกิดใน ☐ ประเทศไทย ☐ ประเทศอื่น (โปรดระบุ) _____

   หากเกิดในประเทศอื่น ท่านอาศัยอยู่ในประเทศนั้นๆตั้งแต่อายุ_____ ปี จนถึงอายุ_____ ปี

6. ภาษาที่ท่านใช้พูดในบ้าน (เลือกได้มากกว่า 1 ข้อ)

   ☐ ภาษาไทย

   ☐ ภาษาถิ่น เช่นภาษาอีสาน ภาษาใต้ (โปรดระบุ) _____

   ☐ ภาษาต่างประเทศ (โปรดระบุ) _____

7. ท่านใช้ภาษาใดพูดกับคนในครอบครัวบ้าง เช่นใช้ภาษาอังกฤษพูดกับพ่อ (เลือกได้มากกว่า 1 ข้อ)

   ☐ ภาษาไทย ใช้พูดกับ _____

   ☐ ภาษาถิ่น (โปรดระบุ) _____ใช้พูดกับ

   _____

   ☐ ภาษาต่างประเทศ (โปรดระบุ) _____ ใช้พูดกับ _____

8. ภาษาที่ท่านสื่อสารได้ดีที่สุดนอกจากภาษาไทยคือ

   8.1 ด้านการฟัง-พูด ได้แก่ภาษา 1) _____ 2) _____ 3) _____

   8.2 ด้านการอ่าน-เขียน ได้แก่ภาษา 1) _____ 2) _____ 3) _____

9. ท่านเริ่มเรียนภาษาอังกฤษตั้งแต่เมื่อใด

   ☐ ก่อนเข้าเตรียมอนุบาล (ที่บ้าน)   ☐ เตรียมอนุบาล   ☐ อนุบาล

   ☐ ประถมศึกษาตอนต้น (ป.1-3) ☐ ประถมศึกษาตอนต้น (ป.4-6)

B) กรุณาทำเครื่องหมาย ✓ในช่องที่ตรงกับประสบการณ์จริงของท่าน<u>ในขณะที่เป็นนักเรียนและขณะที่เป็นนิสิต</u>

1. โดยเฉลี่ยแล้ว ระดับคะแนนวิชาภาษาอังกฤษในขณะที่เป็นนักเรียนมักอยู่ในระดับใด

ระดับคะแนน / ช่วงเวลา	เกรด 0 (F)	เกรด 1 ถึง 1.5 (D ถึง D+)	เกรด 2 ถึง 2.5 (C ถึง C+)	เกรด 3 ถึง 3.5 (B ถึง B+)	เกรด 4 (A)
ในขณะที่เป็นนักเรียนชั้นประถม					
ในขณะที่เป็นนักเรียนชั้นมัธยม					
ในขณะที่เป็นนิสิต					

2. โดยเฉลี่ยแล้ว ภายในระยะเวลา 1 ชั่วโมง อาจารย์ที่สอนวิชาภาษาอังกฤษใช้ภาษาอังกฤษพูดกับท่านในชั้นเรียนมากน้อยเพียงใด

สัดส่วน / ช่วงเวลา	ไม่ใช้เลย	ใช้น้อย (ส่วนใหญ่ใช้ภาษาไทย)	ใช้ปานกลาง (ใช้สลับกับภาษาไทย)	ใช้มาก (ใช้ภาษาไทยเมื่อจำเป็น)	ใช้ตลอดเวลา
ในขณะที่เป็นนักเรียนชั้นประถม					
ในขณะที่เป็นนักเรียนชั้นมัธยม					
ในขณะที่เป็นนิสิต					

ส่วนที่ 2) ปริมาณการสัมผัสกับภาษาอังกฤษในการเรียนทุกประเภททั้งในระบบ นอกระบบ และตามอัธยาศัย

กรุณาทำเครื่องหมาย ✓ ในช่องที่ตรงกับประสบการณ์จริงของท่านตามระดับความถี่มากน้อยดังนี้

ไม่เคย = 0%   น้อยมาก = 1-25% น้อย = 26-50%   บ่อย = 51-75%   บ่อยมาก = 76-100%

ข้อมูล	ระดับความถี่				
	ไม่เคย	น้อยมาก	น้อย	บ่อย	บ่อยมาก
1.ท่านเรียนวิชาภาษาอังกฤษจากอาจารย์ชาวต่างประเทศ ที่โรงเรียนหรือมหาวิทยาลัยบ้างหรือไม่					
2.ท่านเรียนวิชาอื่นๆเป็นภาษาอังกฤษบ้างหรือไม่ ยกเว้นวิชา) (ภาษาอังกฤษ					
3.ท่านค้นหาความหมายของคำศัพท์ภาษาอังกฤษที่พบ ในการทำกิจกรรมต่างๆบ้างหรือไม่					
4.ท่านใช้พจนานุกรมที่อธิบายคำศัพท์ภาษาอังกฤษด้วยภาษาอังกฤษ (English – English Dictionary) บ้างหรือไม่					
5. ท่านเล่นเกมออนไลน์ที่เป็นภาษาอังกฤษบ้างหรือไม่					

ข้อมูล	ระดับความถี่				
	ไม่เคย	น้อยมาก	น้อย	บ่อย	บ่อยมาก
6. ท่านเล่นเกมเกี่ยวกับภาษาอังกฤษ เช่น scrabbles หรือ crosswords บ้างหรือไม่					
7.ท่านฝึกฟังบทสนทนาการพูด-ฟังภาษาอังกฤษ ด้วยตนเอง บ้างหรือไม่					
8. ท่านฟังเพลง หรือร้องเพลงภาษาอังกฤษบ้างหรือไม่					
9.ท่านเคยดูหรือฟังรายการข่าวภาคภาษาอังกฤษ บ้างหรือไม่					
10.ท่านเคยดูภาพยนตร์หรือสารคดีภาคภาษาอังกฤษ บ้าง หรือไม่					
11. ท่านเคยดูคอนเสิร์ตที่มีการใช้ภาษาอังกฤษบ้างหรือไม่					
12.ท่านนำเสนองานหน้าชั้นเรียนเป็นภาษาอังกฤษ บ้าง หรือไม่					
13. ท่านใช้ภาษาอังกฤษเพื่อการสนทนาบ้างหรือไม่					
14.ท่านโพสต์ข้อความภาษาอังกฤษในสังคมออนไลน์ ประเภท Facebook หรือ Twitter บ้างหรือไม่					
15.ท่านสนทนาภาษาอังกฤษในสังคมออนไลน์เช่น Facebook messenger หรือ Line บ้างหรือไม่					
16. ท่านอ่านข้อความหรือข่าวสารต่างๆที่เป็นภาษาอังกฤษ ในสังคมออนไลน์เช่น Facebook หรือ Twitter และ/หรือ เว็บไซต์ต่างๆบ้างหรือไม่					
17.ท่านหาข้อมูลจากเว็บไซต์ต่างๆที่เป็นภาษาอังกฤษ บ้าง หรือไม่					
18.ท่านอ่านตำราเรียนซึ่งเขียนด้วยภาษาอังกฤษ บ้างหรือไม่					
19.ท่านอ่านป้ายประกาศหรือโฆษณาที่ใช้ภาษาอังกฤษ หรือไม่					
20.ท่านอ่านนิตยสารหรือหนังสือพิมพ์ภาษาอังกฤษ หรือไม่					
21.ท่านอ่านนิยายหนังสือการ์ตูนหรือหนังสืออ่านเล่นอื่นๆที่ เป็นภาษาอังกฤษหรือไม่					
22.ท่านเขียนเรียงความหรือบันทึกประจำวันเป็น ภาษาอังกฤษบ้างหรือไม่					
23. ท่านย่อความ/สรุปความเป็นภาษาอังกฤษบ้างหรือไม่					
24. ท่านติดต่อกับผู้อื่นโดยใช้อีเมล์ภาษาอังกฤษบ้างหรือไม่					
25.ท่านเคยเรียนร่วมกับผู้เรียนชาวต่างประเทศ ที่โรงเรียน หรือมหาวิทยาลัยบ้างหรือไม่					

ส่วนที่ 3) การสัมผัสกับภาษาอังกฤษที่เกี่ยวข้องกับประสบการณ์พิเศษแบบเข้มข้น (Intensive)

กรุณาทำเครื่องหมาย ✓ ในช่องที่ตรงกับประสบการณ์จริงของท่าน

1. ท่านเรียนพิเศษภาษาอังกฤษบ้างหรือไม่ (เลือกได้มากกว่า 1 ข้อ)

☐ ไม่เรียน (ข้ามไปตอบข้อ 2) ☐ เรียนในระหว่างปิดภาคเรียน ☐ เรียนในระหว่างเปิดภาคเรียน

1.1 ท่านเรียนพิเศษภาษาอังกฤษคิดเป็นระยะเวลาเท่าใดต่อสัปดาห์

☐ 1-3 ชั่วโมงต่อสัปดาห์ ☐ 3-6 ชั่วโมงต่อสัปดาห์ ☐ มากกว่า 6 ชั่วโมงต่อสัปดาห์

1.2 ผู้สอนพิเศษภาษาอังกฤษของท่านเป็น ☐ ชาวไทย ☐ ชาวต่างประเทศ (เลือกได้มากกว่า 1 ข้อ)

โดยในขณะที่เรียนพิเศษภาษาอังกฤษ ผู้สอนใช้ภาษาอังกฤษสื่อสารกับท่าน (พูดหรือเขียน) กับท่านมากน้อยเพียงใด

สัดส่วน / ผู้สอน	ไม่ใช้เลย	ใช้น้อย (ส่วนใหญ่ใช้ภาษาไทย)	ใช้ปานกลาง (ใช้สลับกับภาษาไทย)	ใช้มาก (ใช้ภาษาไทยเมื่อจำเป็น)	ใช้ตลอดเวลา
ผู้สอนชาวไทย					
ผู้สอนชาวต่างประเทศ					

2. ท่านเดินทางไปยังประเทศซึ่งต้องใช้ภาษาอังกฤษในการสื่อสารบ้างหรือไม่

☐ ไม่เคยไป (ข้ามไปตอบข้อ 3)

☐ ไป ประเทศ 1) _____ ประเทศ 2) _____ ประเทศ 3) _____

2.1 ท่านเดินทางไปประเทศนั้นๆเป็นระยะเวลา

ระยะเวลา / ประเทศ	น้อยกว่า 1 สัปดาห์ ถึง 1 เดือน	1 ถึง 3 เดือน	3 เดือนขึ้นไป	1 ปี ขึ้นไป
ประเทศที่ 1				
ประเทศที่ 2				
ประเทศที่ 3				

2.2 ขณะที่ท่านเดินทางไปประเทศดังกล่าว ท่านใช้ภาษาอังกฤษสื่อสารมากน้อยเพียงใด

การใช้ / ประเทศ	ไม่ใช้เลย	ใช้น้อย (ส่วนใหญ่ใช้ภาษาไทย)	ใช้ปานกลาง (ใช้สลับกับภาษาไทย)	ใช้มาก (ใช้ภาษาไทยเมื่อจำเป็น)	ใช้ตลอดเวลา
ประเทศที่ 1					
ประเทศที่ 2					
ประเทศที่ 3					

3. ท่านเรียนคอร์สภาษาอังกฤษหรือเข้าค่ายภาษาอังกฤษในประเทศที่ต้องใช้ภาษาอังกฤษในการสื่อสารบ้างหรือไม่

☐ ไม่เคยไป (ข้ามไปตอบข้อ ภ)

☐ ไป ประเทศ 1) _____ ประเทศ 2) _____ ประเทศ 3) _____

        2.1 ท่านเดินทางไปประเทศนั้นๆเป็นระยะเวลา

ระยะเวลา ประเทศ	น้อยกว่า 1 สัปดาห์ ถึง 1 เดือน	1 ถึง 3 เดือน	3 เดือนขึ้นไป	1 ปี ขึ้นไป
ประเทศที่ 1				
ประเทศที่ 2				
ประเทศที่ 3				

2.2 ขณะที่ท่านเดินทางไปประเทศดังกล่าว ท่านใช้ภาษาอังกฤษสื่อสารมากน้อยเพียงใด

การใช้ ประเทศ	ไม่ใช้เลย	ใช้น้อย (ส่วนใหญ่ใช้ภาษาไทย)	ใช้ปานกลาง (ใช้สลับกับภาษาไทย)	ใช้มาก (ใช้ภาษาไทยเมื่อจำเป็น)	ใช้ตลอดเวลา
ประเทศที่ 1					
ประเทศที่ 2					
ประเทศที่ 3					

4. ท่านทำงานพิเศษที่ต้องใช้ภาษาอังกฤษในการสื่อสารหรือไม่

   ☐ ไม่ได้ทำ ☐ ทำ โปรดระบุ 1)_____ 2)_____ 3) _____

หลังจากตอบแบบสอบถามแล้ว ข้าพเจ้ายินดีเข้าร่วมทำแบบทดสอบและสัมภาษณ์ (ใช้เวลาประมาณ 15 นาทีโดยได้รับค่าตอบแทน

   ☐ ใช่   ☐ ไม่ใช่

ขอบคุณสำหรับความร่วมมือ

Appendix C Scoring Criteria for the English Language Exposure Questionnaire

Part 1

(A): Total score is 37 points.

Item 1-5 No points

Item 6-7 foreign language = English: 1 point

Item 8 (8.1-8.2) 1) <u>English: 3 points</u> 2) <u>English: 2 points</u> 3) <u>English: 1 point</u>

Item 9   at home (home schooling before pre-school): 5 points

                   in pre-school: 4 points

                   in kindergarten: 3 points

                   in lower primary (year 1-3): 2 points

                   in upper primary (year 4-6): 1 point

(B): Total score is 24 points.

Item 1

Grade 0 (F)	Grade 1 to 1.5 (D to D+)	Grade 2 to 2.5 (C to C+)	Grade 3 to 3.5 (B to B+)	Grade 4 (A)
0 point	1 point	2 point	3 point	4 point
0 point	1 point	2 point	3 point	4 point
0 point	1 point	2 point	3 point	4 point

Item 2

Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
0 point	1 point	2 point	3 point	4 point
0 point	1 point	2 point	3 point	4 point
0 point	1 point	2 point	3 point	4 point

Part 2: Total score is 100 points (4 points x 25 items)

Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
0 point	1 point	2 point	3 point	4 point

Part 3: Total score is 67 points.

Item 1   No: 0 point   Yes: 1 point

Item 1.1   1-3 hours/week: 1 point

            3-6 hours/week: 2 points

            more than 6 hours/week: 3 points

Item 1.2: no point

Item 1.3: Total scores is 8 points.

Marks Teachers	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
Thai teacher (s)	0 point	1 point	2 point	3 point	4 point
Foreign teacher (s)	0 point	1 point	2 point	3 point	4 point

Item 2: Total score is 27 points.

No: 0 point   Yes: 1 point for 1 English speaking country (highest score is 3 points)

2.1

Lengths Countries	Less than 1 week to 1 month	1 to 3 months	More than 3 months	More than 1 year
1st country	1 point	2 point	3 point	4 point
2nd country	1 point	2 point	3 point	4 point
3rd country	1 point	2 point	3 point	4 point

2.2

Lengths Countries	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
1st country	0 point	1 point	2 point	3 point	4 point
2nd country	0 point	1 point	2 point	3 point	4 point
3rd country	0 point	1 point	2 point	3 point	4 point

3. No: 0 point   Yes: 1 job = 1 point (total 3 points)

Item 4: Total score is 27 points.

No: 0 point   Yes: 1 point for 1 English speaking country (highest score is 3 points)

4.1

Lengths Countries	Less than 1 week to 1 month	1 to 3 months	More than 3 months	More than 1 year
1st country	1 point	2 point	3 point	4 point
2nd country	1 point	2 point	3 point	4 point
3rd country	1 point	2 point	3 point	4 point

4.2

Lengths Countries	Never	Rarely (Mostly Thai)	Sometimes (Alternatively with Thai)	Often (Mostly English)	Always
1st country	0 point	1 point	2 point	3 point	4 point
2nd country	0 point	1 point	2 point	3 point	4 point
3rd country	0 point	1 point	2 point	3 point	4 point

The raw scores will be calculated into weighted score as follow.

Parts	Raw scores	Weighted Scores
Part 1	37	35
Part 2	100	30
Part 3	67	35
Total	194	100

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

Appendix D The Scoring Results of the collocations and non-collocations to be used in LDT

Set A

	Yes = 1 Not sure = 0 No = -1	Expert 1	Expert 2	Expert 3	Total
	Collocations				
1	meet demand	Yes	Yes	Yes	3
2	hear stories	Yes	Yes	Yes	3
3	watch movies	Yes	Yes	Yes	3
4	create jobs	Not sure	Yes	Yes	2
5	break thing	Yes	Yes	No	2
6	develop skills	Yes	Yes	Yes	3
7	grow food	Yes	Yes	Yes	3
8	spend hours	Yes	Yes	Yes	3
9	choose side	Yes	Yes	Yes	3
10	produce results	Not sure	No	No	0
11	leave town	Yes	Yes	Yes	3
12	feel pain	Yes	Yes	Yes	3
13	call police	Yes	Yes	Yes	3
14	bring water	Not sure	Yes	Yes	2
15	turn head	Yes	Yes	Yes	3
16	provide support	Yes	Yes	Yes	3
17	start crying	Yes	Yes	Yes	3

	Yes = 1 Not sure = 0 No = -1	Expert 1	Expert 2	Expert 3	Total
	Non-collocations				
1	need page	No	No	No	-3
2	read room	No	No	No	-3
3	hold home	Not sure	No	No	-2
4	build finance	Not sure	No	No	-2
5	apply trace	Not sure	Yes	No	0
6	begin mistake	Not sure	No	No	-2
7	know part	Not sure	No	No	-2
8	come truth	Not sure	No	No	-2
9	find class	Yes	Yes	No	1
10	want gear	No	Yes	No	-1
11	write health	Yes	No	No	-1
12	show garden	No	Not sure	No	-2
13	help month	No	No	No	-3
14	give park	No	No	No	-3
15	make type	Not sure	No	No	-2
16	have year	No	Not sure	No	-2
17	keep crime	No	No	Not sure	-2
18	raise name	Yes	No	Not sure	0

Set B

	Yes = 1 Not sure = 0 No = -1	Expert 1	Expert 2	Expert 3	Total
	Collocations				
1	help people	Yes	Yes	Yes	3
2	give birth	Yes	Yes	Yes	3
3	make sense	Yes	Yes	Yes	3
4	have time	Yes	Yes	Yes	3
5	keep track	Yes	Yes	Yes	3
6	raise money	Yes	Not sure	Yes	2
7	need help	Yes	Yes	Yes	3
8	read books	Yes	Yes	Yes	3
9	hold hands	Yes	Yes	Yes	3
10	build bridges	Yes	Yes	Yes	3
11	begin video	Yes	Yes	Not sure	2
12	know things	No	Yes	Yes	1
13	come visit	No	Yes	Yes	1
14	want peace	Yes	Yes	Yes	3
15	write letters	Yes	Yes	Yes	3
16	show signs	Yes	Yes	Yes	3
17	apply glue	No	No	Yes	-1
18	find work	No	Not sure	Yes	0

	Yes = 1 Not sure = 0 No = -1	Expert 1	Expert 2	Expert 3	Total
	Non-collocations				
1	leave peace	No	No	No	-3
2	feel drug	No	Not sure	No	-2
3	hear major	No	Yes	No	-1
4	call point	No	No	No	-3
5	bring company	No	No	No	-3
6	turn case	No	Not sure	No	-2
7	provide force	Yes	No	No	-1
8	start climate	No	No	No	-3
9	meet scale	No	Not sure	No	-2
10	watch comment	No	Not sure	No	-2
11	create right	No	No	No	-3
12	break child	No	Not sure	No	-2
13	develop club	No	Not sure	No	-2
14	produce school	No	No	No	-3
15	grow paper	No	No	No	-3
16	spend room	No	Not sure	No	-2
17	choose reason	Yes	Yes	No	1

Appendix E Vocabulary Learning Journal

Think of the activities that you see the English words. Fill in the blanks to answer these questions.

ให้นิสิตนึกถึงกิจกรรมที่ทำแล้วได้พบคำศัพท์ภาษาอังกฤษ ตอบคำถามต่อไปนี้ โดยเขียนเติมลงใน ช่องว่าง

1. What do you do when you these activities and face new English words?

เมื่อทำกิจกรรมต่างๆแล้วพบคำศัพท์ภาษาอังกฤษที่ไม่รู้จัก นิสิตทำอย่างไร

....

....

....

....

2. Do you think it's is necessary to find the meanings these new words? Why?

นิสิตคิดว่าเราจำเป็นต้องรู้ความหมายของคำศัพท์ภาษาอังกฤษเหล่านี้หรือไม่ เพราะเหตุใด

....

....

....

....

3. Do we need to try using new words we faced when we use English? Why?

เราจำเป็นต้องนำคำใหม่ที่รู้จักไปใช้หรือไม่ เพราะเหตุใด

....

....

....

....

4. How do you learn new words?

นิสิตเรียนรู้คำศัพท์อย่างไร

....

....

....

....

5. What is the easiest way to memorize new words?

วิธีที่ง่ายที่สุดในการจำคำศัพท์คืออะไร

....

....

....

....
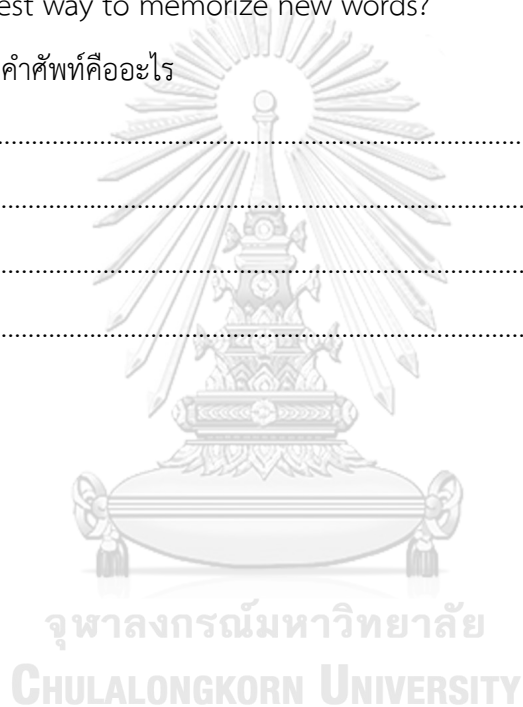
Appendix F ANOVA from the LDT (All participants)

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Collocation	90	80855.72	878.8665	42746.6
non-collocation	90	82466.72	896.3774	48435.28
fillers	90	90130.87	979.6834	54735.87

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	533924.4	2	266962.2	5.488617	0.004603	3.028847
Within Groups	13278515	273	48639.25			
Total	13812439	275				

Appendix G Comparison between Conditions in the LDT (All participants)

t-Test: Two-Sample Assuming Unequal Variances

	LDT-collocation	LDT-fillers
Mean	878.8665	979.6834
Variance	42746.6	54735.87
Observations	92	92
Hypothesized Mean Difference	0	
df	179	
t Stat	-3.09716	
P(T<=t) one-tail	0.001134	
t Critical one-tail	1.653411	
P(T<=t) two-tail	0.002269	
t Critical two-tail	1.973305	

t-Test: Two-Sample Assuming Unequal Variances

	LDT-collocation	LDT-non collocation
Mean	878.8665	896.3774
Variance	42746.6	48435.28
Observations	92	92
Hypothesized Mean Difference	0	
df	181	
t Stat	-0.55622	
P(T<=t) one-tail	0.289373	
t Critical one-tail	1.653316	
P(T<=t) two-tail	0.578745	
t Critical two-tail	1.973157	

Appendix H LDT Reaction times

	Non-cpllocation				Collocation				Nonwords			
	prime	target	Mean H	Mean L	prime	target	Mean H	Mean L	prime	target	Mean H	Mean L
1	feel	drug	847.05	1034.27	feel	pain	915.09	924.63	feel	gwane	927.60	1013.96
2	meet	scale	923.80	1002.78	meet	demand	692.49	949.26	meet	phooze	1197.79	1183.43
3	spend	room	936.91	913.75	spend	hours	644.17	655.83	spend	chold	830.12	1080.01
4	read	room	723.42	843.89	read	books	1262.91	1385.65	read	steave	0.00	1368.83
5	break	child	778.85	954.74	break	things	1033.51	1213.37	break	cuck	1027.03	907.24
6	come	visit	1055.76	1115.78	come	truth	891.54	843.05	come	ghous	821.83	1243.22
7	call	point	1081.45	1228.43	call	police	755.21	734.16	call	corld	744.50	840.13
8	develop	club	753.83	990.96	develop	skills	676.12	789.34	develop	chigh	1105.33	1103.03
9	hold	home	617.35	695.37	hold	hands	979.48	995.98	hold	trox	854.31	879.27
10	watch	comment	812.63	884.49	watch	movies	842.38	999.12	watch	stilch	1351.29	1088.92
11	need	page	837.86	961.92	need	help	680.47	775.54	need	twint	882.22	1076.63
12	want	gear	745.30	883.99	want	peace	1197.67	1241.49	want	gloze	651.51	891.51
13	write	health	866.48	954.09	write	letters	1000.59	1270.58	write	gnuck	1246.43	1333.12
14	keep	crime	834.27	852.81	keep	track	859.42	862.84	keep	bract	840.49	904.75
15	leave	peace	853.42	1070.55	leave	town	961.60	738.81	leave	scoke	844.19	999.78
16	bring	company	855.59	937.91	bring	water	647.66	834.65	bring	shorst	1345.91	1309.70
17	turn	case	708.81	665.96	turn	head	670.40	884.07	turn	glamp	840.38	1124.53
18	have	year	893.61	979.61	have	time	613.27	621.45	have	grourn	826.14	748.07
19	show	garden	788.95	880.54	show	signs	837.59	1009.32	show	stromp	775.78	1040.20
20	create	right	668.14	853.93	create	jobs	1435.51	1156.36	create	spact	1074.59	1234.55
21	give	park	910.50	966.79	give	birth	884.62	939.73	give	granx	1308.47	1169.87
22	build	finance	830.32	1020.80	build	bridges	703.32	884.12	build	wrawpth	1169.15	1203.81
23	provide	force	1085.81	1162.95	provide	support	798.71	1022.18	provide	jous	694.68	868.88
24	make	type	687.07	817.65	make	sense	717.83	762.27	make	volm	1086.30	1071.06
25	start	climate	1120.91	1191.06	start	crying	875.90	909.29	start	phryled	786.72	748.33
26	grow	paper	1067.78	1353.67	grow	food	774.66	755.88	grow	vonx	755.12	941.95
27	know	part	723.00	739.03	know	things	888.79	947.46	know	thwecs	746.32	795.39
28	hear	major	716.71	959.68	hear	stories	764.30	1207.37	hear	chold	1031.46	1245.74
29	begin	mistake	783.50	1024.70	begin	video	644.99	776.90	begin	swirst	919.02	1114.69
30	help	month	749.32	882.39	help	people	914.71	1010.84	help	oiced	739.7	713.404

Appendix I Classification of WAT

Stimulus word	Responses types	HE-group	LE-group
01. feel	Position-based association (Consecutive xy collocation)	good (10) happy (6) sad (3) angry (2) cold (2) great (2) bad (1) blue (1) cool (1) empty (1) fine (1) food (1) hot (1) like (1)	happy (20) good (6) sad (2) sore (2) fine (1) free (1) fresh (1) hot (1) loss (1) love (1) the sun (1)
	Position-based association (Consecutive yx collocation)	-	I (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	emotion (6)	emotion (3)
	Meaning-based association (Specific synonym)	-	emotion (1)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	love (1) moment (1) touch (1)	moment (1)
	Form-based association (Change of affix)	feeling (1)	feeling (1)
	Form-based association (Similar form only)	fever (1)	fun (2) food (1) from (1)
	Other (Erratic association)	donut (1) greed (1)	people (1) up (1)

Stimulus word	Responses types	HE-group	LE-group
02. time	Position-based association (Consecutive xy collocation)	out (4) over (2) up (1)	me (1) out (1)
	Position-based association (Consecutive yx collocation)	damn (1) space (1) total (1) waste (1)	space (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	a moment (1)	school (1) summer (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	morning (7) afternoon (2) midnight (1) period (1)	morning (7) afternoon (2) 7_11 (1) nine o'clock (1) ten (1)
	Meaning-based association (Conceptual related)	clock (10) watch (3) late (2) present (2) o'clock (2) hour (1) punctual (1) rush (1) second (1)	clock (5) hour (2) day (1) eat (1) go back (1) going (1) hours (1) infinity (1) mine (1) minute (1) now (1) p.m. (1) sleep (1) watch (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	tide (1)	talk (1)
	Other (Erratic association)	home (1)	home (1)

Stimulus word	Responses types	HE-group	LE-group
03. people	Position-based association (Consecutive xy collocation)	-	-
	Position-based association (Consecutive yx collocation)	crowded (2) more (2) American (1) black (1) kind (1) ordinary (1) poor (1) Thai (1) white (1) young (1)	Thai (2) Chinese (1) cute (1) good (1) other (1) polite (1) total (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	man (2) human (1) person (1) population (1)	human (4) population (1)
	Meaning-based association (Specific synonym)	crowd (2)	-
	Meaning-based association (Lexical set/ context related)	person (3) women (2) brother (1)	father (2) friends (2) student (2)
		child (1) dad (1) dancer (1) grow (1) human (1) man (1) me (1) mother (1) tiggle (1)	apple (1) doctor (1) famaly (1) family (1) friend (1) girl (1) he she (1) jam (1) mo (1) mother (1) teacher (1) woman and man (1) women (1) you (1)
03. people (Cont.)	Meaning-based association (Conceptual related)	animal (1) chaos (1) community (1) concert (1)	big (1) cat (1) thailand (1)

Stimulus word	Responses types	HE-group	LE-group
		noise (1) social (1)	
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	-	-
	Other (Erratic association)	net (1) stone (1) turn (1)	door (1) very (1) warm (1)

Stimulus word	Responses types	HE-group	LE-group
04. call	Position-based association (Consecutive xy collocation)	friend (2) me (2) mother and father (2) number (2) baby (1) people (1)	me (3) me baby (1) home (1) mom (1) my mom (1) name (1) number (1) sister (1) sun (1)
	Position-based association (Consecutive yx collocation)	phone (15) line (2) emergency (1) recall (1) your (1)	phone (13) line (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	telephone (4) listen (1) telephone (1) tell (1)	talk (4) telephone (3) IPhone (1) nickname (1) number (1) phone number (1) speak (1) tel (1)
	Form-based association (Change of affix)	-	calling (1)
	Form-based association (Similar form only)	-	-

Stimulus word	Responses types	HE-group	LE-group
04. call (Cont.)	Other (Erratic association)	buy (1) get (1) pick up (1) spell (1) take (1)	are (1)

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
05. bring	Position-based association (Consecutive xy collocation)	bag (2) me (2) money (2) things (2) back (1) bring to life (1) cake (1) drug (1) food (1) foods (1) gift (1) money to me (1) out (1) people (1) something (1) suddenly (1) water (1)	money (4) time (2) book (1) gold (1) light (1) on (1) something (1) what (1) work (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	take (3) pick up (1) take away (1)	take (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	give (2) buy (1) lend (1)	give (2) have (1)
	Form-based association (Change of affix)	brings (1)	-

Stimulus word	Responses types	HE-group	LE-group
05. bring (Cont.)	Form-based association (Similar form only)	brought (4) ring (2) bridge (1) bridge (1) brown (1) buy (1)	bang (2) bee (1) big (1) boring (1) ring (1)
	Other (Erratic association)	hand (1) lazy (1)	become (1) girlfriend (1) go (1) go to (1) star (1) talk (1) white (1)

Stimulus word	Responses types	HE-group	LE-group
06. company	Position-based association (Consecutive xy collocation)	profile (1)	-
	Position-based association (Consecutive yx collocation)	pizza (8) PTT (2) SCG (2) McDonald (1) our (1)	pizza (10) car (1) coke (1) in (1) KFC (1) PTT (1) Thai Oil Company (1) True (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	firm (2) organization (1)	-
	Meaning-based association (Specific synonym)	office (4) factory (2)	office (6)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	boss (2) employee (2) house (2) people (2) building (1) city (1) factory (1) machine (1) money (1) organize (1)	employee (2) Apple (1) Bangkok (1) factory (1) farmer (1) leader (1) pay (1) people (1) place (1) together (1)
		school (1) work (1)	work (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	communication (1)	-

Stimulus word	Responses types	HE-group	LE-group
06. company (Cont.)	Other (Erratic association)	condem (1) foundation (1) tower (1) way (1)	are (1) eat (1)

Stimulus word	Responses types	HE-group	LE-group
07. turn	Position-based association (Consecutive xy collocation)	left (8) around (6) right (6) on (4) off (3) back (3) car (1) left (1) light (1)	left (4) back (3) car (3) on (3) off (2) to (1)
	Position-based association (Consecutive yx collocation)	my turn (1) return (1)	U-turn (2) good (1) re (1) return (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	move (1)	-
	Meaning-based association (Specific synonym)	open (1)	go (1) go back (1)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	drive (2) side (2) circle (1) way (1)	gone (1) on my way (1) ran (1) road (1) way (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	-	too (1)
	Other (Erratic association)	home (1) hurt (1)	black (1) fun (1)

Stimulus word	Responses types	HE-group	LE-group
		sex (1)	home (1) ture (1) was (1)

Stimulus word	Responses types	HE-group	LE-group
08. water	Position-based association (Consecutive xy collocation)	melon (3)	fall (1)
	Position-based association (Consecutive yx collocation)	drink (11) blue (2)	drink (5) want (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	fluid (1) liquid (3)	liquid (1)
	Meaning-based association (Lexical set/ context related)	river (3) beer (3) coke (3) ocean (2) cola (2)	soda (3) cola (2) beer (1) coco (1) Coke (1) green tea (1) juice (1) Pepsi (1)
	Meaning-based association (Conceptual related)	ice (2) oil (2) wet (1)	eat (2) element (1) farm (1) kiwi (1) mango (1) rain (1) rice (1) wood (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	ruler (1)	-
	Other (Erratic association)	good (1)	happy (1)

Stimulus word	Responses types	HE-group	LE-group
09. head	Position-based association (Consecutive xy collocation)	ache (3) down (1) shot (1)	-
	Position-based association (Consecutive yx collocation)	forehead (1)	cool (1) hot (1) one (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	brain (2) leader (1)	brain (2)
	Meaning-based association (Lexical set/ context related)	hair (12) body (2) face (3) hand (2) eye (2) hairs (1)	hair (8) eye (5) body (2) face (2) nail (1)
	Meaning-based association (Conceptual related)	hat (3) coin (1) human (2) think (1)	cool (1) hat (1) shampoo (1) think (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	bed (2) had (1)	here (1) hot (1)
	Other (Erratic association)	each (2) noddle (1)	easy (1) from (1) I (1) skill (1)

Stimulus word	Responses types	HE-group	LE-group
10. sense	Position-based association (Consecutive xy collocation)	-	I (1)
	Position-based association (Consecutive yx collocation)	six (6) make (4) special (2)	six (2)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	feel (4) feeling (3)	feel (2)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	smell (2) bad (2) love (1)	happy (2) fun (1) funny (1) sick (1)
	Meaning-based association (Conceptual related)	drama (1) human (2) mouth (1)	ghost (2) eye (1) know (1) think (1) thinking (1)
	Form-based association (Change of affix)	sensitive (1)	present (1) sensitive (1)
	Form-based association (Similar form only)	saint (1) seven (2)	sent (1) soul (1) subject (1) tense (1)
	Other (Erratic association)	boy (2) football (1) part (1) question (1) simple (2) style (1)	baby (1) bee (1) email (1) read (1) sun (1) wing (1)
		tomorrow (1) a chance (1) the flower (1)	

Stimulus word	Responses types	HE-group	LE-group
11. give	Position-based association (Consecutive xy collocation)	money (5) gift (3) up (3) present (2) cake (1) car (1) drum (1) food (1) help (1) time (1) us (1)	money (4) gift (2) present (2) you (2) candy (1) friend (1) good things (1) happy (1) me (1) pen (1) something (1) with (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	send something (1)	-
	Meaning-based association (Specific synonym)	lend (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	kind (4) get (3) borrow (1) buy (1) happiness (1) happy (1) thank you (1)	get (2) happy (2) have (1) postman (1) take (1) thank you (1) want (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	gave (5) grief (1)	gave (1)

Stimulus word	Responses types	HE-group	LE-group
11. give (Cont.)	Other (Erratic association)	except (1) form (1)	big (1) found (1) meked (1)* voice (1)

Stimulus word	Responses types	HE-group	LE-group
12. make	Position-based association (Consecutive xy collocation)	money (3) bakery (2) cake (2) car (2) sure (2) anything (1) appointment (1) feel (1) food (1) friends (1) it happen (1) mistake (1) over (1) robot (1) sense (1) start (1)	something (2) food (1) it (1) product (1) sure (1) up (1)
	Position-based association (Consecutive yx collocation)	can (1)	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	do (9) done (1)	do (4) do it (1) doing (1)
	Meaning-based association (Specific synonym)	-	build (1)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	work (2) happen (1) homework (1)	work (7) cook (1) cooking (1) how (1) real (1)
	Form-based association (Change of affix)	made (3)	homemade (1) made (1) more (1)

Stimulus word	Responses types	HE-group	LE-group
12. make (Cont.)	Form-based association (Similar form only)	bake (1) move (1)	take (1)
	Other (Erratic association)	feel (1) have (1) let (1) see (1) start (1)	god (1) has (1) platform (1)

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
13. have	Position-based association (Consecutive xy collocation)	money (6) fun (2) a dinner (1) bath (1) everything (1) food (1) got (1) have to (1) house and car (1) nothing (1) pencil (1) rice (1) something (1) success (1) things (1) time (1) to (1)	money (5) no (2) apple (1) book (1) cat (1) eat (1) family (1) friend (1) fun (1) lunch (1) money (1) pen (1) pencil (1)
	Position-based association (Consecutive yx collocation)	should (1)	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	eat (2)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	give (1)	give (1) keep (1) rich (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	had (7) has (4)	has (4) happy (1) home (1)

Stimulus word	Responses types	HE-group	LE-group
13. have (Cont.)	Other (Erratic association)	do (1) down (1) handmade (1) human (1) remember (1) shape (1) thinking (1)	good (2) can (1) is (1) love (1) singer (1)

Stimulus word	Responses types	HE-group	LE-group
14. type	Position-based association (Consecutive xy collocation)	four (1) keyboard (3) text (1)	A (1) C (1) keyboard (1)
	Position-based association (Consecutive yx collocation)	blood (3) any (1) different (2) special (1)	both (1) one (1) we (1) what (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	kind (5) categories (2) kind (1)	-
	Meaning-based association (Specific synonym)	species (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	animal (1) browse (1) computer (2) food (2) gen (1) people (1) size (1) woman (1)	animal (1) car (1) cosmetic (1) food (1) size (1) water wind (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	like (2) pipe (1) tribe (1)	crime (1) file (1) treat (1)

Stimulus word	Responses types	HE-group	LE-group
14. type (Cont.)	Other (Erratic association)	boy (1) color (2) you (1)	cute (2) agent (1) cat (1) circle (1) dish (1) give (1) golf (1) old (1) pen (1) rad (1) solid (1) sun (1)

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
15. keep	Position-based association (Consecutive xy collocation)	look (5) calm (2) money (2) secret (2) clam (1) correct (1) down (1) fighting (1) fighting (1) forever (1) going (1) grade (1) it (1) on (1) out (1)	out (3) look (2) going (1) memory (1) money (1) my self (1) pizza (1) secret (1)
	Position-based association (Consecutive yx collocation)	-	to (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	make it safe (1) save (1)	save (1)
	Meaning-based association (Specific synonym)	put (1)	remember (1)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	gave (1) get (1) warehouse (1)	emotion (1) get (1) long (1) remember (1)
	Form-based association (Change of affix)	keeper (1)	-
	Form-based association (Similar form only)	give (3) kept (3) beef (1) kitchen (1)	cook (1) housekeeper (1)

Stimulus word	Responses types	HE-group	LE-group
15. keep (Cont.)	Other (Erratic association)	another (1) bed (1) been (1) family (1) house (1) word (1)	day (2) bao (1) box (1) football (1) hear (1) love (1) teacher (1) yes (1)

Stimulus word	Responses types	HE-group	LE-group
16. year	Position-based association (Consecutive xy collocation)	end (2) ago (1) gap (1) new year (1) now (1) old (1)	old (1) two (1)
	Position-based association (Consecutive yx collocation)	new (6) next (1) pig (1) this (1)	happy (2) new (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	12 months (1) 365 days (1) annual (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	month (7) day (5) month (2) months (2) 1998 (1)	2018 (6) day (5) 21 (1) 2541 (1) December (1) March (1) month (2) October (1)
	Meaning-based association (Conceptual related)	anniversary (1) born (1) Christmas (1) grow up (1) number (1) yesterday (1)	age (2) birth (1) birthday (1) remember (1) star (1) time (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	bear (1)	-

Stimulus word	Responses types	HE-group	LE-group
16. year (Cont.)	Other (Erratic association)	cat (1) help (1)	ball (1) Chonburi (1) help (1) month (1) support (1)

Stimulus word	Responses types	HE-group	LE-group
17. support	Position-based association (Consecutive xy collocation)	father (1) k-pop (1) me (2) mother (2) please (1)	friends (2) money (2) I (1) sister (1) women (1) my mom (1)
	Position-based association (Consecutive yx collocation)	family (3) always (1) game (1) give (1) main (1) parents (2)	parents (2) game (1) give (1) not (1) teacher (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	help (2) assist (2) caring (1) take care (2) treat (1)	-
	Meaning-based association (Specific synonym)	fight (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	love (2) happy (1) sponsor (3) thank (2) willing (1)	help (3) sponsor (2) comfortable (1) service (1) superman (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	success (1)	airport (1) import (1)
	Other (Erratic association)	company (1)	carry (2) hospital (2) cartoon (1) dog (1) healing (1) hurt (1)

Stimulus word	Responses types	HE-group	LE-group
18. need	Position-based association (Consecutive xy collocation)	money (5) have (2) you (2) a hug (1) best friend (1) drug (1) family (1) flower (1) food (1) help (1) more (1) rest (1) rich (1) something (1) telephone (1) water (1)	money (6) sleep (2) you (2) book (1) boy (1) boyfriend (1) candy (1) food (1) gold (1) got7 (1) money (1) someone (1) time (1) water (1)
	Position-based association (Consecutive yx collocation)	not (2) might (1) must (1) should (1)	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	want (13) have to (1)	want (11)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	important (1) necessary (1) necessary (1)	bring (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	lead (1)	-
	Other (Erratic association)	good (1)	age (1) meked (1) normal (1)

Stimulus word	Responses types	HE-group	LE-group
19. provide	Position-based association (Consecutive xy collocation)	job (2) accounting (1) address (1) house (1) lift (1) lyric (1) workshop (1)	home (3) bed (1) book (1) computer (1) number (1) time (1)
	Position-based association (Consecutive yx collocation)	doesn't (1)	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	supply (1)	
	Meaning-based association (Specific synonym)	find (1)	-
	Meaning-based association (Lexical set/ context related)	achieve (1) advice (1) do (1) find (1) organize (1) purchase (1) procure (1) support (1)	-
	Meaning-based association (Conceptual related)	-	bathroom (1) bedroom (1) twin room (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	produce (1) promise (1) province (1)	product (1) promote (1) protect (1) prove (1)

Stimulus word	Responses types	HE-group	LE-group
19. provide (Cont.)	Other (Erratic association)	drive (2) avoid (1) Bangkok (1) big (1) brain (1) English (1) expand (1) grateful (1) happy (1) in (1) multi (1) nun (1) premium (1) recycle (1) Samut Prakan (1) sleep (1) Trat (1)	air (1) black (1) body (1) cat (1) invite (1) know (1) Other (Erratic association) (1) Prachinburi (1) red (1) riving (1) sleep (1) tree (1) useful (1)

Stimulus word	Responses types	HE-group	LE-group
20. book	Position-based association (Consecutive xy collocation)	me (1) worm (1)	store (1) table (1)
	Position-based association (Consecutive yx collocation)	read (8) note (2) notebook (2) borrow (1) cartoon book (1) travel (1)	read (9) cartoon (3) comic (1) dynamics (1) english (1) english book (1) no (1) note book (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	reserve (2)	-
	Meaning-based association (Lexical set/ context related)	novel (1)	newspaper (1)
	Meaning-based association (Conceptual related)	pen (2) librarian (1) my friend (1) paper (1) pencil (1) study (1) text (1)	learning (1) library (1) pencil (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	cook (1)	-
	Other (Erratic association)	do (1) present (1)	allow (1) call (1) cat (1) fall (1) tea (1) thank (1)

Stimulus word	Responses types	HE-group	LE-group
21. room	Position-based association (Consecutive xy collocation)	-	-
	Position-based association (Consecutive yx collocation)	bed (7) big (2) class (1) hotel (1) my room (2) reserve (2) rest (1) safe (1) service (1) small (2) square (1)	bedroom (6) bed (3) bathroom (1) bed room (1) English (1) living (1) living room (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	area (1) place (2) space (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	sofa (1) window (3)	book (1) table (1) tv (1)
	Meaning-based association (Conceptual related)	home (3) black color (1) box (1) condo (1) door (2) friend (1) square (1)	read (3) sleep (2) home (1) house (1) see (1) so cute (1) view (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	moon (1)	boom (1)
	Other (Erratic association)	pen (1)	car (1) Sunday (1) cartoon (2) 24 (1)

Stimulus word	Responses types	HE-group	LE-group
22. meet	Position-based association (Consecutive xy collocation)	friend (5) friends (2) people (2) mother (1) sweetie (1)	friend (10) family (1) k-pop (1) man (1) mom (1) mother (1) you (1)
	Position-based association (Consecutive yx collocation)	-	can (1)
	Position-based association (Other collocational association)	nice to meet you (1)	-
	Meaning-based association (Defining synonym)	see (2)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	party (5) go (2) greeting (2) appointment (1) away (1) find (1) hide (1) miss (1) talk (1) welcome (1)	party (2) find (1) pork (1) see (1) together (1)
	Form-based association (Change of affix)	meeting (2)	meeting (2)
	Form-based association (Similar form only)	met (4) greet (2) delete (1) meal (1) meat (1)	need (2) eat (1) fish (1) make (1) meat (1) met (1)

Stimulus word	Responses types	HE-group	LE-group
22. meet (Cont.)	Other (Erratic association)	awkward (1) fine (1) food (1) response (1) watch (1)	book (2) room (1) travel (1)

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
23. read	Position-based association (Consecutive xy collocation)	book (24) a book (1) cartoon (1) news (1) newspaper (1) novel (1) text (1) the text (1)	book (20) all (1) English (1) magazine (1) news (1) notebook (1) text book (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	-	look (1)
	Meaning-based association (Lexical set/ context related)	write (3) draw (1) listen (1) speak (1)	write (2) writing (1)
	Meaning-based association (Conceptual related)	exam (1) learn (1)	pen (1) spell (1)
	Form-based association (Change of affix)	red (3) get something (1)	-
	Form-based association (Similar form only)	-	real (1) road (1)
	Other (Erratic association)	lerri (1) white (1)	has (1) meal (1)

Stimulus word	Responses types	HE-group	LE-group
24. hand	Position-based association (Consecutive xy collocation)	hand of someone (1) made (2) some (1)	ball (1) made (1) make (1) up (1)
	Position-based association (Consecutive yx collocation)	give (2) shake (2) touch (2) two (1)	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	finger (9) fingers (5) arm (3) body (2) head (3) leg (2)	finger (5) body (1) foot (1) nail (1)
	Meaning-based association (Conceptual related)	controls (4) holding (1) hug (1)	five (1) ring (1) pen (1) ring (1) shoe (1) touch (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	hard (1)	hop (1)
	Other (Erratic association)	figure (1)	angle (1) black hold (1) blue (1) friend (1) pet (1) run (1) text (1) time (1)

Stimulus word	Responses types	HE-group	LE-group
25. hold	Position-based association (Consecutive xy collocation)	on (8) hand (4) bag (2) call (1) gun (1) hands (1) pen (1) rule (1) table (1) the line (1) under (1)	on (2) pen (2) fish (1) hat (1) me (1) mouse (1) movie (1)
	Position-based association (Consecutive yx collocation)	-	can (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	hug (5) comfort (1) pull (1) push (1) wait (1) warm (1)	app (1) black (1) carry on (1) open (1) police (1) safety (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	bold (1) head (1) hear (1) held (1) how (1)	happy (1) holiday (1)

Stimulus word	Responses types	HE-group	LE-group
25. hold (Cont.)	Other (Erratic association)	best (1) boyfriend (1) climb (1) own (1)	dark (3) red (2) yellow (2) brother (1) cool (1) like (1) topic (1) YouTube (1)

Stimulus word	Responses types	HE-group	LE-group
26. watch	Position-based association (Consecutive xy collocation)	TV (14) movie (4) television (6) football (2) telephone (1)	TV (10) movie (3) cartoon (1) rain (1) ROV (1) series (1) show (1) video (1) watch video (1) YouTube (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	see (6) look (1)	look (1) see (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	time (3) careful (1) clock (1) g-shock (1) number (1)	time (2) cinema (1) computer (1) eye (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	match (1) wall (1) water (1) what (1)	-
	Other (Erratic association)	sea (1)	apple (1) city (1) dish (1) engineering (1) need (1) noon (1) pass time (1)

Stimulus word	Responses types	HE-group	LE-group
27. job	Position-based association (Consecutive xy collocation)	interview (3) good (1) need (1)	-
	Position-based association (Consecutive yx collocation)	tired (1)	part time (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	work (5) career (3)	work (4)
	Meaning-based association (Specific synonym)	task (1)	-
	Meaning-based association (Lexical set/ context related)	audit (2) engineer (3) accountant (2) doctor (1) engineering (1) pharmacist (1) pilot (1)	engineer (4) doctor (1) engineering (1) police (1) student (1) teacher (1) writer (1)
	Meaning-based association (Conceptual related)	fund (1) hobby (2) inspiration (1) money (2) salary (1) sing a song (1)	money (4) study (2) work (2) make money (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	mob (1)	joy (1)
	Other (Erratic association)	fun (1) paper (1) register (2) see (1)	game (1) ma (1) nerd (1) room (1)

Stimulus word	Responses types	HE-group	LE-group
28. create	Position-based association (Consecutive xy collocation)	art (3) new (3) idea (2) something (2) work (2) craft (1) data (1) folder (1) house (1) new thigs (1) picture (1) wok (1) wonderful (1)	art (2) work (2) car (1) home (1) image (1) new (1) project (1) new (1)
	Position-based association (Consecutive yx collocation)	-	can (1) could (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	make (4) design (3) build (2)	build (1) built (1) design (1) make (1)
	Meaning-based association (Specific synonym)	imagine (3) think (1)	think (2) thinking (1)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	idea (2) home (1) innovation (1)	draw (1) idea (1)
	Form-based association (Change of affix)	creative (1)	creature (1)
	Form-based association (Similar form only)	credit (1)	care (1)

Stimulus word	Responses types	HE-group	LE-group
28. create (Cont.)	Other (Erratic association)	abs (1) decide (1) sick (1) study (1) take (1)	blue (1) death (1) is (1) pink (1) room (1) student (1) sun (1)

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
29. build	Position-based association (Consecutive xy collocation)	house (11) tower (3) company (1) condo (1) family (1) home (1) skill (1) snow man (1) stock (1) store (1) table (1) the house (1)	home (6) company (2) house (2)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	make (4) create (2)	make (2) do (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	construction (1) destroy (1) engineer (1) KA building (1) many windows (1)	broken (1)
	Form-based association (Change of affix)	building (1)	building (5)
	Form-based association (Similar form only)	blind (1) box (1) built (1)	-

Stimulus word	Responses types	HE-group	LE-group
29. build (Cont.)	Other (Erratic association)	body (1) supermarket (1) Thai (1) university (1)	boy (1) good (1) hop (1) pencil (1) power (1) read (1) stop (1) tack (1) time (1)

จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
30. break	Position-based association (Consecutive xy collocation)	down (2) glass (2) up (2) break down (1) breakfast (1) cookie (1) down stop (1) glasses (1) up, out (1) wheel (1)	glass (2) break (1) breakfast (1)
	Position-based association (Consecutive yx collocation)	got (1) take (1)	breakfast (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	destroy (3) stop (3) smash (1)	morning (1) pause (1) stop (1) turn off (1)
	Meaning-based association (Specific synonym)	food (1) lunch (1)	eat (1) lunch (1)
	Meaning-based association (Lexical set/ context related)	noodle (1) stop (1)	-
	Meaning-based association (Conceptual related)	sad (2) fragile (1) hungry (1) nap (1) time out (1) wait (1)	car (2) home (2) crisp (1) happy (1) sleep (1) stop (1)
	Form-based association (Change of affix)	broken (1)	-
	Form-based association (Similar form only)	broken (3) bread (1) bring (1) broke (1) human (1)	broken (2) broke (1) red (1) egg (1)

Stimulus word	Responses types	HE-group	LE-group
30. break (Cont.)	Other (Erratic association)	free (1) mobile (1)	application (1) cold (1) dog (1) funny (1) sad (1) tree (1) world (1)

Stimulus word	Responses types	HE-group	LE-group
31. develop	Position-based association (Consecutive xy collocation)	country (3) myself (2) computer (1) knowledge (1) manager (1) office (1) pencil (1) phone (1) robot (1) skill (1) tablet (1) technology (1) tool (1)	application (1) computer (1) education (1) everything (1) yourself (1)
	Position-based association (Consecutive yx collocation)	-	no (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	improve (8) better (2) grow (1) up (1)	better (1)
	Meaning-based association (Specific synonym)	build (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	do (1) human (1) manage (1) management (1) mind (1) plan (1) slow (1) think (1)	company (1) drop (1) era (1) evolution (1) job (1) work (1)
	Form-based association (Change of affix)	development (1)	development (1)
	Form-based association (Similar form only)	envelope (1)	deny (1) duck (1)

Stimulus word	Responses types	HE-group	LE-group
31. develop (Cont.)	Other (Erratic association)	busy (1) camp (1) found (1) lamp (1) natural (1) ok (1)	bass (1) grade (1) lit (1) mountain (1) pizza (1) run (1) wood (1) word (1)

Stimulus word	Responses types	HE-group	LE-group
32. child	Position-based association (Consecutive xy collocation)	-	-
	Position-based association (Consecutive yx collocation)	cute (2) happy (2)	cute (1) happy (1)
	Meaning-based association (Defining synonym)	baby (5) kid (5) kids (3)	baby (5) kid (3)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	boy (2) my brother (1) sister (1) son (2) student (2)	son (1) student (1) young brother (1)
	Meaning-based association (Conceptual related)	adult (2) born (1) crying (1) happiness (1) kindergarten (2) noisy (1) school (1)	fun (1) funny (1) man (1) mom (1) mother (1) old (1) play (1) white (1)
	Form-based association (Change of affix)	children (3)	children (2)
	Form-based association (Similar form only)	mild (3)	-
	Other (Erratic association)	-	eat (1) fall (1) hold (1) on (1) sing (1) ship (1)

Stimulus word	Responses types	HE-group	LE-group
33. food	Position-based association (Consecutive xy collocation)	-	-
	Position-based association (Consecutive yx collocation)	eat (10) cat (1) junk (1) tasty (1)	eat (2) fast (1) Korean (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	rice (4) noodle (3) beef (1) chocolate (1) fish (1) KFC (2) meat (1) milk (1) pizza (2) sushi (1)	rice (8) pizza (4) noodle (3) KFC (2) apple (1) chicken (1) donut (1) egg (1) steak (1)
	Meaning-based association (Conceptual related)	hungry (3) canteen (1) dinner (1) drinks (1) happy (2) spoon (1)	7_11 (1) breakfast (1) life (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	fruit (1)	fall (1) father (1) feel (1)
	Other (Erratic association)	-	book (1) meet (1) test (1)

Stimulus word	Responses types	HE-group	LE-group
34. paper	Position-based association (Consecutive xy collocation)	mate (1)	-
	Position-based association (Consecutive yx collocation)	white (8) a4 (1) news (2) research (2)	white (4) a lot of (1) a4 (1) a5 (1) blue (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	report (1)	-
	Meaning-based association (Conceptual related)	pen (6) write (5) book (2) pencil (2) ink (1) notebook (2) space (1) tree (2) writing (1)	pen (4) book (3) double a (2) pencil (2) white (2) copy (1) eraser (1) recycle (1) sheet (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	popular (1)	people (1)
	Other (Erratic association)	town (3) silk (1)	apple (1) hot (1) or (1)

Stimulus word	Responses types	HE-group	LE-group
35. hour	Position-based association (Consecutive xy collocation)	one (1)	-
	Position-based association (Consecutive yx collocation)	sleep (3) 24 hr. (2) 25 (1) our (1) twenty four (2)	12 hour (1) sixty (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	time (8) long time (1)	time (11) 60 min (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	minute (5) second (4) minutes (3)	minute (3) min (1) minutes (1)
	Meaning-based association (Conceptual related)	day (1) fast (1) finish (1) month (2) song (1) watch (2) watches (1)	clock (2) now (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	-	has (1) home (1)
	Other (Erratic association)	machine (1)	room (2) ant (1) call (1) mother (1) rat (1) score (1) table (1)

Stimulus word	Responses types	HE-group	LE-group
36. begin	Position-based association (Consecutive xy collocation)	again (6) life (1) process (1) something new (1)	again (2) game (1) story (1) work (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	start (16)	start (9)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	end (4) finish (4) the end (2) count 1 (1) make (1) new (1) next (1)	born (1) end (1) front (1) morning (1) run (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	began (3) beautiful word (1) being (1)	began (3) become (1) becoming (1) before (1) beginning (1) believe (1) between (1) twin. (1)
	Other (Erratic association)	-	two (2) 17 (1) clock (1) normal (1)

Stimulus word	Responses types	HE-group	LE-group
37. grow	Position-based association (Consecutive xy collocation)	up (7) plant (3) animal (1) old (1) tree (2)	tree (3) back (1) dog (1) up (1) what (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	get old (2) increase (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	adult (3) young (2) body (1) country (1) EXO (1) hormone (1) strong (1) stronger (1) tall (2)	big (3) age (2) body (1) EXO (1) tall (1)
	Form-based association (Change of affix)	-	growing (1)
	Form-based association (Similar form only)	blow (1) glow (2) grave (1) grill (1) growth (3	go (3) cow (1) going (1) gone (1) grave (1)
	Other (Erratic association)	thinking (1)	factor (1) keed (1) new (1) one (1) put (1) school (1) want (1) white (1)

Stimulus word	Responses types	HE-group	LE-group
38.health	Position-based association (Consecutive xy collocation)	care (2) food (1)	-
	Position-based association (Consecutive yx collocation)	good (5)	good (5)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	fitness (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	sick (1)
	Meaning-based association (Conceptual related)	life (5) body (2) doctor (4) exercise (3) green (1) happy (1) hospital (2) lean (1) medicine (3) spirit (1) work out (2)	body (4) basketball (1) eye (1) father (1) food (1) happy (1) run (1) swim (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	heal (3) death (1) healthy (2) wealth (1)	happy (1) heart (1) help (1) hot (1)
	Other (Erratic association)	-	goal (1) love (1) one (1) past (1) tin (1)

Stimulus word	Responses types	HE-group	LE-group
39. part	Position-based association (Consecutive xy collocation)	find (2) life (1)	time (2) one (1)
	Position-based association (Consecutive yx collocation)	best (3) few (1) fifteen (2) small (1)	final (2) bad (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	piece (3) pieces (1) section (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	allocate (1) area (2) book (1) composition (2) everything (1) field (1) life (1) novel (1) quarter (2) Thailand (1) whole (2) YouTube (1)	1,2,3,4 (1) anime (1) number (1) quiz (1) test (1) unit (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	pan (1)	park (1) party (1) pass (1) prot (1)

Stimulus word	Responses types	HE-group	LE-group
39. part (Cont.)	Other (Erratic association)	future (3) allocate (1) circle (2) for (1) tense (1)	future (2) are (1) close (1) collume (1) come (1) love (1) make (1) road (1) run (1) sell (1) study (1) turn (1) word (1)

Stimulus word	Responses types	HE-group	LE-group
41. spend	Position-based association (Consecutive xy collocation)	time (12) money (10)	money (4) time (1)
	Position-based association (Consecutive yx collocation)	-	has (1) to (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	buy (2) give (1) pay (1) purse (1) use (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	pay (1) use (1)
	Meaning-based association (Conceptual related)	share (1)	-
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	send (1) sent (1) speak (1) speed (1) spent (1) spirited (1) spoke (1)	speak (2) see (1) send (1) slow (1) speed (1) spoon (1)
	Other (Erratic association)	conversation (1) music (1) rice (1) sand (1) vocabulary (1)	choose (1) hat (1) hear (1) homework (1) mail (1) tv (1)

Stimulus word	Responses types	HE-group	LE-group
42. month	Position-based association (Consecutive xy collocation)	-	12 (1)
	Position-based association (Consecutive yx collocation)	birthday (2) d/m/y (1)	one (1) twenty (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	30 days (3)	30 day (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	day (11) December (3) august (2) year (4) days (2) February (1) July (2) June (1) week (1)	day (5) year (4) march (3) November (3) July (2) may (2) September (1)
	Meaning-based association (Conceptual related)	calendar (1)	-
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	money (2) mourn (1)	Monday (2) may (1)
	Other (Erratic association)	lip (1) pass (1) salt (1) food (1)	teeth (1) eye (1) food (1) Japanese (1) red (1)

Stimulus word	Responses types	HE-group	LE-group
43. point	Position-based association (Consecutive xy collocation)	-	-
	Position-based association (Consecutive yx collocation)	tiny (3) work (3) centre (1) find (1) free (1) keep (1) middle (2) PowerPoint (2) view (1)	100 (2) full (1) PowerPoint (1) ten (1) work (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	dot (1) focus (1) node (2) purpose (2) score (1)	score (1)
	Meaning-based association (Specific synonym)	number (1)	number (1)
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	test (5) destination (2) grade (3) circle (1) game (2) goal (1) grade A (2)	game (1) quiz (1) stop (1) test (1) top (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	program (3) poor (1)	paint (1) pen (1) pig (1)

Stimulus word	Responses types	HE-group	LE-group
43. point (Cont.)	Other (Erratic association)	circle (2) gold (1) here (1)	bank (1) bath (1) black (1) circle (2) go (1) happy (1) information (1) tree (1) TV (1)

Stimulus word	Responses types	HE-group	LE-group
44. story	Position-based association (Consecutive xy collocation)	my love (1) love (1)	-
	Position-based association (Consecutive yx collocation)	toy (3) bed time (1) know (1) line (1) past (2) remember (1) romantic (2) scary (1) travel (1)	every day (1) fun (1) good (1) life (1) love (1) not good (1) sad (1) short story (1) start (1) toy (1)
	Position-based association (Other collocational association)	someone (1)	
	Meaning-based association (Defining synonym)	tale (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	movie (6) Instagram (4) diary (1) fairy tale (1) me (1) part (1)	movie (2) book (1) cartoon (1) I (1) me (1) novel (1) remember (1)
	Form-based association (Change of affix)	-	history (4)
	Form-based association (Similar form only)	-	-
	Other (Erratic association)	can (1) mission (1) orry (1) family (1)	can (1) cat (1) family (1) home (1) m (1) money (1) music (1)

Stimulus word	Responses types	HE-group	LE-group
45. come	Position-based association (Consecutive xy collocation)	on (5) back (3) home (2) in (2) come on (1) nowhere (1) over (1) study (1) welcome (1) with me (1)	home (4) on (4) back (1) come back (1) Pattaya (1) study (1)
	Position-based association (Consecutive yx collocation)	dream (1)	be (2)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	visit (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	go (8) time (2) visit (2) leave (1)	go (7) going to (2) hello (2) meet (2) walk (2) go to (1)
	Form-based association (Change of affix)	income (1)	welcome (2)
	Form-based association (Similar form only)	came (5)	came (2)
	Other (Erratic association)	happy (1) opened (1) shoes (1)	doc (1) have (1) room (1)

Stimulus word	Responses types	HE-group	LE-group
46. want	Position-based association (Consecutive xy collocation)	drink (2) food (2) money (2) beauty (1) go (1) happy (1) have (1) help (1) know (1) meet (1) slap (1) to be (1) travel (1) water (1) you (1)	money (5) book (2) anything (1) bbq (1) beer (1) eat (1) fan (1) have. (1) sleep (1) supercar (1) you (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	need (15) desire (1)	need (9) would like (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	have to (1) rich (1) should have (1)	abroad (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	won't (1) wonder (1) wood (1)	what (3) was (1) went (1) why (1) work (1)
	Other (Erratic association)	like (2) air (1) yellow (1)	-

Stimulus word	Responses types	HE-group	LE-group
47. write	Position-based association (Consecutive xy collocation)	letter (2) note (2) blank (1) book (1) it (1) notebook (1) novel (1) photo (1) story (1)	book (6) english (1) massage (1) my dad (1) novel (1) number (1)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	draw (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	read (10) pencil (6) pen (5) paper (3) speak (2)	pen (5) read (5) color (1) hand (1) homework (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	random (1) right (1) wrote (1)	-
	Other (Erratic association)	art (1)	black (3) knowledge (1) when (1) where (1)

Stimulus word	Responses types	HE-group	LE-group
48.school	Position-based association (Consecutive xy collocation)	bus (3)	-
	Position-based association (Consecutive yx collocation)	like (1)	go (2) let go (1) miss (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	place (1)
	Meaning-based association (Specific synonym)	university (3)	university (5)
	Meaning-based association (Lexical set/ context related)	r.p.r (1) st. joseph (1)	-
	Meaning-based association (Conceptual related)	teacher (9) learn (4) student (4) child (1) children (1) class (1) excited (1) hell (1) hotel (1) knowledge (3) many child (1) students (2) toddler (1)	student (10) teacher (4) book (2) study (2) books (1) class (1) friend (1) me (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	pool (1)	-
	Other (Erratic association)	-	ground (1) make (1) XL (1)

Stimulus word	Responses types	HE-group	LE-group
49. side	Position-based association (Consecutive xy collocation)	-	out (1)
	Position-based association (Consecutive yx collocation)	by side (2) dark (1) left (3) right (1) river (1) seaside (1)	big (4) in (2) blue (1) by (1) by my side (1) hot (1) on (1) small (1) upper (1)
	Position-based association (Other collocational association)	inside out (1)	-
	Meaning-based association (Defining synonym)	area (2) position (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	next to (2) in front of (2) middle (1)	-
	Meaning-based association (Conceptual related)	Ariana (2) Ariana Grande (2) market (1) together (1)	music (1)
	Form-based association (Change of affix)	-	sided (1)
	Form-based association (Similar form only)	beside (1) glide (1) hide (1) size (1)	sad (1) see (1) sent (1) suite (1)
	Other (Erratic association)	box (1) hob (1) home (1) 1 (1) scout (1) secret (1) toy (1)	concert (1) fit (1) medium (1) show (1)

Stimulus word	Responses types	HE-group	LE-group
50. leave	Position-based association (Consecutive xy collocation)	alone (3) home (2) leave me alone (2) school (2) behind (1) group (1) me alone (1) supermarket (1) Thailand (1)	condo (1) forever (1) game (1) group (1) home (1) house (1) in (1) line group (1) room (1) show (1)
	Position-based association (Consecutive yx collocation)	not (1) train (1)	-
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	go away (3) gone (2) exit (1) fade away (1) get out (1) go out (1) out (1)	exit (1) get out (1) out (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	going (1) login (1)	-
	Meaning-based association (Conceptual related)	arrive (1) bad feeling (1) bye (1) come (1) deny (1) empty (1) stay (1) together (1)	error (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	leaf (3) live (2) life (1)	live (3) life (2) love (1) river (1)
	Other (Erratic association)	angry (1) human (1)	green (1) happy (1) my (1) tree (1)

Stimulus word	Responses types	HE-group	LE-group
51.show	Position-based association (Consecutive xy collocation)	me (4) room (2) ability (1) games (1) guitar (1) me the money (1) off (1) people (1) secret (1) show me (1) time (1)	me (2) bag (1) case (1) mommy (1) of (1) see (1)
	Position-based association (Consecutive yx collocation)	beautiful (1) game (1) live (1) on (1)	good (2) TV (2) amazing (1) dance (1) hot (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	performance (3) present (1)	performance (2)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	musical (2) concert (1) Disneyland (1) opera (1) singing (1)	-
	Meaning-based association (Conceptual related)	movie (2) action (1) basketball (1) cinema (1) hide (1) MUPA (1) stage (1) story (1)	sing (2) acting (1) happy (1) interview (1) movie (1) music (1) song (1)
	Position-based association (Other collocational association)	-	-

Stimulus word	Responses types	HE-group	LE-group
51. show (Cont.)	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	shy (1) slow (1) snow (1)	low (2) go (1) she (1)
	Other (Erratic association)	bring (1) eat (1)	job (1) leaf (1) money (1) were (1)

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

Stimulus word	Responses types	HE-group	LE-group
52.reason	Position-based association (Consecutive xy collocation)	13 reasons why (1)	-
	Position-based association (Consecutive yx collocation)	bad thing (1) important (1) true (1)	bad (1)
	Meaning-based association (Defining synonym)	why (4) because (1) cause (1)	cause (1) why (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	if-clause (1) lie (1) make sense (1)	-
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	season (2) research (1)	person (1) ran (1) read (1) red (1) sea (1) season (1)
	Other (Erratic association)	angry (1) chapter (1) m (1) past (1) people (1) study (1) unit (1) winter (1)	summer (2) game (1) height (1) hot (1) learn (1) math (1) music (1) novel (shelock) (1) snow (1) speak (1) spring (1) story (1) unit study (1)

Stimulus word	Responses types	HE-group	LE-group
53. start	Position-based association (Consecutive xy collocation)	again (1) game (1) letter (1) life (1) lose (1) now (1) over (1) run (1)	game (1) on (1) one (1) over (1) supper (1)
	Position-based association (Consecutive yx collocation)	-	-
	Meaning-based association (Defining synonym)	begin (6)	begin (5)
	Meaning-based association (Specific synonym)	first (3)	go (1) going to (1)
	Meaning-based association (Lexical set/ context related)	stop (6) finish (5) end (3) begin (2) new (2) change (1) count 1 (1) done (1) final (1) one (1) one two three (1) shut (1) the end (1) until (1)	-
	Meaning-based association (Conceptual related)	-	end (4) stop (3) finish (2) run (2) complete (1) final (2) good job (1) number one (1) one (1) shutdown (1) stop (1)

Stimulus word	Responses types	HE-group	LE-group
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	stand (1) starter (1)	stay (1)
	Other (Erratic association)	-	air (1) be (1) meal (1) sport (1)

Stimulus word	Responses types	HE-group	LE-group
54. piece	Position-based association (Consecutive xy collocation)	cake (7) pizza (4) pie (1) piece of cake (1) sushi (1)	cake (2) gold (1) one (1) paper (1) pie (1) piece of cake (1) toy (1)
	Position-based association (Consecutive yx collocation)	expensive (3) small (1)	7 (1) expensive (1) one piece (2) two (1) what (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	part (3)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	full (3) goods (2) sale (1) separate (1) snack (1)	buy (1) number (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	peace (5) pay (1) price (1) port (1)	pen (1) pic (1) pit (1)

Stimulus word	Responses types	HE-group	LE-group
54. piece (Cont.)	Other (Erratic association)	bath (1)	after (1) arrow (1) bottle (1) boy (1) cost (1) make (1) money (1) ring (1) set up (1) tag (1)

Stimulus word	Responses types	HE-group	LE-group
55. page	Position-based association (Consecutive xy collocation)	Facebook (4) number (2) website (1)	Facebook (2) found (1)
	Position-based association (Consecutive yx collocation)	1 page (1) first (2) next (1)	no (2) 32 (1) fan (1) five (1) next (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	-	-
	Meaning-based association (Specific synonym)	slide (1)	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	book (9) paper (9) magazine (2) text (2) the chapter (2) website (2)	book (5) face (1) note (1) notebook (1) one paper (1) paper (1) papers (1) read (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	pace (1)	-
	Other (Erratic association)	-	face (1) here (1) is (1) secret (1)

Stimulus word	Responses types	HE-group	LE-group
56. know	Position-based association (Consecutive xy collocation)	about (1) everything (1) friend (1) information (1) knowledge (1) language (1) what (1) you (1)	news (1) people (1)
	Position-based association (Consecutive yx collocation)	- never (1)	don't (2) i don't (1) i know (1) unknow (1) unknown (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	get (2) recognize (1) understand (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	smart (2) study (2) book (1) education (1) iq (1) learn (1) lesson (1) met (1) school (1) think (1)	learn (1) think (1)
	Form-based association (Change of affix)	knowledge (6) known (2)	knowledge (2) aknowledge (1) no (6)
	Form-based association (Similar form only)	knew (3) now (1) throw (1)	

Stimulus word	Responses types	HE-group	LE-group
56. know (Cont.)	Other (Erratic association)	bed (1) subject (1)	yes (3) best (1) brand (1) cry (1) help me (1) stand (1) very (1) with (1)

Stimulus word	Responses types	HE-group	LE-group
57. help	Position-based association (Consecutive xy collocation)	me (4) people (4) everybody (1) help us (1) me (1) me please (1) us (1)	me (5) people (4) dog (1) find (1) friend (1) help me (1) teacher (1)
	Position-based association (Consecutive yx collocation)	please (2)	please (2) can (1) people (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	support (3) assists (1) give me a hand (1) supportive (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	give (2) hospital (2) kind (2) beg (1) emergency (1) never give up (1) police (1) sympathy (1) thank you (1)	thank you (2) hope (1) hospital (1) hospital (1) kind (1) police (1)
	Form-based association (Change of affix)	helpful (2)	-
	Form-based association (Similar form only)	head (1) health (1) hill (1) hope (1)	hope (1)

Stimulus word	Responses types	HE-group	LE-group
57. help (Cont.)	Other (Erratic association)	look (1) sea (1)	an (1) cry (1) homesick (1) if (1) pig (1) swim (1)

Stimulus word	Responses types	HE-group	LE-group
58. town	Position-based association (Consecutive xy collocation)	china (1)	china (2) home (1) korean town (1)
	Position-based association (Consecutive yx collocation)	home (2) my town (1)	two (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	city (7) urban (1)	city (4)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	bangkok (1) france (1) london (1) new york (1)	chonburi (3) bangkok (2)
	Meaning-based association (Conceptual related)	building (1) condo (1) light (1) people (1) traffic jam (1) tree (1) village (1)	building (2) house (2) bai yok city (1) company (1) condo (1) people (1) tower (1) village (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	cow (1) down (1) tone (1)	-
	Other (Erratic association)	paper (1) provide (1) vintage (1)	everyone (1) height (1) need (1) some one (1) there (1)

Stimulus word	Responses types	HE-group	LE-group
59.garden	Position-based association (Consecutive xy collocation)	-	-
	Position-based association (Consecutive yx collocation)	home (3)	home (1) like (1)
	Position-based association (Other collocational association)	-	-
	Meaning-based association (Defining synonym)	park (1)	park (3) field (1) yard (1)
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	flower (7) tree (6) grass (2) green (1) leaf (1) plant (3) playground (2) trees (2) wood (1)	flower (4) tree (4) ant (1) duck (1) grass (1) green (2)
	Meaning-based association (Conceptual related)	green (2) loft (1)	farmer (1) rice (1)
	Form-based association (Change of affix)	-	-
	Form-based association (Similar form only)	-	grammar (1)
	Other (Erratic association)	football (2) glass (2) JJ (1) paradise (1) year (1)	black (1) child (1) day (1) dragon (1) friend (1) something (1) town (1)

Stimulus word	Responses types	HE-group	LE-group
60.hear	Position-based association (Consecutive xy collocation)	sound (5) more and talk (2) music (2) phone (2) voice (1)	sound (2)
	Position-based association (Consecutive yx collocation)	-	-
	Position-based association (Other collocational association)	do you hear me? (1)	-
	Meaning-based association (Defining synonym)	sense (1)	-
	Meaning-based association (Specific synonym)	-	-
	Meaning-based association (Lexical set/ context related)	-	-
	Meaning-based association (Conceptual related)	listen (9) earing (2) eye (2) feel (1) humor (1) mouse (1) phone (1)	eye (1) laugh (1) tell me (1)
	Form-based association (Change of affix)	heard (1)	-
	Form-based association (Similar form only)	ear (12) ears (2) home (1)	ear (5) head (2) has (1)
	Other (Erratic association)	back (1)	don't know (1) school (1) think (1) where (1) white (1) yes (1)

Appendix J The translation of the focus group interviews

Code	Original transcription in Thai	English translation
T01	"ก็ปกติหนูจะมีเพื่อนคนไทยที่คุยกันเป็นภาษาอังกฤษเพราะบางทีเราสื่อสารภาษาไทยกันไม่รู้เรื่อง ฮึๆ (ขำ) มันเหมือนภาษาไทยนี่พูดมาประโยคนึงมันจะมีนัยยะ มันจะมีหลายความหมาย ทีนี้ เราก็ต้องมีการ explain เป็นภาษาอังกฤษ"	Normally, I have some friends who I speak in English with because we don't understand what we say in Thai. (Laugh) It is like one sentence in Thai contains many meanings. So we need to explain in English.
T02	"ถ้าต้องใช้ภาษาอังกฤษบ่อยๆก็เอาจริงๆแทบทุกอย่างเลยค่ะเพราะอย่างสมมติว่ากีฬาที่ไปเล่นอย่างนี้ก็ เวคบอร์ดน่ะค่ะ มันก็ส่วนมากก็จะมีแต่ชาวต่างชาติ ฝรั่งเยอะแยะเลย แล้วคนไทยก็คุยภาษาอังกฤษกันเองด้วย แล้วหนูก็มีเพื่อนต่างชาติ พอเค้าพูดอะไรเราก็จำมาใช้บ้าง"	I often use English. Actually, I use English with almost everything. For example, when I play wake board, most players are foreigners. Some Thai wake board players are familiar with English. I have some foreign friends. I tried to imitate what they said.
T03	"...ก็จำมาเป็น phrase อะไรที่เค้าพูด ตอนแรกไม่เข้าใจก็ถามเค้าบ้าง บางทีก็ไปเปิดหาจากเว็บว่าเออ แบบนี้ได้มั้ย ใช้ตอนไหนได้บ้าง เพราะมันไม่ได้ใช้ได้ทุกสถานการณ์"	I remember the phrases that they spoke. In the first place, I asked them what I didn't understand. I looked through websites to check the correct ways of using the phrases. They are not fit in every situation.
T04	"หนูว่าด้วยความที่เดี๋ยวนี้ทุกคนพูดภาษาอังกฤษเป็นภาษาที่ 2 กันหมดแล้ว คือส่วนใหญ่เหมือนเป็นภาษาหลัก เอาแบบนี้ดีกว่า ที่เค้าใช้กันได้ทั่วโลก สามารถสื่อสารได้ไม่ว่าจะคนละประเทศยังไงก็ตาม ... ในมุมหนูก็เลยมองว่า เป็นข้อได้เปรียบมากกว่าที่เราฟังได้ เพราะบางคนที่ไม่รู้ภาษา ... คือไม่รู้เลยจริงๆอะ แล้วบางคนไม่คิดที่จะรับด้วย ในการที่จะเรียนรู้เพิ่มเข้ามา หนูก็มองว่าทำไมไม่ลองนิดหน่อย เพราะมันได้เปรียบในหลายๆด้าน ไม่ว่าจะเป็นเรื่องงาน หรือว่าไปเที่ยว ไปไหนก็ตาม"	Nowadays, everyone speaks English as their second language. It is the language has been used all over the world. People can communicate even if they are from different countries. From my point of view, it is our advantage if we can understand English. However, I don't know why someone doesn't want to learn English. I think they should try learning it because we can get many benefits from knowing English such as jobs or travelling.

Code	Original transcription in Thai	English translation
T05	"ผมว่ามันคือโอกาสของชีวิต มันจะทำให้เรามีโอกาสมากขึ้น อย่างที่บอกไปเหมือนการทำงานงี้ครับ หลักๆก็คือใช้ในการสื่อสาร เพราะว่าเดี๋ยวนี้มันเป็น international หมดครับ"	I think knowing English makes more opportunities for life, like for working. Mainly, we use English for communication. Nowadays, everywhere is international.
T06	"ท้อ หนูเรียนไม่เก่ง คือตั้งแต่เรียนที่นี่ยังไม่เจอฝรั่งจริงๆเลย เจอแต่อ.ไทย แล้วเค้าก็.เน้น แกรมม่า แล้วพอเวลามี speaking test หนูก็จะไม่ค่อยกล้าพูดกับเค้า เพราะเค้าเป็นคนไทยค่ะ ถ้าคนไทยเค้าจะดูแกรมม่ามาก … ถ้าteacher เค้าใจดีกว่า เค้ารู้ว่าเราพูดไม่เป๊ะหรอก"	Discouraging. I'm not good at study. Since I came here, I've never studied with native teachers. I studied with Thai teachers only. They always teach grammar. In speaking test, I was afraid to speak English with the teachers because they were Thai. Thai teachers heavily focus on grammar. Native teachers are more generous. They know that we can't speak perfectly.
T07	"คือมัธยมก็เน้นแกรมม่า เจออ.ไทย เค้าก็พูด.ภาษาไทย แล้วเรียนคนไทยเค้าก็เน้นแต่แกรมม่าๆมาตลอด"	In high school, grammar was emphasized. When I studied with Thai teachers, they speak Thai. Thai teachers seem to emphasize the grammar rules.
T08	"หนูว่าเรียนจีนแค่เทอมเดียว หนูไปได้เร็วกว่าเรียนอังกฤษมาสิบ ยี่สิบปีอีกค่ะ หมายถึงว่า จีนนี่เรียนเทอมเดียว มันสามารถพูดได้ สื่อสารได้ ทั้งที่หนูไม่เคยมีพื้นฐานจีนเลยนะคะ"	I think studying Chinese one semester was faster than studying English for ten or twenty years. I mean, I can speak Chinese in one semester although I didn't have background.

Code	Original transcription in Thai	English translation
T09	"สมัยนี้ทุกอย่างก็ต้องใช้ภาษาอังกฤษ หนูไป ถามพี่มา เค้าบอกว่าสมัยนี้เค้าสัมภาษณ์งาน กันเป็นภาษาอังกฤษ คือหนูก็อยากมีโอกาส ไปต่างประเทศ แต่ด้วยความที่ภาษาอังกฤษ หนูไม่เก่งอย่างนี้ค่ะ มันตัดโอกาสเราไปนิดนึง หนูคิดว่าเราต้องพยายามมากขึ้น"	Now, everywhere needs English. I asked my sister. She said job interviews are in English. I want to have a chance to go to other countries but I'm not good at English. I missed some opportunities. I think we should put in more effort.
T10	"หนูก็ค่อนข้างเฉยๆกับภาษาอังกฤษ เพราะ ตอนเด็กเรียนไม่ค่อยรู้เรื่อง คืออาจารย์ตอน สมัยมัธยม ก็สอนแบบเน้นแต่แกรมม่า หนูก็ รู้สึกว่า เฮ้ย มันไม่ค่อยชอบนะ แล้วก็ไม่รู้เรื่อง แต่ถ้าเป็นจีนหรือญี่ปุ่นที่มีเรื่องการ์ตูนที่หนู ชอบก็จะรู้สึกว่า เออ มันน่าเรียน"	I feel indifferent to English. I wasn't good at studying when I was a child. My high school teachers taught only grammar rules. I didn't like them and I didn't understand them. But, if it is Chinese or Japanese with some cartoons, I like it. It is more interesting.
T11	"ไม่ชอบภาษาอังกฤษค่ะ เราไม่อยากเรียน ภาษาอังกฤษ เราไม่ได้ แต่ต้องเรียนเพราะคน ส่วนใหญ่ใช้ภาษาอังกฤษชอบซีรีย์ ดารา … จีน ก็เลยชอบภาษาจีนไม่ชอบเรียน อังกฤษ… นี่เราต้องท่องศัพท์ต้องรู้แกรมม่า"	I don't like English. I don't want to study English. I can't speak, but I have to study because most people use English. I like TV series and Chinese artists so I like Chinese language. I don't like studying English so I must remember vocabulary and know grammar rules.
T12	"จะไปกลัวเรื่อง native มากกว่าครับ เวลา ใช้คำยังงี้ เราจะยืดยาวกว่าเค้ารึเปล่า"	I'm afraid of native speakers. When I use words, I might use too many words.
T13	"เพราะเราไม่มั่นใจว่าสิ่งที่เราพูดมันตรงกับ ความต้องการเค้ารึเปล่า".	I'm not confident if what I say [in English] is what they want.
T14	"…ก็บางทีเราอยากรู้คำศัพท์ มันเปลี่ยนชีวิต เรา แล้วภาษาในเกมส์มันเปลี่ยนไปตามที่เรา ตั้งด้วย อีกเกมส์ก็ hard stone ภาษาที่ใช้มัน เปลี่ยนไป"	I sometimes want to learn new words. It change my life. Also, language in online games is changed according to what I set. Another game, the Hard Stone, the language is changed.

Code	Orignial transcription in Thai	English translation
T15	"กลัวภาษาอังกฤษ แต่ก็ชอบ รู้ว่ามันมีประโยชน์"	I'm afraid of English but I like it. I know it is useful.
T16	"ถ้าพูดก็ไม่กล้าค่ะ แต่ให้อ่าน text นี่ทำไหวค่ะ"	If speaking, I'm not brave to do. But I can read texts.
T17	"ถ้าดาราที่ชอบพูดอิ้ง หนูคงตามเค้า"	If my favorite artists like speaking English, I might do like them.
T18	"ถ้าให้ทำกิจกรรมภาษาอังกฤษ เช่น ให้ดูหนัง ก็น่าสนใจแต่ต้องเป็นเรื่องที่เราชอบด้วย"	If I am required to do activities in English such as watching movies, it is interesting. But they must be what we like.
T19	"หนูติดตามพวกเพจที่เป็นเว็บภาษาอังกฤษ ตั้ง see first ไว้ก็อ่านดูบ้าง พวกภาษาอังกฤษที่ใช้ในชีวิตประจำวัน คืออะไรที่เรียนในห้อง ก็เข้าใจ แต่พอออกมาเราก็ลืม"	I follow some Facebook pages that teach English. I set them as "See First". I read their contents. I rarely use English in daily life. I understand what is taught in the classroom. But I forget when I leave the class.
T20	"ถ้าอ่านไม่เข้าใจ งงคำไหนก็ไปถามเพื่อนที่เค้าเก่ง ว่าคำนี้แปลว่าอะไร เพราะหนูเปิดหาคำศัพท์แล้วยังแปลไม่เข้าใจ ก็ถามเค้าเพิ่ม"	When I find unknown words, I ask my friends who are good at English for help. I will ask them when I don't understand the meanings in the dictionary.
T21	"พูดถึงภาษาอังกฤษนี่ ผมก็ไม่เกลียดนะ แต่ก็ไม่ได้ชอบอะไรส่วนใหญ่เวลาว่างก็เล่น...เกมส์ครับ จะเป็นเกมส์ที่มีคำบรรยายภาษาอังกฤษ ผมก็เดาๆความหมายคำเอาจากที่อ่าน แต่ว่ามักจะอ่านออกสียงคำผิดบ่อยๆ"	Speaking of English, I don't hate it. I feel indifferent. I play online games when I have free time. In the games, there are some English narrations. I guess the meanings from the context. Anyway, I often mispronounced some words.

VITA

NAME   Suparuthai It-ngam

DATE OF BIRTH   24 September 1981

PLACE OF BIRTH   Chonburi

INSTITUTIONS   B.A. in English, Burapha University;
ATTENDED   M.Ed. in TEFL, Chulalongkorn University
HOME ADDRESS   352 M.5 Bansuan A.Mueang Chonburi, 20000

PUBLICATION   It-ngam, S. and Luksaneeyanawin, S. (2019). An
Interlanguage Study of L2 Mental Lexicon. Pan-Pacific
Association of Applied Linguistics, 23(1), 15-36.