Profiling Receptive and Productive English Polysemous Phrasal Verbs among Thai
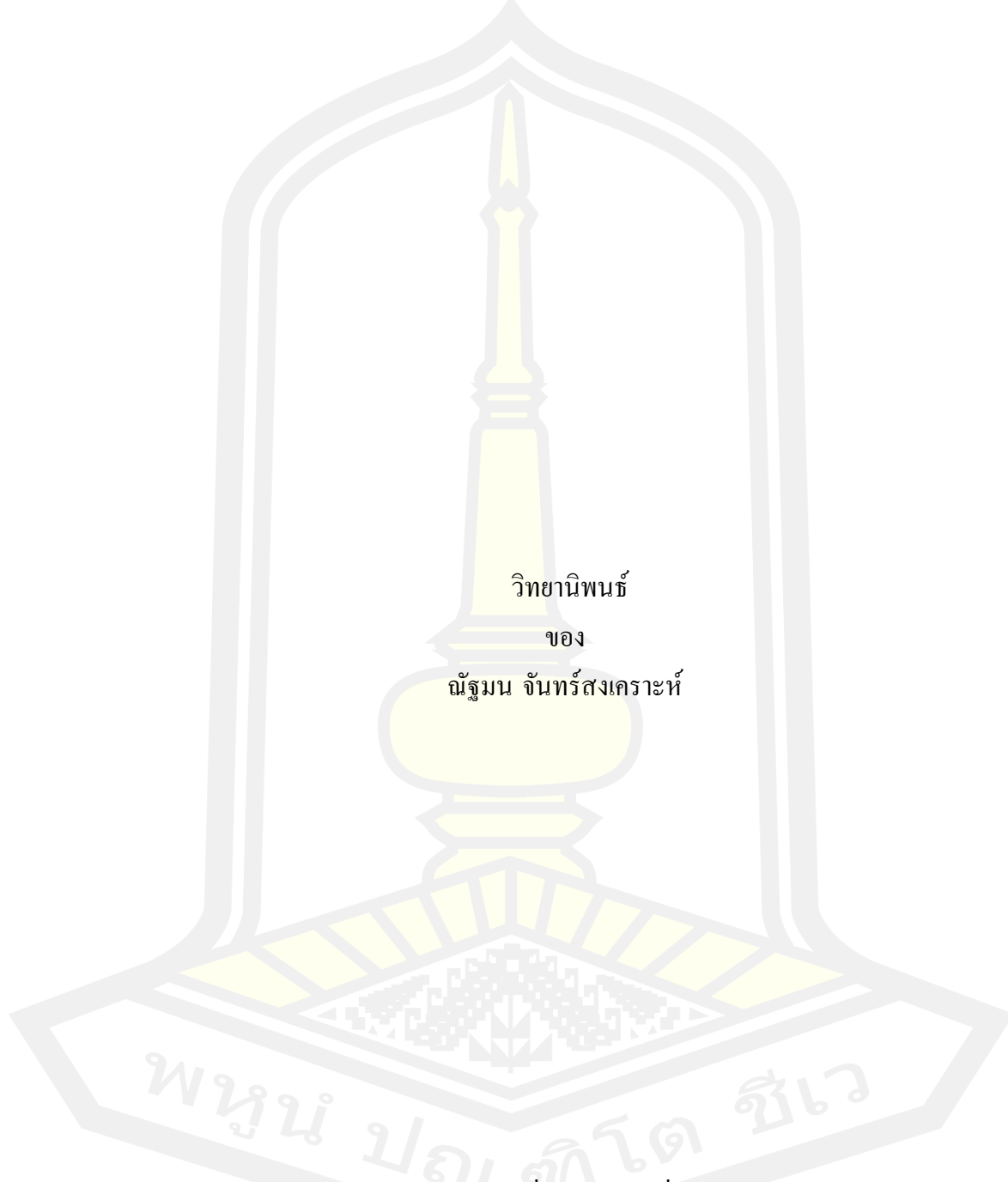EFL High School Learners

Natthamon Chansongkhro

A Thesis Submitted in Partial Fulfillment of Requirements for

degree of Master of Education in English Language Teaching

December 2022

การศึกษากริยาวลีภาษาอังกฤษของผู้เรียนภาษาอังกฤษในฐานะภาษาต่างประเทศระดับมัธยมศึกษา
ตอนปลายชาวไทย

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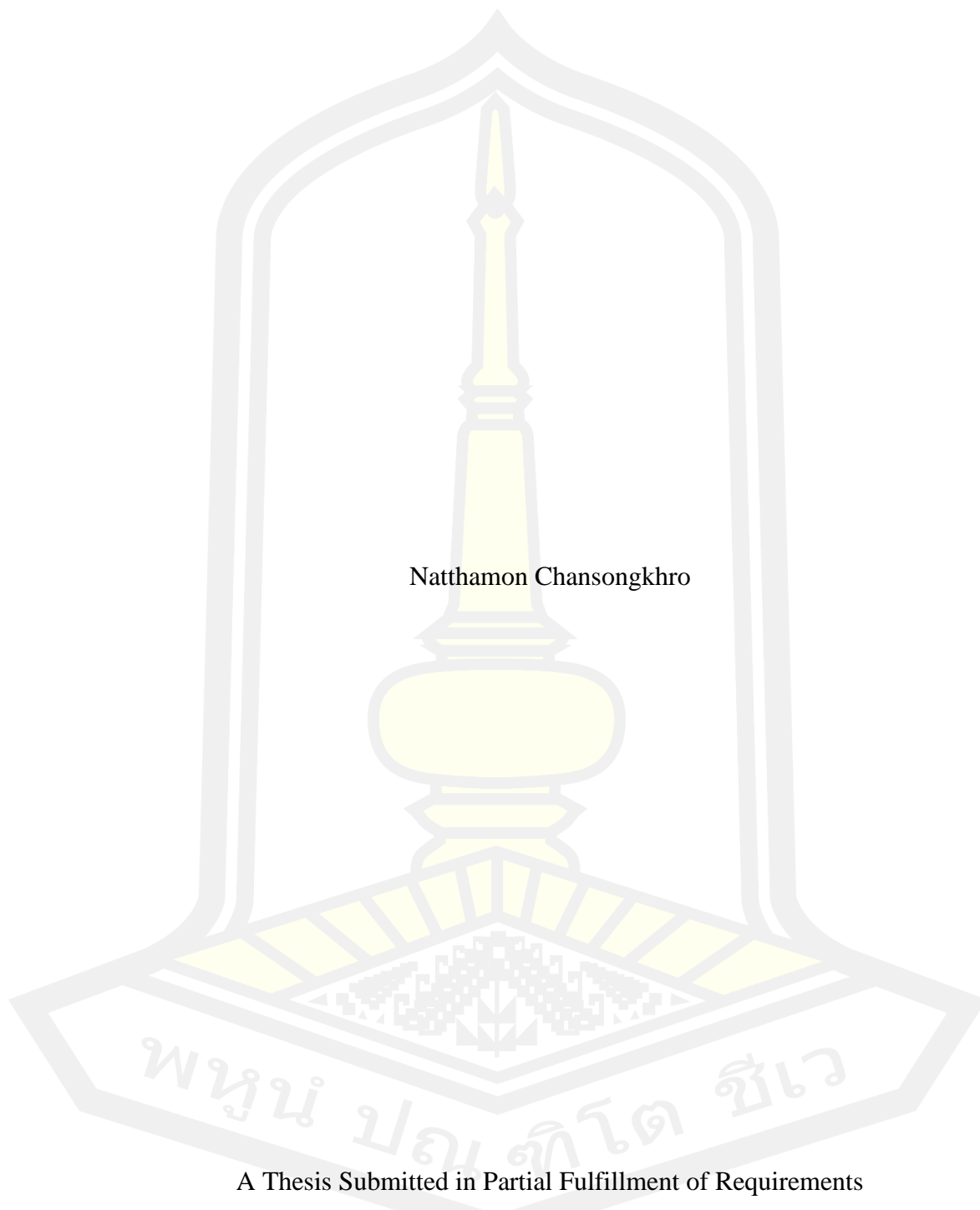เสนอต่อมหาวิทยาลัยมหาสารคาม เพื่อเป็นส่วนหนึ่งของการศึกษาตามหลักสูตร
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December 2022

The examining committee has unanimously approved this Thesis, submitted by Miss Natthamon Chansongkhro , as a partial fulfillment of the requirements for the Master of Education English Language Teaching at Mahasarakham University

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TITLE	Profiling Receptive and Productive English Polysemous Phrasal Verbs among Thai EFL High School Learners		
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ABSTRACT

Vocabulary has long been a concern for English learners and researchers since it plays a vital role in the use of languages. To use a language naturally in context and communicate effectively, learners need to be familiar with phrasal verbs, which are a part of vocabulary. Therefore, this study investigated Thai high school learners' receptive and productive knowledge of English polysemous phrasal verbs. Two hundred eighty-six Thai EFL high school learners participated in the study. These participants were aged 16-18 and were in grades ten-twelve at a public school. All participants were given four different tests. Three measures of polysemous phrasal verbs were developed and validated to assess the learners' receptive and productive knowledge of polysemous phrasal verbs. The other was used to measure their vocabulary size. The data were analyzed using descriptive and inferential statistics, including t-tests, ANOVA and correlational and regression analyses. The study results indicated that Thai EFL high school learners had intermediate knowledge of English polysemous phrasal verbs. The receptive knowledge test scored higher than the controlled and free productive knowledge tests. Furthermore, the findings demonstrated a positive relationship between vocabulary size and English polysemous phrasal verb knowledge receptively and productively. The correlation analysis also revealed that several dimensions of English polysemous phrasal verb knowledge were interrelated. Overall, this study provides empirical evidence that English polysemous phrasal verb knowledge of Thai EFL learners develops along the receptive and productive continuum. This study also indicates that polysemous phrasal verbs are multidimensional and incremental. Future research would benefit from longitudinal studies with different L1 and education levels.

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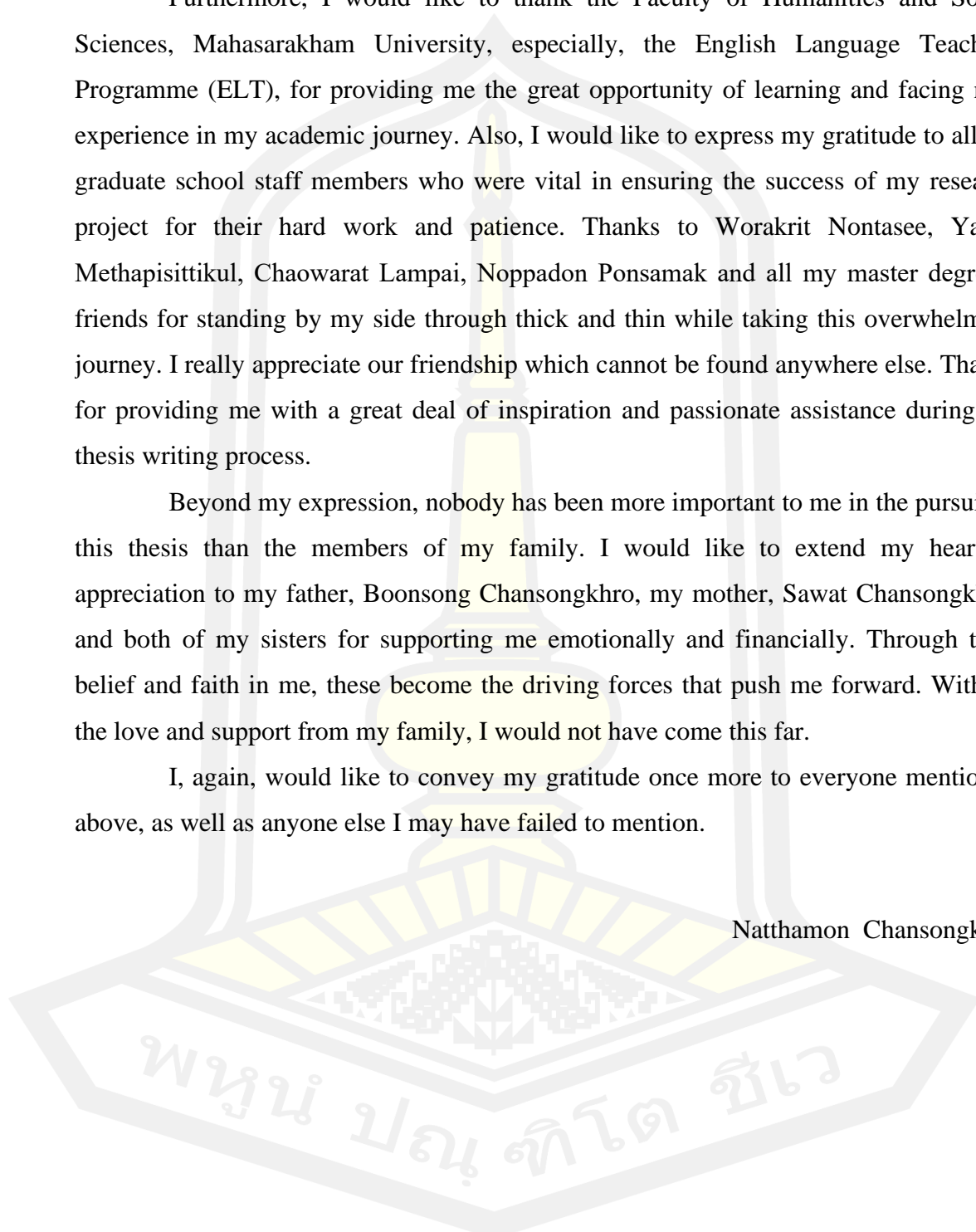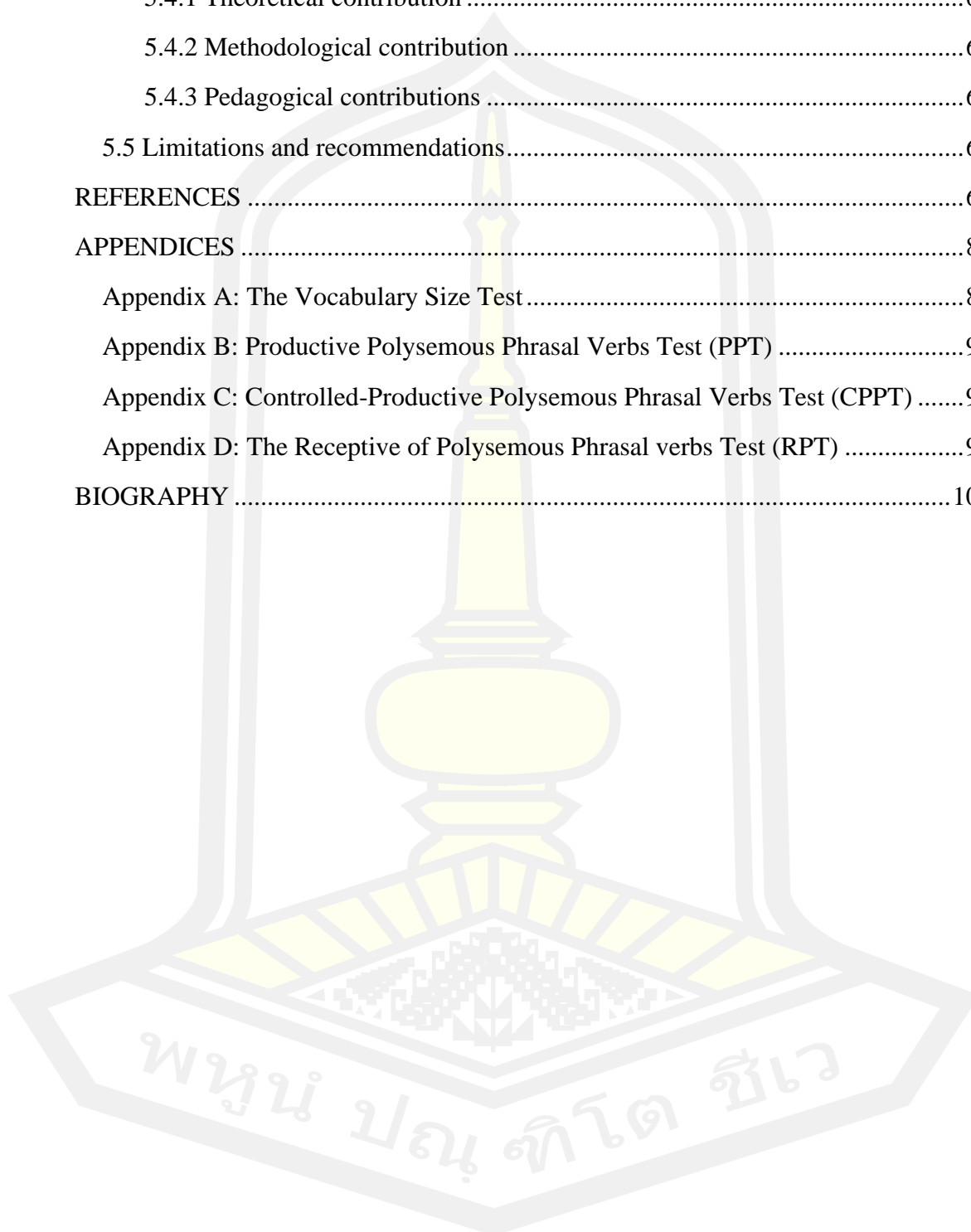
Natthamon Chansongkhro

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CHAPTER I
INTRODUCTION

1.1 Background to the study

Vocabulary has long been a concern for English learners and researchers since it plays a vital role in the use of languages (Nation, 2013; Schmitt, 2010). According to Read (2000), "vocabulary is not merely a collection of linguistic units; it is also an attribute of individual language learners, in the form of vocabulary knowledge and the ability to access that knowledge for communicative purposes" (p. 14). In addition, those with a more extensive vocabulary may comprehend new ideas and concepts more quickly than those with a limited vocabulary (Sedita, 2005). Indeed, Nation (2013) emphasized that knowing a word depends on three interdependent aspects (form, meaning, and use) and that each aspect includes both receptive and productive dimensions. Receptive and productive knowledge are two significant distinctions in the acquisition of vocabulary knowledge. Nation (2013, p. 48) emphasized that "receptive carries the idea that we receive language input from others through listening or reading and attempt to comprehend it, whereas productive carries the idea that we produce language forms by speaking and writing to communicate with others." Furthermore, Nation argued that receptive and productive terms apply to all language knowledge and usage types. When used in vocabulary, these terms cover various aspects of what it means to know a word.

In vocabulary acquisition, phrasal verb (henceforth PV) is well-established as a type of formulaic sequence that "contains a verb proper and a morphologically invariable particle that works lexically and syntactically as a single unit" (Gardner & Davies, 2007; Garnier & Schmitt, 2016; Liao & Fukuya, 2004; Wood, 2010). To illustrate, *get off* is composed of the proper verb *get* and the particle *off*. In the area of second language (L2) acquisition, researchers recognized that there is widespread recognition among grammarians and applied linguists that phrasal verbs are a critical and advanced part of the word or lexical knowledge in both spoken and written texts (Darwin & Gray, 1999; Gardner & Davies, 2007; Liu, 2011; Nation, 1990). Avoiding phrasal verbs is impossible because they are widespread and ubiquitous in everyday

English communication, frequently employed by native speakers, and require fluency (Garnier & Schmitt, 2014). The low usage of PVs results in an unnatural and nonidiomatic sounding language (Garnier & Schmitt, 2015; Siyanova & Schmitt, 2007).

Learners must know phrasal verbs to use a language naturally in context (Gardner & Davies, 2007; Garnier & Schmitt, 2015). They must learn English Phrasal Verbs instead of individual English words (Celce-Murcia & Larsen-Freeman, 1999). For instance, "put off" sounds more natural than the one-word verb "postpone." In addition, using phrasal verbs can improve a learner's fluency and native-like selection. Knowing Phrasal Verbs can help learners reduce cognitive effort by reducing the time spent processing a word and making it immediately accessible in their minds.

Despite their widespread use, several studies in L2 vocabulary have demonstrated that PVs are one of the most notoriously difficult aspects of the English language (Dagut & Laufer, 1985; Demetriou, 2020; Gardner & Davies, 2007; Garnier & Schmitt, 2015; Liu, 2011; McCarthy & O'Dell, 2007; Phoemthaweesuk, 2009; Schmitt & Redwood, 2011; Sonbul *et al*., 2020; Strong & Boers, 2019; Yasuda, 2010). Several reasons have been suggested for the particular difficulty of PVs (e.g., Garnier & Schmitt, 2015; Liu & Myers, 2020; Omidian *et al*., 2019; Wang, 2019). Sonbul et al. (2020) also cite four reasons PVs are considered one of the most notoriously difficult English language features, such as (1) the overwhelming number of PVs in English. (2) For some learners, whose first language (L1) does not contain such a structure, PVs are perceived as an unnatural construction. (3) PVs are a composite of two or more orthographic words semantically treated as a unit. (4) Most PVs in nature are polysemic and have multiple meanings.

According to Gardner and Davies' study, the finding indicates that PVs are extremely polysemous lexical words. The PVs on their list have an average of 5.6 meaning senses. This shows that, compared to most other English words or word combinations, PVs likely have a higher learning burden. This 5.6 meaning sense average result from the list of 100-150 PVs implies that understanding the most common PVs in English

requires memorizing between 560 and 840 form-meaning linkages rather than just 100 or 150.

According to the Macmillan Phrasal Verbs Plus Dictionary (Rundell, 2005), it defines "put off" is a phrasal verb with six distinct meanings: 1) make somebody dislike something; 2) postpone something you do not want to do; 3) make something happen later; 4) schedule a later meeting with somebody; 5) keep somebody from concentrating; and 6) let a passenger off. Due to its polysemic meaning and word structure, a phrasal verb is challenging to master. While knowledge and acquisition of phrasal verbs are frequently insufficient and challenging for L2 learners, they are integral to English language learning. They are necessary for a wide variety of communicative functions that need to be considered (Garnier & Schmitt, 2016).

A body of research has shown that the knowledge of PVs, particularly of the second language (L2) learners, is correlated to the vocabulary size of learners (Garnier & Schmitt, 2016; Liao & Fukuya, 2004; Schmitt & Redwood, 2011; Sonbul *et al*., 2020) and find significant positive correlations between L2 learners' scores on receptive and productive tests of PVs (Kamarudin *et al*., 2019; Omidian *et al*., 2019; Schmitt & Redwood, 2011). In recent years, many studies have identified the significance of English phrasal verbs in the context of Thai EFL language acquisition (Boontong, 2015; Chodchoi, 2018; Kosolsombat & Pongpairoj, 2017; Paugtes, 2020; Rumpanpetch, 2013). It appears that learners in a Thai context acquire knowledge of receptive phrasal verbs before productive ones (Chodchoi, 2018; Paugtes, 2020). In fact, previous research has demonstrated that learners with higher proficiency levels find phrasal verbs less complicated than those with lower proficiency levels (Rumpanpetch, 2013) and produce more phrasal verbs than one-word equivalents (Boontong, 2015; Kosolsombat & Pongpairoj, 2017).

Although numerous studies have been conducted on the vocabulary acquisition of EFL learners, there is still a need for more empirical research focusing on phrasal verbs. Previous research has typically examined the receptive and productive vocabulary knowledge of L2 learners but has largely ignored their knowledge of phrasal verbs. In addition, little research has been undertaken to date on L2 learners'

understanding of PVs that takes their polysemic nature into account (Garnier & Schmitt, 2015; Liu, 2011). Therefore, the present study yielded fruitful information and shed light on the learning of vocabulary in the Thai EFL context. It contributed to the literature by exploring learners' receptive and productive knowledge of polysemous PVs and determining whether learners' vocabulary size correlates with their receptive and productive knowledge of polysemous PVs. Understanding high school learners' levels of phrasal verb knowledge provided a platform for pedagogical practices and the development of vocabulary knowledge.

1.2 Purposes of the research

This study aimed to test a hypothesis that learners' knowledge of polysemous phrasal verbs increases in relation to their vocabulary, which in turn promotes a better understanding of polysemous phrasal verbs. Therefore, the current study focused on high school learners' receptive and productive knowledge of English polysemous phrasal verbs. The present study aimed to investigate receptive and productive knowledge of English polysemous phrasal verbs among Thai high school EFL learners. Specifically, this study addressed the following research questions:

1. To what extent do Thai high school EFL learners have receptive and productive knowledge of English polysemous phrasal verbs?
2. Is there any relationship between Thai EFL high school learners' vocabulary size and receptive/productive knowledge of English polysemous phrasal verbs?

1.3 Scope of the research

The present study investigated Thai high school EFL learners' receptive and productive knowledge of English polysemous phrasal verbs in a regional context. Specifically, this study aimed to gain deeper insights into the extent to which Thai EFL learners know polysemous PVs. The present study focused on Thai EFL senior high school learners. This cross-sectional study was a quantitative design, and four different vocabulary tests were used to collect the data during class time and lasted for two days. Nation and Beglar's (2007) Vocabulary Size Test (VST) was used to measure participants' vocabulary sizes. In addition, receptive and productive

knowledge of polysemous phrasal verbs were measured using two adopted and one newly developed test, Receptive Polysemous Phrasal Verbs Test (RPT), Controlled Productive Polysemous Phrasal Verbs Test (CPPT), and the Productive Polysemous Phrasal Verbs Test (PPT), which have been specifically developed for the current study based on Sonbul et al. (2020), Garnier & Schmitt (2016) and Sukying (2018). The learners were asked to sign the consent form prior to data collection. Furthermore, this quantitative study employed the theory of vocabulary testing to assess learners' receptive and productive knowledge of polysemous PVs based on Read's (2000) model.

1.4 Significance of the study

The current study provided a significant contribution to vocabulary acquisition and use. Specifically, it provided empirical evidence into the nature of English polysemous phrasal verb acquisition and its role in vocabulary development and language use, particularly in Thai EFL learners. Indeed, the implication of this study can be beneficial evidence to vocabulary teaching and learning in English language instruction. More specifically, this investigation supplied practitioners with implications for creating vocabulary teaching plans, course and textbook designs, diagnostic tests, techniques for assessing learners' vocabulary knowledge, and suggestions for enhancing vocabulary teaching and learning. Finally, the findings of this study provided an innovative methodology for practitioners, test developers, and researchers in the language teaching and learning field.

1.5 Definitions of terms

Polysemous phrasal verbs refer to two-part verbs composed of a lexical verb plus a particle, the meaning of which is different in every distinct context in which it occurs. For example, the word "bring in", 1) bring something to a place (literal meaning), 2) ask someone to do a particular job or task (figurative meaning).

Receptive knowledge refers to the ability to recognize and comprehend a phrasal verb, at least to some extent.

Productive knowledge refers to the ability to retain, retrieve, and employ a phrasal verb in context.

Thai EFL high school learners refer to tenth graders, eleventh graders, and twelfth graders at a high school in northeastern Thailand.

1.6 Organization of the thesis

The present study investigates Thai high school EFL learners' receptive and productive knowledge of English polysemous phrasal verbs. The study is organized as follows. Chapter I provides a brief introduction to the research background, the purpose of the study, and the research questions. Then, the scope and the significance of the study are presented. Also, the definitions of the terms used in this study are explained.

Chapter II provides a literature review, beginning with a presentation of the theoretical framework and the definition of vocabulary knowledge, including knowing a word and English phrasal verbs. Then, the importance of English phrasal verbs in L2 learning will be discussed, followed by a description of methods used to measure vocabulary sizes and phrasal verbs. A review of previous studies on vocabulary and English phrasal verbs is also provided.

Chapter III begins with the participants and settings that are used in this study. Then, research instruments are addressed. The chapter explains how to select target phrasal verbs used in this study. The chapter also presents the details of the data collection procedures and the data analysis methods. Finally, the pilot study results are addressed.

Chapter IV is the core of the current study, and it explains the data analysis in detail and discusses these results. The presented data are processed by SPSS 26.0. Based on the results of data analysis, two research questions are answered respectively.

Chapter V serves as a conclusion and discussion of the study. First, it summarizes the major findings of the investigation. Next, it puts forward corresponding suggestions from the pedagogical aspects based on the results of the current study. Then, the

limitations of this study are addressed. Finally, some recommendations for future research are suggested.
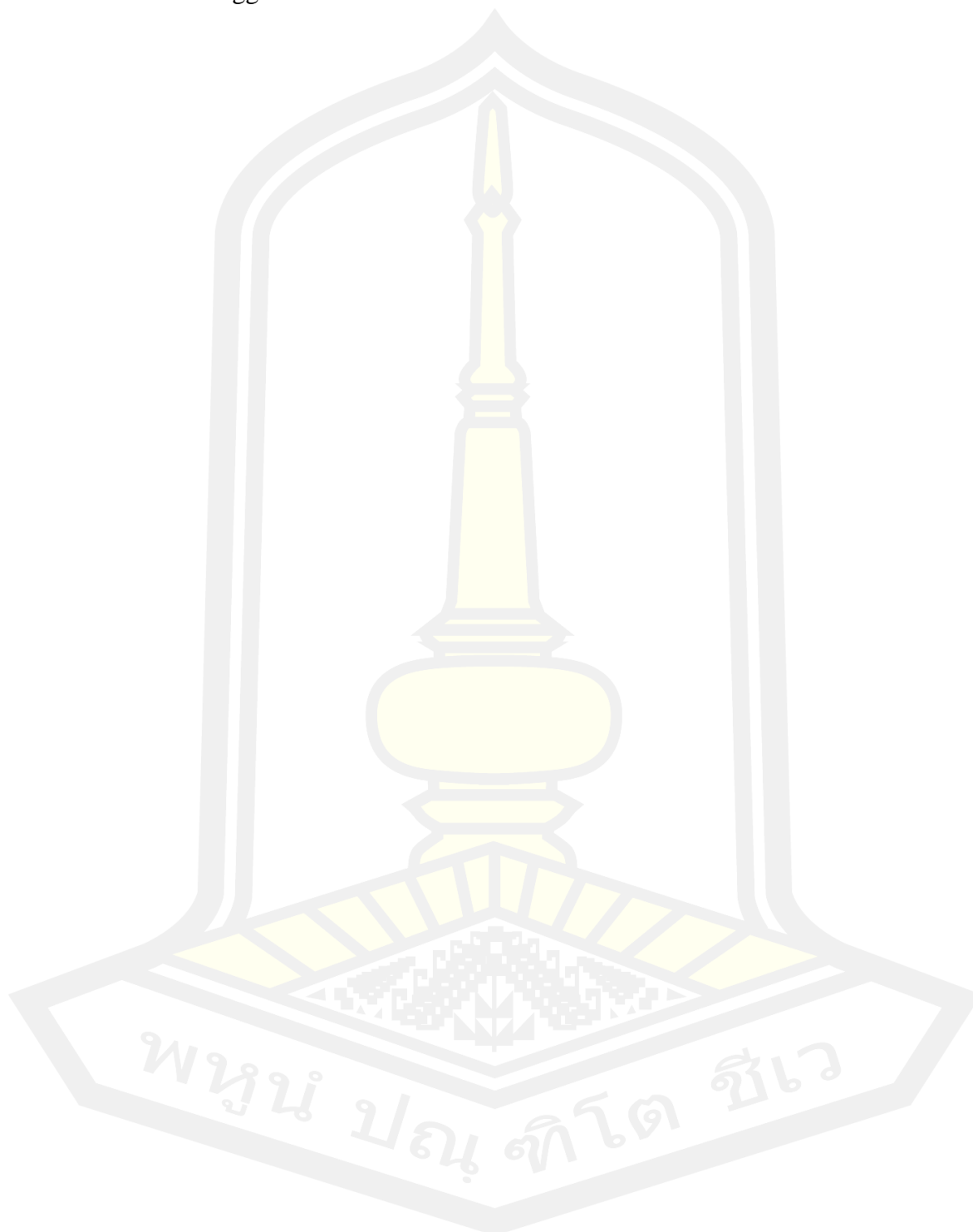
CHAPTER II
LITERATURE REVIEW

This chapter reviewed existing documents related to the theoretical framework of vocabulary knowledge, concluding with definitions of size and depth and receptive and productive vocabulary knowledge. Then, the construct of English phrasal verbs were reviewed. This followed by a description of the roles of English phrasal verbs in language learning. Then, the study reviewed some instruments for measuring vocabulary knowledge and English phrasal verbs that were used in the present study. Then, the final section of the chapter reviewed previous research on vocabulary and English phrasal verbs.

2.1 Construct of the current study

2.1.1 Construct of vocabulary knowledge

2.1.1.1 Knowing a word

Vocabulary knowledge can be defined as a language's words, whether a single item or phrase or a group of several words with a common meaning and includes both the understanding and use of words and the requirement to understand both concrete and abstract meanings (Nation, 2013). Researchers of L2 vocabulary acquisition provided a distinct but complementary framework to define what it means to know a word (Nation, 2001, 2013; Qian, 2002; Read, 2000; Richard, 1976). Nation (2001) argues that knowing a word requires understanding its form, meaning, and use in reception (reading and listening) and production (speaking and writing). He then extends this to the knowledge of formulaic sequences, including idioms, collocations, and phrasal verbs. Moreover, Qian (2002) argued that when analyzing what vocabulary knowledge means, four fundamental dimensions should be considered: lexical organization, receptive-productive knowledge, vocabulary size, and vocabulary depth. Research on L2 lexical organization reveals how L2 words are processed and represented in a learner's mental L2 lexicon. The receptive-productive knowledge dimension refers to the incremental learning processes that involve the learner's ability to recognize a word and the ability to use it in authentic contexts. While vocabulary size refers to the number of words known by a learner, at least to some

extent, vocabulary depth indicates the quality of an individual word known by a learner. This study investigates the sub-component knowledge of learners' vocabularies and phrasal verbs along two developmental dimensions: size and depth and receptive-productive incremental continuum.

Knowledge: Size and depth

Numerous researchers assume that vocabulary knowledge comprises two primary dimensions: size and depth (Wesche & Paribakht, 1996; Qian, 1998), and these two dimensions are the most frequently employed concept of word knowledge when investigating vocabulary (e.g., Meara, 1996; Nation, 2001; Schmitt & Meara, 1997). The term "vocabulary size" generally replaces the "vocabulary breadth" dimension in the literature (Meara, 1996). In the literature, "size" and "breadth" are used interchangeably to refer to the same concept. The vocabulary size or the number of words that one knows is defined as a breadth of vocabulary knowledge. Whereas vocabulary depth refers to the quality of vocabulary knowledge a person knows or how well one knows a specific word or set of words (Read, 2004; Schmitt, 2014). Consequently, vocabulary size and depth should be significant for language learners' vocabulary acquisition and growth.

In the area of phrasal verb expertise, vocabulary size plays a vital role in being omnipresent as a predictor for both receptive and productive phrasal verb knowledge. For instance, Schmitt and Redwood (2011) classified their participants as "intermediate" or "upper-intermediate" according to institution-specific placement criteria. Upper-intermediate learners performed significantly better than intermediate learners on both the receptive and productive PV tests (eta squared > 0.20). These findings should be interpreted with caution due to variation in participant proficiency measurement. Moreover, Sonbul et al. (2020) classified Saudi EFL learners into intermediate and advanced groups based on Vocabulary Level Test (VLT) scores. They discovered that proficiency levels were ubiquitous as a predictor of productive and receptive polysemous phrasal verb knowledge. In order to answer the research question of whether the size of a learner's vocabulary influences their knowledge of

polysemous phrasal verbs, the test of a learner's vocabulary is used to determine their overall vocabulary in the current study.

Receptive and productive vocabulary knowledge

One of the important distinctions in the field of vocabulary acquisition is the division of word knowledge into *receptive/passive* knowledge and *productive/active* knowledge (Milton, 2009). Despite the number of researchers and language teachers who provide definitions and distinctions, these two notions are not easy to identify (Melka, 1997; Laufer & Paribakht, 1998). Receptive and productive vocabulary knowledge is defined differently depending on the research goals (Read, 2000). Many researchers have proposed various definitions of these two dimensions.

Nation (2013) emphasized that knowing a word relies on three interrelated components: form, meaning, and use, and each component incorporates both a receptive and productive dimension. Receptive and productive knowledge are two significant distinctions in vocabulary knowledge learning. Nation (2013) pointed out the definition of receptive and productive vocabulary use as the following:

> In essence, receptive vocabulary use entails perceiving a word's form while listening or reading and retrieving its meaning. To use vocabulary productively, one must desire to express meaning through speech or writing and then retrieve and produce the appropriate spoken or written word form. (Nation, 2013, p. 47)

Moreover, the receptive and productive dimensions of vocabulary acquisition form a continuum. Indeed, receptive and productive skills are inextricably linked; receptive skills can help develop productive abilities, while productive ones can help develop receptive ones (Corson, 1995; Nation, 2013).

Additionally, Read (2000) argues that receptive and productive vocabulary requires multiple measures that tap into the continuum's relative progression. As illustrated in Table 1, Read (2000) proposes a four-cell matrix for categorizing receptive and productive vocabulary (Read, 2000, pp. 154–157). He distinguishes two types of receptive vocabulary: recognition and comprehension. Additionally, he classifies productive vocabulary into two categories: recall and use, depending on the context.

Here, the context "includes entire texts and, more broadly, discourse" (Read, 2000, p. 11). The term "recall" refers to the act of retrieving vocabulary from memory in response to a stimulus word, whereas "use" refers to the act of producing vocabulary through speaking and writing (Read, pp. 155-156).

Table 1. Four types of vocabulary

	Receptive	Productive
Out of context	Recognition	Recall
In context	Comprehension	Use

Note: * From Read (2000, pp. 154-157)

Furthermore, Henriksen (1999) distinguishes receptive and productive vocabulary knowledge in terms of measurement tasks, suggesting that receptive vocabulary knowledge is often assessed using recognition tasks such as multiple-choice examinations. In comparison, productive vocabulary knowledge is routinely assessed through retrieval tasks, such as interviews, description, translation, and retelling.

Language learners require receptive and productive knowledge of English phrasal verbs to demonstrate their mastery of the target language and function effectively in the real world. It is given that phrasal verbs are a component of vocabulary and given the importance of learning them (Demetriou, 2020; Garnier and Schmitt, 2015, 2016; Sonbul et al., 2020). Due to the widespread use of PVs by native speakers in all types of discourse (formal and informal, written and spoken; academic and non-academic), language learners are expected to possess not only an understanding of the forms and functions of PVs (receptive knowledge) but also the ability to use this language feature appropriately in everyday communication (productive knowledge). Nation's (2013) definition of receptive and productive word knowledge is adopted in this current study. Accordingly, receptive vocabulary knowledge is the capacity to recognize and understand a word, at least to some extent, as measured by a multi-choice test format. Conversely, productive vocabulary knowledge is defined as the capacity to recall, retrieve, and use a word in context. A sentence completion format measures the productive vocabulary knowledge.

2.1.2 English phrasal verbs

Considered formulaic sequences, phrasal verbs are an essential component of the English vocabulary and crucial for foreign language learners' communicative competence. Phrasal verbs represent a quite complex area of English vocabulary (Bolinger, 1971). While they are ubiquitous in the English language (Biber et al., 1999; Gardner & Davies, 2007; Liu, 2011), providing their definition is not an easy task. Phrasal verbs have been defined in a variety of ways, including by Fraser (1976) as verb-particle combinations, Schmitt and Siyanova (2007) as multi-word verbs, and Garnier and Schmitt (2016) as formulaic sequences. Phrasal verbs are commonly characterized as a mixture of verbs with adverbial particles and an adverb in the Collins Cobuild Advanced Learners' Dictionary. Fraser (1976) defined a verb-particle combination as "a single constituent or series of constituents whose semantic interpretation is independent of the formatives that comprise it." Moreover, Crystal (1995) called this linguistic phenomenon a "multi-word verb" that is best described as a lexeme or a unit of meaning that may be greater than a single word. According to Hornby (1995), a phrase or a sentence whose meaning is not clear through the meaning of the constituent words, the meaning of the constituent words, must be taken as one unit.

Celce-Murcia & Larsen-Freeman (1999) defined a phrasal verb as a verb followed by a particle that functions as a lexical or single verb unit. Also, Bolinger (1971) described the phrasal verb as "a lexical unit in the strict sense of a non-addictive compound or derivation, one that has a fixed meaning that is distinct from the sum of its constituents' meanings" (p. xii). Schmitt and Siyanova (2007) asserted that phrasal verbs function as a single lexical unit whose meaning can sometimes be predicted easily from its constituent components (e.g., return from a trip = return) but cannot be predicted at all (e.g. brush up on your French = revise).

Although researchers have differing views on the term "phrasal verbs," this current study utilizes Gardner and Davies' (2007) definition of PVs because it is more functional and objective. The researchers define phrasal verbs as "any two-part verb that consists of a lexical verb (LV) proper followed by an adverbial particle

(designated as AVP)" (p. 341). Using this definition is that Garnier and Schmitt (2015) utilized it to build the PHaVE frequency list, which is employed in this study to choose the target phrasal verbs.

2.1.2.1 Classification of phrasal verbs

There are two common classification schemes for phrasal verbs: semantic and syntactic. This section will go into detail on both classes of phrasal verbs.

2.1.2.1.1 Semantic categories

A critical characteristic of a phrasal verb is that the entire group of words should function as a lexical unit with its own meaning (Lindstromberg, 2010). Several studies have classified phrasal verbs according to their semantic categories. There are three distinct categories of phrasal verbs, ranging from idiomaticity to its opposite, transparency.

Celce-Murcia and Larsen-Freeman (1999) postulated three sorts of phrasal verbs based on their semantic categories:

- Literal (also called transparent, directional, and systematic)
- Semi-transparent (also called aspectual, semi-idiomatic, and completive)
- Idiomatic (also called figurative and opaque)

1) Literal phrasal verbs: This category is composed of verbs that appear to be a combination of a verb and a directional preposition as *put on*. *"Put on"* implies the meaning of this phrasal verb simply by combining the verb *"put"* and the preposition *"on."* Literal phrasal verbs are highly guessable when the component words' basic literal meanings are known (Celce-Murcia & Larsen-Freeman, 1999; Dagut & Laufer, 1985).

2) Semi-transparent phrasal verbs: This is the second category, in which the meaning of the phrasal verb is less obvious but also not idiomatic. This category includes verbs with particles that either describe the outcome of the action or emphasize the degree of the action denoted by the verb (Celce-Murcia & Larsen-

Freeman, 1999). For instance, the phrasal verb *"eat up"* is easily understood due to the main word *"eat."*

3) Idiomatic phrasal verbs: This is the third category, in which the phrasal verb's meaning is idiomatic. It is difficult, if not impossible, to deduce the meaning of the verb simply by combining the meanings of its components because a new meaning has resulted from a metaphoric shift in the meaning and the semantic fusion of the components. For instance, it's impossible to deduce the meaning of *"give up"* by examining the parts of *"give"* and *"up"* or by concentrating on the main verb *"give,"* because this phrasal word means *"surrender."* As a result, it is difficult, if not impossible, for ESL/EFL learners to deduce the ambiguous meanings of phrasal verbs by examining the individual meanings of the particles (Celce-Murcia & Larsen-Freeman, 1999).

However, polysemy is one of the difficulties associated with categorizing PVs in semantic categories. It is widely accepted that many PVs are polysemous and can have multiple interpretations.

Polysemous phrasal verbs: As with other verbs, phrasal verbs can be polysemous (have multiple meanings). Gardner and Davies (2007) estimated that each of the top 100 phrasal verbs in their frequency list has between five and six meanings or senses on average. Similarly, Garnier and Schmitt (2015) concluded that, on average, phrasal verbs have 1.9 meaning senses when examining COCA to determine the most frequent phrasal verb meanings. Apart from their polysemy, phrasal verbs span the idiomatic spectrum; they can be literal, aspectual, or idiomatic. Consider the following phrasal verb *"work out"*, which was also provided by Gardner and Davies (2007):

1. *work out* (come up with) "His colleagues worked out his interesting idea".
2. *work out* (work out in detail) "elaborate a plan".
3. *work out* (do physical exercise) "Every day, she works out in the gym".
4. *work out* (be calculated) "The fees work out to less than $1,000".

Due to the PHaVE frequency list adopted in the current study, this polysemy was employed in this investigation. As discussed previously, there are two major classification schemes for phrasal verbs: semantic and syntactic. However, the current study focused on the semantic varieties of phrasal verbs while taking polysemy into account.

2.1.2.1.2 Syntactic behaviors

The transitivity of a phrasal verb (transitive vs. intransitive) and the separability of a phrasal verb are two syntactic features (separable vs. inseparable). Additionally, it incorporates the more widely accepted tests for discriminating between phrasal verbs and verb + preposition sequences. Below are additional explanations and examples of the syntactic characteristics of phrasal verbs.

1) The transitivity of phrasal verbs.

Phrasal verbs, like single-word verbs, can be transitive (as in I *called off* the meeting) or intransitive (as in My car *broke down*). Additionally, some regular verbs (e.g., *open, increase*) can be transitive or intransitive depending on the agent's role, but some phrasal verbs can do the same.

For instance:

> The hotel was *set on* fire by an arsonist. (transitive)
>
> The hotel *burned down*. (intransitive) (Celce-Murcia & Larsen-Freeman, 1999)

2) The separability of phrasal verbs

Phrasal verbs are separable. The particle of phrasal verbs can be separated from the verb by the direct object in some cases, as in Mark *threw* the ball *away*, but not in others. When the direct object is a pronoun, as in Mark *threw* it *away*, separation is required. The largest and most productive category is transitive, separable phrasal verbs. On the other hand, there is a more restricted category of inseparable phrasal verbs, in which the particle cannot be separated from the verb, as in Josh *ran into* an old friend. There is a small subcategory of phrasal verbs that occur exclusively when the verb and particle are separated, as in How can I get the message through to him? (get...through meaning convey; transmit). This mandatory separation is necessary to avoid ambiguity with inseparable phrasal verbs that have the same form but have a

different meaning, as in Get through the lesson (get... through means finish) (Celce-Murcia & Larsen-Freeman, 1999).

Additionally, phrasal verbs are divided into three categories based on their syntactic behaviors (Brown, 2002):

1. Transitive-separable

   This phrasal verb needs a direct object, such as a noun or phrase, and it can be separated. The object can be put between the words.

   Example:

   "The music was too loud, so my mother asked me to **turn** it **down."**

   Turn down means to decrease the volume. It is transitive-separable because *turn down* uses a direct object, and it can be put between the words turn and down.

2. Transitive-inseparable

   This phrasal verb also uses a direct object, but it cannot be separated, and the object should be put after the phrasal verb itself.

   Example:

   "Mila is my old friend. I **ran into** her yesterday at the library."

   Ran into means to meet by chance. It is transitive-inseparable because *ran into* uses a direct object, which should be put after the phrasal verb.

3. Intransitive-inseparable

   This phrasal verb does not need a direct object, and it cannot be separated.

   Example:

   "My mother called me yesterday. She asked me to **come over**."

   Come over means to visit for a short time, and it is intransitive-inseparable because *come over* does not need a direct object, and the phrasal verb cannot be separated.

2.1.3 Roles of English phrasal verbs in language learning

The importance of learning phrasal verbs

Phrasal verbs are frequently employed in casual and formal communication and are critical in both. Cornell (1985) underlines the fact that English native speakers grasp and communicate successfully in spoken discourse and informal writing spontaneously. However, due to the dynamism of phrasal verbs in English and the difficulty associated with understanding their use, EFL learners should be taught how to successfully communicate in English using phrasal verbs.

Additionally, Armstrong (2004) pointed out the importance of teaching phrasal verbs, developing receptive awareness, and the ability to produce them:

> Despite their difficulty, PVs must be taught at some point because they are widespread, their underlying system is economical and creative, and they are an integral part of the language system; indeed, as Bolinger (1971: xi) puts it, they constitute 'an explosion of lexical creativity that exceeds anything else in our language'. It is critical for all learners to develop at least a receptive awareness that will enable them to decode the PVs encountered in spoken and written texts, while those aspiring to be expert users should be able to appropriately produce at least the more common PV combinations. (p. 214)

Phrasal verbs in EFL setting

Using phrasal verbs results in increased English competence and the ability to communicate in a native-like manner in the English language. English ESL and EFL learners frequently lack an awareness of the semantic characteristics of phrasal verbs and the ability to communicate effectively and efficiently utilizing them. As a result, phrasal verbs are a difficult form for EFL learners. Additionally, Darwin and Gray (1999) assert that teachers avoid teaching phrasal verbs for the following reasons: 1) it is difficult to define phrasal verbs; 2) little research has been conducted on frequently used phrasal verbs.

According to Blau, Gonzales, and Green (1983), learners struggle with the complexity of phrasal verbs' meaning since it is unrelated to the constituents' usual meaning. Additionally, the meaning of idiomatic phrasal verbs is difficult to understand, such as

catch up, which refers to conversing with someone you have not seen in a long and *chew out*, which refers to harshly criticizing someone (1999; Schmitt & Siyanova, 2007; Celce-Murcia & Larsen-Freeman, 1999).

Phrasal verbs provide difficulties for EFL learners to produce and grasp as a result of their great productivity (Bolinger, 1971), with combinations of common verbs and particles seemingly utilized to generate new items at random (Celce-Murcia & Larsen-Freeman, 1999). Cornell (1985) also showed that at least seven hundred phrasal verbs are employed in ordinary English conversation. Therefore, EFL learners are often confronted with new phrasal verbs.

Phrasal verbs are considerably more difficult to use when there is polysemy involved. According to Garnier and Schmitt's (2016) findings, only approximately 40% of the PV meaning senses were generally known by the participants, and there was only a 20% chance that everyone would be familiar with every PV example's multiple meaning senses. Additionally, Sonbul et al. (2020) discovered that EFL students found it challenging to recall or recognize the case of the less transparent PV senses.

While knowledge and acquisition of phrasal verbs are frequently insufficient and challenging for EFL learners, they are integral to English language learning and are required for a wide variety of communicative functions that need to be considered (Garnier, 2016).

2.2 Vocabulary assessment

Concerning vocabulary measures, Webb and Nation (2017) emphasize the importance of "[m]easures of lexical richness" in distinguishing between more and less proficient learners' language." Having access to this information enables educators to promote practices that aid learners in the language learning process and aid in their proficiency advancement. Numerous measures are developed to assess learners' vocabulary knowledge, and numerous researchers have advocated for various exams based on their definition of vocabulary knowledge (Laufer & Goldstein, 2004; Read, 2000; Webb, 2013).

2.2.1 Assessing receptive vocabulary knowledge

Vocabulary Size Test

The Vocabulary Size Test (VST) (Nation and Beglar, 2007) was designed to measure first language and second language learners' written receptive vocabulary size in English. It contains 140 multiple-choice questions, 10 of which are drawn from the 1st 1000 to the 14th 1000 word families of English. The words used in The Vocabulary Size Test were revised using word family range and frequency figures from the 10 million tokens spoken section of the British National Corpus (BNC). The respondents were scored using a dichotomous scoring system: 1 point for a correct response and 0 points for an incorrect response. The estimated total vocabulary is equal to the total score multiplied by 100. For example, if the total score is 50, the amount of vocabulary is 5000. Here is a sample item from the 5th 1000 word level.

Miniature: It is a **miniature.**

a. a very small thing of its kind

b. an instrument for looking at a very small living creature

c. a very small living creature

d. a small line to join letters in handwriting

Compared to the Vocabulary Level Test (VLT) and the New Vocabulary Level Test (NVLT), the VST is a proficiency measure used to determine how much vocabulary learners know, but the VLT and NVLT are diagnostic measures. While the VST is more difficult to administer than the NVLT (Nation, 1999), its validity is high (Belgar, 2010).

The Vocabulary Levels Test

Vocabulary Level Test or VLT was developed by Nation (1983) and then updated by Schmitt, Schmitt, & Clapham's (2001) with a five-level test: 2,000 words level test, 3,000 words level test, 5,000 words level test, the university words level test, and 10,000 words level test. The test can be done as a whole with learners completing all levels, or it can be done with only individual levels. The VLT employs a matching format in which the participants are presented with 30 questions per level. The test was separated into two columns: the left column contains words, and the right column

contains definitions. The words are presented in 10 clusters of six words (three keys and three distractors) and three definitions at each level. The participant receives a point for each correct response in a cluster, so the maximum score at each level is 30. To avoid making any suggestions about the word category's association, each set of the vocabulary battery presents all of the words in the same part of speech. The following are some examples of the VLT, which shows an example of a noun cluster at the 3000 level in one of Schmitt, Schmitt, & Clapham's (2001) versions.

1. bull

2. champion   3   formal and serious manner

3. dignity   2   winner of a sporting event

4. hell   5   building where valuable objects are shown

5. museum

6. solution

The VLT is widely used to determine whether learners need to focus on high frequency words, academic words, or low frequency words. It is a diagnostic test that looks at separate slices of a learner's vocabulary (the 2nd 1000, the 3rd 1000, the 5th 1000, the Academic Word List, and the 10th 1000).

New Vocabulary Levels Test

Due to the VLT's shortcomings, a New Vocabulary Levels Test (NVLT) was created. Excluding the level of 10,000 words from the VLT, the New Vocabulary Levels Test (NVLT) comprises five levels of frequency: 1,000, 2,000, 3,000, 4,000, and 5,000 words from Nation's (2006) BNC Word List and Academic Word List (AWL) (Coxhead, 2000). The test consists of five 24-item levels that measure knowledge of the most frequent 5,000 word families and a thirty-item section that measures knowledge of the AWL. Within the NVLT, there are six clusters of words at each level: three groups of nouns, two groups of verbs, and one group of adjectives. Again, the participants are requested to link the possible meanings of the likely stimulus words presented. The following are examples of the NVLT from 1,000 and 2,000 words.

1,000 level of frequency

    1. idea

    2. milk   _____6_____   moving air

    3. oil   _____5_____   things

    4. party   _____2_____   white drink

    5. stuff

    6. wind

1,000 level of frequency

    1. idea

    2. milk   _____6_____   moving air

    3. oil   _____5_____   things

    4. party   _____2_____   white drink

    5. stuff

    6. wind

2,000 level of frequency

    1. admire

    2. complain   _____6_____   make wider or longer

    3. fix   _____5_____   bring in for the first time

    4. hire   _____1_____   have a high opinion of someone

    5. introduce

    6. stretch

Like the VLT, the NVLT test is more effective at providing a profile of learners' vocabulary, which is particularly useful for placement and diagnostic purposes than determining an individual's overall vocabulary ability.

2.2.2 Assessing productive vocabulary knowledge

The Productive Vocabulary Levels Test

Laufer and Nation's (1999) Productive Vocabulary Levels Test (PVLT) was used to measure the participants' levels of productive vocabulary size. This test sampled 18 items at each of the five word frequency levels: 2,000, 3,000, 5,000, Academic Word List levels, and 10,000 word levels. A sentence in a meaningful context is provided with a few initial letters of the target word in order to elicit test takers to produce only the intended word. Using a completion task format, the test asks learners to fill gaps in sentences with an appropriate word based on the initial letters provided as cues. Each level represents 1,000 words, which means if a participant has 9 out of 18 items correct at a certain level, this roughly indicates he or she knows about 500 out of 1000 words at that level. Examples are the following:

The 2000-word level

    i.   I'm glad we had this opp_____ to talk.

    ii.   There are a doz_____ eggs in the basket.

The 3000-word level

    i.   He has a successful car_____ as a lawyer.

    ii.   Sudden noises at night sca_____ me a lot.

This PVLT's reliability and validity have been established, and it is widely used among vocabulary researchers throughout the world (Laufer, 1998; Laufer & Nation, 1995; Meara & Fitzpatrick, 2000).

Word Associates Test

Read's (1998) Word Associates Test (WAT) emphasizes the form-meaning link and presents participants with a stimulus accompanied by four possible synonyms and four possible collocates, from which four correct associates should be selected. The correct answer may include one synonym and three collocates, two synonyms and two collocates, or three synonyms and one collocate. This uncertainty was added in an attempt to limit the effectiveness of guessing strategies (Read, 2000, p. 184). Starting from the aspect of teaching applications, scholars proposed WAT during standardized

testing such as the TOEFL examination, and the reliability of the Word Associates Test is up to 0.93 (e.g., Bogaards, 2000; Qian, 2002; 2004). An example is shown below:

1. *sudden*

beautiful **quick** **surprising** thirsty	**change** doctor **noise** school

Note: example of WAT item (Read, 1998, p. 46), The words in the left box are possible synonym options; those on the right are possible collocate options. Correct answers are in boldface.

The Word Associates Test has a validity of up to 0.93 (e.g., Bogaards, 2000; Qian, 2002; 2004) and is a popular instrument among researchers and language teachers. Experts suggested incorporating WAF into standardized exams such as the TOEFL from a pedagogical standpoint.

2.2.3 Assessing knowledge of English phrasal verbs

2.2.3.1 Assessing receptive knowledge of English phrasal verbs

The Form Recognition Test

The form recognition test, which was developed by Demetriou (2020), is a multiple-choice cloze test, testing all 72 senses of the 25 PVs selected from the PHaVE list (Garnier and Schmitt, 2015). The PV meaning is provided in bold in the sentence, and the PV form is incorporated into a set of multiple-choice items. The participants have to choose the correct PV form from a total of four options (three distractors are included). Below is an example of a sentence included in the test for the PV *pick up*:

    i.   Can you **collect** my mail from the post office, please?
        a. pick out
        b. set out
        c. pick up
        d. make up

Receptive Phrasal Verb Knowledge Measure

A multiple-choice test was developed by Sonbul et al. (2020) used to assess receptive knowledge pf PVs. The test comprised of 100 items. Each item included the meaning sense with five options (the key, three distractors, and an "I do not know" option to discourage guessing). The PV meanings were provided in the brackets as the clues for

the participants. The target PVs and distractors were selected from the PVs included in the PHaVE List (Garnier & Schmitt, 2015). The test was piloted with natives over the course of three rounds in order to establish its validity. The last round, which included six English native speakers, resulted in a flawless score of 100 percent on every item. It was easy to determine the test's results. Choosing correctly received a score of 1, while selecting incorrectly or responding, "I do not know," received a score of 0. Below is an example of a sentence included in the test for the PV *hand over*:

i. She returned to ___ ___ her keys to her husband. **(give, present)**
   A. take over   B. hand over   C. carry out   D. pull out   E. I do not know

2.2.3.2 Assessing productive knowledge of English phrasal verbs
The Productive Form Recall Test

To measure participants' productive knowledge of PVs, (Garnier and Schmitt, 2016) constructed an off-line pencil-and-paper form recall test in the form of gap-fill sentences, gauging the knowledge of all 100 meaning senses of the 40 PVs. The target items are from the PHaVE List, which presents the most frequent meaning senses of the most frequent English PVs (Garnier & Schmitt, 2015). The list includes the 150 PVs which have been identified by previous research (Liu, 2011) as being the most frequent, i.e. having at least ten tokens per million words in either the COCA or the BNC. Two gaps are included, corresponding to each of the two words that form the PV (lexical verb and adverbial particle). The first letter of each of the two words is provided to restrict the PV options. At the end of each sentence, the meaning is provided in parenthesis in the form of a one-word English synonym or phrase of the target PV in bold and italic. The test, which is formatted as a fill-in-the-blank format, requires learners to complete gaps in sentences with an appropriate word based on the bold and initial letters provided as cues.

Below is an example of a sentence included in the test:
   i.   You need to take the bus and **g**___ **o**___ at the third stop. (*leave the bus*)
   ii. Don't forget to **t**___ **o**___ the rubbish. (*remove*)

2.3 Previous related studies on vocabulary acquisition

The number of studies on vocabulary acquisition has increased significantly over the last decade as the critical nature of vocabulary learning has been rediscovered and received significant attention (e.g., Hajiyeva, 2014; Kader and Kader, 2018; Ozturk, 2015; Nation, 2001, 2013; Nirattisai & Chiramanee, 2014; Nontasee & Sukying, 2020, 2021; Schmitt, 2014; Sukying, 2017, 2018a; Thangaroonsin, 2016; Wero et al., 2021; Zhang & Sukying, 2021)

Most vocabulary research shows a positive relationship between receptive and productive vocabulary knowledge (Hajiyeva, 2014; Kader and Kader, 2018; Nizonkiza, 2016; Wero et al., 2021). More recently, Wero et al. (2021) conducted quantitative research on the vocabulary size of English department learners. The study included 21 Indonesian learners as the sample, obtaining 122 learners as the population. The instruments used in collecting the data were tests, divided into two: Receptive Vocabulary Size Test (RVST) and Productive Vocabulary Size Test (PVST). The results showed that learners' receptive and productive vocabulary sizes were 3,110 words and 1,841 words, respectively, with receptive vocabulary knowledge being higher than productive vocabulary knowledge. However, it showed a lower score for learners who studied English for approximately eight semesters, when it should be higher. As a result, lecturers can use the vocabulary test to ascertain their learners' strengths and weaknesses in language use. Similarly, Hajiyeva (2014) conducted a quantitative study with 159 English major learners, administering two vocabulary tests. The findings indicated that receptive vocabulary was larger than productive vocabulary, with receptive scores falling below 50% of the minimum standard for word families. The researchers recommended that future studies should involve a larger sample size.

Nizonkiza (2016) investigated the receptive and productive use of academic vocabulary through the use of the Academic Word List (Coxhead, 2000). The participants (204 first-year college learners) were given a battery of tests that included the PVLT, which measured the productive ability of vocabulary knowledge, and the VLT, which measured receptive vocabulary knowledge. The results demonstrated that

receptive vocabulary knowledge increased rapidly. In contrast, productive vocabulary knowledge lagged and remained a problem. The results also indicated that the correlation between receptive and productive knowledge was slightly higher than fifty percent, lending empirical support to previous findings that the correlation between the two different components of vocabulary knowledge was positively correlated (Milton, 2009). This study only involved a small number of participants, so the findings cannot be generalized. Extending the study to a larger sample size may shed light on the relationship between receptive and productive knowledge.

Kader and Kader (2018) investigated the vocabulary size and verb-noun collocational knowledge of Saudi university EFL learners. It also intended to investigate the correlation between vocabulary size and collocational knowledge. Sixty-five learners in their first and final years of study at the English Department, College of Languages and Translation, AL-Imam Muhammad Ibn Saud Islamic University comprised the participants. A vocabulary size test and a test of receptive collocational knowledge were used to collect data. The results revealed that the average vocabulary size of first-year learners was 2,451-word families and that of fourth-year learners was 4,220-word families. It was also discovered that fourth-year learners had significantly greater receptive collocational knowledge than first-year learners. In addition, the results revealed a significant correlation between the size of the learners' vocabularies and their receptive knowledge of collocations. The researchers suggested that future research should assess both receptive and productive lexical and grammatical collocations and use a larger group of participants.

These studies illustrate the significant relationship between receptive and productive word knowledge and indicate that receptive word knowledge is acquired prior to productive word knowledge. In other words, the ability to recognize the form and meaning of a vocabulary item is typically mastered prior to the ability to recall and retrieve its form and meaning, followed by the ability to use the word in context, which is typically acquired last during the learning process. Nonetheless, empirical evidence is necessary for the study of numerous other vocabulary components.

In the Thai context, there is some vocabulary research that shows a positive relationship between receptive and productive vocabulary knowledge (Nontasee & Sukying, 2020, 2021; Sukying, 2017, 2018a; Thangaroonsin, 2016; Zhang & Sukying, 2021) and demonstrates a positive correlation between the size of the vocabulary and other aspects of vocabulary knowledge acquisition. For example, Nontasee and Sukying (2020, 2021) examined the learnability of multiple word knowledge aspects and their relationship. The following aspects of receptive and productive word knowledge were assessed in 261 Thai high school learners: word parts, the form-meaning link, and collocations. The current findings indicated that word parts were acquired first, followed by the form-meaning link and collocations, implying a receptive and productive continuum of word knowledge acquisition. These findings aligned with a study by Sukying and Worakrit (2022), showing that learners learned some vocabulary knowledge aspects at different times and progressed at different rates. Additionally, the findings indicated an interdependent relationship between various aspects of word knowledge. The results suggest that both receptive and productive knowledge of word knowledge aspects is critical for vocabulary knowledge growth. These findings verify prior research indicating that various aspects of vocabulary knowledge are interrelated; in other words, vocabulary acquisition occurs along a developmental continuum (Nation, 2013; Nontasee & Sukying, 2020; Schmitt & Meara, 1997; Sukying, 2017).

Thangaroonsin (2016) conducted quantitative research on the receptive vocabulary size of Thai EFL graduate learners to understand their breadth of word knowledge and how much additional vocabulary they should acquire to reach the threshold level of reading and comprehend English academic texts. The Bilingual English-Thai Version developed by Nation and Beglar (2007) was used to collect data from twenty-seven participants and an open-ended questionnaire. The results indicated that learners had a mean receptive vocabulary size of approximately 8,100-word families, suggesting that they can read English novels or newspapers adequately. However, it is recommended that learners know at least 10,000-word families to have sufficient vocabulary knowledge for reading academic texts in a particular field of study. For further

studies, a larger number of learners is recommended to improve the accuracy and efficiency of the vocabulary size estimation.

Sukying (2017) used Bauer and Nation's (1993) word family construct to investigate the nature of affix acquisition in the Thai EFL context through a cross-sectional study. In addition, the study aimed to determine how much knowledge of receptive and productive affixes increases vocabulary size in the Thai EFL context. The research involved 486 Thai EFL learners. Participants were required to do five tests: two established vocabulary size tests and three affix knowledge evaluations (RAK, LPAK, MPAK). The affix knowledge tasks were developed and piloted specifically for this study to evaluate the participants' receptive and productive affix knowledge. There was a correlation between EFL learners' receptive and productive knowledge of English affixes and the size of their receptive and productive vocabularies. This study shed important light on the acquisition and growth of vocabulary along the receptive-productive continuum. In a related study, Sukying (2018a) investigated whether and to what extent knowledge of receptive and productive affixes contributes to vocabulary size in an EFL context. This study specifically examined the Affix Knowledge-Vocabulary Size Hypothesis, which states that affix knowledge is directly proportional to lexicon size (Nation, 2013). A correlational analysis revealed that all aspects of the affix knowledge of the participants were positively correlated with their vocabulary size. Specifically, receptive affix knowledge had a moderate correlation with receptive vocabulary size, and a positive correlation was found between productive affix knowledge and productive vocabulary size and between combined affix knowledge and total vocabulary size. The results support previous claims that affix knowledge is positively associated with receptive and productive vocabulary size (Hayashi & Murphy, 2011; Mochizuki & Aizawa, 2000). Overall, the study demonstrates that vocabulary knowledge facilitates word acquisition.

Additionally, Zhang and Sukying (2021) examined lexical collocations in first- and fourth-year Thai university learners, focusing on the relationship between receptive and productive knowledge of lexical collocations. Two measures were used to assess 148 learners (75 first-year learners and 73 fourth-year learners) on their lexical

collocations, both receptively and productively. The results indicated that Thai university learners performed significantly better on receptive knowledge tests of lexical collocations than productive ones. Additionally, the data analysis revealed that fourth-year learners outperformed first-year learners on receptive and productive measures of lexical collocations. Furthermore, the correlational analysis revealed an association between receptive and productive knowledge of lexical collocations. Likewise, Jeensuk and Sukying (2021a, 2021b) found that learners had a poor understanding of collocations in English. Their findings also showed developmental stages and different speeds of collocation learning in high school learners in Thailand. Precisely, receptive knowledge of collocations was acquired first, followed by productive knowledge. Further, grammatical knowledge of collocations was learned before lexical knowledge in reception, while productive knowledge of grammatical collocations was acquired after lexical collocational knowledge.

The studies of Nontasee & Sukying (2020, 2021), Thangaroonsin (2016), Sukying (2017, 2018a), and Zhang & Sukying (2021) have revealed that some vocabulary elements are acquired before others. Moreover, some have shown that learners' vocabulary size is positively correlated and may influence vocabulary achievement and production. Overall, while numerous studies have been conducted on the vocabulary acquisition of EFL learners, this area is still not fully comprehensive. Previous research has typically examined EFL learners' receptive and productive vocabulary knowledge but has largely ignored many other aspects, including phrasal verbs. In addition, little is known about the relationship between phrasal verbs and vocabulary sizes. The current study will contribute to the literature by investigating learners' receptive and productive knowledge of polysemous phrasal verbs and determining whether learners' vocabulary size correlates with learners' knowledge of polysemous PVs. Understanding the levels of phrasal verb knowledge among high school learners will provide a foundation for pedagogical practices and the growth of vocabulary knowledge.

2.4 Previous related studies on English phrasal verbs

This section summarizes previous studies on the use of phrasal verbs and polysemous phrasal verbs in EFL learners. For example, Schmitt and Redwood (2011) investigated L2 learners' receptive and productive knowledge of highly frequent phrasal verbs in English and their relationship with frequency, exposure, and individual differences factors. Results showed that participants had good receptive knowledge (65.2%) and adequate productive knowledge (48.2%) of the target phrasal verbs considering their intermediate level of English. Moreover, Schmitt and Redwood (2011) discovered that phrasal verb knowledge appeared to be related to overall language competency, as their upper-intermediate participants scored higher than their intermediate-level participants.

Kamarudin et al. (2019) investigated the receptive and productive knowledge of PVs among Malaysian learners and the factors that may contribute to their difficulties in understanding and employing this language feature. A battery of tests was developed and administered to them to assess the receptive and productive knowledge of 480 secondary school learners in Malaysia regarding PVs. Using actual data from the English of Malaysian School Learners (EMAS) Corpus, the actual usage of PVs by Malaysian learners was investigated. The PVs test results indicated that Malaysian learners possessed an average level of PVs knowledge. Analysis of the EMAS corpus revealed that the production of PVs was highly problematic.

These two studies (Redwood & Schmitt, 2011 and Kamarudin *et al*., 2019) compared receptive and productive phrasal verb knowledge. However, most of the items of PVs assessed had only one sense, negating the goal of studying polysemous phrasal verbs. According to Gardner and Davies (2007), each of the top 100 phrasal verbs on their frequency list has, on average, between five and six meanings or senses. Similarly, Garnier and Schmitt (2015) determined that, on average, phrasal verbs have 1.9 meaning senses by analyzing COCA to determine the most common phrasal verb meanings. Therefore, polysemy must be considered because most phrasal verbs have multiple meaning senses.

A recent series of the studies aimed to better understand the roles of polysemous phrasal verbs knowledge by investigating the acquisition of receptive and productive knowledge of polysemous phrasal verbs (Demetriou, 2020; Garnier & Schmitt, 2016; Kamarudin *et al*., 2019; Sonbul *et al*., 2020; Zhang & Wen, 2019). Garnier and Schmitt (2016) examined L2 learners' knowledge of extremely common polysemous phrasal verbs in English and the effect of various variables on this knowledge. 128 Chilean English learners (36 men, 84 females, and eight unknown) from two Chilean universities participated in the study. The data collection tool was an offline pencil-and-paper form recall test comprised of gap-fill sentences. The results indicated that, on average, only 40% of phrasal verb meaning senses were known, with the likelihood of knowing all the different meaning senses of each phrasal verb tested being around 20%. In contrast to Zhang and Wen (2019), they examined the receptive knowledge of intermediate and advanced Chinese learners regarding polysemous English PVs. Participants judged the acceptability of 100 senses of 50 PV taken from the PHaVE list (Garnier and Schmitt 2015). The conclusion was that both intermediate and advanced learners possessed an average level of knowledge about polysemous PVs and tended to favor higher frequency senses over lower frequency senses.

Unlike Garnier & Schmitt (2016), focusing on productive knowledge, Zhang and Wen (2019) investigated receptive knowledge of polysemous phrasal verbs. The two studies' findings are not directly comparable because two different studies applied different measurements (receptive versus productive). According to Nation (2001, 2013), comparing the receptive and productive levels of vocabulary mastery is critical since they are distinct components of vocabulary knowledge. Moreover, conclusions may be more valid if receptive and productive tasks were utilized because Liao and Fukuya (2004) found that L2 learners' use of PVs tended to vary in different testing tasks.

Two studies most recently examined polysemous phrasal verb knowledge receptively and productively, Sonbul *et al*. (2020) and Demetrios (2020). First, Sonbul et al. (2020) examined EFL high school learners' receptive and productive knowledge of

polysemous phrasal verbs. Sixty participants were recruited from two intact English classes and placed into two distinct groups: the control group (Class A: 26 participants) and the experimental group (Class B: 26 participants) (Class B: 19 participants). The researchers used a recall test from Garnier and Schmitt (2016). The test comprised 100 gap-fill items with a defining context and no PV. A multiple-choice exam was devised to assess receptive knowledge of Phrasal Verbs. After removing the first-letter clues, the test presented the same sentence contexts used in the productive test. Results showed that participants had good receptive knowledge and adequate productive knowledge of the target polysemous phrasal verbs. Similar to Demetriou (2020), this study examined the productive and receptive knowledge of 100 high school English language learners regarding a sample of high-frequency phrasal verbs and phrasal verbs meaning senses. Participants were assessed at the form-recall and form-recognition levels of mastery. The results indicated that participants had a rather limited understanding of phrasal verbs. In the study, the participants were all of the same age and proficiency level (B1+). Thus, the study did not provide information on how differences in proficiency can affect both PV knowledge and the factors that influence such knowledge at the level of specificity researchers examined. Future research could again compare L2 learners with varying proficiency levels to better comprehend the effect of proficiency level on PV knowledge.

In the Thai context, few studies investigated PVs among learners with different levels of proficiency (Chodchoi, 2018; Paugtes, 2020; Rumpanpetch, 2013). Chodchoi (2018) investigated the understanding of each type of English phrasal verbs of Mattayom 5 learners studying in an English program and a regular program in a public school in Krabi, Thailand. The study also aimed to determine the difference in understanding English phrasal verbs between learners from the two programs. The participants were 60 high school learners: 30 from an English program and the other 30 from a regular program. Three tests were used to measure the learners' understanding of phrasal verbs: a multiple-choice test, a matching test, and a gap-filling test. The findings showed that English program participants understood literal phrasal verbs the most, followed by aspectual phrasal verbs and idiomatic phrasal

verbs in all three tests. Likewise, regular program participants understood literal phrasal verbs the most, followed by aspectual phrasal verbs and idiomatic phrasal verbs on Test 1 and Test 2. In Test 3, they understood aspectual phrasal verbs the most, followed by literal phrasal verbs and idiomatic phrasal verbs. In addition, there was a significant difference between the two groups regarding understanding English phrasal verbs. The researchers suggested that future research could investigate the difference between how these two types of phrasal verbs are understood.

Paugtes (2020) investigated how bilingual and mini-bilingual learners use phrasal verbs and the type of phrasal verbs. At a bilingual school in Nonthaburi, Thailand, the participants included 52 Grade 12 bilingual program learners and 63 Mathayom 6 mini-bilingual learners. The data collection instrument was a phrasal verb test that included 40 phrasal verbs and required participants to complete matching, gap-filling, and multiple-choice items. The findings indicated that the learners' proficiency level in the present study did not play an essential role in using phrasal verbs. For further study, the researchers suggest that multifaceted testing would allow drawing stronger conclusions on learners' usage of phrasal verbs. In addition, to confirm that there is no correlation between learners' proficiency level and their use of phrasal verbs, researchers may conduct a proficiency level test rather than relying on learners' school English test scores.

Rumpanpetch (2013) conducted research to determine the competency level of 40 learners enrolled in the Master of Arts in English for Careers (MEC) program at Thammasat University's Language Institute regarding the recognition and use of common three-word phrasal verbs. The researchers sought to determine whether learners could recognize and correctly use three-word phrasal verbs and whether proficiency was related to the ability to use three-word phrasal verbs. They were required to complete three tests: recognition, matching, and multiple-choice questions. The findings indicated that EFL learners demonstrated a high level of competency in understanding and using common three-word phrasal verbs. Additionally, the high proficiency group's test scores were higher than the average proficiency group's test scores.

These studies demonstrate the relationship between language proficiency and the capacity to acquire new vocabulary. Two studies demonstrate a positive correlation between proficiency and vocabulary acquisition ability (Chodchoi, 2018; Rumpanpetch 2013). The results indicate that those with higher proficiency levels acquire more phrasal verbs than those with lower or intermediate proficiency levels. In contrast, the study by Paugtes (2020) demonstrates that learners' proficiency level is unrelated to their knowledge of phrasal verbs. In order to gain a more complete understanding, it is necessary to investigate the relationships between these two aspects.

Furthermore, some researchers compared learners' preference for phrasal verbs and their one-word equivalents, which caused avoidance of using phrasal verbs (Boontong, 2015; Kosolsombat & Pongpairoj, 2017). Boontong (2015) investigated Thai learners' preferences regarding English phrasal verbs compared to their single verb equivalents. Further, the study intended to assess whether learners' competency levels influenced their selections. Thirty-four test items were used in the study. The phrasal verb test phrases were generally identical to those in Liao and Fukuya's study, but the single verbs were placed in novel situations. Thirty Thai learners of different proficiency levels undertook an acceptability judgment task. The data revealed different patterns based on their proficiency. The beginners and intermediate learners preferred the phrasal verbs to the single verbs, while the upper-intermediate learners preferred both types equally. Additionally, Kosolsombat and Pongpairoj (2017) conducted research to investigate L1 Thai learners' avoidance behavior concerning English phrasal verbs. The participants comprised 52 university learners with an intermediate proficiency level. A comprehension task was used to elicit data, followed by a preference assessment and translation task. The results indicated that L1 Thai participants preferred single-word verbs over phrasal verbs, owing to Thai's lack of phrasal verbs. Due to the semantic complexity of figurative phrasal verbs, the avoidance behavior was also more pronounced.

These two studies demonstrate that language learners avoid phrasal verbs in favor of one-word verbs for the following reasons:1) phrasal verbs are composed of two or

more orthographic words that are semantically treated as a unit; 2) phrasal verbs require more complex processing than single-word verbs to understand their meaning, and 3) most phrasal verbs in nature are polysemic and have multiple meanings. On the contrary, the phrasal verbs could not always be replaced with one-word equivalents due to their unnatural sound and meaning differences. This makes them essential to English language instruction and necessary for a wide range of communicative functions that must be considered (Garnier, 2016).

However, in the Thai EFL context, the researchers investigate the phrasal verb knowledge of Thai EFL learners using a variety of measures. Moreover, the researchers focus on the one-meaning sense of phrasal verbs and do not examine the correlation between learners' proficiency level and phrasal verb knowledge. Consequently, the current study seeks to fill the gap by examining learners' receptive and productive knowledge of polysemous PVs and determining whether learners' vocabulary size correlates with the learners' receptive and productive knowledge of polysemous PVs.

2.5 Summary

Vocabulary knowledge is essential to mastering a language, and words are key components of vocabulary learning. Previous studies indicated that vocabulary testing is critical for vocabulary acquisition. It is also a major instrument to test the current situation of learners' vocabulary learning and lays the foundation for the accumulation and improvement of vocabulary. Therefore, based on Nation's (2013) concept of receptive and productive vocabulary knowledge and Murcia and Larsen-Freeman's (1999) concept of phrasal verbs, the present study aimed to investigate receptive and productive knowledge of English polysemous phrasal verbs among Thai high school EFL learners. The current study also aimed to hypothesize that learners' knowledge of polysemous phrasal verbs increases in relation to their vocabulary, which in turn promotes a better understanding of polysemous phrasal verbs. Furthermore, the current study also highlighted the roles of English phrasal verbs in vocabulary learning and teaching.

This study used four tests to assess learners' vocabulary knowledge, one of which was designed specifically for this study based on previous research. Vocabulary sizes were captured by adopting one test, the Vocabulary Size Test (VST), which was validated by Nation and Beglar (2007). The test was quick and easy to score, requires no special equipment, and provides a clearer picture of a learner's vocabulary than most other tests. Receptive and productive knowledge of English polysemous phrasal verbs were measured using three tests, two were adapted, and one was newly developed. The Receptive Test of Polysemous Phrasal Verbs (RPT) was based on Sonbul et al (2020) 's work, the Controlled Productive Test of Polysemous Phrasal Verbs (CPPT) was based on the work of Garnier and Schmitt (2016), and the Productive Test of Polysemous Phrasal Verbs (PPT) was a newly developed test based on Sonbul et al. (2020), Garnier & Schmitt (2016) and Sukying (2018). Figure 1 illustrates how vocabulary sizes and polysemous were measured in the current study.
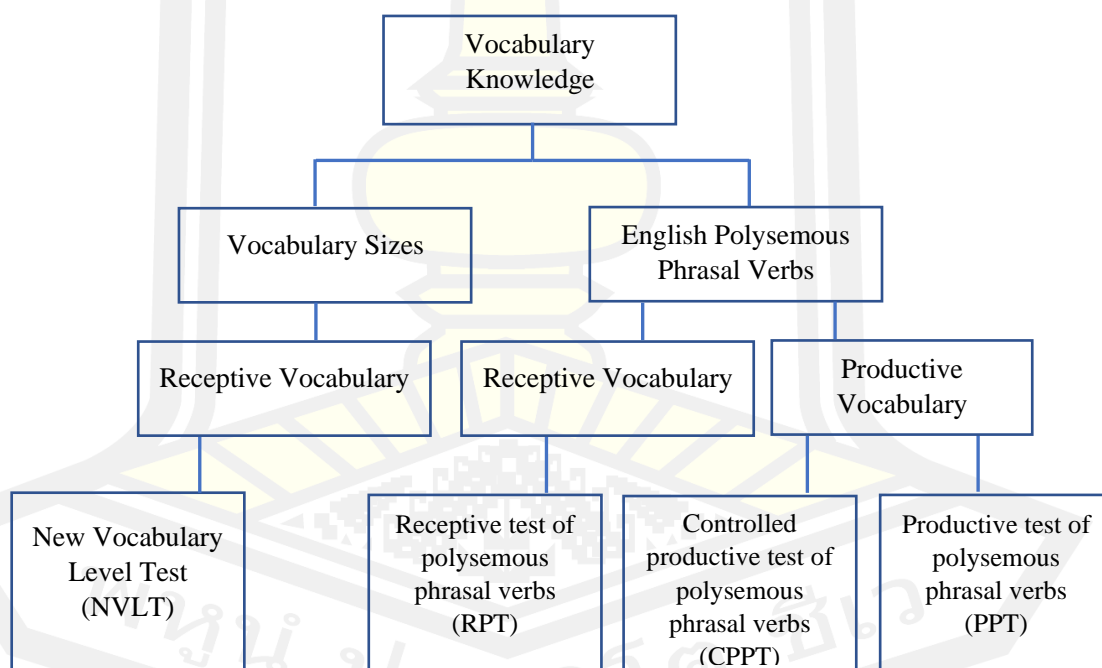
Figure 1. Measuring methods of vocabulary sizes and English polysemous phrasal verbs

CHAPTER III
RESEARCH METHODS

The current study aims to measure Thai EFL learners' knowledge of English polysemous phrasal verbs. This chapter provides a full account of the methodology of the present study. First, a description of the participants involved in the research and justifications for the choice of such cohorts of participants were discussed. Next, the research instruments, data collection procedures, and analysis were discussed quantitatively. The methodology followed previous studies examining receptive and productive knowledge of English phrasal verbs (Boontong, 2015; Chodchoi, 2018; Dagut and Laufer, 1985; Demetriou, 2020; Garnier and Schmitt, 2015, 2016; Kamarudin et al., 2019; Kosolsombat and Pongpairoj, 2017; Paugtes, 2020; Phoemthaweesak, 2009; Rumpanpetch, 2013; Schmitt and Redwood, 2011; Sonbul et al., 2020). The pilot study results and the reliability and validity of the three polysemous phrasal verb tests adapted and developed by the researcher were discussed quantitively. Finally, the chapter ends with a summary of the current chapter.

3.1 Research paradigm and design

The cross-sectional study is founded on postpositivist ideas, which apply more to quantitative research. There is a system of unchangeable laws or theories governing reality (Guba & Lincoln, 2005). In other words, reality is quantifiable and measurable. Consequently, the problems investigated by the researchers highlight the necessity to identify and evaluate the factors that affect results, such as those discovered in the research. Moreover, it is reductionistic. The objective is to minimize the number of concepts to a manageable number for testing, such as the variables that comprise research questions and hypotheses.

Through a postpositivist lens, knowledge is derived from thorough observation and measurement of the objective reality that exists in the world. Therefore, it is essential for a postpositivist to establish numerical measurements of observations and investigate the actions of individuals or language learners. In this respect, a quantitative researcher frequently starts with a theory, gathers data that either

confirms or contradicts the theory, then makes the appropriate adjustments and conducts additional tests. Therefore, research instruments and data collection techniques need to be validated before being used in the main study. Based on the assumptions mentioned above, the analysis of numerical data was the primary goal of the current study, which used a cross-sectional research approach. The underlying rationale of this study was to determine the extent to which Thai high school students have receptive and productive knowledge of polysemous phrasal verbs. It also aimed to test a hypothesis that learners' knowledge of polysemous phrasal verbs increased in relation to their vocabulary, which promoted a better understanding of them. Therefore, the current study focused on investigating high school learners' receptive and productive knowledge of English polysemous phrasal verbs and determining whether the vocabulary size correlated with the knowledge of English polysemous phrasal verbs.

3.2 Participants and setting

The current study was conducted at a typical semi-urban, provincial high school in northeast Thailand. The high school was chosen due to the diversity of learners' English language abilities, which range from advanced beginners to upper-intermediate. At this school, class sizes ranged between 30 and 40 learners.

The participants were 286 high school learners, including tenth to twelfth graders. Convenience sampling was utilized to select participants for this study, as all participants attended the researcher's school. Participants in these grades were chosen because they had been studying English for more than ten years and had varying proficiency levels. At the time of data collection, their ages ranged from 16 to 18. Each participant was a native Thai speaker who used their L1 to communicate with friends or classmates at school; none had studied English in an English-speaking country. The participants received an average of four hours of English instruction per week, which included five 50-minute English sessions. All participants had been enrolled in EFL classes for a minimum of ten years as a mandatory subject, according to the Office of the Basic Education Commission (Ministry of Education in Thailand). Additionally, while they had accessed to English language media, such as the internet, news articles, films, radio, and television, they may have used them sparingly due to

their inability to comprehend them autonomously. As a result, it was assumed that Thai learners' exposure to the English language was limited to their classroom instruction. The participants were informed in advance of the study's purpose, and all participants volunteered to participate, with the data remaining anonymous.

3.3 Ethical consideration

The current study required approval from Mahasarakham University's Ethics Committee. As a result, all participants were recruited using a set of formal procedures. To begin, ethical approval was obtained from school principals, which included the Participation Information Sheet (PIS) and Principal Consent Form (PCF). Second, all potential participants were provided with a Participant Information Sheet about the research and a form of consent prior to the study's start. Thirdly, the study was conducted with learners who submitted written informed consent forms with their signatures and their parents' signatures.

3.4 Research instruments

The current study employed four research instruments. The Vocabulary Size Test (VST) was used to assess participants' receptive knowledge of vocabulary sizes. The Receptive Polysemous Phrasal Verbs Test (RPT) adapted from Sonbul et al., 2020 was employed to capture polysemous phrasal verb knowledge. In contrast, the Controlled Productive Polysemous Phrasal Verbs Test (CPPT) adapted from Garnier and Schmitt, 2016 and the newly developed Productive Polysemous Phrasal Verbs Test (PPT) assessed participants' productive knowledge of phrasal verbs. To determine their validity and reliability, all three tests were piloted with 61 senior high school learners prior to the main study. Content validity was also determined by five experts in the field of English education with over ten years of experience teaching English in Thai EFL contexts, including one native speaker, two university professors, and two high school teachers.

3.4.1 Vocabulary knowledge test
The Vocabulary Size Test (VST)

Nation and Beglar (2007) created the Vocabulary Size Test (VST) to provide comprehensive, accurate, and reliable measures of the size of learners' receptive

written vocabulary. The 14-1,000 BNC word lists are represented by 140 multiple-choice items. Each 1,000-word family level contains ten items, and each item represents a member of a word family. Participants were given items ranging from the first to the fifth 1,000 most common words. The sixth to fourteenth thousand most frequent words were not provided to participants because they were deemed to exceed the vocabulary knowledge of EFL learners (an average of approximately 2,100-word families) (Laufer, 2000; Nation, 2006; Nurweni & Read, 1999).

The current study's format consisted of 50 items, with four options per item (Nation, 2015). Participants must select the optimal definition of the tested word from four options. No points were awarded for no response or an incorrect response, and for every correct answer, one point was awarded. Multiplying the individual's total score by 100 provided an estimate of his or her overall receptive vocabulary size. An example question from the VST is shown below (Nation & Beglar, 2007, p.75):

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1. poor: we are poor.
     a. have no money
     b. feel happy
     c. are very interested
     d. do not like to work hard

3.4.2 Phrasal verb knowledge tests
3.4.2.1 Receptive Polysemous Phrasal Verb Test (RPT)

The multiple-choice format test (Sonbul et al., 2020) had been modified to assess the receptive knowledge of PVs among learners. The original 100-item test contains 37 polysemous items with two to four meanings. The samples were drawn from the PHaVE List (Garnier & Schmitt, 2015). The distractors were also chosen from non-target PVs on the PHaVE List that did not fit the sentence context. To ensure the test's validity, it was piloted with three rounds of natives. In the final round with six native English speakers, all items received a perfect score of 100 percent.

Twenty polysemous PVs with fifty distinct meaning senses from Sonbul et al. (2020) 's test were employed in the current study. After comparing 37 polysemous PVs to the

vocabulary lists of the National Institute of Educational Testing Service (NIETS) and testing to determine the level of familiarity with the target words in the context of the research (Wesche & Paribakht, 1996), it was determined that 17 polysemous PVs did not represent in the context of the research. The 'I do not know' option displayed in Sonbul et al. (2020) 's test was removed from the distraction because it encouraged participants to avoid thinking and committing (Oppenheim, 1992). Additionally, the sentence contexts had been altered to make them unfamiliar with the Controlled-Productive Polysemous Phrasal Verbs Test (CPPT), which was based on Garnier and Schmitt's work (2016). The final outcome of the current study's receptive polysemous PVs test was a 50-item test consisting of 20 polysemous PVs with 50 different meaning senses, requiring participants to read the sentence and choose the most appropriate response. This test was straightforward to grade, and a correct response received a score of 1, while an incorrect response received a score of 0. The RPT example is presented below:

i. We could fit more people on the bus if everybody ____ ____ a bit.
    (change position to make more space)
    a. broke up   b. looked up   c. turned up   d. moved up

ii. Mike needs a lift from the station. Can you go and ____ him ___?
    (collect, give a lift)
    a. pick / out   b. pick / up   c. pick / at   d. pick / on

Selected target phrasal verbs for the current study

Nation and Waring (1997) suggest that ESL and EFL learners should focus on the language's high-frequency words. English learners clearly benefit from initially focusing on the 2000 most frequently occurring words, as they account for at least 80% of the running words in any written or spoken text (Read, 2004; Schmitt & Zimmerman, 2002). The following statement of Nation (2001) can provide evidence for the claim:

> "There is a small group of highly frequent words that are critical because they account for a significant portion of the running words in spoken and written texts and occur in a variety of contexts. The language's high-

frequency words are critical, and teachers and learners should devote considerable time to them. They are well worth the time spent on them due to their frequency coverage and range. There is a large group of words that occur infrequently and account for a negligible portion of any text. Numerous words with a low frequency are proper names." (Nation, 2001, p. 21-22)

Phrasal verbs have been found to be extremely common in language use. Gardner and Davies (2007) estimate that learners will encounter one PV in every 150 words of English they encounter, based on a corpus search of the British National Corpus (BNC). According to Biber et al. (1999), PVs occur approximately 2000 times per million words. Additionally, PVs have a wide range of meanings and functions. There are two additional frequency lists for phrasal verbs, for example, Gardner and Davies's (2007) and Liu's (2011). The current study made use of items from the PHaVE List, a list of the most frequently occurring meaning senses for the most frequently occurring English PVs (Garnier & Schmitt, 2015). The reason for using this list is to account for polysemy which is the purpose of this current study to investigate Thai EFL high school learners' English polysemous phrasal verbs knowledge, and it has been used by many researchers (e.g. Demetriou, 2020; Garnier and Schmitt, 2016; Sonbul et al., 2020) The list comprises 150 PVs that were found as the most prevalent in a prior study (Liu, 2011), defined as having at least ten tokens per million words in either the Corpus of Contemporary American English (COCA) or the BNC. The COCA corpus was used to determine the frequency of occurrence for each PV that was displayed in Table 3. The target words were compared to an international standard for describing language ability, the Common European Framework of Reference for Languages (CEFR). The 75 words list after comparing with CEFR (A2-B1) level was displayed in Table 2.

Table 2. The 75 words list after comparing with CEFR

No		PV	No		PV	No		PV	No		PV
1	**B**	back up	21	**G**	get back	41		hold on	61		put on
2		break down	22		get down	42		hold up	62		put out
3		break off	23		get in	43	**K**	keep on	63		put up
4		bring in	24		get off	44		keep up	64	**R**	reach out
5		bring out	25		get on	45	**L**	lay down	65		run out
6		build up	26		get out	46		lay out	66	**S**	set out
7	**C**	call out	27		get through	47		look around	67		sit back
8		carry on	28		get up	48		look back	68		sit back
9		check out	29		give back	49		look down	69		stand out
10		clean up	30		give out	50		look out	70	**T**	take back
11		come along	31		give up	51		look up	71		take in
12		come in	32		go along	52	**M**	make out	72		take out
13		come on	33		go down	53		make up	73		turn around
14		come out	34		go out	54		move back	74		turn over
15		cut off	35		go up	55		move in	75		turn up
16	**E**	end up	36	**H**	hand over	56		move on			
17	**F**	figure out	37		hang on	57		move up			
18		fill in	38		hang out	58	**P**	pay off			
19		find out	39		hang up	59		pull back			
20		follow up	40		hold back	60		put in			

Moreover, the 75 words list was compared to the vocabulary lists of the National Institute of Educational Testing Service (NIETS), which comprised the vocabulary from fifteen 12th grade textbooks: Global Link 6 (Student Book), Global Link 6 (Workbook), Super Goal 6 (Student Book), Super Goal 6 (Workbook), World Club 3 (Learners' Book), World Club 3 (Activity Book), My World 6 (Student Book), My World 6 (Workbook), Concentrate of Critical Reading 6A, Concentrate of Critical Reading 6B, Speak out 3, Different 3, Listen in 3, Snapshot, and Green Light 6. The result after comparing with the Vocabulary List was 37 words. Then the test was determined the level of familiarity with the target words in the context of the research (Wesche & Paribakht, 1996). Additionally, the words should be agnostic in terms of difficulty, i.e. neither the simplest nor the most difficult (Bruton, 2009; Morgan & Bonham, 1944; Palmberg, 1987; Paribakht & Wesche, 1993). To determine the familiarity of each word, a pilot study was run with 50 senior high school learners. The final twenty words with neutral (or average) scores were selected as the prompt words (Morgan & Bonham, 1944). Unknown and well-known words were not chosen based on participants' scores. All target phrasal verbs used in the current study were sufficiently common that high school learners in the EFL context might be reasonably

expected to know them, at least to some extent. Table 3 presents 20 items with 50 different meaning senses employed in the current study.

Table 3. Summary of the English phrasal verbs used in the current study

No	PV		Meaning sense	Frequency
1	Break down	F	Stop working or functioning; fail or collapse	2106.72
		F	Lose control of one's emotions and yield to tear or distress	1536.15
		L	Undergo chemical decomposition; separate into different substances	1185.03
2	Bring in	L	Bring STH to a place	4248.92
		F	Ask SB to do a particular job or task	2492.155
3	Clean up	L	Get rid of dirt or mess	6147.92
		F	Make STH free from dangerous, unacceptable	1827.76
4	Come along	L	Appear or arrive; come into existence	3969.375
		F	Go somewhere with SB	1122.375
5	Come out	L	Leave a place (room, building, container) or appear from it	13874.94
		F	Become known or revealed after being kept secret	4929.255
		F	Make public knowledge a privately held position	2198.995
		F	Become available or released to the public (film, book ...)	3651.3
6	Cut off	L	Remove a part of STH by cutting it	2036.88
		F	Interrupt SB as they are speaking	1848.28
		F	End the provision of STH (electricity, money)	1772.84
7	Get down	F	Begin to pay serious attention to STH	1957.8
		L	Lower one's body as by kneeling, sitting or lying	1694.25
		L	Come down from STH; descend (car, horse, tree)	1317.75
8	Get off	L	Go away from, leave (train, bus, aircraft, lift)	3884.22
		F	Begin STH in a certain way	899.125
9	Give out	L	Give to each of a large number of people; distribute	1209.6
		F	Make known openly or publicly; reveal	1013.04
		F	Collapse, fail; stop functioning properly (heart, knees)	347.76
10	Go down	L	Move down to a lower level or position	5827.84
		F	Decrease in value or amount	5425.92
11	Hand over	L	Give STH to SB by holding it in one's hand and offering it to them	1755.585
		F	Surrender control or responsibility for STH/SB to SB else, esp. officially	1245.415
12	Hold back	F	Decide not to do or say STH	988.645
		F	Prevent SB/STH from reaching their full potential	883.47
		L	Prevent SB/STH from going somewhere	736.225
		F	Contain an unwanted physical manifestation (tears, laughter, sigh, sneeze)	673.12
13	Move up	F	Move to a better position; advance to a higher level/rank	2101.37
		L	Move upward, from a lower spatial location to a higher one	1005.975
14	Pull back	L	Move backwards or make SB/STH move backwards	3767.225
		F	Withdraw or retreat from an activity or location, esp. military	1756.15
15	Put on	L	Put a piece of clothing or jewellery onto one's body	3341
		F	Present or stage (play, show, competition)	931.635
16	Put up	L	Display or attach STH (e.g., to a wall) so it can be seen	2456.17
		F	Be willing to accept STH unpleasant or not desirable; tolerate	2029.01
		F	Build or place STH somewhere	1922.22
17	Run out	F	Use STH (or become used) completely so that nothing is left	2822.985
		L	Leave suddenly, as if in a hurry	1939.02
18	Sit back	L	Rest in a comfortable position against the back of a seat	2671.68
		F	Deliberately take no action/remain passive about STH	1376.32
19	Take out	L	Remove or extract STH from a container	7182.615
		F	Invite to a recreational place or social event	1920.105

No	PV		Meaning sense	Frequency
		F	Obtain an official document or service from an authority	1777.875
20	Turn over	F	Surrender possession or control to SB/STH (esp. in authority)	3709.23
		L	Change position so that the other side is facing towards the outside or the top	2119.56

Note: L = Literal meaning sense, F = Figurative meaning sense

3.4.2.2 Controlled-Productive Polysemous Phrasal Verb Test (CPPT)

This current study modified the Productive Phrasal Verb test (Garnier & Schmitt, 2016) to fit the research context. The original version of the test contained 100 gap-fill questions in which a defining context was presented, but the PV was removed (see Garnier & Schmitt, 2016 for the full version of the test). On the basis of extensive pilot testing with natives, the first letter (s) of each word and its meaning sense were used as hints to limit the responses. Minor modifications were made to better suit the research context. This controlled productive test of polysemous PVs employed 20 polysemous PVs with 50 distinct senses of meaning as the study's target items. The test used different sentence contexts from the receptive test to prevent participants from establishing a link between words on the receptive test and their spelling on the productive test (Laufer & Goldstein, 2004). The final test consisted of 50 gap-fill items, including 20 polysemous PVs with 50 distinct senses of meaning. The task evaluated the ability to recall and generated polysemous PVs when prompted. The test was presented with a cue prompting a response and sentence completion. The examples are given below:

Item Sentence   **Answer**

   i. The prisoners are hoping to g___o___ of jail soon. *(leave)*   *get out*

  ii. I did not think he would b___u___ the subject. *(mention, introduce)*   *bring up*

3.4.2.3 Productive Polysemous Phrasal Verb Test (PPT)

The Productive Polysemous Phrasal Verb Test (PPT) was a newly developed based on the LPAK task format of Sukying (2018). The test was used to assess participants' capacity to recall and produce polysemous PVs. Each item contained two parts (Xa and Xb). Part Xa presented the meaning sense definition of target PVs, followed by a blank space for writing the phrasal verb word the participants identify. In part Xb,

participants were required to write the sentence using the phrasal verb the participants provided in part Xa. The sample information is given below:

Item	Meaning sense definition	Phrasal verb
1a)	Move upward, or from a lower spatial location to a higher one	*g___u___*
1b)	_____	

The PPT comprised 20 items, utilizing 20 polysemous PVs with 20 distinct senses of meaning, selected from 50 senses of meaning. 20 senses of meaning from Garnier and Schmitt (2016)'s work were selected using a frequency criterion out of 50 possible meanings. Each PV's most often used meaning was chosen. Only 20 senses of meaning were selected because the PPT was a free-writing assignment that required more time to complete. Moreover, writing 50 unique sentences can tire and bore participants during data collection. In part Xa, the correct PV written was awarded one point, and an incorrect answer was awarded no point. The participant's written sentences in section Xb were evaluated by an experienced native speaker who teaches English as a foreign language in Thailand. Assuming that participants had a limited understanding of PVs, minor misspellings were disregarded, and no points were deducted if the constructed sentence was incorrect.

3.5 Data collection procedure

After permission from the high school was obtained, the research was presented to the participants as part of their regular classwork. It was conducted for two days during different class sessions. On the first day of data collection, before assessing the polysemous phrasal verb knowledge, the Vocabulary Size Test (VST) was given to measure participants' overall receptive vocabulary size knowledge, followed by Productive Polysemous Phrasal Verb Test (PPT). On the second day, the Controlled-Productive Polysemous Phrasal Verb Test (CPPT) was conducted, followed by the Receptive Polysemous Phrasal Verb Test (RPT). Before the tests were administered, the participants were informed of the general purpose of the current study and told that their performance on the tests did not affect their course outcome. The researcher provided test instructions to participants in their native Thai language to avoid any confusion. The productive tests were given first to avoid the possibility that

participants might draw a connection between words on the receptive test and their spelling on the productive test (Laufer & Goldstein, 2004). That is, the two types of productive polysemous phrasal verb knowledge tests were administered prior to the receptive polysemous phrasal verb knowledge test. Thus, the four tests were administered in the following order: 1) VST, 2) PPT, 3) CPPT, and 4) RPT. During the four tests, participants were required to complete the tests independently without using a dictionary or discussing with their classmates. Participants who left answers blank for all questions were excluded from the analysis. Those who provided the same ten consecutive answers in response to different questions were also excluded. A summary of the data collection procedure is illustrated in Table 4.

Table 4. A summary of data collection procedures

Data collection procedures	
Day 1	**Time (mins)**
1. Vocabulary Size Test (VST)	40
2. Productive Polysemous Phrasal Verbs Test (PPT)	30
Day 2	
3. Controlled-productive Polysemous Phrasal Verbs Test (CPPT)	40
4. Receptive Polysemous Phrasal Verbs Test (RPT)	30

3.6 Data analysis

The test scores from four tests were analyzed to answer the research questions with the Statistical Package for the Social Sciences (SPSS) (Larson-Hall, 2016; Larson-Hall & Herrington, 2010). Firstly, a paired-samples *t*-test were used to determine a significant difference between different tests, both receptively and productively. Secondly, *F-test* analysis was used to compare all tests. Thirdly, correlation analysis was used to examine the relationship between performance on the different tests based on Cohen's (1988) guidelines: small, $r = 0.10$ to 0.29; medium, $r = 0.30$ to 0.49; large, $r = 0.50$ to 1.0. Fourthly, the regression coefficients (β) suggest the discriminant validity and affect the significance of the construct paths (Kline, 2016). The regression analysis was used to estimate the predictions of English polysemous phrasal verb knowledge to vocabulary size. The size of correlation effect R^2 was

calculated by squaring the correlation coefficient *r*, signifying the population of variance from one variable that may be explained by the other variable in a linear relationship (Cohen, 1988). A small effect of R^2 is 0.01, a medium effect is 0.09, and a large effect is 0.25 (Cohen, 1988). A summary of the data analysis is shown in Table 5.

Table 5. A summary of the data analysis

Vocabulary aspects	Tests		RQ	Data analysis
Phrasal verbs	RPT CPPT PPT	R P P	1	• Descriptive statistics • *t*-test analysis • ANOVA analysis • Effect size analysis (Cohen's *d*)
Vocabulary sizes & Phrasal verbs	VST RPT CPPT PPT	R R P P	2	• Correlation analysis • Regression analysis • Effect size analysis (R^2)

Notes: R = Receptive knowledge, P = Productive knowledge

3.7 Results of the pilot study

A pilot study was conducted as part of the strength testing for the new instruments to produce consistent test items for the receptive and productive tests of English polysemous phrasal verb knowledge, i.e., RPT, CPPT, and PPT. The validity and reliability of these tests were examined in the pilot study. The content validity of the three tests was assessed by five experts in the field of English education with over ten years of experience teaching English in Thai EFL contexts, including one native speaker, two university professors, and two high school teachers. The item difficulty and discrimination were also examined to pinpoint the best available items for the tests' final forms. To determine test reliability, all three tests will be piloted with 70 senior high school learners. Yet, not all learners completed all three tests and were left some blanks, resulting in over 50% missing data. The pilot analysis included only 61 learners who completed all tests in the pilot study, representing an 87.14% completion rate.

The descriptive statistics in the pilot study comprised the mean, standard deviation, skewness, and kurtosis, as shown in Table 6. The raw total test scores were together converted into percentages.

Table 6. Descriptive statistics of pilot results (N = 61)

English polysemous phrasal verbs	Tests	Mean (%)	SD	Skewness	Kurtosis
Receptive knowledge	RPT	35.64	13.90	-0.36	-0.69
Controlled-productive knowledge	CPPT	34.20	13.17	-0.13	-0.98
Productive knowledge	PPT	27.05	12.11	0.20	-0.54

The pilot results showed that the participants knew less than half of the items for each test and that receptive knowledge of English polysemous phrasal verbs was higher than controlled and free productive knowledge of it. Skewness and kurtosis were found to be a normal distribution of scores across all knowledge tests, with all scores less than 2.0 (Kunnan, 1998). Therefore, there was no violation of the statistical assumption of normal distribution (Larson-Hall, 2016).

As shown in Table 7, an ANOVA analysis was used to examine an overall significant difference in scores on the three tests of English polysemous phrasal verb knowledge (RPT, CPPT, and PPT). The effect size was also calculated.

Table 7. Comparison of the English polysemous phrasal verb knowledge tests from the pilot results

Tests of English polysemous phrasal verb knowledge	F-test	Effect-size (η^2)
RPT, CPPT, PPT	104.25**	0.64

Notes: **$p < 0.001$, $N = 61$ (2-tailed)

The ANOVA analysis indicated a significant difference between the three tests of English polysemous phrasal verbs, with a medium effect size ($F = 104.245$, $p < 0.001$, $\eta^2 = 0.64$).

A paired-samples *t*-test was used to determine if there was any significant difference in performance on the different tests of English polysemous phrasal verb knowledge. Effect sizes (*d*) were also calculated.

Table 8. Comparison between the receptive and productive tests of English polysemous phrasal verb knowledge in the pilot study

English polysemous phrasal verbs	Tests	*t*-value	Effect-size (*d*)
Receptive knowledge	RPT		
Controlled-productive knowledge	CPPT	2.35*	0.11
Receptive knowledge	RPT		
Productive knowledge	PPT	12.64**	0.66
Controlled-productive knowledge	CPPT		
Productive knowledge	PPT	11.60**	0.57

*Notes: **p < 0.001, *p < 0.05, N = 61 (2-tailed)*

The analysis revealed a significant difference between different tests of English polysemous phrasal verb knowledge. The paired-samples *t*-test showed that performance was significantly different on the receptive and controlled-productive tests of English polysemous phrasal verb knowledge (RPT versus CPPT; $t = 2.35$, $p < 0.05$, $d = 0.11$), the receptive and productive test of English polysemous phrasal verb knowledge (RPT versus PPT; $t = 12.64$, $p < 0.001$, $d = 0.66$). The controlled-productive and productive tests were also significantly different (CPPT versus PPT; $t = 11.60$, $p < 0.001$, $d = 0.57$).

To sum up, the statistical analyses showed that performance on the three different tests was significantly different, and more specifically, scores on the receptive test of English polysemous phrasal verb knowledge were higher than scores on the controlled and free productive tests. This suggests that receptive knowledge of English polysemous phrasal verbs was acquired before its productive knowledge. Although a pair of RPT and CPPT averaged below the effect size threshold, it partly caused that the effect sizes informed here might be smaller due to the delimited sample size of the pilot participants.

A correlation analysis was conducted to examine the relationships between the different English polysemous phrasal verb knowledge tests (RPT, CPPT, and PPT). Effect sizes were also calculated (R^2).

Table 9. Correlation between scores on the English polysemous phrasal verb tests for the pilot study

Tests	RPT	CPPT	PPT
RPT	1		
CPPT	0.94	1	
PPT	0.93	0.93	1

Notes: **$p < 0.001$, r (0.10-0.29) = Small, r (0.30-0.49) = Medium, r (0.50-1) = Large, $N = 61$ (2-tailed)

Pearson correlation coefficient showed that the tests were highly correlated. All correlations (r) were ≥ 0.93 (all R^2 values ≥ 0.86). Particularly, a correlation of RPT and CPPT was 0.94 ($R^2 = 0.88$), RPT versus PPT ($r = 0.93$, $R^2 = 0.86$), and CPPT versus PPT ($r = 0.93$, $R^2 = 0.86$), All effect sizes were large. This suggested that English polysemous phrasal verb knowledge was interrelated and positively correlated in the broader population.

From the pilot results, some items of the tests were removed due to being out of the difficulty and discrimination average. Five items of the RPT were deleted, including *went down*, *broke down*, *got off*, *clean up*, and *come out*. Nine items of the CPPT were also detached, consisting of *put on*, *cut off*, *break down*, *hand over*, *put up*, *come out*, *give out*, and *sit back*. Five items of the PPT further were uninvolved, encompassing *turn over*, *put up*, *put on*, *clean up*, and *come along*.

Notably, the final form of the RPT was 45 English polysemous phrasal verb items. The CPPT finalized 41 English polysemous phrasal verb items and 15 for the PPT.

In conclusion, the English polysemous phrasal verb knowledge tests, i.e., RPT, CPPT, and PPT, were adapted and developed using the notion of English polysemous phrasal verb knowledge (Garnier & Schmitt, 2015, 2016; Read, 2000; Schmitt and Redwood, 2011; Sonbul et al., 2020). These innovative measures of English polysemous phrasal verbs seize the progression of English polysemous phrasal verb knowledge

acquisition, beginning with the reception of English polysemous phrasal verbs and ending with its full comprehension in production. Therefore, assessing receptive and productive knowledge is critical for identifying possible barriers to English polysemous phrasal verb acquisition and addressing remedial instructions in English polysemous phrasal verb learning strategies. Analyses of the pilot data showed that test performance was significantly related and that all tests were reliable instruments for assessing English polysemous phrasal verb acquisition.

3.8 Summary

This chapter outlines the methodology of the current study, including participants and setting, the research instruments, the data collection procedure, and results of the pilot study. In addition to establishing the reliability and validity of new tests, their practical applications and usability have been emphasized. In particular, the research design procedures for the current study were broken down into three steps: first, the pilot study was conducted which was already presented above, then the data collection, and finally, the data analysis. A summary of the research design procedures is shown in Figure 2.

Phase	Procedure	Product
1. Pilot study	• $N = 61$ • Examine measured reliability and validity	• RPT • CPPT • PPT
2. Data collection	• $N = 286$ • Testing receptive vocabulary size (VST) • Testing receptive and productive knowledge of polysemous phrasal verbs (i.e., RPT, CPPT, and PPT)	• Numeric data (test scores)
3. Data analysis	• Descriptive statistics • Inferential statistics	• Conclusion

Figure 2. Summary of the procedure for the current study

CHAPTER IV
RESULTS

This chapter provides the results presenting the descriptive and inferential statistics for instrumental tests to address the reception and production of English polysemous phrasal verb knowledge in the Thai EFL context and their relationships to vocabulary size. The related methods, including a pair-samples *t*-test, ANONA, correlation, and effect-size analysis, are used to analyze the data.

4.1 English polysemous phrasal verb knowledge

In response to Research Question 1: To what extent do Thai high school EFL learners have receptive and productive knowledge of English polysemous phrasal verbs?, the Receptive Polysemous Phrasal Verb Test (RPT) was employed to measure participants' receptive knowledge of polysemous phrasal verbs, whereas the Productive Polysemous Phrasal Verb Test (PPT) was administered to assess students' productive polysemous phrasal verb knowledge. The Controlled-Productive Polysemous Polysemous Phrasal Verb Test (CPPT) was also used to measure participants' partial productive knowledge of phrasal verbs.

This section summarizes the scores of the senior high school learners ($N = 286$) on the receptive and productive English polysemous phrasal verb knowledge tests, i.e., RPT, CPPT, and PPT, and their vocabulary size, i.e., VST. The descriptive statistics included mean, standard deviation, minimum and maximum scores, skewness, and kurtosis. Plus, the raw total test scores were converted into percentages and then calculated by dividing the total score of each test by its mean. Percentages are used to compare across polysemous phrasal verb test performance, which differ between tests.

Table 10. Descriptive statistics

Tests	Mean	SD	Skewness	Kurtosis	Total (%)
RPT	37.01	13.43	-0.43	-0.51	74.02
CPPT	35.51	12.80	-0.22	-0.83	71.02
PPT	25.67	12.05	0.11	-0.51	64.18
VST	25.78	4.79	0.12	-0.52	51.56

As shown in Table 10, the participants had English polysemous phrasal verb knowledge about 69.74% (three tests mean percentage: RPT, CPPT, PPT), and performed best on receptive knowledge test of English polysemous phrasal verbs (RPT; 74.02%), followed by its controlled-productive knowledge test (CPPT; 71.02%) and, at least, its free productive knowledge test (PPT; 64.18%). They also had around 51.56% of vocabulary size on the VST.

The normal distribution of the performance across different English polysemous phrasal verb knowledge tests was further verified according to the skewness and kurtosis values which were shown around $\pm$ 1 (all $\leq$ 0.2); hence, there was no violation of the statistical assumption.
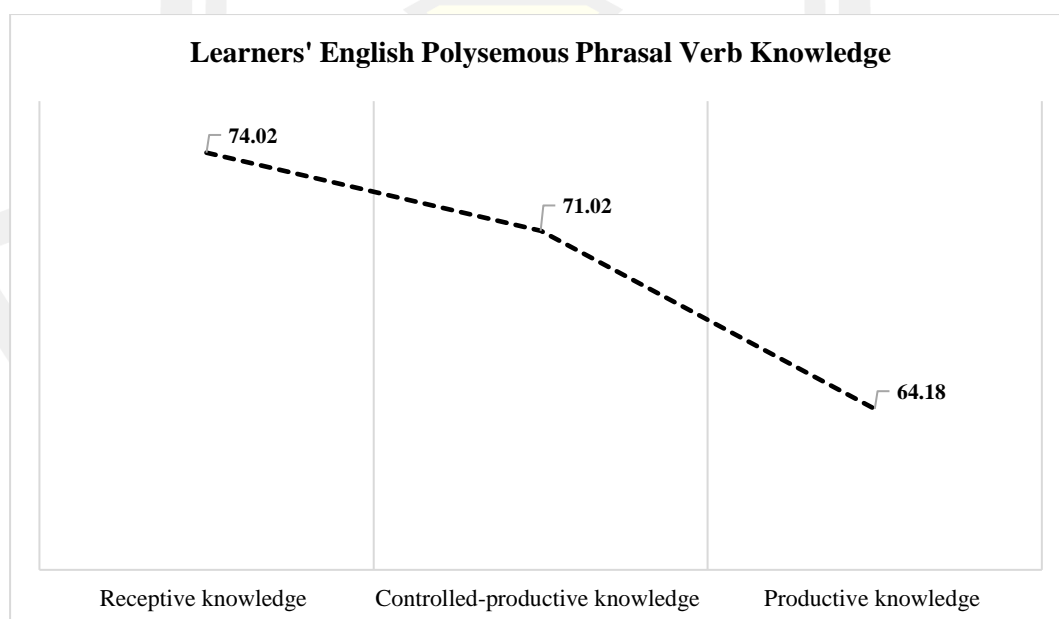

Figure 3. Mean percentage of English polysemous phrasal verb knowledge

An ANOVA analysis was also conducted to determine the difference between tests. The results, as illustrated in Table 11, indicated an overall significant difference for different tests (RPT, CPPT, PPT, and VST), with a large effect size ($F = 744.705$, $p < 0.001$, $\eta^2 = 0.42$). Further, there was a statistically significant difference in three different tests of English polysemous phrasal verb knowledge (RPT, CPPT, and PPT) and a large effect size ($F = 207.755$, $p < 0.001$, $\eta^2 = 0.72$).

Table 11. The ANOVA results

Knowledge	Tests	F-test	η^2
Polysemous phrasal verbs	RPT, CPPT, PPT	207.755**	0.72
Polysemous phrasal verb + Vocabulary size	RPT, CPPT, PPT, VST	744.705**	0.42

Note: **$p < 0.001$ (2-tailed)

Based on a paired-samples t-test analysis, different tests of English polysemous phrasal verb knowledge were significantly different (RPT versus CPPT: $t = 5.45$, $p < 0.001$, $d = 0.11$; RPT versus PPT; $t = 32.32$, $p < 0.001$, $d = 0.89$; CPPT versus PPT; $t = 30.06$, $p < 0.001$, $d = 0.79$). Hence, based on test scores, there are different degrees of reception, controlled production, and free production of English polysemous phrasal verb knowledge.

Table 12. Comparisons between scores on different tests of English polysemous phrasal verb knowledge

English polysemous phrasal verbs	Tests	t-value	d
Receptive knowledge	RPT		
Controlled-productive knowledge	CPPT	5.45**	0.11
Receptive knowledge	RPT		
Productive knowledge	PPT	32.32**	0.89
Controlled-productive knowledge	CPPT		
Productive knowledge	PPT	30.06**	0.79

Note: **$p < 0.001$ (2-tailed)

4.2 Vocabulary size and English polysemous phrasal verb knowledge

This section answers Research Question 2: Is there any relationship between Thai EFL high school learners' vocabulary size and receptive and productive knowledge of English polysemous phrasal verbs?

A correlation analysis was conducted to examine the relationships between English polysemous phrasal verb knowledge tests (RPT, CPPT, and PPT) and vocabulary size tests (VST). Effect sizes were also calculated (R^2).

Table 13. Correlations between vocabulary size and polysemous phrasal verb knowledge

Tests	RPT	CPPT	PPT	VST
RPT	1			
CPPT	0.94**	1		
PPT	0.90**	0.90**	1	
VST	0.07	0.09	0.08	1

Note: **$p < 0.001$ (2-tailed)

Pearson correlation coefficient showed that there were low relationships between vocabulary size (VST) and English polysemous phrasal verb knowledge (RPT, CPPT, and PPT) and small effect sizes (all r values ≤ 0.09, $R^2 \leq 0.01$). These figures are presented in Table 13.

However, the three different tests of English polysemous phrasal verb knowledge (RPT, CPPT, and PPT) were closely related ($p < 0.001$). All correlations (r) were $\geq$ 0.90 (all R^2 values ≥ 0.81). More specifically, a correlation of RPT and CPPT was 0.94 ($R^2 = 0.88$), RPT versus PPT ($r = 0.90$, $R^2 = 0.81$), and CPPT versus PPT ($r = 0.90$, $R^2 = 0.81$). All effect sizes were large.

Table 14. Predictions of English polysemous phrasal verb knowledge to vocabulary size

	B	*t*	*p-value*	*R²*	*f²*
Predicting VST					
RPT	-0.059	-0.911	0.363	0.011	0.01
CPPT	0.084	1.196	0.233		
PPT	0.010	0.167	0.867		

Forced-entry regression analysis was also used to estimate the predictions of English polysemous phrasal verb knowledge to vocabulary size. As shown in Table 14, there was no statistical significance ($p > 0.05$). The regression results yielded an explanatory model ($R^2 = 0.011$). Thus, the explanatory variables, English polysemous phrasal verb knowledge (RPT, CPPT, and PPT), accounted for 1.1% of the variability in participants' vocabulary size (VST). This regression model has no global effect size ($f^2 = 0.01$).

Based on the regression coefficients (β), the CPPT most predicted VST at 0.084%, followed by PPT at 0.010% and RPT at -0.059%, respectively. The contributions of English polysemous phrasal verb knowledge to vocabulary size are regarded as low predictions. It should be noted that the β value is commonly accepted at ≥ 20%. However, regarding the regression results, this can be the initially proven evidence to further investigate and describe the relationship between English polysemous phrasal verb knowledge and vocabulary size knowledge.

4.3 Summary

The statistical analyses showed that performance on the three different tests was significantly different. More specifically, scores on the receptive test of English polysemous phrasal verb knowledge were higher than scores on the controlled and free productive tests. This suggests that receptive knowledge of English polysemous phrasal verbs is acquired before its productive knowledge. The relationships between vocabulary size and English polysemous phrasal verb knowledge were low, but relationships between receptive and productive knowledge of English polysemous phrasal verbs were highly correlated. This suggests that English polysemous phrasal

verbs knowledge is interrelated and positively correlated in the broader population. Further, the participants' vocabulary size scores were relatively poor. It should be noted that the learners' vocabulary size may be inadequate to build on English polysemous phrasal verb knowledge.

The next chapter will discuss the results by connecting them to theoretical frameworks and other research findings to draw and conclude the study findings.
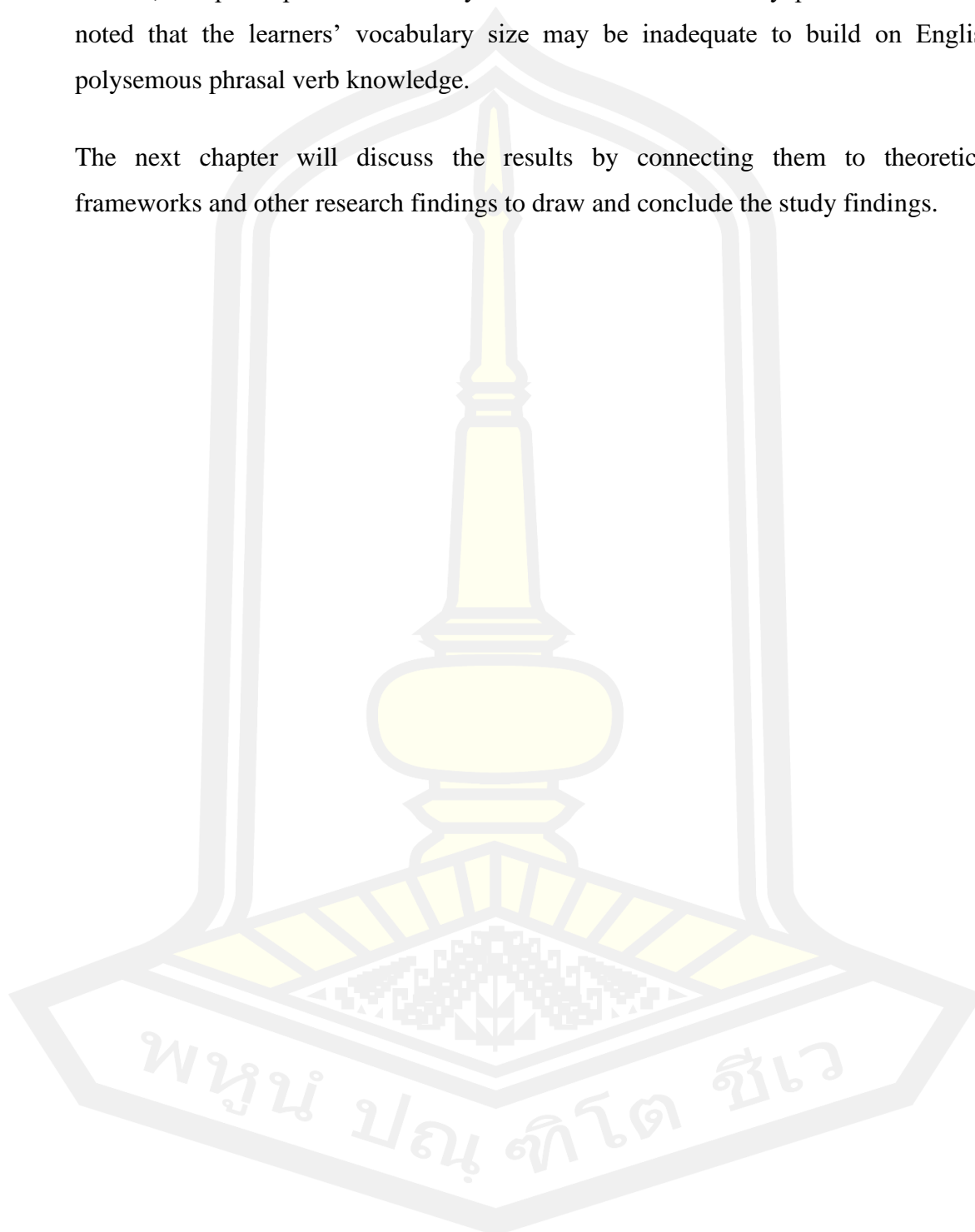
CHAPTER V
DISCUSSION AND CONCLUSION

The preceding chapter presented the statistical results and preliminary findings in regard to the research questions. This chapter will discuss the research findings in relation to the existing literature. Notably, the findings of the current study expand our understanding of the roles of the aspects of English polysemous phrasal verb knowledge in EFL learners, especially in the Thai context. The findings provided empirical evidence into acquiring English polysemous phrasal verb knowledge, particularly emphasizing its relationship to vocabulary size acquisition. The present chapter further highlights these insights and their significance to current pedagogy and second language acquisition studies, particularly vocabulary acquisition. It also addresses the implications for learning phrasal verbs and limitations for future research possibilities.

5.1 Receptive and productive English polysemous phrasal verb knowledge

This study explored the high school learners' receptive and productive knowledge of English polysemous phrasal verbs in Thailand using the multiple test battery. The results showed that the aspects of English polysemous phrasal verb knowledge were correlated but not known concurrently, suggesting that it is an incremental learning process.

The findings indicate that Thai high school participant performance on different polysemous phrasal verb tests demonstrates various degrees of knowledge. Participants perform best on the receptive knowledge test, followed by the controlled productive knowledge and productive knowledge tests. The performance of these tests reflects the degrees of polysemous phrasal verbs and their acquisition. The current findings provide evidence to support previous studies that, like vocabulary, different aspects of polysemous phrasal verbs are obtained at different speeds (Demetriou, 2020; Garnier & Schmitt, 2016; Kamarudin et al., 2019; Sonbul et al., 2020).

The three measures of polysemous phrasal verbs used in the current study indicate varying degrees of phrasal verb knowledge. The RPT test measures participants' ability to recognize the form and meaning and comprehend a phrasal verb in decontextualized sentences. By contrast, the CPPT reflects participants' ability to recall and create polysemous phrasal verbs when prompted in provided sentences. Similarly, the PPT measures participants' ability to draw on different types of knowledge, including cognitive and metacognitive strategies, to relate the meaning and form of the target phrasal verbs in prompted contexts with little clues. The situation could be explained by the degrees of learning in L2 contexts (Laufer & Goldstein, 2004). The RPT possibly inflicted a far less heavy cognitive processing demand on Thai learners than the CPPT, which likely imposed a less processing demand than the PPT. The difference between the RPT and the PPT scores may imply that the CPPT test acts as a bricklayer, scaffolding learners to acquire and develop knowledge of phrasal verbs. In other words, receptive knowledge of phrasal verbs progresses productive phrasal verb knowledge. These findings also suggest that receptive phrasal verb knowledge is learned at an initial stage in which such knowledge may not be fully mastered. That is, productive knowledge of phrasal verbs may not be mastered unless receptive knowledge of phrasal verbs is fully acquired.

Based on the mean percentage of English polysemous phrasal verb knowledge, scores on the receptive test of English polysemous phrasal verb knowledge were the highest, followed by the controlled-productive test and at least the free productive test. The results showed that participants had better receptive knowledge than productive knowledge of the target polysemous phrasal verbs. Consistently, learners know receptively English polysemous phrasal verbs more than productively, implying that receptive knowledge's English polysemous phrasal verbs are likely acquired before its productive knowledge (Chodchoi, 2018; Demetriou, 2020; Garnier & Schmitt, 2016; Kamarudin et al., 2019; Paugtes, 2020; Rumpanpetch, 2013; Sonbul et al., 2020; Zhang & Wen, 2019). Moreover, Thai EFL high school participants demonstrated a greater understanding of the form and meaning of the target phrasal verb than of its application in authentic contexts. This is consistent with the notion that receptive knowledge entails recognizing the form and/or meaning of lexical items, as stated in

previous research. In contrast, productive knowledge requires retrieving and generating semantically suitable lexical forms. (Jeensuk & Sukying, 2021; Laufer & Goldstein, 2004; Nation, 2013; Sukying & Nontasee, 2022, Sukying, 2017, Zhang & Sukying, 2021). The results show that productive usage of phrasal verbs may not occur unless a certain phrasal verb is wholly mastered. However, it should be noted that Thai high school EFL learners had intermediate performance in English polysemous phrasal verb knowledge, both receptively and productively. Learners may not understand the meaning of phrasal verbs in different contexts and may be unable to use them appropriately or correctly. The current study results are consistent with previous literature that phrasal verbs were challenging for EFL learners (Celce-Murcia & Larsen-Freeman, 1999; Schmitt & Siyanova, 2007). Given the semantic complexity of figurative phrasal verbs, EFL learners frequently find it difficult to know the semantic properties of phrasal verbs, in addition to the ability to communicate effectively and efficiently to use them (Chodchoi, 2018; Paugtes, 2020; Rumpanpetch, 2013), particularly in Thailand (Boontong, 2015; Kosolsombat & Pongpairoj, 2017). Learners grapple with the complexities of phrasal verb meaning because it is unrelated to the typical meaning of the constituents (Blau, Gonzales, & Green, 1983).

Consistent with previous findings on the acquisition of phrasal verbs (e.g., Demetriou, 2020; Garnier & Schmitt, 2016; Kamarudin et al., 2019; Sonbul et al., 2020), the current findings indicate that the ability to recall and produce English phrasal verbs is more complex than the ability to recognize English phrasal verbs. This phenomenon could be explained by context-specific learning levels (Nation, 2013). In other words, the productive measure of phrasal verb knowledge imposed a significantly greater processing burden on Thai high school learners than the receptive measure. In fact, the new finding shows that productive knowledge is constructed from receptive knowledge. Together, receptive and productive knowledge acquisition is ongoing and receptive to productive knowledge shifts gradually (Henriksen, 1999; Nation, 2013; Schmitt, 2010).

According to the items used from the PHaVE List, which present the most frequent meaning senses of the most frequent English PVs (Garnier & Schmitt, 2015), The performance of the participants on the tests indicated that the lower-frequency meaning sense was less well-known than the higher-frequency meaning sense. For example, in the word "put up," the figurative meaning sense has a lower occurrence frequency (COCA frequency = 931.635) than the literal meaning sense's (COCA frequency = 3341) in both the CPPT and RPT tests; however, it was excluded from the main study due to being outside the difficulty and discrimination average. Consistent with previous findings on the acquisition of phrasal verbs (Garneir & Schmitt, 2016), the frequency of occurrence was the best predictor of PV knowledge. Because PVs have been proven to be prevalent in the everyday language of native speakers, it is vital to master English PVs (Garneir & Schmitt, 2016). Yet, to utilize a language naturally in context, EFL learners must be familiar with phrasal verbs (Gardner & Davies, 2007; Garnier & Schmitt, 2015). Knowing phrasal verbs can help students increase their fluency and native-like choices and also minimize cognitive effort by shortening the time spent processing a word and making it instantly available in their minds. Furthermore, Cornell (1985) emphasizes that native English speakers intuitively absorb and communicate well in spoken discourse and informal writing. However, because of the dynamism of phrasal verbs in English and the difficulty in recognizing their use, EFL learners should be taught how to communicate effectively in English using phrasal verbs. However, because of their high productivity, phrasal verbs pose challenges for EFL students to comprehend and use (Bolinger, 1971). For EFL learners, the lack of L2 exposure negatively impacts their knowledge of PVs, as most of their everyday exposures are in L1 (Garnier & Schmitt, 2016). In order to expand their knowledge of PVs and L2 vocabulary in general, L2 learners should be encouraged to devote more time to such activities. To effectively increase vocabulary knowledge, it may be necessary to mix implicit and explicit learning and for teachers to pay more attention to PVs in instructional contexts (Garnier & Schmitt, 2016).

The results of the current study give primary information on polysemous phrasal verb knowledge acquisition. Even though the study indicates evident details in the domain of phrasal verb knowledge, it still needs more research to describe clearer its nature and conceptualization in acquisition and development and provide the benefits for the pedagogy.

5.2 Relationship between English polysemous phrasal verb knowledge and vocabulary size

This section addressed the relationship between high school learners' vocabulary size knowledge and English polysemous phrasal verb knowledge, both receptively and productively, in Thailand. The correlational analysis of the findings revealed that learners' English polysemous phrasal verb knowledge was contributed by their vocabulary size knowledge but not significantly, suggesting that learners require a larger vocabulary size to develop their English polysemous phrasal verb knowledge.

The findings showed low relationships between vocabulary size and English polysemous phrasal verb knowledge, and there was no statistical significance. However, the regression coefficients demonstrated that English polysemous phrasal verb knowledge likely contributes to vocabulary size but relatively low predictions. That implies the contributions of English polysemous phrasal verb knowledge to vocabulary size are regarded as very small predictions. This low contribution to vocabulary size could be due to the knowledge of phrasal verbs among Thai EFL high school participants.

The relationships between vocabulary size and English polysemous phrasal verb knowledge were low, but relationships between receptive and productive knowledge of English polysemous phrasal verbs were highly correlated. This suggests that English polysemous phrasal verbs knowledge is interrelated and positively correlated in the broader population. Further, the participants' vocabulary size knowledge was relatively poor. Notably, learners' vocabulary size may be inadequate to build on their English polysemous phrasal verb knowledge. EFL learners had a relatively limited understanding of vocabulary size (Laufer & Goldstein, 2004; Hayashi & Murphy, 2011; Sukying, 2017, 2018a) and phrasal verbs (Sonbul et al., 2020; Demetrios,

2020). Both vocabulary size and English polysemous phrasal verbs knowledge of learners in the present study seem to cause low related effects.

Most previous vocabulary research revealed a positive correlation between the size of vocabulary knowledge and other aspects of vocabulary knowledge acquisition (Nontasee & Sukying, 2020, 2021; Sukying, 2017, 2018a; Thangaroonsin, 2016; Zhang & Sukying, 2021). Some other knowledge aspects, such as affixation (Hayashi & Murphy, 2011; Mochizuki & Aizawa, 2000; Sukying, 2017) and collocation (Jeensuk & Sukying, 2021a, 2021b; Zhang & Sukying, 2021) are proven to relate to or build up learners' vocabulary size knowledge or conversely learners' vocabulary size knowledge could influence their other knowledge aspects of vocabulary. Overall, the study demonstrates that vocabulary knowledge facilitates word acquisition.

Moreover, Schmitt and Redwood (2011) discovered that phrasal verb knowledge was related to overall language competency and a positive correlation between proficiency and vocabulary acquisition ability. These prior results indicate that those with higher proficiency levels acquire more phrasal verbs than those with lower or intermediate proficiency levels (Chodchoi, 2018; Rumpanpetch, 2013). In contrast, Paugtes's (2020) study demonstrated that a comparison of the higher and lower groups' English examination scores revealed no statistically significant difference in phrasal verb scores between the higher and lower groups of learners. Consequently, there was no correlation between the scores on the English exam and the phrasal verb test. Thus, the learners' proficiency level had no effect on their use of phrasal verbs.

Nevertheless, the results in the current study give principal information on the influence of vocabulary size on acquiring English polysemous phrasal verb knowledge. Even though the study indicates evident details in the domain of phrasal verb knowledge, it still needs more research to describe its vibrant nature and conceptualization in acquisition and development and provide benefits for the pedagogy. Different contexts and methods may further prove any better evidence, indicating more positive contributions of vocabulary size to English polysemous phrasal verb knowledge and any other English aspect which increase English polysemous phrasal verb knowledge.

The current study may contribute to the literature by illustrating learners' receptive and productive knowledge of polysemous phrasal verbs and the relative contribution of learners' vocabulary size to their knowledge of polysemous phrasal verbs. This current evidence may also help to understand the situation of polysemous phrasal verb knowledge among high school learners in Thailand and provide a foundation for pedagogical practices and the growth of vocabulary knowledge.

5.3 Conclusion

For Research Question 1, which examines the extent Thai high school learners know receptive and knowledge of English polysemous phrasal verbs, the findings showed that Thai high school participants had intermediate knowledge of polysemous phrasal verbs both receptively and productively. Specifically, Thai high school participants mastered receptive knowledge of polysemous phrasal verbs before productive knowledge. Indeed, the current study indicated varying degrees of phrasal verb knowledge, starting from recognizing its form and meaning and continuing to develop before fully mastering it. In brief, the study showed a critical standpoint on English polysemous phrasal verb knowledge, which was an incremental learning process.

Regarding Research Question 2, the current findings demonstrated a positive relationship between vocabulary size and English polysemous phrasal verb knowledge receptively and productively. Overall, the correlation analysis revealed that several dimensions of English polysemous phrasal verb knowledge were substantially and closely related.

To conclude, the current study indicated that Thai high school participants had intermediate knowledge of polysemous phrasal verbs. The findings also demonstrated the varying degrees of phrasal verb knowledge, which lie along the continuum. Specifically, it was shown that receptive knowledge of English polysemous phrasal verbs was first known before its productive knowledge. Furthermore, the correlation analysis revealed highly and closely interrelated results of different dimensions of English polysemous phrasal verb knowledge. Together, the regression results showed that English polysemous phrasal verb knowledge beneficially predicted vocabulary size, both receptively and productively. The present findings address that English

polysemous phrasal verb learning is an incremental process continuum and also imply that knowing English vocabulary likely contributes to English polysemous phrasal verb knowledge acquisition. Overall, this study suggests an empirical evidence into the English polysemous phrasal verb knowledge acquisition of Thai EFL learners by suggesting the natural construct of the English polysemous phrasal verb knowledge in Thailand and the vocabulary facilitations to increase it.

5.4 Implications

5.4.1 Theoretical contribution

The current research gives quantitative support for English polysemous phrasal verb knowledge acquisition and the relationship of vocabulary size knowledge to its growth. An ANOVA analysis indicated that English polysemous phrasal verb knowledge was different levels of understanding, particularly receptive knowledge being acquired before productive knowledge. The correlative study also demonstrated that word knowledge is positively connected, which indicated that receptive knowledge could improve productive knowledge. The regression analysis further illustrated that learners' English polysemous phrasal verb knowledge could build up their size of vocabulary knowledge.

The data demonstrate that learning, such as vocabulary size and English polysemous phrasal verb knowledge growth, operates over an incremental process. This shows that vocabulary size is an essential intermediary for English polysemous phrasal verb knowledge acquisition, while knowing polysemous phrasal verbs is vital to promote vocabulary growth. Learning English polysemous phrasal verb knowledge among EFL learners requires other facilitations of such knowledge as size and/or depth of vocabulary. That is, several learning modes would be rather than any particular one alone.

5.4.2 Methodological contribution

English polysemous phrasal verb knowledge necessitates being assessed both receptively and productively. Each type of English polysemous phrasal verb knowledge requires different receptive and productive measures (Schmitt, 2010, Nation, 2013). Three distinct measures of English polysemous phrasal verb

knowledge were developed. First, the Receptive Polysemous Phrasal Verb Test (RPT), modified as a multiple-choice format test (Sonbul et al., 2020) to assess the receptive knowledge of PVs among learners, requires participants to read the sentence and choose from nontarget PVs on the PHaVE List that did not fit the sentence context. Second, the Controlled-Productive Polysemous Phrasal Verb Test (CPPT) contained gap-fill questions in which a defining context (Garnier & Schmitt, 2016) evaluates the ability to recall and generate polysemous PVs when prompted. Finally, the Productive Polysemous Phrasal Verb Test (PPT), newly developed based on the LPAK task format (Sukying, 2018), assesses participants' capacity to recall and produce polysemous PVs. It presents the meaning sense definition of target PVs, followed by a blank space for writing the phrasal verb word the participants identify. It also requires participants to write the sentence using the phrasal verb provided. In addition to measuring learners' vocabulary size, the Vocabulary Size Test (VST) (Nation & Beglar, 2007), a measure of the size of learners' receptive written vocabulary, encourages participants to select the optimal definition of the tested word from four options.

Therefore, the current study provides an innovative methodology for practitioners, test developers, and researchers. A pioneering battery of English polysemous phrasal verb knowledge tests was developed to account for receptive, controlled-productive, and free productive knowledge. Given that the battery was shown to be reliable and valid, researchers and test developers should examine how to expand its possible research applications.

5.4.3 Pedagogical contributions

The findings show an empirical principle for teaching and learning polysemous phrasal verb knowledge in English. Vocabulary knowledge, often known as the cornerstone of English language learning, can favor other English language sub-skills. In particular, English vocabulary knowledge, size, and depth can help learners build their English polysemous phrasal verb comprehension and facilitate efficient English language development. The instruction should explicitly educate the comprehensive concept of English polysemous phrasal verb knowledge and, in alternative to

broadening and deepening learners' vocabulary knowledge, it could be a beneficial option. The implications of the current study may help to develop policies in English instruction. English polysemous phrasal verb knowledge is one of the most effective alternatives for enhancing Thai EFL learners' English language learning. It would be preferable if Thai EFL learners were taught and learned English polysemous phrasal verbs, such as by implementing a course in the English curriculum.

5.5 Limitations and recommendations

The current study provides empirical evidence for the nature of Thai EFL learners' acquisition of English polysemous phrasal verb knowledge. Nevertheless, it should be noted that this study only investigated learners of one L1 and specific context, raising the question of whether the findings can be extended to other EFL learners. Second, future research should involve participants from various educational grades to better understand the functions of its acquisition in specific contexts, such as primary, high school, and university students. This study is also constrained to a cross-sectional design, and longitudinal and experimental studies are required to better understand the nature of English polysemous phrasal verb development. Future studies can look at its relationship to other variables, such as vocabulary depth, speaking, and writing.

Other instruments based on qualitative methodologies, such as observation, questionnaires, and interviews, should be employed to verify the reliability and validity of the data and to gather further information about English polysemous phrasal verb acquisition. In addition, future research should apply other vocabulary size tests, such as the Vocabulary Level Test (VLT) or the New Vocabulary Level Test (NVLT), to determine if the findings may be expanded besides using Vocabulary Size Test (VST). Other advanced model analyses are also required to demonstrate and prove evidently. Finally, the tests used in this study were created for the particular aims of this investigation; as such, future studies should ensure that the substance of the tests, in addition to the tests themselves, are adapted to the particular context of the study.

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APPENDICES
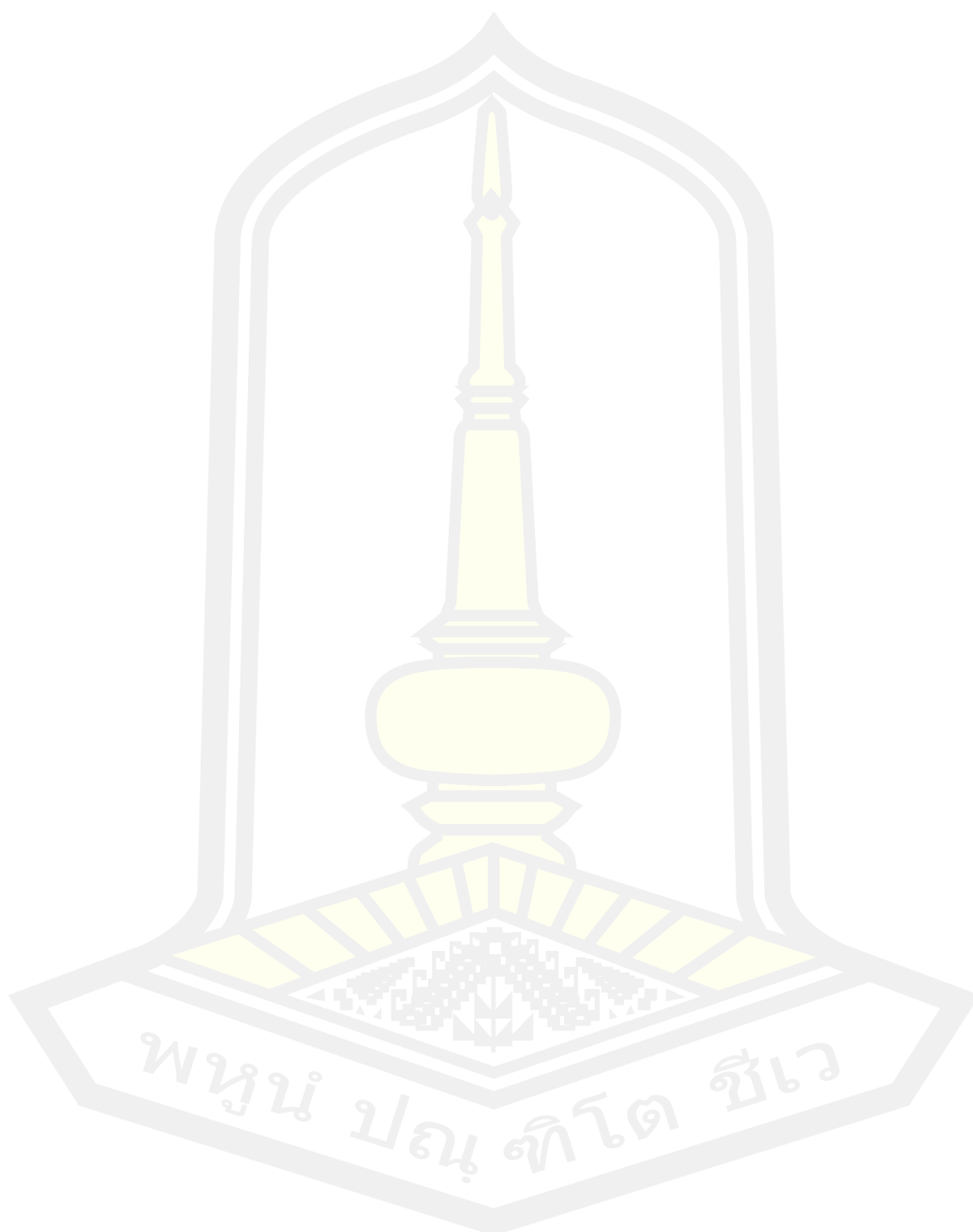
Appendix A: The Vocabulary Size Test

This is a vocabulary test. It has 50 items, ten at each of five-thousand-levels. If you do this test carefully, it should give you a good idea of the number of English words you know.

Instructions: In each item, please select the option a, b, c, or d which has the closest meaning to the word in **bold**.

1. **Cat**: The **cat** sat on the mat.

      a. animal that chases dogs

      b. animal that carries people

      c. animal that chases a mouse

      d. animal that eats fruit

In the example, the best meaning for **cat** is answer c, "animal that chases a mouse."
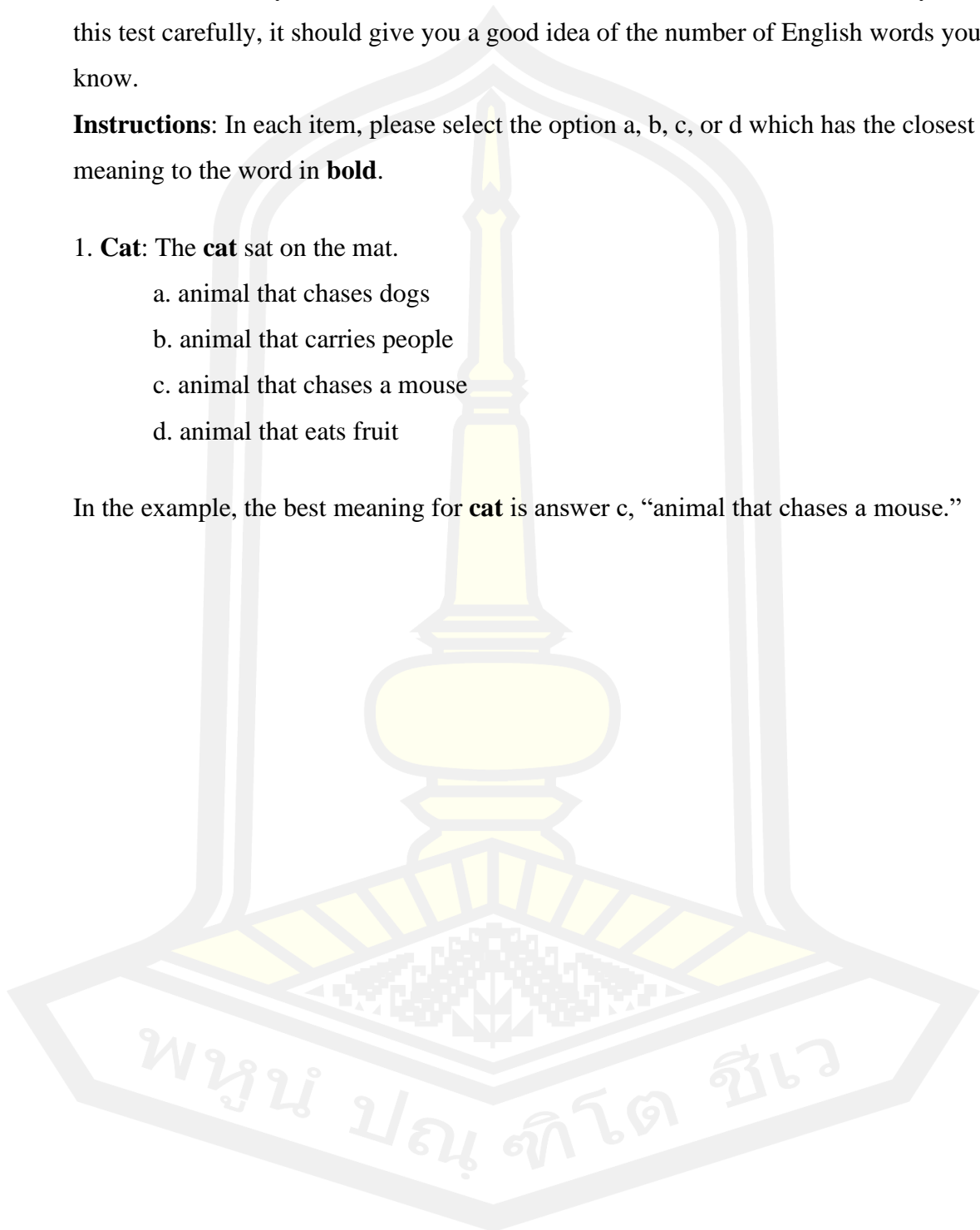
First 1000

1. **See**: They **saw** it.

    a. cut

    b. waited for

    c. looked at

    d. started

2. **Time**: They have a lot of **time**.

    a. money

    b. food

    c. hours

    d. friends

3. **Period**: It was a difficult **period**.

    a. question

    b. time

    c. thing to do

    d. book

4. **Figure**: Is this the right **figure**?

    a. answer

    b. place

    c. time

    d. number

5. **Poor**: We are **poor**.

    a. have no money

    b. feel happy

    c. are very interested

    d. do not like to work hard

6. **Drive**: He **drives** fast.

    a. swims

    b. learns

    c. throws balls

    d. uses a car

7. **Jump**: She tries to **jump**.

    a. lie on top of the water

    b. get off the ground suddenly

    c. stop the car at the edge of the road

    d. move very fast

8. **Shoe**: Where is your **shoe**?

    a. the person who looks after you

    b. the thing you keep your money in

    c. the thing you use for writing

    d. the thing you wear on your foot

9. **Standard**: Her **standards** are very high.

    a. the bits at the back under her shoes

    b. the marks she gets in school

    c. the money she asks for

    d. the levels she reaches in everything

10. **Basis**: This was used as the **basis**.

    a. answer

    b. place to take a rest

    c. next step

    d. main part

Second 1000

11. **Maintain**: Can they **maintain** it?

    a. keep it as it is

    b. make it larger

    c. get a better one than it

    d. get it

12. **Stone**: He sat on a **stone**.

    a. hard thing

    b. kind of chair

    c. soft thing on the floor

    d. part of a tree

13. **Upset**: I am **upset**.

    a. tired

    b. famous

    c. rich

    d. unhappy

14. **Drawer**: The **drawer** was empty.

    a. sliding box

    b. place where cars are kept

    c. cupboard to keep things cold

    d. animal house

15. **Patience**: He has no **patience**.

    a. will not wait happily

    b. has no free time

    c. has no faith

    d. does not know what is fair

16. **Nil**: His mark for that question was **nil**.

    a. very bad

    b. nothing

    c. very good

    d. in the middle

17. **Pub**: They went to the **pub**.

    a. place where people drink and talk

    b. place that looks after money

    c. large building with many shops

    d. building for swimming

18. **Circle**: Make a **circle**.

    a. rough picture

    b. space with nothing in it

    c. round shape

    d. large hole

19. **Microphone**: Please use the **microphone**.

    a.   machine for making food hot

    b.   machine that makes sounds louder

    c.   machine that makes things look bigger

    d.   small telephone that can be carried around

20. **Pro**: He's a **pro**.

    a.   someone who is employed to find out important secrets

    b.   a stupid person

    c.   someone who writes for a newspaper

    d.   someone who is paid for playing sport etc

Third 1000

21. **Soldier**: He is a **soldier**.

    a.   person in a business

    b.   person who studies

    c.   person who uses metal

    d.   person in the army

22. **Restore**: It has been **restored**.

    a.   said again

    b.   given to a different person

    c.   given a lower price

    d.   made like new again

23. **Jug**: He was holding a **jug**.

    a.   a container for pouring liquids

    b.   an informal discussion

    c.   a soft cap

    d.   a weapon that explodes

24. **Scrub**: He is **scrubbing** it.

    a.   cutting shallow lines into it

    b.   repairing it

    c.   rubbing it hard to clean it

    d.   drawing simple pictures of it

25. **Dinosaur**: The children were pretending to be **dinosaurs**.

    a. robbers who work at sea

    b. very small creatures with human form but with wings

    c. large creatures with wings that breathe fire

    d. animals that lived an extremely long time ago

26. **Strap**: He broke the **strap**.

    a. promise

    b. top cover

    c. shallow dish for food

    d. strip of material for holding things together

27. **Pave**: It was **paved**.

    a. prevented from going through

    b. divided

    c. given gold edges

    d. covered with a hard surface

28. **Dash**: They **dashed** over it.

    a. moved quickly

    b. moved slowly

    c. fought

    d. looked quickly

29. **Rove**: He couldn't stop **roving**.

    a. getting drunk

    b. travelling around

    c. making a musical sound through closed lips

    d. working hard

30. **Lonesome**: He felt **lonesome**.

    a. ungrateful

    b. very tired

    c. lonely

    d. full of energy

Fourth 1000

31. **Compound**: They made a new compound.

    a. agreement

    b. thing made of two or more parts

    c. group of people forming a business

    d. guess based on past experience

32. **Latter**: I agree with the **latter**.

    a. man from the church

    b. reason given

    c. last one

    d. answer

33. **Candid**: Please be **candid**.

    a. be careful

    b. show sympathy

    c. show fairness to both sides

    d. say what you really think

34. **Tummy**: Look at my **tummy**.

    a. fabric to cover the head

    b. stomach

    c. small soft animal

    d. thumb

35. **Quiz**: We made a **quiz**.

    a. thing to hold arrows

    b. serious mistake

    c. set of questions

    d. box for birds to make nests in

36. **Input**: We need more **input**.

    a. information, power, etc. put into something

    b. workers

    c. artificial filling for a hole in wood

    d. money

37. **Crab**: Do you like **crabs**?

    a. very thin small cakes

    b. tight, hard collars

    c. sea creatures that always walk to one side

    d. large black insects that sing at night

38. **Vocabulary**: You will need more **vocabulary**.

    a. words

    b. skill

    c. money

    d. guns

39. **Remedy**: We found a good **remedy**.

    a. way to fix a problem

    b. place to eat in public

    c. way to prepare food

    d. rule about numbers

40. **Allege**: They **alleged** it.

    a. claimed it without proof

    b. stole the ideas for it from someone else

    c. provided facts to prove it

    d. argued against the facts that supported it

Fifth 1000

41. **Deficit**: The company had a large **deficit**.

    a. spent a lot more money than it earned

    b. went down a lot in value

    c. had a plan for its spending that used a lot of money

    d. had a lot of money stored in the bank

42. **Weep**: He **wept**.

    a. finished his course

   **b. cried**

    c. died

    d. worried

43. **Nun**: We saw a **nun**.

    a. long thin creature that lives in the earth

    b. terrible accident

    c. woman following a strict religious life

    d. unexplained bright light in the sky

44. **Haunt**: The house is **haunted**.

    a. full of decorations

    b. rented

    c. empty

    d. full of ghosts

45. **Compost**: We need some **compost**.

    a. strong support

    b. help to feel better

    c. hard stuff made of stones and sand stuck together

    d. rotted plant material

46. **Cube**: I need one more **cube**.

    a. sharp thing used for joining things

    b. solid square block

    c. tall cup with no saucer

    d. piece of stiff paper folded in half

47. **Miniature**: It is a **miniature**.

    a. a very small thing of its kind

    b. an instrument to look at small objects

    c. a very small living creature

    d. a small line to join letters in handwriting

48. **Peel**: Shall I **peel** it?

    a. let it sit in water for a long time

    b. take the skin off it

    c. make it white

    d. cut it into thin piece

49. **Fracture**: They found a **fracture**.

    a. break

    b. small piece

    c. short coat

    d. rare jewel

50. **Bacterium**: They didn't find a single **bacterium**.

    a. small living thing causing disease

    b. plant with red or orange flowers

    c. animal that carries water on its back

    d. thing that has been stolen and sold to a shop
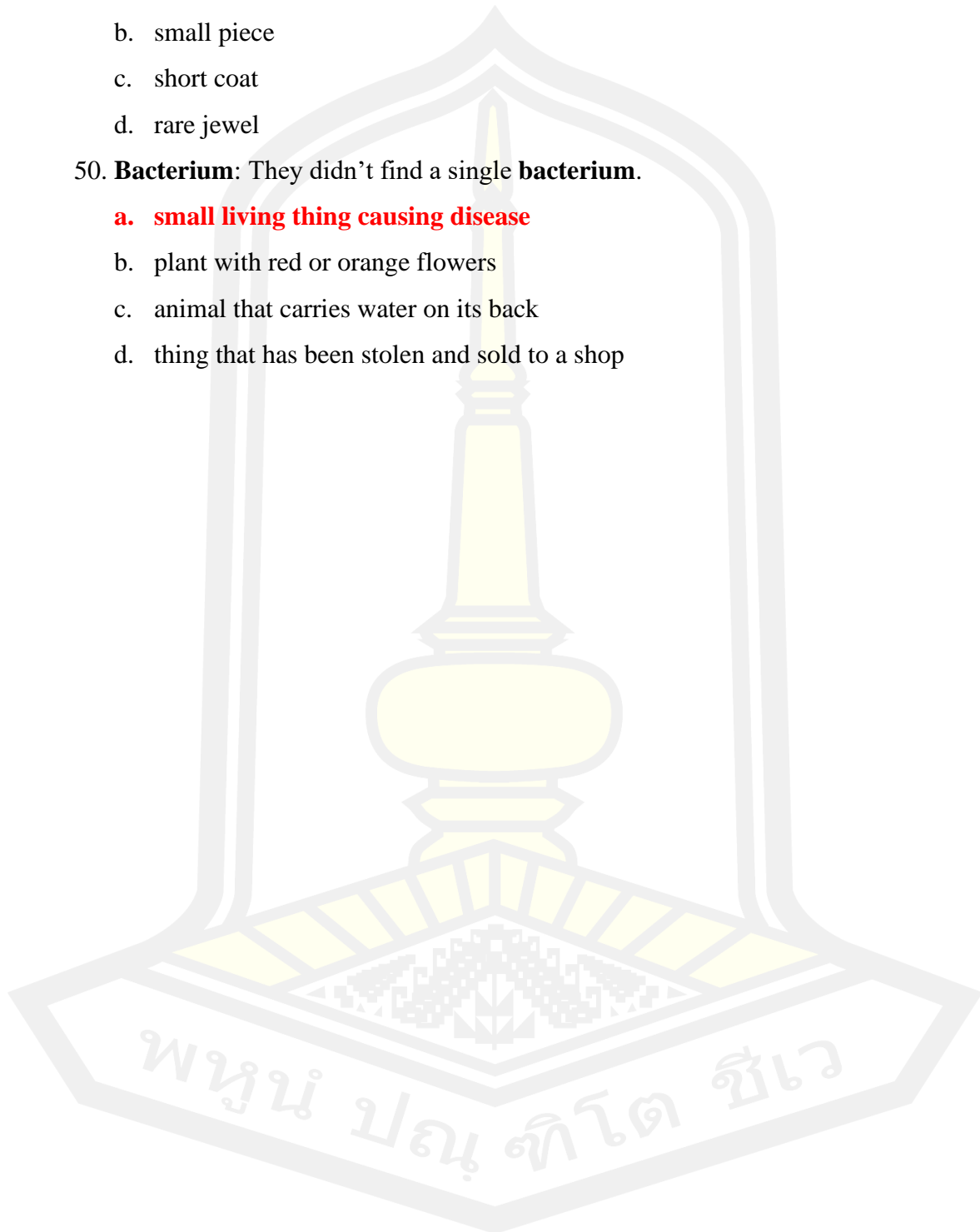
Appendix B: Productive Polysemous Phrasal Verbs Test (PPT)

Instructions: Each item contains two parts (Xa and Xb).

Part Xa presents the meaning sense definition of target PVs, followed by a blank space next to the sentence for writing the phrasal verb word you identify as the missing word (a phrasal verb). To help you, the first letter(s) of each word is/are shown. In part Xb, you are required to write the sentence using the phrasal verb that you provide in part Xa. **Please make sure you read each definition carefully**. There are 20 items in this test.

You have 30 minutes to finish the test. Good luck!

Example sentences:

#	Meaning sense definition	Answer
ia	Go away from, leave (train, bus, aircraft, lift)	*g____o____ (get off)*
ib	*She **gets off** the school bus when it arrives at her house.*	

#	Meaning sense definition	Answer
iia	Become higher in value; increase	*g____u____ (go up)*
iib	*Oil prices **go up** every day.*	

item	Meaning sense definition	Answer
1a	Interrupt somebody as they are speaking	**Cut off**
1b		
2a	Rest in a comfortable position against the back of a seat	**Sit back**
2b		
3a	Invite to a recreational place or social event	**Take out**
3b		
4a	Use STH (or become used) completely so that nothing is left	**Run out**
4b		
5a	Collapse, fail; stop functioning properly (heart, knees)	**Give out**
5b		
6a	Move down to a lower level or position	**Go down**
6b		
7a	Give STH to SB by holding it in one's hand and offering it to them	**Hand over**
7b		
8a	Contain an unwanted physical manifestation (tears, laughter, sigh, sneeze)	**Hold back**
8b		
9a	Move backwards or make SB/STH move backwards	**Pull back**
9b		
10a	Ask SB to do a particular job or task	**Bring into**
10b		

| item	Meaning sense definition	Answer
11a	Divide or separate into categories or smaller components	**Break down**
11b		
12a	Come down from STH; descend (car, horse, tree)	**Get down**
12b		
13a	Move to a better position; advance to a higher level/rank	**Move up**
13b		
14a	Manage to avoid serious trouble or consequences	**Get off**
14b		
15a	Leave a place (room. Building, container) or appear from it	**Come out**
15b		
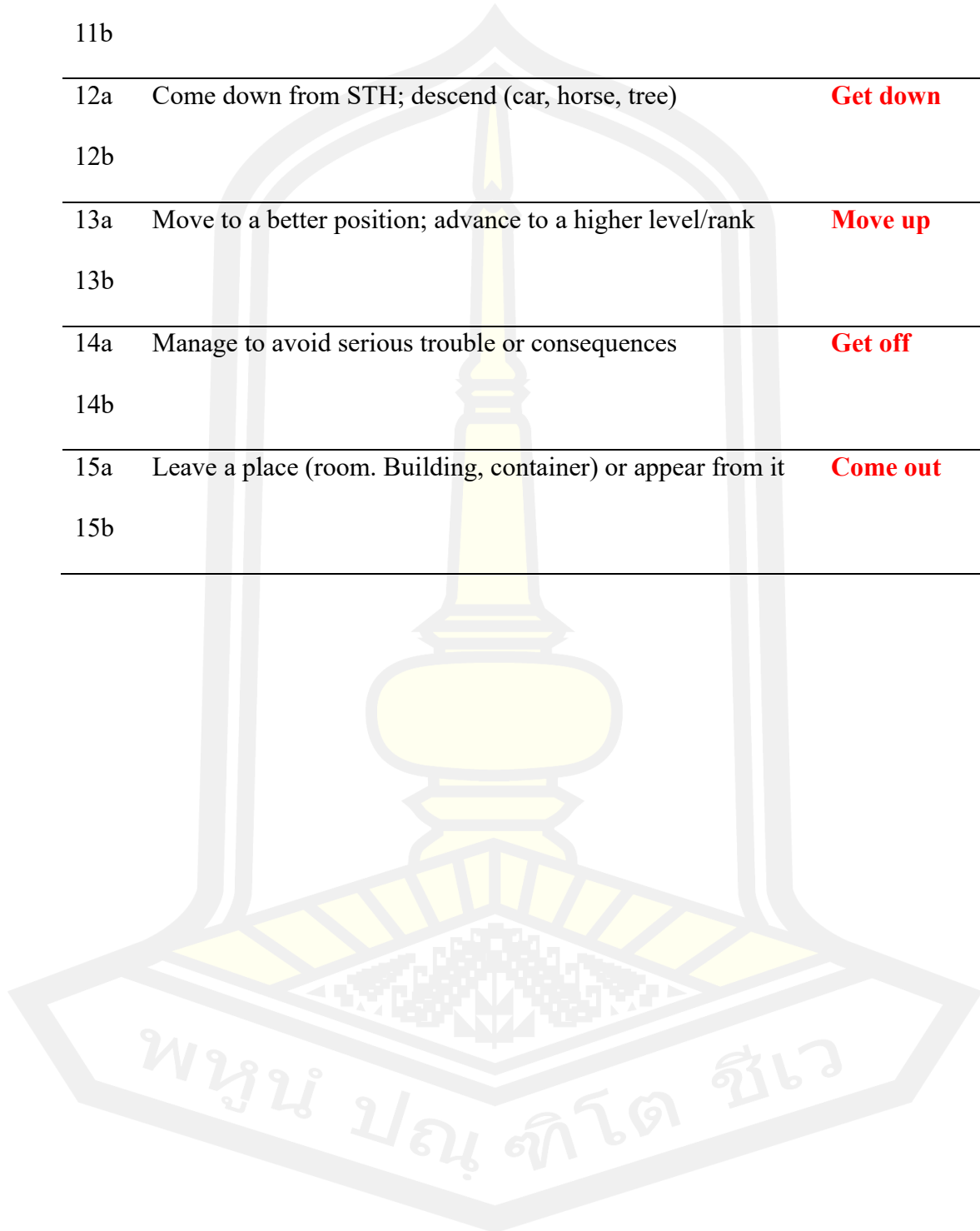
Appendix C: Controlled-Productive Polysemous Phrasal Verbs Test (CPPT)

Instructions: Read each sentence carefully, and then write what you think the missing words (a phrasal verb) are, in the space next to the sentence. To help you, the first letter(s) of each word is/are shown. A definition for each phrasal verb is also given after every sentence. **Please make sure you read each definition carefully**. There are 50 sentences and some of them use the same phrasal verb.

You have 40 minutes to finish the test. Good luck!

Example sentences:

Item	Sentence	Answer
i	Following a disagreement, the government br___ o___ diplomatic relations with China. (***ended***)	*broke off / break off*
ii	He t___ u___ to the meeting half an hour late. (***arrived, appeared***)	*turned up / turn up*
iii	He closed the dictionary and l___ b___ to his notes. (***watched again after watching something else***)	*looked back / look back*
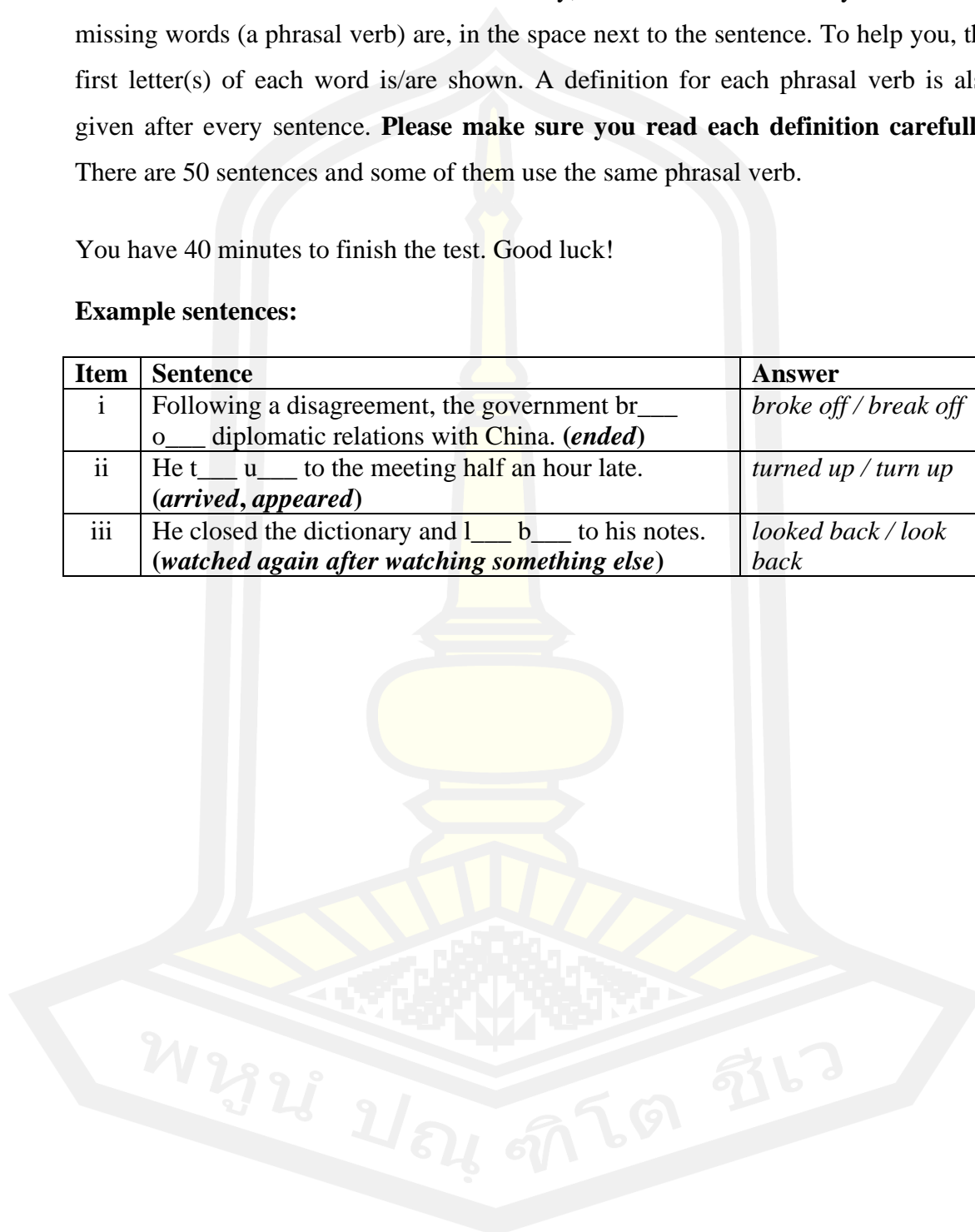
Item	Sentence	Answer
1	Put the chicken on the grill and t___ it o___ a few times. (***bring the bottom to the top or vice versa***)	*Turn over*
2	Their new album will c___ o___ next month. (***be released to the public***)	*Come out*
3	She h___ b___ the laughter with great effort. (***contained, repressed***)	*Hold back*
4	They p___ u___ a few posters on the wall. (***displayed, attached***)	*Put up*
5	After hitting the iceberg, the ship began to g___ d___. (***sink***)	*Go down*
6	She p___ b___ the curtains so the light could come into the room. (***removed***)	*Pull back / pulled back*
7	The storm c___ o___ electricity from the entire town. (***ended the provision of***)	*Cut off*
8	He had been br___ i___ to save the company. (***involved in a situation, introduced***)	*Bring in / brought in*
9	He was asked to cl___ u___ his language during the interview. (***make more acceptable/appropriate***)	*Clean up*
10	Unfortunately we've r___ o___ of biscuits. (***used completely***)	*Run out*
11	We're going to the cinema tonight; you should c___ al___ with us! (***join***)	*Come along*
12	Digestion br___ d___ substances into small molecules. (***decomposes***)	*Break down*
13	I had to t___ o___ a loan to cover all my expenses. (***obtain***)	*Take out*
14	The committee g___ o___ more than 100 copies in the last meeting. (***distributed***)	*Give out / gave out*
15	She turned around to h___ o___ her keys to her husband. (***give, present***)	*Hand over*
16	We should g___ d___ to discussing those issues as soon as possible. (***begin***)	*Get down*
17	People need to c___ o___ and say what they think about it. (***declare publicly***)	*Come out*
18	Security guards tried to h___ b___ the crowd. (***stop***)	*Hold back*
19	She m___ u___ from secretary to senior manager in just a few years. (***advanced, progressed***)	*Move up / moved up*
20	I won't p___ u___ with your bad behaviour for much longer. (***tolerate***)	*Put up*
21	I don't think prices will g___ d___. (***decrease***)	*Go down*
22	The team has g___ o___ to a good start this season. (***begun in a certain way***)	*Get off / got off*
23	G___ d___ on your knees so you can get a better view. (***lower body***)	*Get down*

Item	Sentence	Answer
24	At 95 years of age, her heart finally g___ o___. (*collapsed*, *failed*)	*Give out / gave out*
25	You cannot let a few unmotivated pupils h___ b___ the rest of the group. (*limit potential*)	*Hold back*
26	I didn't expect such an opportunity to c___ al___. (*appear*, *arrive*)	*Come along*
27	You should t___ her o___ to this new Chinese restaurant. (*invite*)	*Take out*
28	She put her hand on his shoulder and m___ it u___ along the back of his neck. (*raised*, *lifted*)	*Move up / moved up*
29	He loves climbing trees but finds it hard to g___ d___. (*descend*)	*Get down*
30	He g___ o___ the bus to school. (*boarded*)	*Get off / got off*
31	I br___ i___ my laptop computer today because my office computer is broken. (*took to a place*)	*Bring in / brought in*
32	The policeman t___ o___ the criminal to the jail guard. (*transferred*, *surrendered*)	*Turn over / turned over*
33	You should p___ o___ your gloves, it's really cold outside. (*wear*)	*Put on*
34	They should not h___ b___ from joining us if they want to. (*refrain*)	*Hold back*
35	Make sure you c___ u___ your room because I won't do it for you. (*tidy*)	*Clean up*
36	The army was forced to p___ b___ due to bad weather. (*withdraw*)	*Pull back*
37	She s___ b___ in her chair and turned on the TV. (*settled*, *rested*)	*Sit back / sat back*
38	Our car b___ d___ yesterday. (*stopped working*)	*Break down / broke down*
39	After the argument, she r___ o___ into the garden and screamed. (*left suddenly/in a hurry*)	*Run out*
40	He tore open the envelope and t___ o___ a few bills. (*extracted*, *removed*)	*Take out / took out*
41	She went into the bank and c___ o___ with some money. (*exited*, *left*)	*Come out / came out*

Appendix D: The Receptive of Polysemous Phrasal verbs Test (RPT)

Instructions: Read each sentence carefully, and then choose the phrasal verb that best completes the meaning of the sentence. To help you, a definition for each phrasal verb is given after every sentence. **Please make sure you read each definition carefully.** There are 50 sentences and some of them use the same phrasal verb.

You have 30 minutes to finish the test. Good luck!

Example sentences:

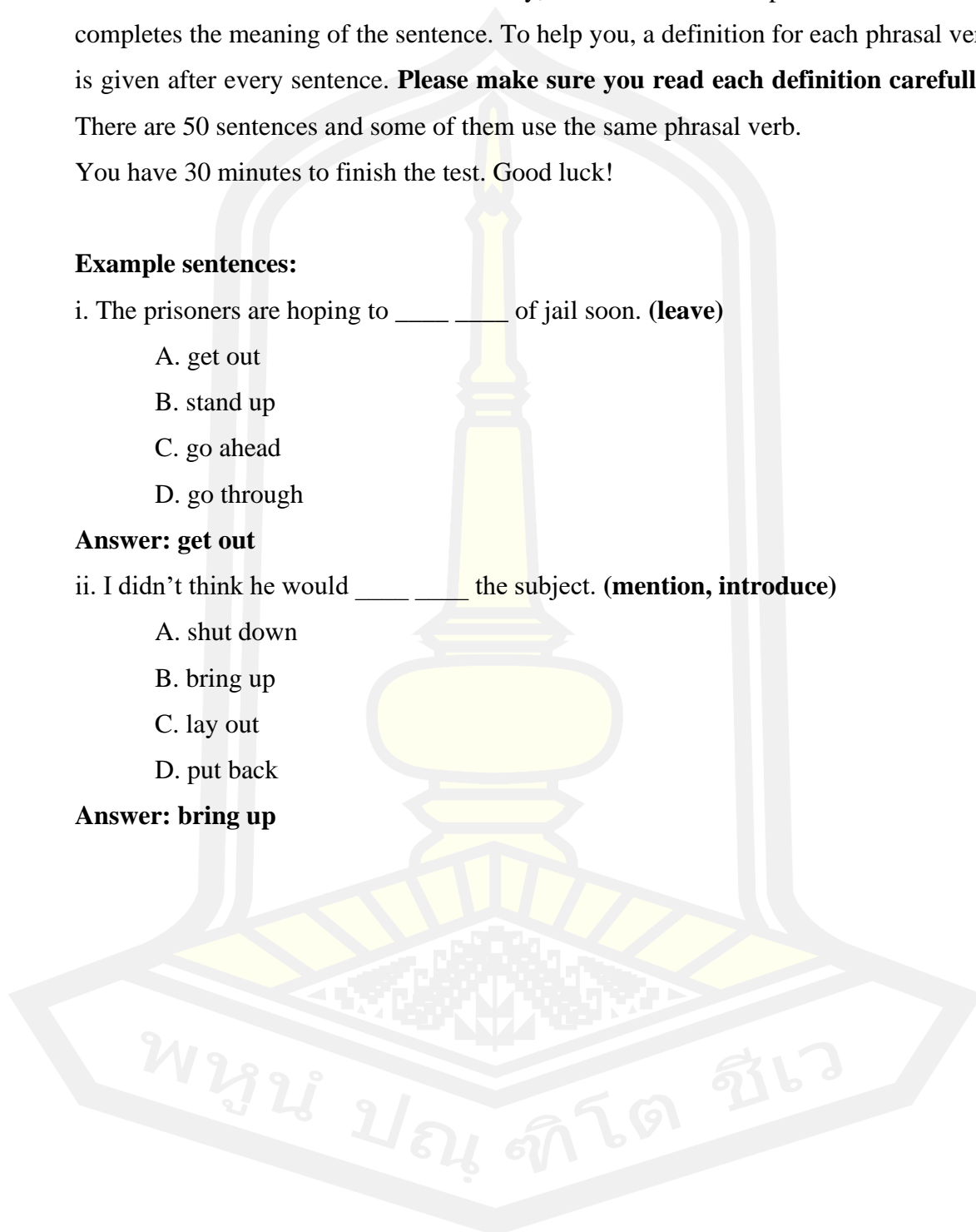i. The prisoners are hoping to ____ ____ of jail soon. **(leave)**

    A. get out

    B. stand up

    C. go ahead

    D. go through

Answer: get out

ii. I didn't think he would ____ ____ the subject. **(mention, introduce)**

    A. shut down

    B. bring up

    C. lay out

    D. put back

Answer: bring up

1. Our water supply has been _____ _____. **(ended the provision of)**

   A. went off

   B. winded up

   C. cut off

   D. hung up

2. Do you think that mixed-ability classes _____ _____ the better students? **(limit potential)**

   A. close down

   B. give back

   C. hold back

   D. move back

3. Our tank and infantry forces _____ _____ to regroup. **(withdrew)**

   A. went out

   B. pulled back

   C. looked around

   D. went in

4. She resigned and _____ _____ to one of her younger colleagues. **(surrendered, yielded)**

   A. handed over

   B. went off

   C. pulled up

   D. winded up

5. He _____ _____ a cheque for $200,000. **(gives, presents)**

   A. takes over

   B. hands over

   C. carries out

   D. pulls out

6. The full story _____ _____ at the trial. **(became known)**

   A. went on

   B. came out

   C. found out

   D. came down

7. Details of the accident were _____ _____ on the nine o'clock news. **(revealed)**

   A. given out

   B. held out

   C. thrown out

   D. opened up

8. _____ the paper _____ and slide it forward. **(remove)**

   A. Put… back

   B. Turn… off

   C. Pull… back

   D. Set… down

9. Could you get some milk? We seem to have _____ _____. **(used completely)**

   A. started out

   B. shut down

   C. run out

   D. shut up

10. She just managed to _____ _____ her anger. **(contain, repress)**

    A. catch up

    B. bring about

    C. hold back

    D. shut up

11. Dorothy _____ _____ her coat and went out **(wears)**

    A. puts on

    B. hangs up

    C. takes on

    D. takes over

12. He gave his first interview since _____ _____ to the role of chairman.

    (advancing, progressing)

    A. coming up

    B. breaking out

    C. moving up

    D. walking out

13. They ____ ____ a new shelf on the wall. **(displayed, attached)**

    A. called out

    B. carried on

    C. set off

    D. put up

14. The kitten climbed the tree, but then couldn't ____ ____ again. **(descend)**

    A. look down

    B. turn back

    C. get down

    D. bring down

15. The police were unable to ____ ____ the crowd. **(stop)**

    A. play out

    B. hold back

    C. go around

    D. put off

16. The crooks were ____ ____ to the police station for questioning. **(taken to a place)**

    A. got out

    B. brought in

    C. worked out

    D. carried out

17. When we gave her the bad news, she ____ ____ and cried. **(yielded to tears or distress)**

    A. put off

    B. broke down

    C. looked down

    D. went over

18. I've got a lot of work to do, but I can't seem to ____ ____ to it. **(begin)**

    A. build up

    B. write down

    C. get down

    D. send out

19. You can't just ____ ____ and wait for job offers to come to you. **(take no action)**

    A. pass on

    B. sit back

    C. set down

    D. give back

20. You may ____ ____ your exam papers now. **(bring the bottom to the top or vice versa)**

    A. wind up

    B. turn over

    C. look down

    D. go off

21. The temperature ____ ____ to minus ten last night. **(decreased)**

    A. went down

    B. got in

    C. took off

    D. gave up

22. I'm going to ____ ____ in here this afternoon. **(tidy)**

    A. settle down

    B. pass on

    C. clean up

    D. go over

23. He ____ ____ on his knees and starts praying. **(lowers body)**

    A. lines up

    B. gets down

    C. sets about

    D. sets off

24. Our car ____ ____ and we had to push it off the road. **(stopped working)**

    A. got out

    B. came off

    C. broke down

    D. filled out

25. The team has ____ ____ to a good start this season. **(begun in a certain way)**

    A. gone ahead

    B. brought back

    C. caught up

    D. got off

26. I would like you to ____ ____ with me to the opera. **(join)**

    A. come along

    B. go through

    C. hang out

    D. move in

27. When does their new album ____ ____? **(be released to the public)**

    A. end up

    B. bring out

    C. come out

    D. close down

28. You need to take the pink bus and ____ ____ at the next station. **(leave the bus)**

    A. step back

    B. get off

    C. get up

    D. take up

29. She ____ ____ in her chair and started to read. **(settled, rested)**

    A. moved out

    B. moved back

    C. sat back

    D. sat up

30. She ____ her parents ____ for dinner. **(invited)**

    A. stepped….back

    B. brought….down

    C. got….in

    D. took….out

31. The office ____ ____ financial advice to students. **(distributed)**

   A. set down

   B. gave out

   C. checked out

   D. lay down

32. I have to ____ ____ some money for the weekend. **(obtain)**

   A. get through

   B. take out

   C. write down

   D. bring about

33. They had to ____ ____ two of his teeth. **(extract, remove)**

   A. take out

   B. blow up

   C. carry on

   D. turn off

34. Experts were ____ ____ to advise the government. **(involved in a situation, introduced)**

   A. summed up

   B. taken on

   C. brought in

   D. got up

35. I want to tell him the truth, but something ____ me ____. **(refrains)**

   A. goes…. back

   B. stands.…up

   C. comes…. down

   D. holds…. back

36. He got into the school and ____ ____ with his son. **(exited, left)**

   A. came out

   B. worked out

   C. brought up

   D. pulled up

37. When the sun ____ ____, it goes below the horizon. **(moves to the lower level)**

    A. shuts down

    B. puts back

    C. goes down

    D. slows down

38. In her speech, the senator ____ ____ in favor of a change in the law. **(declared publicly)**

    A. gave back

    B. came out

    C. come about

    D. carried on

39. He had his finger ____ ____ in an accident at work. **(removed)**

    A. cut off

    B. sat up

    C. sent out

    D. picked out

40. Sugar and starch are ____ ____ in the stomach. **(decomposed)**

    A. filled in

    B. got through

    C. broken down

    D. walked out

41. After getting what they wanted, the thieves ____ ____ the store. **(left suddenly/in a hurry)**

    A. ruled out

    B. shut down

    C. ran out

    D. went around

42. Jackson approached her, and she nearly ____ ____ into his arms. **(collapsed, failed)**

    A. turned off

    B. blew up

    C. gave out

    D. turned down

43. They've ____ ____ a new tent after the previous one was ruined by the strong wind. **(built)**

    A. put up

    B. sent out

    C. blown up

    D. broken out

44. Can you please ____ the boxes ____ to the second shelf? **(raise, lift)**

    A. blow….up

    B. move….up

    C. rule….out

    D. take….on

45. We were ____ ____ in the middle of our conversation. **(interrupted abruptly)**

    A. hung on

    B. cut off

    C. called out

    D. held on

BIOGRAPHY

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