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EFL VOCABULARY LEARNING
THROUGH CODESWITCHED
READING TASKS

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A THESIS SUBMITTED IN FULFILMENT OF THE
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ABSTRACT

Research in second language vocabulary acquisition has generally recommended a combination of extensive reading with explicit instruction as part of a thorough vocabulary intervention programme. However, a gap remains between research and its pedagogical application to task design and materials (Chacón-Beltrán, Abello-Contesse and Torreblanca-López, 2010). A study by Macaro and Mutton (2009) shows that the use of graduated codeswitched texts with strategy instruction is more effective in raising successful inferencing than relying on graded readers. Nevertheless, there are no previous studies done on the effects of codeswitched reading tasks in second language vocabulary learning. This study investigates the use of codeswitched texts in enhancing L2 learners' lexical inferencing and lexical recall of target words. A treatment group of EFL learners exposed to codeswitched texts is compared with another group of EFL learners exposed to graded readers in terms of receptive and productive vocabulary measured by a modified Vocabulary Knowledge Scale and recall of target words assessed by retrieval-retention tests. Statistical findings were triangulated with protocol analyses of concurrent think alouds. Quantitative and qualitative results show that the treatment group outperformed the control group in successful lexical inferencing and retention-retrieval, with proficiency as a second influencing variable. Metacognitive skills in evaluating and monitoring semantic hypotheses are also found to be crucial in increasing accurate guesses. Specifically, knowledge of claim types and local discourse coherence are knowledge sources used to arrive at successful semantic hypotheses. This study recommends that codeswitching reading tasks, as a less

intensive vocabulary strategy, be incorporated in a comprehensive ESL vocabulary intervention programme.

DEDICATION

I dedicate this dissertation draft to my Lord and Saviour, Jesus Christ.

I am deeply indebted to my main supervisor, Associate Professor Lawrence Jun Zhang, and my co-supervisor, Professor Judy Parr.

I thank my loving parents, sister and family for their support and encouragement through arduous times.

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CHAPTER ONE

INTRODUCTION

1.1. Chapter Overview

This chapter begins by establishing the research territory in vocabulary second language acquisition (SLA), codeswitching, cognitive/experimental psychology, neuroscience and advertising research that is relevant to the study at hand. It then portrays the research niche or lacuna warranting the research worthy of this study by indicating that the potential pedagogical usefulness of codeswitched (CS) reading texts in vocabulary development is a research gap in vocabulary SLA research which this study aims to fill. Importantly, potential modulating effects of codeswitched reading on retention-retrieval is a novel gap in cognitive psychology and SLA which the present study addresses. A detailed rationale and significance of the study are expounded subsequently. The research niche is then addressed by the explication of research questions, a brief adumbration of the theoretical position and methodology, and an operationalisation of concepts and terms used in the research.

1.2. Relevant Knowledge Territory and Research Niche of the Study

Despite the apparent differences between L1 and L2 acquisition, both are inextricably intertwined in language processing as there is conceptual transfer from L1 to L2 learning in L2 bilinguals (MacWhinney, 2008). MacWhinney elaborates that conceptual transfer is seamless via translation linkages between L1 and L2. He states that L2 learners can accomplish accelerated initial progress by mapping L2 words en masse onto L1 concepts. Jarvis (2009)

contends that there are complex mental links between lexemes of varying strengths from both languages depending on cross-linguistic semantic similarity and frequency of use. Kroll and Stewart (1994) propose that L2 weak learners tend to rely initially on lexical links or similarities in word representations between similar languages to access concepts when confronted with unfamiliar L2 words before developing direct L2 conceptual connections. Kroll and Stewart's (1994) revised hierarchical model (RHM) of bilingual memory organisation postulates that at the genesis of L2 vocabulary learning, the lexical link between the L2 word and the corresponding L1 word is stronger than the link between the concept and the new word (see Chapter 3 for a detailed discussion of RHM).

However, L2 conceptual links are stronger in advanced learners than their less proficient counterparts (Kroll & Stewart, 1994). The model is corroborated by recent research which shows that there is a common non-language specific conceptual store in bilinguals who develop automatic cross-linguistic semantic links between noncognates (e.g., Ameel, Malt, Storms, & Van Assche, 2009; Perea, Duñabeitia, & Carreiras, 2008). Furthermore, the model is affirmed by Jiang (2000) who found that for weaker learners, L1 lemma, or the semantico-syntactic information of a L1 word as defined by Levelt (1989), mediates the semantic content of a L2 word where L2 phonological/orthographical form of the word is matched with the corresponding L1 lemma. In other words, an L2 learner accesses the conceptual information of an L2 word by matching it with the semantic information of the corresponding L1 word. The L1 lemma mediation can be seen as the conduit to eventual L2 semantic representation.

The advantage of this lexical transfer between languages is the acceleration of L2 semantic development (Jiang, 2002, 2004b). Evidence for L1 transfer in L2 lexical inferencing is consistently reported in antecedent literature demonstrating automatic meaning activation in both languages (e.g., Wesche & Paribakht, 2010). A recent event-related potential (ERP) study by Li, Fan, Sun, Wang and Mo (2012) found that such dual activation of languages is more so for the proficient non-target language or L1 during conceptual decision tasks, which supports the L1 lemma mediation model. Nevertheless, such a direct matching may not fully capture the nuances of the conceptual meaning of the L2 word, resulting in transliteration and eventual fossilisation of L2 lexical development. Not all L1 words have corresponding L2 translations and not all L1 translations have the exact 'semantic overlap' with L2 words (Jiang, 2000), where the relationships and overtones that L2 words carry are omitted as a result of direct translation (Cook, 2008).

Currently, there is a dichotomous divide in L2 intentional vocabulary tasks (see Chapter 2, p. 31 for R. Ellis's (2008) definition of intentional learning), between employing a word association approach, where direct translation of L2 words to L1 words is encouraged and provided in glosses on the text margins, and the contextualised approach, where the conceptual meanings of L2 words are speculated based on the contextual cues found in L2-medium texts. The disadvantages of both strategies are apparent from prior empirical studies. The translation method facilitates understanding of L2 words readily with L1 concepts but research has shown that it is less effective in enhancing lexical retention-retrieval than the contextualised approach (e.g.,

Hulstijn, Hollander, & Greidanus, 1996). Also, L1 translations are not sensitized to semantic prosody as there may not always be exact one-to-one semantic correspondences between languages and this may result in the lexical fossilisation of L2 as mentioned by Jiang (2002, 2004b). On the other hand, the contextualised approach in encouraging the inference of L2 conceptual word meanings from context presented in L2-medium texts may not be within the competent reach of L2 learners (Jiang, 2002), depending on the ability to construct local discourse meaning (Koda, 2007). Thus, there is a need for an effective vocabulary strategy that draws on the strengths of the two fore-mentioned strategies and minimizes the impact of their shortcomings.

The proposed study will examine the role of code-switched reading tasks in L2 vocabulary teaching, which is posited as a hybrid intentional vocabulary method to the two previously mentioned strategies. Codeswitched or code-paired reading texts refer to written information presented in late bilinguals' L1 with a few lexical items expressed in another language or L2. L2 words are situated in L1 texts, where ESL learners are linguistically more able to infer the conceptual meanings of L2 words through context as presented in L1, where contextual information is argued to be comprehensible input to L2 learners, whereas the same information presented in L2-medium may not be so to some L2 learners. Word contexts presented in the L1 produce meaning-bearing comprehensible input, which Barcroft (2004) stipulates as a principle in presenting new words to learners. Furthermore, Tsui (2004) attests that the "rich linguistic resources of the mother tongue" (p. 162) are crucial in the semantic enrichment of learning L2 words where the schemata of students are

accessed to bridge the learning of L2 words in context made familiar to them by their mother tongue or L1. The optimisation of L2 learning via the exclusive employment of L2 in classrooms with EFL learners whose L1 is shared has not been shown in antecedent studies, as Macaro (2001) pointed out.

1.3. Rationale and Significance of the Present Study

As mentioned briefly in the preceding section of this chapter, CS texts fulfill a principle of effective second language vocabulary instruction emphasised by Barcroft (2004) which is to “use meaning-bearing comprehensible input when presenting new words” (p. 204). Comprehensible word contexts are a prerequisite of form-meaning connections. Krashen’s (1985) $i + 1$ hypothesis states that language acquisition entails input that is slightly above one’s current competence. As previously discussed, the contextualised approach in encouraging the inference of L2 conceptual word meanings from context presented in L2-medium texts may not be within the competent reach of L2 learners (Jiang, 2002) as ESL/EFL learners need to know the majority of the words surrounding target words in order to guess target word meanings successfully (Nagy, 1997). Presenting word contexts in L1 increases comprehensibility and aid lexical inferencing.

Another advantage of this code-paired approach as a vocabulary-specific activity is the accelerated network-building of L1 words semantically related to a L2 word, which is more effective at capturing the fine nuances or semantic prosody of L2 word meanings vis-à-vis a directly translated L1 word as advocated by the word association method. Network-building refers to the

construction of word groups linked contextually and semantically (Aitchison, 1994; Mead, 1996). It is argued that a single L1 word may not efficiently and sufficiently capture the semantic information of the targeted L2 word. The interpretation of L2 lexical content is not rigidly tied to a single L1 lemma but is constructed collectively by semantically linked L1 words. Lexical meanings are constructed via the propinquity of collocates (Xiao & Mcenery, 2006).

Also, the reader needs to undergo deep processing by inferring the conceptual meanings of L2 from context expressed in L1 rather than being provided the L1 translations. Previous studies that investigated factors influencing human memory found that long-term retention of lexical items is enhanced when there is occurrence of deep or elaborative processing of information or encoding of conceptual meanings, corroborating Craik & Lockhart's (1972) Levels of Processing (LOP) framework (e.g., Craik & Tulving, 1975; Hulstijn, 1992; Newton, 1995). It is empirically evident that sophistication of encoding and distinctiveness of trace are correlated factors in long-term recall (Matlin, 2008). A claim made by Atkinson and Shiffrin's (1968) influential multi-store human memory theory that novel or distinctive input receives priority in being stored has been consistently corroborated in reported empirical literature (Ahn & Ferle, 2008; Domzal, Hunt, & Kernan, 1995; Kaufman-Scarborough 2001). Illustratively in advertising discourse or advertisements, it is argued that brand names are processed and retained for their distinctive characteristics of script rather than their semantic meanings (Ahn & Ferle, 2008; Elias & Perfetti, 1973). A brand name presented in a L2 or foreign language would be a novel and distinctive stimulus – L2 or foreign

words situated in L1-medium texts tend to stand out (Bishop, 2006; Bishop & Peterson, 2010; McClure, 2001; Montes-Alcala, 2001). Furthermore, memory retention of lexical items as salient codeswitched elements in texts is enhanced relative to the same lexical items in strictly monolingual texts (Bishop, 2006; Bishop & Peterson, 2010), similar to typographical cues in text which enhances recall of cued textual information with minimal impact on recall of non-cued information (Gaddy, Van den Broek, & Sung, 2001).

It is hypothesized that like typographic cues, codeswitched elements may increase the level of attention that readers pay to them. If such codeswitched texts are related to L2 learners' development of automaticity in terms of their memory, retention and retrieval of L2 lexical items, then the pedagogical implications are obvious, especially if L2 learners' retrieval performance can be enhanced (Zhang, 2002). The findings of this study may have pedagogical implications for the existing ESL/EFL teaching method of employing graded readers or L2-medium texts. Code-switched texts may aid EFL learners in the development of automaticity in L2 language processing and the inferential process of L2 lexical meanings.

Reading experts agree that the process of reading is best described as an interactive model of top-down and bottom-up processes (e.g., Grabe, 2009; Urquhart & Weir, 1998). When an unknown word is encountered, a new form-meaning connection is formed via bootstrapping strategies like gleaning clues from morphological and syntactic information about the grammatical category, word meaning components, grammatical role among others in combination

with cues found within the immediate sentence, or proximate sentences and the thematic context. However, successful lexical inferencing is achieved by top or global strategies like guessing word meanings from context instead of bottom cues like syntactic and morphological features of words (Hamada & Park, 2011). Qian (2004) found that the most preferred strategy in dealing with unknown words is to guess their meanings from the context. CS reading would facilitate contextual guessing with comprehensible input.

The current study adopts the Modified Hierarchical Model of Bilingual Memory Organisation (MHM) which is a hybrid model built on the strengths of the connectionist-oriented information processing approach (Distributed Feature Model, see De Groot, 1992a, 1992b, 1993) and symbolist approach (Revised Hierarchical Model, see Kroll & De Groot, 2005; Kroll & Stewart, 1994). The Revised Hierarchical Model is regarded as a seminal psycholinguistic model accounting for bilingual memory development via lexical and conceptual connections (N. Ellis, 2008; Pavlenko, 2009). The underlying contribution of RHM is in articulating the developmental process of lexical and conceptual connections in the bilingual memory organisation and was initially proposed as an intermediate model between the word association and conceptual mediation hypotheses by Potter, So, von Eckardt and Feldman (1984). Language specific lexicons are discrete and linked to a shared conceptual or semantic store. RHM incorporates Potter et al.'s (1984) Developmental Hypothesis, which postulates that lowly proficient L2 learners tend to use L1 as a medium between L2 and the underlying conceptual store while highly proficient learners are able to access the conceptual store directly

with L2 although they also rely on the L2-L1 translation path. It is also assumed that the L1 lexicon is larger than the L2 lexicon as L2 bilinguals are generally familiar with more L1 vocabulary than L2 words (Altarriba & Mathis, 1997). The question is whether low and intermediate learners would benefit more from intentional vocabulary gains from the use of codeswitched texts than advanced learners who are able to access the conceptual store directly with L2. Jiang's (2000) L2 Lexical Representation and Development Model (LRDM, see Chapter 3 for a detailed discussion of the model), which incorporates RHM in its theoretical framework, proposes that weaker learners would rely more on lexical links with the L1 to access concepts than their advanced peers. The latter may develop direct L2 conceptual connections although Jiang (2000) is pessimistic of an extensive development of a separate L2 lexicon. He suggests that most words known by even advanced bilinguals would stabilise at a "hybrid-entry stage" or L1 lemma mediation stage when a L2 word blends L2 form information with L1 semantic and syntactic information. Jiang and Forster (2001) even suggest that L2 words are stored in episodic memory where there is a lack of semantic development. Furthermore, Kroll and De Groot (2005) and Kroll and Stewart (1994) argue that the link between L2 lexicon and the conceptual system remains comparatively weak even in highly proficient learners based on evidence of asymmetrical connections from Stroop tasks which show conceptual interferences from the L1 (e.g., Tzelgov, Henik & Leiser, 1990). Stroop tasks involve a stimulus and a participant's response or reaction to it – the time taken to react to the stimulus could be an indication of interference if the reaction time is atypically substantial.

Adding to the pessimism is the recent finding by Dimitropoulou, Duñabeitia and Carreiras (2011) that L2 proficiency does not reduce the asymmetry of stronger L1-L2 translation than L2-L1 translation. They concluded that symmetric masked translation priming effects entail native-like proficiency. In Dimitropoulou et al.'s (2011) study, masked translation priming symmetry refers to a lack of difference in reaction times in lexical decision tasks across two translation directions (L1→L2 or L1 primes and L2 targets, and L2→L1 or L2 primes and L1 targets). Contrarily, Altarriba and Mathis (1997) found that for beginning learners to learn L2 vocabulary, both conceptual and lexical links are developed for L2 words after just one initial session of exposure to L1-L2 translation pairs and receptive vocabulary tasks. However, they noted that the conceptual connections found in L2 learners can be seen as L1 lemma mediated links (Jiang, 2000, 2002, 2004b). They argued that it is actual lexical knowledge that varies from word to word rather than broad language proficiency per se that differentiates learners according to lexical and conceptual development. Similarly, Chen (1990) found that beginning learners showed that they can conceptually mediate L2 words via L1 lemmas after about thirty minutes of learning an unfamiliar language. However, direct L2 conceptual links may be tenuous. In a conceptual decision task which Chinese-English bilinguals were exposed to a list of English and Chinese vocabulary which are discrete words and not translation equivalents, participants exhibited a N400 peak delay in the ERP readings while making decisions on whether the displayed word represents a living or non-living thing; Participants processed English words even as they were told to ignore them when English was the non-target language (Li et al., 2012). Li et al. (2012)

inferred that this delay was attributed to the participants' lower proficiency in English than in Chinese and that participants can process the non-target language (English in this case) during conceptual tasks. However, results by Chen and Leung (1989) and Kroll and Curley (1988) suggest that bilinguals generally take about two years of L2 instruction before they could attain direct L2 conceptual access.

Another criticism of RHM is that not all L2 words can be mapped directly one-to-one onto L2 equivalents as cross-linguistic semantic correspondence is not extended to all words so the underlying conceptual store cannot be perfectly shared by two language systems (Pavlenko, 2009). The Distributed Feature Model (DFM) reflects empirical evidence of bilinguals' relative ease in translating concrete words and cognates compared to translating abstract words. However, it does not account for the developmental process of acquiring partial translation equivalents, prototype and context-dependent effects on inferencing of unknown L2 words, and conflation of cross-linguistic strengths and concreteness (Pavlenko, 2009). The MHM takes into account recent criticisms of RHM and DFM and presents a more coherent and comprehensive model (see Chapter 3 for a detailed treatment of MHM). A caveat to this approach is detailed in Chapter 3. This study addresses the question of conceptual development of L2 words and whether low-proficient learners develop conceptual links from an intentional reading task. Also, the study addresses whether employing the L1 is a facilitating contextual resource for inferring L2 target words (TWs). This study's TWs are lexicalised in

Chinese or L2 words which share full or partial semantic equivalence with their L1 counterparts.

This study also adopts Jiang's (2000, 2002) LRDM or the L1 lemma mediation model, which is built on earlier symbolist models, namely Kroll and Stewart's RHM and Levelt's (1989) model of lexical representation. Levelt's model proposes that each root word has a lexical entry in the mental lexicon. The lexical entry consists of four linguistic information types in two layers – semantic and grammatical features in the lemma layer which corresponds to the conceptual connections in RHM/MHM, and morphological and orthographic/phonological features in the lexeme layer which relates to the lexical links posited in RHM/MHM. Jiang argues that lexical development consists of three progressive stages. At the first stage, L2 lexical entry contains only formal specifications and is mapped onto L1 translations, not to direct meanings. This implies that L2 learners rely on L1 translations for access to word meanings in L2, likely done through a bilingual dictionary. Gradually due to repeated exposure, the L1 lemma layer is integrated with the L2 lexeme layer in the L2 lexical entry. L2 words are now mapped onto L1 meanings, and not L1 lexical entries. This differs from the conceptual mediation model as the lemma mediation model implies that the conceptual store does not have a L2-specific conceptual store but only a L1-specific conceptual system. However, Jiang posits that L2 direct conceptual mediation is possible albeit restricted to a very small pool of words as the final stage of second language development. The novel aspect of MHM which distinguishes it from RHM/LRDM is that the former postulates that the conceptual system contains both L1 conceptual

features and L2 conceptual features and a third category of shared semantic features. In essence, MHM is a theoretical compromise that accommodates the various postulations of RHM, LRDM and DFM (see Chapter 3 for a detailed treatment of the theoretical models).

1.4. Research Objectives

This study used an eclectic methodology which culled data from questionnaires, reading and vocabulary tests and introspective think-aloud protocols – essentially, a mixed methods approach (Creswell, 2009; Creswell & Clark, 2006; Doñrnyei, 2007). The justification of the methods used is detailed in Chapter 4. The methods are symbiotic and their findings were triangulated to increase data validation. Methodologically, the study’s design consisted of two major components – a lexical inferencing component that is designed in an intentional mode while the lexical retention-retrieval component is designed in an incidental mode (see Chapter 2, p. 30, for definitions of intentional and incidental learning).

This study has three research objectives. Firstly, this study aims to investigate the efficacy of codeswitched texts in raising successful lexical inferencing in comparison to graded readers. Student participants will be organised into two groups, namely the experimental or treatment group which reads the codeswitched texts, and the comparison group which reads the graded readers. Related to the first research objective, the study also aims to compare the lexical guessing performance of the student participants according to their receptive knowledge levels. To facilitate the comparison, the student

participants in each of the two groups will be further categorised according to three ability sub-groups based on their receptive vocabulary knowledge levels, namely high-ability, middle-ability and low-ability.

The second research objective of this study is to investigate the efficacy of codeswitched texts in raising lexical retention-retrieval in comparison to graded readers. The experimental group will receive the treatment condition of reading codeswitched texts while the comparison group will receive graded readers. ESL student participants will need to recall the target words and their meanings in an immediate recall test and a delayed recall test. Related to the second research objective, the study also aims to compare the recall performance of the student participants according to their receptive knowledge levels. To facilitate the comparison, the student participants in each of the two groups will be further categorised according to three ability sub-groups based on their receptive vocabulary knowledge levels, namely high-ability, middle-ability and low-ability.

The third research objective is to investigate the extent of successful lexical guessing of English target words which lack one-to-one meaning equivalence in Chinese (the ESL learners' mother tongue). Such L2 words which lack semantic equivalents in L1 are called non-lexicalised words while L2 words which have semantic equivalents in L1 are called lexicalised words (Chen and Truscott, 2010).

1.5. Summary

Second language vocabulary acquisition underlies the heart of successful language learning (De Groot, 2012; Folse, 2006; Chacón-Beltrán, Abello-Contesse, & Torreblanca-López, 2010). Hence, the importance of vocabulary acquisition research in second language learning cannot be understated. Recent survey findings by Macaro (2003) and Knight (1994) and anecdotal findings by Zhou (2010) and Pan and Xu (2011) who are ESL teachers teaching in universities in China indicated that second language learners rated vocabulary as their topmost concern which pedagogical language research should address. However, Macaro (2003) noted that vocabulary learning as a discrete and structured activity is surprisingly lacking in most foreign-language programmes. It is posited in this study that code-switched reading tasks can be an effective vocabulary-specific activity facilitating lexical inferencing success and retention.

While vocabulary gains derived from exposure of words through extensive reading have been extolled by researchers (e.g., Grabe, 2009; Stanovich, 1999), there are countering views that L2 learners' limited vocabulary size reduces incidental gains from extensive reading while direct vocabulary instruction is more effective than extensive reading in L2 vocabulary acquisition (e.g., Laufer, 2005, 2010). Yet, it is hard to dismiss the practical concern that form-focused instruction (FFI) or deliberate teaching is severely limited by time constraints and that the crucial need for L2 learners to develop large vocabularies so as to develop proficiency remains unaddressed by instruction alone (Macaro, 2003). This study proposes a modified intentional

reading and vocabulary task using codeswitched texts that present running words in L1 to ensure lexical coverage for learners who in turn would use the more accessible co-text in lexical inferencing of unknown L2 words. A reading task scaffolded for intentional vocabulary acquisition would accelerate vocabulary growth. Also, it is postulated in this study that presenting unknown L2 words by embedding them in L1 running text assists in lexical inferencing and raises retention. It is further posited that codeswitched reading would encourage inferencing behavior. Codeswitched reading tasks would be supportive and complementary to direct vocabulary instruction. Grabe (2009) and Waring and Nation (2004) among others assert that extensive reading and planned lexical instruction forms a symbiosis for vocabulary acquisition. I propose that codeswitched reading is a more effective variant of extensive reading for lexical development which would be invaluable for second language vocabulary learning and curricular design.

The organisation of this thesis is structured as follows: a thorough literature review of major research areas relevant to the research objectives is presented in Chapter 2 before an explication of the underlying theoretical approaches that this study subscribes to in Chapter 3. Chapter 4 contains a detailed account of the methodology and analysis employed. A presentation of the results follows suit in Chapter 5, and a critical discussion of the results is detailed in Chapter 6. A penultimate summary of main findings and pedagogical implications and recommendation for future research precedes concluding remarks and limitations of the study in Chapter 7.

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

2.1. Chapter Overview

This chapter is a review of relevant literature that underlies the two measures of vocabulary acquisition, namely, successful lexical inferencing and lexical retention-retrieval. It opens with a discussion of the conceptual dichotomies of implicit/explicit learning and incidental/intentional vocabulary learning and the differences between the two dichotomies, and how they define the research design of the study. Explicitness relates to all forms of vocabulary learning; incidentalness relates to lexical retention-retrieval while intentionality relates to lexical inferencing. This is followed by a review of codeswitched texts used in vocabulary learning to date and how it relates to lexical inferencing and lexical retention-retrieval; other factors of successful lexical inferencing in prior studies will be reviewed as well.

2.2. Explicit Learning

According to Hulstijn (2013), the implicit/explicit learning dichotomy refers to the “unconscious and conscious learning of facts or regularities in the input materials to which subjects in learning experiments are exposed.” (p. 2638). However, Hulstijn states that the implicit/explicit terms are no longer critical constructs in language learning theories after the behaviorist learning paradigm was superseded by the cognitive revolution or cognitive science which includes the birth of cognitive psychology in the 1950s decade. Nevertheless, it can be seen that vocabulary learning is an explicit and

conscious process which can be measured and experimentally observed. Explicit learning is further defined by N. Ellis (1994) as a "...conscious operation where the individual makes and tests hypotheses in a search for structure...explicitly through selective learning (the learner searching for information and building then testing hypotheses), or, because we can communicate using language, explicitly via given rules (assimilation of a rule following explicit instruction)" (p. 1-2). Thus, explicit learning entails attention to or noticing of information - a view also held by other cognitive psychologists and linguists (e.g., Schmidt, 1994, 2000; Pulido, 2007a). It is worthwhile to note that while attention is crucial for explicit learning and less so for implicit learning, explicit learning is clearly differentiated from implicit learning by the former's relatively higher level of operational consciousness vis-à-vis the latter.

In relation to L2 vocabulary learning, Laufer and Hulstijn (2001) among others attest that learning semantic meanings and connecting form-meanings are exclusively done consciously and attentionally. Schmidt (1994) asserts that attention to input is imperative for explicit learning to take place. This view is reiterated by several recent studies which show that sufficient attention or noticing is an obligatory prerequisite in establishing new L2 form-meaning connections. N. Ellis (1994) further elaborates on this view which he calls an explicit vocabulary learning hypothesis:

An explicit vocabulary learning hypothesis would hold that there is some benefit to vocabulary acquisition from the learner noticing novel

vocabulary, selectively attending to it, and using a variety of strategies to try to infer its meaning from the context. (N. Ellis, 1994, p. 219)

The explicit vocabulary hypothesis is in contrast with the implicit vocabulary hypothesis, which describes an unconscious stage of learning without intentionality. N. Ellis (1994) defines it as follows:

An implicit vocabulary learning hypothesis would hold that the meaning of a new word is acquired totally unconsciously as a result of abstraction from repeated exposures in a range of activated contexts (N. Ellis, 1994, p. 219)

Some researchers hold that most vocabulary is acquired incidentally through reading and the inference of meaning through context (e.g., Huckin & Coady, 1999). Note that incidental learning is not implicit learning per se - both share the lack of intentionality; although implicit learning lacks awareness or advance notice to students to focus on an aspect of learning, incidental learning may entail some form of induced awareness among students of a specific task focus but tested on another aspect of the task outside the expressed focus (see Section 2.4 for a detailed explanation). Nevertheless, some researchers do not make this fine distinction between incidental learning and implicit learning and render them as synonymous; furthermore, intentional learning and explicit learning are also used interchangeably (see Chacón-Beltrán, Abello-Contesse, & Torreblanca-López, 2010). A combination of explicit and incidental learning is considered synergistic in L2 vocabulary learning (Chacón-Beltrán, Abello-Contesse, & Torreblanca-López, 2010, Schmitt, 2000) although Laufer and

Hulstijn (2001) argue that explicit learning takes place both incidentally and intentionally and that the explicit/implicit dichotomy cannot be synonymous with the intentional/incidental dichotomy. Laufer and Hulstijn (2001) pertinently stress that vocabulary learning is an exclusively explicit process involving both incidental and intentional conditions. This study postulates that codeswitched reading tasks as an intentional and incidental vocabulary learning approach may raise successful lexical inferencing and retention-retrieval.

A potent factor influencing attention and reading comprehension is the mix of first and second languages within text (Ahn & Ferle, 2008). According to mixed language approaches in advertising texts, the distinction of L2 lexical items embedded in a L1 text has been shown to elicit attention for advertisement discourse (e.g., Kaufman-Scarborough, 2001; Lerman & Garbarino, 2002; Lowrey, Shrum, & Dubitsky, 2003). A study by Lerman and Garbarino (2002) shows that inferring meanings of brand names is the most elaborate and active form of cognitive processing boosting retention and recall. Their finding is in agreement with the LOP (Levels of Processing) theory or *Depth of Processing* Hypothesis and cognitive psychological literature. In the context of Korea and bilingual participants whose L1 is Korean and L2 is English, Ahn and Ferle (2008) found that the distinctive nature of English brand names written in the Roman alphabet and embedded in contrasting Korean body texts written in Hangul script enhanced high recall scores and brand name recognition compared to Korean brand names embedded in English texts. The relative novelty and distinctiveness of the L2 embedded in a contrasting L1 text aids in retention and recall. Ahn and Ferle also tested the memorability of body

copy messages presented in English and Korean separately. Copy messages consist of product information written in prose and contain key information about product attributes and/or product usefulness. Participants were able to recall significantly more details about product benefits and attributes in Korean than in English. It can be seen that the more familiar language or L1 aids in retention of conceptual information but it is not as effective in enhancing single word recall as the less familiar language or L2. Based on the findings from advertisement texts, this present study tests the possibility that codeswitched texts could aid in lexical retention of L2 TWs where brand names/body copy texts presented in L2 and L1 respectively in advertisements can be extrapolated to codeswitched texts consisting of L2 TWs embedded with L1 running words.

Findings from an eye-tracking study also concur with the distinctiveness of codeswitched elements in sentences eliciting more noticing and attention (Altarriba et al., 1996). Longer fixation times were noted for codeswitched elements, particularly for highly constrained sentential contexts, although it is less so for less constrained contexts. The speculation is that the languages are processed separately when participants were primed in one language and more attentional resources are used to attend to the codeswitched items. Altarriba et al.'s (1996) suggestion is confirmed by neuro-imaging findings which showed different cerebral regions activated during Chinese reading vis-à-vis English reading (e.g., Cheung and Kemper, 1993; Tan et al., 2000; Tan et al., 2003; Tan et al., 2005). In contrast, Chee et al. (2000) found that semantic processing of Chinese characters by Singaporean Chinese who possessed greater fluency in English than in Chinese is more similar to English word processing than picture

processing. Also, an inference can be made that constrained or helpful contexts may have assisted in some form of lexical inferencing which occurred during longer fixations. Nevertheless, there are no studies that test the possibility that cognitive benefits of a mixed language approach can be extended to the language education setting.

According to Laufer and Hulstijn (2001), explicit learning research was first expounded by Craik and Lockhart (1972) in their influential LOP (Levels of Processing) hypothesis, which was further refined by several studies (e.g., Lockhart and Craik, 1990; Lockhart and Tulving, 1975; Muter, 1984). The main claim of their hypothesis is that the likelihood of new input being stored in long-term memory is positively correlated with the processing depth of the same input. In essence, the crucial requirement for successful retention of input is its inherent elaborate encoding (Anderson, 1995; Baddeley, 1997; Lockhart & Tulving, 1975). However, Laufer and Hulstijn (2001) and Gu (2005) noted that the concepts of a level of processing and its depth in comparison with other processing levels are at best vaguely defined.

To address the perceived vagueness, the key aspects of attention and elaboration are operationalised by Laufer and Hulstijn's (2001) Involvement Load Hypothesis which postulates that lexical retention-retrieval is dependent on levels of 'need', 'search' and 'evaluation' imposed by reading assignments. 'Need' refers to learner motivation or need to accomplish the task; 'search' involves efforts to guess the meaning of an unknown word; 'evaluation' entails selecting the semantic meaning that is contextually appropriate. The

Involvement Load Theory has been corroborated and substantiated by recent empirical research studies (e.g., Kim, 2011; Peters, Hulstijn, Sercu and Lutjeharms, 2009; Pulido, 2007a). Further elaboration of the Involvement Load Hypothesis will be expounded in the later part of this chapter regarding the ‘need’ component and in the following theoretical framework chapter.

Recently, Baddeley (2007) went further to qualify that information presented in a context permitting imagery, elaboration or integration with schema facilitates memory encoding, storage and retrieval of new input. In Mondria and Boer’s (1991) seminal study, the depth of processing is defined by the level of difficulty in guessing the meanings of unfamiliar words. They compared the retention-retrieval of words in a scale of inferential difficulty based on the number of contextual clues linked to the unfamiliar word meanings. Their important finding is that new L2 words embedded in “pregnant” or helpful contexts were not successfully retained while new L2 words that were inferred with some difficulty in moderately pregnant contexts are remembered and retrieved. Their finding that moderate difficulty in lexical inference of unfamiliar L2 word meanings is key to lexical retention-retrieval is corroborated by Mondria (2003), Haastrup (1991) and Jacob, Craik and Begg (1979) among others. Macaro (2003) asserts that lexical inferencing ability is facilitated by the transparency or richness of contextual cues. Also, Laufer and Hulstijn (2001), Hulstijn and Laufer (2001), and Gu (2005) reviewed findings from several studies and found that they concur with the *Depth of Processing* hypothesis (e.g., Hulstijn, 1992; Newton, 1995). The empirical consensus is

that when lexical inference takes place, word meanings are retained better than words with meanings provided in glosses.

2.3. The Word Association Approach – Using L1 Translations

Contrary to this consensus, Prince (1996) found that L2 learners, particularly the weaker learners, are able to recall words more effectively when unknown L2 words are provided with L1 equivalents in comparison to words learnt in context. However, the context of each unknown word was limited to a sentence, which severely restricted the contextual information which the learner drew on to infer unknown L2 word meanings, relative to a reading passage which provides more contextual clues and is more helpful in assisting successful inferencing. Sentential context is very limiting in the richness of contextual clues for the learner to use in inferring meaning. Also, the helpfulness of the sentential contexts was not rated by EFL teachers. Without evaluation of contexts, each word may vary significantly in inferential difficulty. Despite the empirical evidence showing that lexical glosses do not enhance word retention-retrieval, studies by Ko (2005, 2012) have suggested that they may be useful in assisting learners in reading comprehension.

A far more extensive use of L1 translations in the form of bilingual texts is advocated by Goh (2007). This bilingual approach in the teaching of Chinese in Singapore addresses perceived declining proficiency in Chinese among Chinese Singaporean students. Goh's method is similar to the translation mode in Prince's (1996) study, but it is far more extensive in that whole Chinese texts are presented in parallel with their English translated equivalents. The bilingual

or dual language approach which is, in essence, similar to the word association approach, has been supported by the Ministry of Education in Singapore for wide implementation in primary schools since 2004 (Goh, 2007). Goh's rationale is that English being the dominant language of English speaking-only students is used supplementally as a linguistic tool to connect English lexical concepts with L2 expressions. Goh (2003) grounded his rationale on Kroll and Stewart's (1994) Revised Hierarchical Model of bilingual memory organisation which shows that weak learners tend to map L2 words onto L1 translation equivalents which have stronger conceptual links so as to circumvent the weaker L2 conceptual links. Although it can be seen that translation can be useful in mediating weak learners in accessing reading comprehension and unknown word meanings, it can hamper learners' vocabulary development (Hunt & Beglar, 1998; Prince, 1996). It can be seen that the provision of L1 translations takes away the need to infer unknown L2 words contextually which is key to lexical retention-retrieval via a deep level of processing involving elaboration and attention. Based on a review of several empirical studies, Laufer & Hulstijn (2001) and Hulstijn and Laufer (2001) established that once a vocabulary task based on reading text is simplified for the learner by incorporating unknown word meanings in glosses within the text margin, the task has a significantly reduced involvement load severely undermining intentional vocabulary learning as the learner is not required to search or infer the word meanings from context (or the "search" component) and evaluate and select the appropriate meaning of a polysemous word (or the "evaluate" component).

Also, there are L2 words that do not have one-to-one correspondence with L1 counterparts or are not lexicalised in L1. “Translations” of non-lexicalised L2 words which are semantically non-equivalent result in insensitivity to semantic prosody of English words and fossilisation of such errors (Jiang, 2000; Xiao & Mcenery, 2006). Semantic prosody is defined as “a form of meaning which is established through proximity of a consistent series of collocates’ (Louw, 2000, p. 57). A review of studies on the relationship between word forms and their real-world referents by Pavlenko (2009) shows pervasive differences in conceptual references and partial semantic interface between languages. This study selects English TWs that are lexicalised in Chinese.

An interesting parafoveal processing study of highly proficient bilinguals by Altarriba, Kambe, Pollatsek, & Rayner (2001) revealed that showing a preview non-cognate which is a codeswitched translation within a sentence very briefly and subliminally before it is replaced by the target word does not reduce first-fixation duration and gaze duration on the target word. In comparison with monolinguals, there are no significant differences in fixations on TWs. However, the TWs were not deemed to be unfamiliar or familiar to the bilingual participants who are highly proficient so the finding that there is no semantic priming of preview translations cannot be argued with certainty. However, it can be inferred that advanced bilinguals do not rely solely on lexical links to L1 translations for conceptual access but also on direct conceptual links with the conceptual system.

2.4. Incidental Vocabulary Learning

Laufer and Hulstijn (2001) noted that studies oriented in the *Depth of Processing* hypothetical framework employ the incidental vocabulary learning design. Incidental learning is distinguished from intentional learning in that the former lacks a pre-notification of a recall test while the latter incorporate an alert to participants regarding a subsequent recall test (Laufer & Hulstijn, 2001). On the other hand, Wesche and Paribakht (1999) and Barcroft (2004) claimed that in language pedagogy, incidental learning had a looser meaning encompassing learning as a by-product of comprehending input in context, which renders incidental learning as synonymous with implicit learning. However, Laufer and Hulstijn (2001) and Hulstijn (2003) qualify that incidental/intentional learning should not be viewed as synonymous with the implicit/explicit learning dichotomy. While implicit learning is exclusively processed incidentally, without learners' intentional memorisation of information or learners' awareness of an impending retention test, explicit learning takes place both incidentally and intentionally. Laufer and Hulstijn (2001) pertinently stress that vocabulary learning is an exclusively explicit process involving both incidental and intentional conditions. R. Ellis (2008) succinctly compared and contrasted the related approaches of incidental/intentional learning and implicit/explicit learning in Table 2.1.

It is noted in Table 2.1 that both awareness and intentionality characterize incidental learning. Although Hulstijn (2013) succinctly defined incidental learning as “the acquisition of a word or expression without the conscious intention to commit the element to memory” (n.p.), Haynes (1998,

cited in Wesche & Paribakht, 1999) highlights *attention* rather than *intention* as the variable discriminating incidental learning from other types of learning. Hulstijn (2013) traced the incidental/intentional dichotomy to early behaviorist psychology research which sought to compare human learning under two treatment conditions.

Table 2.1

Distinguishing Four Approaches to Learning

| Approach | Intentionality | Awareness | Typical Task |
|----------------------|----------------|-----------|---|
| Incidental Learning | No | Possibly | Learners are given a task that focuses their attention on one aspect of the L2, and without being pre-warned, tested on some other aspect of the task (e.g., they are asked to read a passage for general understanding and then tested on whether they have learned a set of words in the text). |
| Intentional Learning | Yes | Yes | Learners are given a task (e.g., to memorize a set of words), told they will be tested afterwards and then tested on the task as set. |
| Implicit Learning | No | No | Learners are simply exposed to input data, asked to process it for meaning and then tested (without warning) to see what they have learnt (e.g., input-flooding). |
| Explicit Learning | Usually | Yes | Learners are either given an explicit rule which they then apply to data in practice activities (deductive explicit learning) or they are asked to discover an explicit rule from an array of data provided (i.e. inductive explicit learning). |

Note. Adapted from *The study of second language acquisition* (2nd ed.) (p. 445), by R. Ellis, 2008, Oxford: Oxford University Press. Copyright 2008 by Oxford University Press.

Laufer and Hulstijn (2001) noted that many empirical studies following the seminal work of Craik and Lockhart (1972) and Craik and Tulving (1975) employed the incidental learning condition. In the intentional condition,

subjects were given notice of a recall test anterior to an experimental task whereas, in the incidental condition, no such advance notice was issued to subjects. Hence, the incidental/intentional terms were used to specify the absence/presence of a methodological measure of controlled experiments; that is, preceding notice of a recall test to study participants – terms which are still being employed in vocabulary acquisition studies. This present study used an incidental vocabulary design in which retrieval tests were conducted without advance notice. A pre-notification would skew results, as a recent study by Barcroft (2007) shows, namely, that advance notice of retrievals increased higher retention of target vocabulary.

Huckin and Coady (1999) and Akbulut (2007) argue that incidental learning is preferred as it is (1) individualised and facilitates learner autonomy, (2) a key part of vocabulary building as it offers learners a contextual understanding of word uses in practice, (3) leads to more permanent vocabulary gains and (4) is pedagogically more efficient in that it enables processes of lexical learning and reading to run concurrently. Furthermore, Huckin and Coady (1999) found, in a systematic review of both incidental and intentional vocabulary learning studies, that incidental vocabulary gains are better retained than words learnt in the intentional learning mode. Correspondingly, Nation (2001) argued that the learning words incidentally from context via extensive reading is the more efficient way of acquiring new words than learning through explicit instruction, a view echoed by Schmitt (2000), Stahl (1999) and Stahl and Nagy (2006). Furthermore, Grabe (2009) pointed out that instructed vocabulary learning results in far fewer acquired words. Gass (1999) and Hunt

and Belgar (1998) among others state that empirical evidence indicates that most vocabulary gains are acquired incidentally via extensive reading in the long-run. Gass (1999) added, from her systematic review of L2 vocabulary acquisition studies, that the general agreement is that some or most second language vocabulary gains are acquired incidentally. For example, Laufer (1998) measured the passive vocabulary gains (or acquisition of semantic word meanings) of L2 English learners and found that while it took six years to learn 1,900 words in the classroom, 1,600 words were actually learnt incidentally within a year with no explicit teacher instruction and intervention. Similarly, Laufer and Paribahkt (1998) found that passive or breadth vocabulary knowledge is significantly larger than active or depth vocabulary knowledge and that this gap is larger in the second language than the mother tongue. Gass (1999) noted that the incidental learning process is incremental and gradual, an empirically founded finding that is substantiated and reinforced by past and recent evidence converging on L2 vocabulary acquisition as a cumulative and time-intensive path (Grabe, 2009).

Evidence supporting the benefits of extensive reading in ESL/EFL vocabulary development is substantial (e.g., Day & Bamford, 1998, Krashen, 2004, Nation, 2001). A seminal study by Elley (1991) over a three-year period from 1985 to 1988 on a book-immersion program in Singapore schools (initially carried out in thirty schools and later extended to 103 schools) showed that experimental subjects outperformed control students in reading comprehension, vocabulary, grammar and listening comprehension. Experimental classes received two book sets for shared reading activities and

150 books per class for independent reading. The key contributing factors to the success of the book flood were extensive amounts of meaningful input, incidental learning, students' focus on meaning rather than form and high intrinsic motivation. Later longitudinal studies on the effects of book-flood curricula in over thirty countries including Sri Lanka, South Africa, and the Solomon Islands concur that the positive vocabulary gains by experimental subjects are replicable and corroborated (Elley, 1992, 2000). Elley's findings confirmed similar findings by earlier researchers that book-flood programs and extensive reading lead to vocabulary acquisition gains in ESL/EFL learners (e.g., Elley & Mangubhai, 1983; Lightbrown, 1988, 1992). Another study by Gradman and Hanania (1991) reported that extra-curricular reading by ESL preuniversity students correlates most significantly with TOEFL scores. 'Reading outside of class' was the strongest significant predictor on reading comprehension and vocabulary performance.

An interesting study by Tanaka and Stapleton (2007) on EFL students' silent reading of graded readers at home by 96 Japanese high school students over a period of five months revealed that the silent reading group outperformed control peers in reading comprehension. Students who reported reading the most number of graded readers showed the most significant vocabulary gains. In a systematic review of reading literature, Grabe (2009) concludes that consistent and growing evidence for the benefits of extensive reading establishes the finding that students' language abilities will significantly improve after wide amounts of extensive reading. Recently, a study by Vidal (2011) within a four-week span found that ESL learners who

read academic texts silently showed the most vocabulary acquisition and retention compared to their counterparts who listened to lectures. The established recommendation in EFL pedagogy is for teachers to encourage students to engage in extensive reading (Zhang, 2001, 2003). However, incidental exposure to reading texts alone may not be an effective and efficient way of increasing vocabulary size and depth knowledge of EFL learners. The drawbacks of incidental vocabulary learning will be expounded later in this section.

Several studies in both L1 and L2 have reported that vocabulary knowledge is one of the correlated factors of reading ability and ability to absorb new information from texts (Nation, 2001; Qian, 2002; Read, 2000). It is established that vocabulary knowledge level is a reliable predictor of learners' vocabulary learning through reading (Parry, 1997; Pulido, 2003; Verspoor & Lowie, 2003). A distinction is frequently made between two dimensions of vocabulary knowledge: depth of knowledge and vocabulary size or breadth (e.g., Albrechtsen, Haastrup, & Henriksen, 2008; Mead, 1996, Read, 2000). Breadth of vocabulary knowledge refers to the quantity of lexical items known to the learner at a particular level of language proficiency (Nation, 2001). Researchers have used various methods to measure vocabulary size but the most established measure is Nation's Vocabulary Levels Test (2001), which is structured as a word-meaning matching test that consists of words representing different word frequency levels, between high frequency (2,000 word level) to low-frequency words (10,000 word level). Separately, depth of vocabulary knowledge is defined as the quality of lexical knowledge or how

well the learner knows a word (Mead, 1996; Read, 2000). Read (2004) went further to distinguish three types of depth knowledge, namely, precision of meaning, comprehensive word knowledge, and network knowledge. Arguably the best measure of vocabulary depth is Paribakht and Wesche's (1997, 2010) Vocabulary Knowledge Scale (VKS). VKS appears to be an established evaluation tool of levels of knowledge – an integrated measure of multiple vocabulary knowledge receptive and productive of a word, and different facets of depth of understanding, which is useful for data triangulation – simply because it “...is probably the best-known assessment instrument of levels of [vocabulary] knowledge.” (Richards and Malvern, 2007, p. 83). However, there are criticisms of VKS which will be discussed in Chapter 7. Depth of vocabulary knowledge is shown to be a better predictor of L2 reading comprehension (Qian, 1999). Schmitt and Meara (1997) claimed that depth and breadth are closely related and there is no need to make a strict distinction between the two types of vocabulary knowledge. However, findings by Laufer (1998, 2003) and Laufer and Paribakht (1998) that productive vocabulary knowledge (vocabulary depth) is significantly lower than passive vocabulary implies that the distinction may be necessary.

Notably, Coady (1997) pointed out a beginner's paradox in which a weak learner's low vocabulary size and/or depth may hinder incidental learning through reading L2 texts. Vocabulary size has been shown consistently to be a strong predictor of reading comprehension (e.g., Laufer, 1992a, 1992b, 1997; Henriksen, Albrechtsen, & Haastrup, 2004; Zhang, 2010; Zhang & Annual, 2008). Furthermore, lexical inferencing is shown to be correlated with text

inferencing or reading comprehension (Haastrup, Albrechtsen, & Henriksen, 2004). Gu (2005) noted that second language acquisition studies generally showed significantly smaller gains in the number of word meanings that were successfully learnt incidentally relative to L1 studies. Researchers correspondingly suggest that L2 learners are poor guessers who lack the competencies in critical language skills underlying lexical inferencing (e.g., Bensoussan & Laufer, 1984; Haynes, 1993). Nassaji (2004) found that vocabulary knowledge positively correlates with number of lexical inferencing strategies that learners used. Empirical research has established that students with advanced verbal fluency are better guessers at meanings of unknown words (Sternberg, 1987, as reported in Macaro, 2003). Highly proficient L2 learners used more strategies such as verifying, self-inquiry and section repeating relative to weaker learners.

A large-scale study by Albrechtsen, Haastrup and Henriksen (2008) found there are differences between lexical inferencing processes used and the level of educational levels which are correlated with proficiency levels. Highly proficient learners typically used advanced processing, showed adaptability in the use of appropriate processing types for different word types and were successful in identifying precise word meanings in context. Incidental vocabulary learning by guessing word meanings via context may be an inefficient method for weaker L2 learners because they have poorer bottom-up word recognition and decoding skills owing to their lower language proficiency. Gu (2005) postulates that low-ability L2 learners would face more problems with learning vocabulary incidentally relative to their intermediate

and advanced peers who in turn are significantly less able guessers than L1 learners. It can be seen that lexical inferencing success is a function of proficiency level.

In contrast, L1 vocabulary acquisition findings show significant gains in incidental vocabulary during passive reading (Nagy, Herman, & Anderson, 1985). Albrechtsen, Haastrup and Henriksen (2008) revealed that bilingual participants of all grades achieved significantly higher lexical inferencing success in their L1 than in their L2 and that the success rate is correlated with educational level, which reflects proficiency level. Furthermore, empirical results of studies by Bialystok et al. (2010), Bialystok and Feng (2009) and Bialystok, Craik and Luk (2008) corroborate with antecedent findings that bilingual children and undergraduate students of various native language groups generally possess smaller vocabulary sizes in each of the languages vis-à-vis their monolingual counterparts. However, advanced bilingual learners matched the performance of monolinguals in receptive and productive vocabulary tests and category fluency tasks.

On the other hand, there is research evidence that shows that instructed L2 vocabulary learning is effective (File & Adams, 2010; Stahl & Fairbanks, 1986), although the effect is somewhat limited in preschool children, lower-income children and at-risk of linguistic impairment children based on a comprehensive meta-analysis of prior findings by Marulis and Neuman (2010). Some studies find that explicit instruction is more effective in supporting vocabulary acquisition than incidental exposure for low to intermediate learners (Laufer, 2003; Watanabe, 1997). Notably, several empirical findings have

promoted instructed over incidental learning as the more efficient method in acquisition of L2 vocabulary. For example, Paribakht and Wesche (1997) found that direct instruction gleans more vocabulary retention, a view reinforced in subsequent studies they carried out (Paribakht & Wesche, 1999; Wesche & Paribakht, 2010). Their view that incidental learning is slow and unpredictable in comparison to instructed vocabulary learning is shared by Laufer (2003, 2005) who suggests that planned lexical instruction is the main source of L2 vocabulary acquisition.

However, Alemi and Tayebi (2011) found no statistically significant difference in learner performance between incidental and intentional learning modes for L2 undergraduates who had at least four years of formal English training previously. Gu (2005) suggests that incidental learning is more suited to intermediate to advanced L2 learners who possess a basic grasp of reading skills while weaker learners might profit from intentional learning designs. Huckin and Coady (1999) cautioned that despite the importance of incidental learning, particularly for advanced learners, it requires explicit training in bottom-up processing skills. Hunt and Beglar (1998) added weight to the idea of planned lexical instructed learning as appropriate for weaker learners as their reading ability is generally deemed low. In addressing the merits of form-focused instruction, Macaro (2003) highlights that there is simply too much vocabulary to be learnt exclusively in a FFI mode or deliberate teaching within the restricted classroom hours. Grabe (2009), correspondingly, states that the number of words learnt through direct instruction is small. He adds that it is a false dilemma to view learners having to make a choice between direct

vocabulary instruction and incidental learning by extensive reading - both pathways to lexical acquisition are complementary and required. Grabe (2009) suggests that instructed learning should target high frequency words, key topical words and generally useful academic words while extensive incidental reading reinforces learning of less-frequent words and more topical words, developing elaborated meaning networks linking many semantically related words and increasing exposure to less frequent words.

It appears that it is a zero sum game for L2 learners and their L1 counterparts in incidental vocabulary learning - weak learners miss out on critical gains from incidental vocabulary acquisition in reading, from which L1 natives benefit as the former possesses less efficient inferencing skills and smaller vocabulary sizes in comparison to their higher-ability counterparts and monolinguals' skills and vocabulary banks. If learners' proficiency falls below the threshold level, this would result in a short-circuiting of incidental learning (Macaro & Mutton, 2009). Since the majority of L1 and L2 vocabularies are learnt incidentally, the a posteriori conclusion is that weaker learners are disadvantaged by their poorer inferencing abilities that impede and delay their linguistic progress. A suggestion is to offer learners the option to refer to the dictionary for unknown L2 word meanings. According to Knight (1994) and Lupescu and Day (1993), the more efficient strategy is to look up meanings of unknown words in dictionary, rather than reading without a dictionary. However, Lin and Ahrens (2005) found that there is a partial divergence between the meanings of ambiguous words coded in dictionaries and meanings obtained from subjects in English and Chinese. Meanings in both languages

fluctuate over time and some dictionary meanings go out of fashion while language users continually formulate novel uses of existing words and develop coinages. In other words, relying on dictionaries for word meanings can be a semantically invalid and inaccurate method for the L2 learner who may learn semantically inaccurate word meanings from the dictionary which, in turn, become fossilised errors. Such misreading of nuanced word meanings can be reduced with guessing word meanings in context consisting of collocates and other contextual cues which help to contribute to nuanced meaning-making.

The importance of constrained contexts facilitating guessing from context is reinforced by Kelly (1990) who claims that only contexts that are highly constrained can aid guessing of unfamiliar L2 words. Contextual information presented in authentic texts can be often unhelpful and unreliable, which leads to difficulty in guessing lexical meanings correctly (e.g., Bensoussan & Laufer, 1984; Haynes, 1993; Watanabe, 1997). Previous findings show that learners need to be familiar with 95% of the running words in a reading text to infer the unfamiliar word meanings successfully (Chen & Truscott, 2010; Laufer, 1989; Liu & Nation, 1985; c.f. Nagy, 1997). Nation (2001) recommend that the appropriate text coverage level range for extensive reading targeted for vocabulary growth should be between 95% and 98%. However, Maxim (2002) and Macaro and Erlar (2008) found that difficult texts can be used with beginning learners although the former integrated extensive reading with an array of follow-up activities such as role plays and writing activities while the latter employed explicit strategy instruction in conjunction with reading. Notably, transparent contexts have been shown to reduce lexical retention while

moderately difficult contexts aid retention most effectively as discussed earlier in this chapter (Mondria & Wit-de Boer, 1991).

Increasingly, some researchers are recommending the use of simplified or modified texts over the use of authentic materials. Textual authenticity is defined by Alderson et al. (2006) as texts that are not abridged or simplified for L2 learners. A reservation over the use of contrived learning materials is that they are not authentic or adequate language models for L2 learners and may even short-circuit their language development as the lack of exposure to authentic discourse would render them even more inaccessible to second language learners. Waring and Nation (2004) advocated the use of graded readers and counter the reservation by asserting that L2 readers can only process modified texts fluently, freeing cognitive resources to be used for higher level processing for reading comprehension, lexical inferencing and incidental vocabulary gains. Correspondingly, Shomoossi and Ketabi (2007) argue that authenticity is subject to pragmatic variation and pedagogical appropriateness.

Although Grabe (2009) criticized the concept of textual authenticity as an imprecise term and downplays the concerns for the use of authentic texts in L2 learning, he did not advocate the use of modified texts. Instead, he argued for the use of level-suitable reading materials for extensive reading which he believes is key to incidental learning. However, he did not elaborate on the selection criteria of appropriate texts such that 95% of the words are familiar to the L2 learner. It can be conceded that simplified texts are not representative

discourse that highly proficient L2 bilinguals and native speakers use. The appropriation of texts for learners should be an informed process based on declarative feedback of passage sight vocabulary or number of familiar words in a reading text from students.

2.5. Research on the Use of Codeswitched Texts in the L2 Context

The question remains as to whether graded readers are the only type of reading materials that can facilitate L2 learners' incidental vocabulary learning with sufficient involvement load to facilitate lexical retention-retrieval. The mixed language approach to designing advertising discourse or advertisement texts has been shown to be effective in raising retention-retrieval of single words and conceptual details as discussed earlier in this chapter. Also, eye-tracking findings suggest that more attention is spent on codeswitched elements which would facilitate elaboration on L2 target word features and boost retention (Altarriba & Gianico, 2002; Altarriba et al., 1996).

Linguists have advocated informed use of L1 in L2 classrooms and found that teacher codeswitching in classrooms enhanced students' learning (e.g., Auerbach, 1993; Butzkamm, 1998; Celik, 2003, Macaro, 2005). Macaro, Guo, Chen, & Tian (2009) found that brief switches do not disrupt communication and may accelerate or boost comprehension in terms of text access less impeded by L2 word forms and/or linguistic meanings which are unfamiliar and inaccessible. Furthermore, Macaro et al. (2009) found that EFL learners tend to mentally translate L2 discourse into their L1 regardless of the medium being in their L1, concurring with the postulation of parallel activation of languages

according to the parallel access hypothesis (e.g. Marian & Spivey, 2003a, 2003b; Marian, Spivey and Hirsch, 2003; Preston and Lambert, 1969).

In the area of L2 vocabulary acquisition, it can be seen that the L1 can be used strategically in a codeswitched reading text as a form of linguistic scaffolding freeing learners' cognitive resources for lexical inferencing of a few embedded L2 words, resources that would otherwise be preoccupied with L1 lemma mediation of a myriad of function words and other vocabulary words. However, the pedagogical usefulness of codeswitched texts has not been investigated hitherto. There are no empirical studies which have investigated experimentally whether presenting selected unknown L2 words integrated with L1 reading texts can enhance inferencing and recall of the L2 lexical items compared to L2-only texts. The closest study on the role of codeswitched texts in pedagogy is Macaro and Mutton's (2009) study of English primary school learners of French which tested whether an English-French codeswitched text which they called the "pedagogical tool" in conjunction with teacher directed strategy instruction such as direct teacher prompts, oral elicitations, reading-aloud, think-aloud, use of inferencing strategy metalanguage, rereading instruction and positive reinforcement as part of an arsenal of direct intervention measures. Their study extends from the first attempt at using codeswitched texts as part of a palette of strategies used in second language reading by Macaro and Erler (2008). However, Macaro and Mutton (2009) and Macaro and Erler (2008) did not control variables to separate or isolate the effect of the codeswitched text from other components or strategies of a reading strategy intervention; instead, their focus is on evaluating the effects of an

assortment of teacher directed strategies with gradated codeswitched texts vis-à-vis the use of graded readers without strategy suggestions from the teacher.

Using a narrative novel written in English, Macaro and Mutton replaced TWs with French translations and used the codeswitched text with explicit inferencing strategy instruction for an experimental group of L2 students. The ratio of French to English words steadily increased from chapter to chapter with at least two hours of exposure to the strategy intervention per student over four sessions lasting 30 minutes each. A second group of students used graded readers with additional reading time but no strategy intervention. A third group used for comparison received mainstream teaching without the experimental variables. Macaro and Mutton (2009) then administered three tests – the first test consists of six sentences with a new and unknown word each which participants are required to guess. These TWs were seen in both the narrative novel and the graded readers; the second test evaluated learners' reading comprehension by providing a short passage in French which learners were required to translate their understanding of the text in English; the third test is a receptive vocabulary test which requires learners to give English translations of 30 French function words which are the TWs, alongside a long list of distracters that were deemed easy as they are French-English cognates. Importantly, the results show that the inferencing group performed markedly better than the groups relying on graded readers and mainstream teaching and materials in all three tests although the lead shown in the reading comprehension is not statistically significant.

Although Macaro and Mutton (2009) showed that codeswitched texts as part of a strategy intervention protocol accelerate inferencing development, they did not implement a recall test to assess lexical retention. While Macaro and Mutton's (2009) focus was on investigating the benefits of vocabulary learning via an elaborate strategy intervention conducted by them with the use of an English-French codeswitched text, the reported gains cannot be attributed solely to the codeswitched reading task and isolated from effects of other measures incorporated in the treatment such as insertion of illustrations to assist comprehension and enhance attractiveness, reading-aloud, verbalisations of inferencing strategies, oral elicitation of French words and rereading instruction. This present study focuses on measuring possible intentional learning gains (successful lexical inferencing) and incidental learning gains (lexical retention-retrieval) from a series of codeswitched (English-Chinese) readings in comparison with another group of students replying on graded readers which are identical in content to the codeswitched texts sans L1. Also, the text used by Macaro and Mutton (2009) is a narrative whereas this study aims to employ expository texts. Argumentative discourse is the genre that is most needed at university level reading and writing (Vähäpääsi, 1982, reported in Weigle, 2002). Hence, it is pedagogically more appropriate to use expository texts which are the representative discourse which the student participants are most likely to read as undergraduates.

The postulation of this study is that running words in L1 generally ensure greater lexical coverage or passage sight vocabulary than L2, which, in turn, would facilitate fluent reading, successful lexical inferencing, and incidental

vocabulary learning of unfamiliar L2 words. This hypothesis is founded on research findings by Albrechtsen, Haastrup and Henriksen (2008) who found that bilinguals achieved more successful lexical inferences in their L1 than in their L2. Furthermore, the parallel access hypothesis, which is supported by recent priming and Stroop studies, states that the bilingual processes stimuli or input with concurrent activation of two languages (e.g., Marian & Spivey, 2003a, 2003b; Marian, Spivey and Hirsch, 2003; Preston and Lambert, 1969). The implication is that parallel activation is ineluctable and advantageous for the bilingual in processing either language. It can be seen that the second language learner subconsciously activates the L1 parallel to the decoding of L2 during reading. LRDM predicts that the L2 learner mediates L2 conceptual access with L1 lemma (Jiang, 2000, 2002, 2004b). This study posits that CS reading texts facilitate acquisition of L2 word meanings, mediated by L1 lemma or concepts during reading and lexical inferencing of L2 TWs and increasing meaning-bearing comprehensibility of word contexts of target words.

2.6. Other Factors of Successful Lexical Inferencing

Apart from the depth of vocabulary knowledge, the richness of contextual clues and learners' vocabulary proficiency level discussed previously in this chapter as key factors influencing successful lexical inferencing, Gu (2005) identified three other factors – word salience in context, learner motivation, and repeated exposure to lexical items in various contexts.

Word saliency is defined as the perceived contextual or thematic importance of a word in a reading text. Word repetition can affect a learner's perceived importance of the word in understanding the context. Brown (1993) states that words, which are deemed important or salient in understanding a specific context within the reading text, are more likely to be acquired irrespective of word frequency. If saliency of an unknown word is rated highly, then there is more impetus or need to guess its meaning (Watts, 2008). However, studies by Brown (1993) and Chen and Truscott's (2010) did not survey participants' perceived importance of TWs in the reading texts although they found that word saliency plays a role in receptive knowledge of meaning and form. Nevertheless, one can extrapolate from Jiang's (2007) comment that perceptual saliency in relation to grammatical features of a word is a vague construct that is not easy to measure to refer to the similarly fuzzy construct of word saliency in semantic terms. However, visual saliency of words, particularly codeswitched words in a text, is found to be an important factor underlying attention in eye-tracking research (e.g., Altarriba & Gianico, 2002; Altarriba et al., 1996), and successful retention-retrieval in advertising research (e.g. Ahn & Ferle, 2008; Bishop & Peterson, 2010; Li and Kalyanaraman, 2012).

Dörnyei (2009) states that learner motivation is affected by the needs for self-achievement and self-confidence. It is further influenced in the classroom learning context by the curricular materials, attitudes and behavior of teachers and team dynamics. In the area of task design, the Involvement Load Hypothesis raised the importance of learner motivation/interest or "need" in

incidental vocabulary learning, stating that it is one of three obligatory task variables critically needed to induce incidental learning. The “need” component refers to the need to follow task instructions and complete a task.

Repetitive exposure to an unknown word in reading has been shown to increase the chances of the word meaning being acquired and retained (e.g., Chen & Truscott, 2010; Coady, 1993). Waring and Nation (2004) recommend that future research identify the exact optimal rate of lexical repetition leading to vocabulary learning. However, Chen and Truscott (2010) assert that there are no ready answers to the exact number of exposures needed to result in successful lexical inference and retention. Illustratively, a case study carried out by Pigada and Schmitt (2006) shows that extensive reading by a French-German bilingual young adult lasting a month and consisting of four simplified pocket-size books resulted in an increment of 17.8% in mastery of lexical knowledge, with noticeable effects in 20 or more text occurrences. The increment is lower than the higher figure of 25% of vocabulary gains reported by Dupuy and Krashen (1993, reported in Waring and Nation, 2004) although it is within the range of 5.8% to 25% in a review of past studies of vocabulary growth from L2 reading by Waring and Nation (2004). On the other hand, Chen and Truscott (2010) found that the frequency rate of seven text occurrences was sufficient to produce significant productive knowledge gains although receptive knowledge gains are considerably less. However, lexical repetition alone did not lead to the acquisition of L2 words that are not lexicalised or coded conceptually in L1. L1 lexicalisation is a vital factor that Gu (2005) overlooked.

The L1/L2 semantic overlap and divergence can affect incidental L2 vocabulary gains but has surprisingly received scant attention from second language researchers with only two studies conducted to date by Paribakht (2005) and Chen and Truscott (2010). As discussed earlier in this chapter, not all Chinese and English words are semantically equivalent although there are many lexical meanings in either language which have been coded in one language and shared with the other language (Lin & Ahrens, 2005). L1 lexicalisation refers to known concepts that are codified in L1 and are correspondingly shared with L2. Non-lexicalised L2 words are shown by Chen and Truscott (2010) to be problematic to learners despite repeated exposure. Their finding confirms the perceived learning difficulty that learners have with non-lexicalised L2 words as reported by Paribakht (2005). On the other hand, lexicalised L2 words or words that conceptually correspond with L1 counterparts are easier to be learnt and retained. In this light, this study selects only English TWs that are lexicalised in Chinese as semantic dissimilarity can negatively influence inferencing and retention.

Topic familiarity is another variable which was not mentioned by Gu (2005), but which may play a role in vocabulary acquisition. Some studies using think-aloud protocols have revealed that L2 learners of all proficiency levels depend on background knowledge to infer word meanings (Haastrup, 1989; Haastrup, Albrechtsen, & Henriksen, 2004; Nassaji, 2003). However, there are studies which also show that intermediate learners use more bottom-up processes like grammatical knowledge than top-down processing using schema (De Bot, Paribakht, & Wesche, 1997; Rott, 2000). A few studies which

examine the effects of topic familiarity on retention-retrieval of TWs show that there is low recall of TWs in familiar topical contexts. It appears that learners do not adequately notice word forms and meanings due to the identification of familiar topics with assumed ease in inferencing word meanings (Mondria & Wit-de Boer, 1991; Mondria, 2003). However, Pulido (2007a, 2007b) argued that topic familiarity is positively correlated with successful lexical inferencing. Nevertheless, results were mixed regarding the relationships between topic familiarity and assumed ease/difficulty in guessing and between topic familiarity and lexical retention-retrieval. A recent empirical study by Bolger and Zapata (2011) found that EFL vocabulary learning of words related to a topic that was expounded and enriched by the teacher and language textbook hinder vocabulary acquisition. In this study, student participants were surveyed for their topic familiarity in a pilot group before five reading passages were chosen based on a mean familiarity score range between 2.54 to 3.73, indicating that the topics of the readings texts are neither alienating nor markedly familiar (see appendix I for the questionnaire on topic familiarity).

Language distance has been shown by linguists to be an important factor in vocabulary acquisition and lexical inferencing (e.g., Chiswick & Miller, 2004; Ma, 2009; Swan, 1997). Linguistic typology classifies languages according to similarities or dissimilarities in structural features. Structural differences increase the language distance between languages. Typologically related languages have been shown to be a facilitating effect for L2 vocabulary acquisition while typologically distant languages have a converse effect on L2 vocabulary acquisition (Koda, 2005). However, semantic similarity between

languages at the sub-semantic level such as motion, possession, perception, desire, causal and modal can facilitate L2 vocabulary acquisition even in languages that are typologically distant. Yu (1996a, 1996b) found that Chinese native speakers who are ESL learners outperformed their Japanese ESL counterparts in using motion verbs. Yu (1996b) defined motion verbs as words that indicate movements with respect to environments. Although Chinese and English are typologically dissimilar, they share cross-linguistic semantic meanings in motion verbs because both languages conflate manner with motion in motion verbs; Japanese counterparts are not semantically similar to English motion verbs. However, it is not clear if Chinese and English share other semantic sub-features. Nevertheless, typologically-close languages typically share many similarities in their sub-features that can facilitate L2 vocabulary acquisition. In the case of Chinese and English, their typological distance would imply that semantic dissimilarities outweigh similarities.

2.7. Research Questions

Based on the literature review relevant to my research objectives stated in Chapter 1, my research questions are as follows:

Question 1a: Is the strategy of using Chinese-English codeswitched reading tasks a more effective intentional vocabulary-specific method for EFL learners to infer unknown L2 TWs successfully than using graded readers?

Question 1b: How effective are codeswitched reading tasks in raising lexical inferring behavior relative to graded readers?

Question 1c: Does the use of codeswitched reading tasks lead to differential effects on lexical inferencing among beginning learners, intermediate learners and advanced learners?

Research question 1a stems from a hypothesis of the present study, which posits that codeswitched reading tasks increase lexical inferencing of unknown L2 words, regardless of successful or erroneous inferences. A study by Macaro and Mutton (2009) compared two groups' performance in terms of lexical inferencing, reading comprehension and an English translation test of French function words. The treatment involved codeswitched texts with the percentage of French (L2) words increased marginally at every subsequent lesson alongside direct teacher prompts, elicitations, reading-aloud, rereading instruction and positive reinforcement as part of an arsenal of direct intervention measures. The comparison group used graded readers which are simplified French texts without strategy instruction. They found that the inferencing group outperformed the graded readers group in successful lexical inferencing. The alleged pedagogical difference between the groups is that the former involved a teacher's elicitation of unknown word meanings by guessing while the latter involved a teacher who deliberately avoided suggesting strategies to student participants. However, the graded readers group involved the researcher guiding students to helpful contexts found in key sentences and phrases. It can be argued that both groups involved explicit guidance in guessing word meanings. The remaining variable would be the texts employed – the experimental group was given codeswitched texts while the comparison group was given simplified texts. The hypothesis of this study is that

codeswitched reading tasks may encourage L2 learners to take risks and infer unknown word meanings while the graded readers would induce less of such behavior. Independent-samples t-tests were specifically performed on the number of guesses of target word meanings indicated by the experimental and comparison groups. Specifically, independent-samples t-tests analyse the mean differences of lexical inferencing scores between the treatment or codeswitched (CS) group and the comparison or graded readers (GR) group. Statistical findings will be reported in Chapter 5.

Research question 1b is based on the first premise of this study, which proposes that presenting running words of reading texts in L1 is a more reliable method in ensuring lexical coverage and facilitating successful lexical inferencing of L2 target words. The hypothesis is that learners who read codeswitched texts are more inclined to guess unfamiliar target word meanings than learners reading graded readers. Generally, attempts at guessing increase the chances of successful lexical inferencing compared to non-attempts – a partial bivariate correlation test controlling for pre-knowledge of target word meanings will be conducted to test for a hypothesised relationship between total number of tries and VKS scores. An independent-samples t-test will also be conducted to compare and check for a statistical difference between the lexical inferencing performance of the treatment group and the comparison group. Statistical findings will be reported in Chapter 5.

Research question 1c is derived from MHM and RHM which state that learner proficiency is a deterministic variable of learner performance in

receptive and productive vocabulary tasks. *T*-tests were performed on vocabulary scores of student participants divided into two groups, experimental codeswitched reading (CS) and graded readers (GR). Two-way ANOVA tests were used to compare the mean scores of the three proficiency levels in the treatment and comparison groups. The findings were triangulated by protocol analyses of introspective tasks or concurrent think-aloud verbal reports. Findings will be reported in Chapters 5 and 6.

Research Question 2a: Is the recall of TWs by EFL learners enhanced by reading codeswitched texts relative to their counterparts reading graded readers in an incidental learning design?

Research Question 2b: Does the use of codeswitched texts lead to differential effects on lexical retention-retrieval among advanced learners, intermediate learners and basic learners?

The questions are based on a proposition of this study, which hypothesizes that presenting embedded L2 target words in L1 texts will facilitate lexical retention-retrieval. The students were asked to read and infer target words found in reading texts – the treatment group was given codeswitched texts while the comparison group was given graded readers. However, the students were not given advance notice of a recall test that ensued so that the data can be classified as incidental (see Hulstijn, 2013, for a definition of incidental design). Codeswitched texts have been shown to increase recall of target words in advertising texts or advertisements (e.g., Ahn & Ferle, 2008) and that codeswitched elements increase fixation times during

an eye-tracking study, which implies that more attentional resources are given to codeswitched elements (Altarriba, Kroll, Sholl, & Rayner, 1996). Extending the empirically substantiated finding that proficiency affects vocabulary performance, research question 2a probes whether retention of target words may be differentiated according to proficiency levels. Statistical analyses (t-test and two-way ANOVA) of mean recall scores of the experimental and comparison groups were applied to address the question. Statistical findings will be reported in Chapter 5.

Research question 3: Regarding English target words that lack one-to-one meaning equivalence in Chinese, will learners proffer target word definitions that are partially equivalent (like L1 translation equivalents) or fully/closely equivalent to target word meanings?

Research question 3 relates to a premise of the study based on Jiang's lemma mediation hypothesis that postulates that learners tend to simplify L2 meanings by using L1 conceptual features that are deemed shared with L2 semantic features, and drop L2-specific features. The question of the degree of L2 learners' sensitivity to semantic prosody will be examined in a discussion of four conspicuous cases of L2 target words whose contextual meanings used in the reading texts partially differ from English dictionary meanings and Chinese translation equivalents. Lexical Representation and Development Model (LRDM) predicts that learners will use L1 lemma to mediate L2 words conceptually – this would suggest that students give definitions that are similar to the Chinese translation equivalents. However, if students give definitions that

match the contextual meanings, this would indicate that students guess the full semantic meanings as used in the reading passage – a case for direct L2 word conceptual links are formed, albeit from a semantic network presented in L1. A semantic analysis of students' word definitions, translations and productive sentences was conducted to address the research question. Qualitative findings will be reported in Chapter 6.

2.8. Summary

The literature review in this chapter serves to inform readers of key concepts and findings most relevant to the theories that shape this present study's research design. These theories of theoretical framework will be discussed in the following chapter. Specifically, the theories address the three major content areas related to the research questions, namely, lexical inferencing, lexical retention-retrieval and lemma/conceptual mediation.

CHAPTER THREE

THE THEORETICAL FRAMEWORK

3.1. Chapter Overview

This chapter begins with a presentation of Nation's (2007b, 2008) meaning-focused input criteria which underlie the design of codeswitched texts and is relevant to research questions 1a – 1c which focus on the relationship between codeswitched reading tasks and successful lexical inferencing. Also relevant to research questions 1a – 1c is the following section on the knowledge source use in lexical inferencing. This is followed by a section which delves into connectionism and its influence on information processing models, particularly Baddeley and Hitch's (1974) influential Working Memory model which will be explicated. Together with the Working Memory model, Noticing/attention and LOP or *Depth of Processing* Hypothesis are major components which will be discussed in relation to lexical retention-retrieval, which is relevant to research questions 2a – 2b. Also relevant to research questions 2a – 2b, Laufer and Hulstijn's (2001) Load Involvement Hypothesis, which is built on LOP or Depth of Processing Hypothesis, will be fully expounded. Then, I review bilingual lexical representation models which generally argue for two divergent paths – a continued reliance on L1 word concepts to access L2 word meanings (lemma mediation), or the formation of L2-specific lexical store without the reliance of L1 (conceptual mediation). This is relevant to research question 3 of this present study. If ESL students regardless of English proficiency levels simplify word definitions of English

words which lack Chinese equivalents, particularly abstract words, this agrees with Potter et al.'s (1984) word association hypothesis, Jiang's (2000) LRDM (Lexical Representation and Development Model) and De Groot's (1992) DFM (Distributed Feature Model). However, if high-ability students proffer word definitions that capture semantic nuances usually overlooked by bilingual dictionaries by using directive contexts to guess them, then this would corroborate with Potter et al.'s (1984) concept mediation hypothesis and Pavlenko's (2009) MHM.

3.2. Meaning-Focused Input Criteria

Nation (2007b, 2008) has constructed a set of criteria for meaning-focused input which CS reading tasks used in this present study satisfy. The criteria or guidelines of meaning-focused input are as follow:

- (1) Most of what the learners are listening to or reading is already familiar to them.
- (2) The learners are interested in the input and want to understand it.
- (3) Only a small proportion of the language features are unknown to the learners. In terms of vocabulary, 95-98% of the running words should be within the learners' previous knowledge, and so only 5 or preferably only 1 or 2 words per hundred should be unknown to them (Hu & Nation, 2000).
- (4) The learners can gain some knowledge of the unknown language items through context clues and background knowledge.
- (5) There are large quantities of input.

(Nation, 2007b, p. 3)

The meaning-focused input strand is one of four strands (the other strands are meaning-focused output, language-focused learning and fluency development) which serve as guidelines for ESL/EFL course developers and teachers to maintain an optimal balance of learning opportunities and a subsequent reduction in deliberate teaching and learning (Nation, 2007b, 2008). The most relevant strand in evaluating CS reading tasks is the meaning-focused input strand. Criterion 1 relates to topic and linguistic familiarity. Student participants' topic familiarity was surveyed for their perceived familiarity towards the topics of the reading texts – the texts used in the study are deemed generally familiar. As previously discussed in Chapter 2, topic familiarity shows mixed empirical results and texts that are markedly familiar or alienating were discarded to reduce possible skewed results. Linguistically speaking, Chinese students are naturally more familiar with L1 than L2 as their L1 lexicon is larger than the L2 lexicon (e.g., Altarriba & Mathis, 1997). Criterion 2 relates to the students' interest level towards the reading passages which were surveyed at the pilot stage – only reading texts that are generally deemed as interesting to the students were employed. It can be generalised that Chinese students prefer L1 or Chinese texts in L2 classrooms as previously reported by Johnson et al. (1985, as reported in Lin, 2013) and one can surmise that codeswitched texts are intrinsically interesting to Chinese students relative to English-only texts. Criterion 3 matches with Barcroft's (2004) meaning-bearing comprehensible input requirement when presenting new words. Barcroft (2004) states that comprehensible input is a key principle of effective L2 vocabulary instruction. I argue that codeswitched word contexts in L1 raise

comprehensibility and semantic transparency which satisfies both Barcroft's (2004) principle of meaning-bearing comprehensible input and Nation's (2007b, 2008) criterion of high passage sight vocabulary or lexical coverage. Criterion 4 is satisfied by the presence of directive word contexts of target words. Also, qualitative findings show that the predominant knowledge source is contextual cues. Criterion 5 is approximately ensured by maintaining a low number of target words (5 TWs) per reading passage with most words serving as contextual input.

3.3. Knowledge Source Use in Lexical Inferencing

Vocabulary learning entails educated guesswork based on contextual clues that the reader relies on (Huckin & Coady, 1999). Haastrup (1991) cogently defined lexical inferencing as a process of "making informed guesses as to the meaning of a word in light of all available linguistic cues in combination with the learner's general knowledge of the world, her awareness of context and her relevant linguistic knowledge" (p. 40). The success of L2 lexical inferencing is measured in terms of retention gains of the word form, and intake of its semantic and other lexical aspects (Paribakht and Wesche, 1999). In addressing the knowledge sources that L2 learners tap into while inferring L2 word meanings, Haastrup (1991) devises a hierarchy of cue levels in lexical inferencing divided between 'top cues' and 'bottom cues', in parallel with top-down and bottom-up reading processes, based on transcribed interview data and protocol analysis of L2 learners' lexical inferencing. The hierarchy of cue levels, which is later reiterated by Haastrup, Albrechtsen and Henriksen (2004) and Albrechtsen, Haastrup and Henriksen (2008), is shown in Figure 3.1.

| | |
|---------------------|--|
| TOP level | Context (the text, and knowledge of the world) |
| | Semantics (meaning considerations) |
| | Collocation |
| | Syntax |
| | Word Class |
| | Lexis (word form) |
| | Morphology |
| | Orthography/Phonology |
| BOTTOM level | |

*Figure 3.1. A hierarchy of cue levels. Adapted from Vocabulary and writing in a first and second language: Processes and development (p. 80), by D. Albrechtsen, K. Haastrup and B. Henriksen, 2008, Basingstoke: Palgrave Macmillan. Copyright 2008 by Palgrave Macmillan. "Lexical inferencing processes in L1 and L2: Same or different? Focus on issues in design and method," by K. Haastrup, D. Albrechtsen and B. Henriksen, 2004, in D. Albrechtsen, K. Haastrup & B. Henriksen (Eds.), *Angles on the English-speaking world: Volume 4 Writing and Vocabulary in Foreign Language Acquisition* (p. 116), Copenhagen: Museum Tusulanum Press. Copyright 2004 by Museum Tusulanum Press.*

The types of knowledge sources (KSs) which consist of previous knowledge, word information and surrounding text employed by second language readers have been a subject of refinement and elaboration (e.g., Bengelil & Paribakht, 2004; de Bot, Paribakht & Wesche, 1997; Paribakht & Wesche, 1999, 2006; Haastrup, 1991; Haastrup, Albrechtsen & Henriksen, 2004; Paribakht, 2005). Albrechtsen, Haastrup and Henriksen (2008) demarcate two broad types of knowledge, namely declarative and procedural knowledge. They view declarative knowledge ('knowing that') as constituting world knowledge, linguistic and discourse knowledge and socio-cultural knowledge.

Albrechtsen and colleagues subscribes to the assumption that the vocabulary size and organisation underlie the four language skills. On the other hand, procedural knowledge ('knowing how') consists of learners' knowledge of a number of different procedural aspects, notably reception and production processes, and learning procedures. Receptive processes include reading processes, among which text inferencing ability is a crucial skill.

Albrechtsen, Haastrup and Henriksen (2008) states that lexical inferencing involves the interaction of both declarative and procedural knowledge in lexical problem solving. Haastrup, Albrechtsen and Henriksen (2004) explained that context and semantics are top cues as they are used while inferring unknown word meanings. On the other hand, when L2 learners focus exclusively on bottom cues or linguistic word level cues which consist of lexical features without consideration of word meanings, such as orthographic similarity or cognate statuses of words, morpheme boundaries, among others, they are likely unable to infer successfully. A learner may use either one cue or a combination of cues which are likely to lead to an accurate or sound guess. However, it can be seen that top cues are key in guessing conceptual meanings of L2. Coady (1979) attests that beginning learners focus on word level cues and as proficiency increases, meaning-oriented strategies are employed such as background knowledge and contextual inferencing. Jiang (2002) postulates that L2 lexeme information, or morphology, pronunciation and orthography, is gradually deactivated in the L2 learner since it does not help in applying L2 word. The postulation is substantiated by Brown (2010) who found that ESL learners pay scant attention to the syntactic features of words during reading of

expository passages. Furthermore, a study by Hamada and Park (2011) found that learners who reported higher success in lexical inferencing tend to use top or global strategies rather than bottom or local strategies.

Haastrup (1991) first conceptualised the hierarchy of cue levels to address the question of which knowledge sources informants activate. Albrechsten, Haastrup and Henriksen (2008) clarified that top or contextual cues are derived from the co-text of the target word (word contexts) and/or from the learners' world knowledge. The latter refers to reader-driven or top-down cognitive process of selecting and connecting knowledge schema with the stimuli or reading topic/theme. In reading tasks, world knowledge is indicated by topic familiarity (Pulido, 2007a, 2007b). Some studies have shown that learners of beginning, intermediate and advanced levels relied on schema to guess unknown word meanings (Lee & Wolf, 1997; Nassaji, 2003) but these findings are contrasted with results from other studies that show that the effects of background knowledge on lexical retention and perceived familiarity of vocabulary used in a reading text or lexical coverage are inconsistent (Pulido, 2007a, 2007b). In this study, student participants' topic familiarity with the reading passages used in the study are surveyed and the topics that are generally familiar (means between 2.54 to 3.73) were chosen (see chapter 4 for a detailed description). These reading passages are originally designed for students in Singapore of a similar grade level as the study participants.

Qian (2004) conducted an important survey-based study on Chinese and Korean ESL learners' preferred lexical inferencing strategies which found that

guessing unfamiliar word meanings from context is the most preferred strategy, followed by two other global strategies. The results are reproduced in Table 3.1.

Table 3.1

Results of Qian's (2004) Survey of the Whole Sample: Ranking of Students' Preferred Lexical Inferencing Strategies Perceived (n = 61)

| Rank | Strategy | Short Name | Mean Ranking (Max 4) |
|------|---|--------------------|----------------------|
| 1 | I make use of the meaning of the paragraph or text as a whole to guess the meaning of the unknown word | Global meaning | 3.64 |
| 2 | I use my background knowledge of the topic of the text to guess the meaning of the unknown word | World knowledge | 3.59 |
| 3 | I use the meaning of other words in the same sentence to help me guess the meaning of the unknown word | Syntagmatic cues | 3.36 |
| 4 | I examine the unknown word to see if any part of it is familiar in meaning | Morphological cues | 3.21 |
| 5 | I look for grammatical clues in the surrounding sentence to help me guess the meaning of the unknown word | Sentence grammar | 2.98 |
| 6 | I examine the unknown word to see if it contains any grammatical clues to tell me what part of speech it belongs to | Word class | 2.95 |

Note. Adapted from “Second language lexical inferencing: Preferences, perceptions, and practices,” 2004, by D. D. Qian, in P. Bogaards & B. Laufer (Eds.), *Vocabulary in a second language: Selection, acquisition and testing* (p. 163), Philadelphia: John Benjamins. Copyright 2004 by John Benjamins Publishing Company.

Table 3.1 shows that ESL learners prefer the top or global strategies relative to bottom cues. This marked preference reflects their awareness that top strategies tend to produce successful lexical inferencing. The relatively lowly ranked bottom cues agree with Brown's (2010) finding that ESL learners do not pay much attention to grammatical features while reading.

| |
|---|
| <p>Linguistic Sources</p> <p>L2-based sources</p> <ul style="list-style-type: none"> • Word Knowledge <ul style="list-style-type: none"> ○ <i>Word Association</i>: Association of the target word with another familiar word or a network of words. ○ <i>Word Collocation</i>: Knowledge of words that frequently occur with the target word. ○ <i>Word Morphology</i>: Morphological analysis of the target word based on knowledge of grammatical inflections, stem, and affixes. ○ <i>Word Form (written)</i>: Knowledge of formal (orthographic or phonetic) similarity between the target word, or a part of it, and another word and mistaking the target word for another word resembling it. • Sentence Knowledge <ul style="list-style-type: none"> ○ <i>Sentence Meaning</i>: The meaning of part or all of the sentence containing the target word ○ <i>Sentence Grammar</i>: Knowledge of the syntactic properties of the target word, its speech part and word order constraints ○ <i>Punctuation</i>: Knowledge of rules of punctuation and their significance. • Discourse Knowledge <ul style="list-style-type: none"> ○ <i>Discourse Meaning</i>: The perceived general meaning of the text and sentences surrounding the target word (i.e. beyond the immediate sentence that contains the target word). ○ <i>Formal Schemata</i>: Knowledge of the macro structure of the text, text types and discourse patterns and organisation. ○ <i>Text Style and Register</i>: Knowledge of stylistic and register variations in word choice. <p>L1-based sources</p> <ul style="list-style-type: none"> • L1 Collocation • Knowledge of words in L1 that have collocational relationship with the L1 equivalent of the target word, assuming that the same relationship exists in the target language. • L1 Word Form • Knowledge of formal (orthographic or phonetic) similarity between target words or a part of it and a L1 word. |
| <p>Non-Linguistic Source</p> <ul style="list-style-type: none"> • Word Knowledge Non-linguistic knowledge, including knowledge of the topic of the text and other related background knowledge. |

Figure 3.2. Trilingual study taxonomy of KS use in L1 and L2 lexical inferencing. Adapted from *Lexical inferencing in a first and second language: Cross-linguistic dimensions* (p. 77), by M. B. Wesche and T. S. Paribakht, 2010, Clevedon: Multilingual Matters. Copyright 2010 by Multilingual Matters.

Building on Haastrop's hierarchy of cue levels, Wesche and Paribakht (2010) developed a comprehensive taxonomy of knowledge source (KS) use involved during L1 and L2 lexical inferencing based on findings reported in their study involving English monolinguals and French-English and Persian-English bilinguals, as shown in Figure 3.2.

In Wesche and Paribakht's (2010) study, TWs were replaced with pseudo words designed with morphological and inflectional cues embedded in reading passages written in three languages (English, Persian, French). They also tested all participants using English texts with actual English words as TWs. Based on protocol analysis of concurrent think-aloud, what is common in both L1 and L2 inferencing is that all main taxonomic categories of linguistic KSs in the text language as well as non-linguistic KSs were used by all participants from each language group, namely French L1 speakers whose L2 is English, Persian L1 speakers whose L2 is English, and English monolingual speakers. Also, most sub-categories within each linguistic category were used by all speakers across the two bilingual groups and one monolingual group, with the exception of word association which was never used by Persian L1 speakers in L1 inferencing and style/register which was never used by French L1 speakers in L1 inferencing, as well as both French and Persian speakers in English L2 inferencing. The bilingual participants inferring in their L2 (English) reported using certain linguistic KSs from their L1 to arrive at their proposed meanings, specifically L1 word collocation and L1 word form. L1 word collocation is not a reliable KS as collocates differ cross-linguistically. Also, it is noted that L1 word form is not a KS for ESL/EFL speakers whose L1 is typologically distant from English, such as Chinese and Persian. L1 linguistic conditioning has been shown to constrain L2 processing (Wesche & Paribakht, 2010). Nevertheless, Chinese and English share some semantic sub-features, particularly in motion verbs, which can facilitate ESL/EFL vocabulary acquisition.

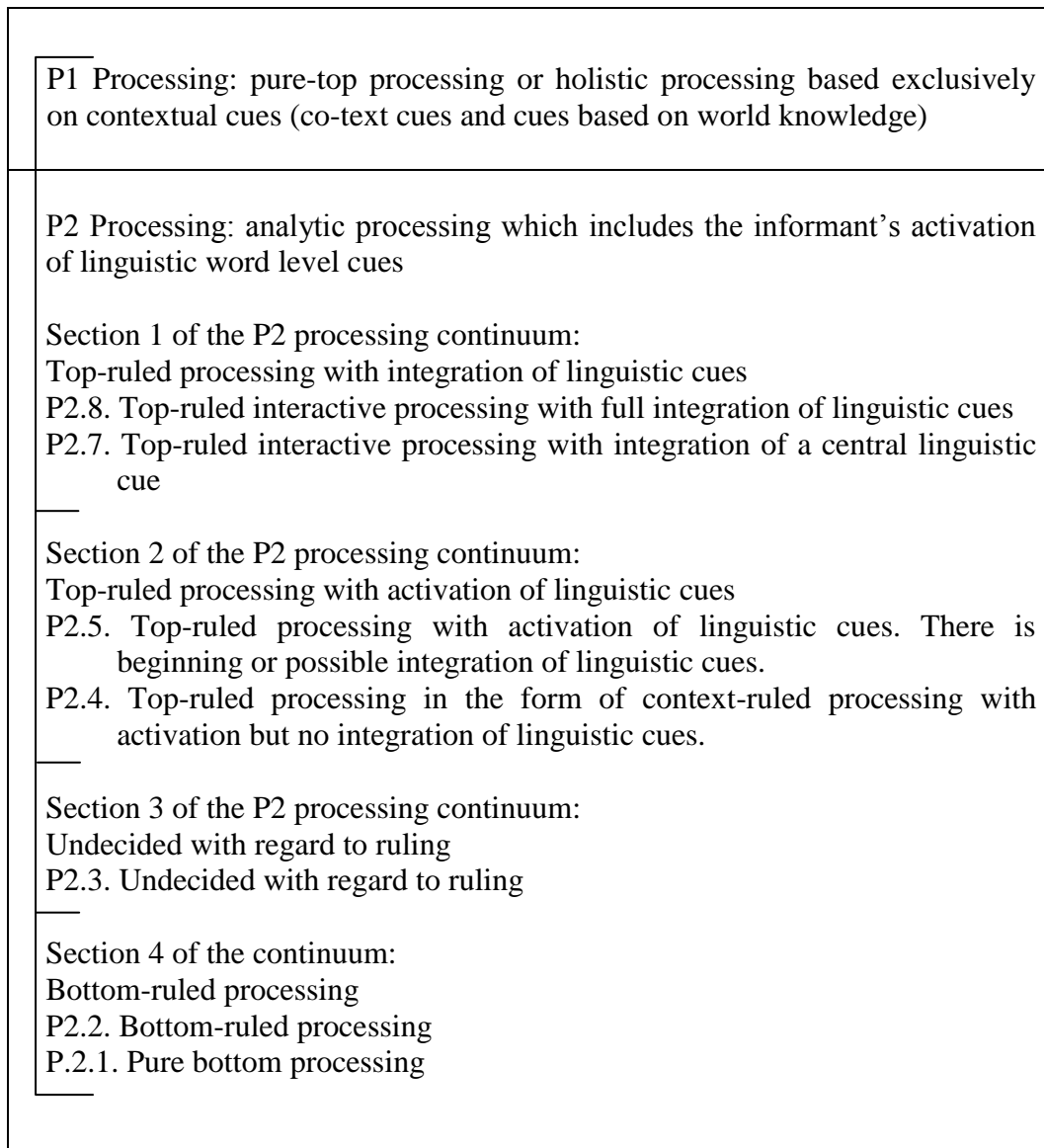


Figure 3.3. Coding framework of P1 and P2 processing continuum. Adapted from *Vocabulary and writing in a first and second language: Processes and development* (p. 78-81), by D. Albrechtsen, K. Haastrup and B. Henriksen, 2008, Basingstoke: Palgrave Macmillan. Copyright 2008 by Palgrave Macmillan.

The coding framework established by Haastrup (1991) and refined by Albrechtsen, Haastrup and Henriksen (2008) was used to code processing types consisting of knowledge sources as found in protocol analyses of introspective verbal protocols. This study used Albrechtsen, Haastrup and Henriksen's coding framework in interpreting verbal protocol data. The coding framework is detailed in Figure 3.3.

An important distinction is made by Haastrup, Albrechtsen and Henriksen (2004) and Albrechtsen, Haastrup and Henriksen (2008) between *potentially effective processing* and *ineffective processing*. Effectiveness is defined as the “informants’ chances of making a qualified guess or, at least, a guess that makes sense in the context” (Albrechtsen, Haastrup, & Henriksen, 2008, p. 87). Potentially effective processing encompasses P1 processing or pure-top processing and P2 processing Sections 1 and 2 on the continuum, or interactive top-ruled processing. Ineffective processing refers to Sections 3 and 4 P2 processing. It is posited in this study that CS reading texts can facilitate low-ability and middle ability learners who would otherwise use ineffective processing to achieve potentially effective processing.

In Haastrup’s (1991) model of *high-quality lexical inferencing*, a competent word processor has the following three characteristics: (1) *advanced processing* - possesses a processing repertoire that includes the full range of potentially effective processing types; (2) *adaptability of processing* - flexible in processing; and (3) *lexical inferencing success* - achieves a high level of inferencing success.

The other source of contextual cues stems from the text itself, or sentence knowledge. In a study to investigate the effects of contextual richness or transparency on guessability of target L2 words, Mondria and Wit-de Boer (1991) selected eight TWs and formulated eight contrived sentences of each TW in the subject + verb + target word + function of the target word form, and varying the factors of subject, verb, and function as being pregnant or non-

pregnant by the presence and absence of telling word cues in each grammatical/lexical category. This resulted in a taxonomy of word contexts ranked according to contextual transparency, namely pregnant contexts, moderately pregnant contexts and non-pregnant contexts. However, it is noted that the word contexts used by Mondria and Wit-de-Boer are deemed as pedagogical contexts that are specially designed for teaching vocabulary. These contrived contexts can be seen as artificially remote from authentic texts as the language is typically decontextualised. The focus of the current study is on natural contexts which are generally aimed to communicate ideas and not to specifically demonstrate the meanings of specific words (Beck, McKeown, & McCaslin, 1983). Furthermore, natural contexts form most materials used for vocabulary development in basal or graded readers (Beck et al., 1983).

Nagy et al. (1985) and Beck, McKeown and Kucan (2002) argue that many natural word contexts are not sufficiently helpful or informative for inferring word meanings. The reason is largely due to the general rhetorical purpose of an author to argue or explain a phenomenon rather than qualifying specific word meanings. Beck et al. (1983) examined several story contexts of target words found in authentic narrative texts and developed a continuum of effective word contexts which typify the natural contexts in which unknown L2 words are embedded. The continuum of natural word contexts is schematically represented in Table 3.2. At one end of the continuum is misdirective contexts, which are proximate cues that may lead L2 readers to an erroneous interpretation of a target word. Beck and colleagues illustrated each context type with a typical example, as listed in Table 3.2. They further tested the

validity of their context categories by eliciting inferences of TWs from L2 adult learners using two narrative texts taken from basal readers with TWs omitted and replaced by gaps. The results match their predicted continuum of guessing ease/difficulty of word contexts, with highest level of success found in target words embedded in directive contexts.

Table 3.2

Continuum of Natural Context Types and Illustrative Example Contexts with Target Words Italicised

| Natural Context Types | Example contexts |
|-----------------------|---|
| Misdirective contexts | Sandra had won the dance contest, and the audience’s cheers brought her to the stage for an encore. “Every step she takes is so perfect and graceful,” Ginny said <i>grudgingly</i> as she watched Sandra dance. |
| Nondirective contexts | Dan heard the door open and wondered who had arrived. He couldn’t make out the voices. Then he recognized the <i>lumbering</i> footsteps on the stairs and knew it was Aunt Grace. |
| General contexts | Joe and Stan arrived at the party at 7 o’clock. By 9:30, the evening seemed to drag for Stan. But Joe really seemed to be having a good time at the party. “I wish I could be as <i>gregarious</i> as he is,” thought Stan. |
| Directive contexts | When the cat pounded on the dog, he leapt up, yelping , and knocked down a shelf of books. The animals ran past Wendy, tripping her. She cried out and fell to the floor. As the noise and confusion mounted, Mother hollered upstairs, “What’s all that <i>commotion</i> ?” |

Note. From *Bringing words to life: Robust vocabulary instruction* (p.4-5), by I. L. Beck, M. G. McKeown and L. Kucan, 2002, New York: Guildford Press. Copyright 2002 by Guildford Press.

The directive context is deemed to be most helpful as it is distinguished from the other three contexts by the presence of pregnant or telling word cues

highlighted in boldface (see Table 3.2) which are relevant to guessing the meanings of TWs. It is noted that the word cues in the general context are semi-pregnant or less transparent than the word cues in the directive context. Alongside contextual clues of noise generation from dog yelping, fallen shelf of books and Wendy's cry, a synonym "noise" for the target word "commotion" is present in the directive context example which would substantially assist the readers to infer the meaning of the target lexical item. It can be seen that these clues semantically overlap with the conceptual coverage of "commotion". Instead of a one-to-one semantic mapping in the word association or translation approach, the contextualised approach offers a more nuanced capturing of conceptual meanings via a semantic network of associated words, particularly in the case of partial conceptual equivalence which lacks direct translation equivalence. Grabe (2008) noted that only directive contexts are useful for inferring unknown word meanings. In this study, a key criterion in the selection of target words is the presence of directive or transparent contexts. Additionally, it can be seen from the taxonomy of word contexts that useful/directive contexts entail the reader to be familiar with the majority of the ambient words. It is often the case that the most telling cues are in the immediate proximity to the TW and that there are no misleading clues nearby.

3.4. Connectionism and Information Processing Models

The overarching theory that this study subscribes to is the connectionist-oriented information processing approach as advocated by cognitive psychologists. The connectionist paradigm views the mental lexicon as a network of nodes linked to each other by interacting interfaces (Broeder &

Plunkett, 1994). In connectionist models, information access entails parallel, concurrent activation by multiple processors. Also, aspects of lexical entry or lexical word representation are partially activated in a distributed manner, accessible as activation patterns at the level of sub-lexical features, such as De Groot's DFM. Foundationally, all information processing models assume that human information processing is akin to computational processing. Laufer and Hulstijn (2001) state that the broad information processing paradigm is founded on features of computerized connectionist simulation. Underlying the information processing approach are four ontological assumptions which are as follows (R. Ellis, 2009):

- 1) Thinking - Firstly, information taken from the immediate milieu is processed via perception and attention during the process of thinking, encoding the perceived external stimuli in the sensory store and short-term memory.
- 2) Analysis of Stimuli - This is subsequently followed by systematic modifications made to the new input. The analysis of encoded stimuli is altered via the processes of encoding, strategisation, generalisation and automatisation.
- 3) Situational Modification - The input stored in the working memory and long-term memory is used in processing similar experiences or modified to fit different problems.
- 4) Obstacle Evaluation – the make-up of the obstacle or problem is assessed for difference or similarity with prior experience. Irrelevant and/or superfluous information elements may disrupt the evaluative process.

Typically, information processing proponents agree that there are three components of memory consisting of a sensory store which contain fleeting information susceptible to decay, a short-term store which includes the working memory, where input is held for a short yet adequate time for processing to occur, and a long-term memory store. According to R. Ellis. (2008), working memory is the locus of critical processes of perception, attention, and rehearsal and is of perennial concern in cognitive SLA.

The working memory model that is most influential in cognitive psychology and SLA is that of Baddeley and Hitch (1974). Human working memory is defined by Eysenck (2000, reported in R. Ellis, 2008) as a memory store that is constrained by space and holds information for only a few seconds. The model accounts for a wide range of tasks such as online processing of sentences, reasoning and problem solving among others which the short-term memory processes. The basic architecture of the working memory model is that it consists of three key parts – the phonological loop which holds input in an auditory mode briefly and facilitates articulatory rehearsal if willed by the subject; storage and modification of spatial and visual information are held in the “visual-spatial pad”; the most important component is the “central executive” which activates attentional resources directed at a target stimuli and concurrently filters out ambient information.

A neuro-imaging study by Tan et al. (2003) found that Chinese-English bilinguals reading in Chinese or L1 activate the left middle frontal and posterior

parietal gyri which are cortical regions linked to spatial information representation and memory and to management of inhibitory and excitatory resources. These findings built on an earlier study by Tan et al. (2000) which found that reading in Chinese is typified by activation of strong left lateralisation of frontal and temporal cortices and right lateralisation of visual systems, parietal lobe and cerebellum. These findings relate to Baddeley and Hitch's (1974) visual-spatial pad and central executive and confirms speculation from early memory research that Chinese words are processed differently from English words (e.g., Cheung & Kemper, 1993). Tan et al. (2005) infer that the visual nature of Chinese logographic characters may account for the activation of the visual-spatial neural system. The surprising finding is that when the bilingual subjects read in L2, the cerebral areas mediating English monolinguals' phonemic analysis were weakly recruited while the visual-spatial neural system and central executive are strongly activated. Their finding implies that Chinese-English bilinguals may not be fully proficient in processing English phonemically and instead rely on processing English words visually like Chinese characters. The postulation of this study is that processing the Roman script-based English visually requires more attentional resources and this may subsequently raise retention if the novelty and distinctiveness of English script are increased by the contrast with predominating Chinese logographs in a reading text. This postulation is further supported in a study by Hamada and Koda (2011) which found that recall of pseudowords with irregular English grapheme-phoneme correspondences by native English speakers and Chinese ESL learners waned, a feature markedly pronounced among the native English speakers. The reason is that English L1

users depend on phonological sensitivity in learning words incidentally (Ramachandra et al., 2011). Overall, empirical research shows that Chinese ESL learners rely less on phonology than English native speakers in processing English words as the former also used visual encoding similar to processing Chinese logographic characters as a complementary processing pathway.

A further study by Tan et al. (2005) found that the left middle frontal gyrus is recruited for phonological processing of Chinese while left temporoparietal regions are activated for assembling phonology in alphabetic languages. Indeed, several studies have shown that Chinese and Japanese logographic readers employ both phonological (to a lesser extent) and spatial encoding (to a greater extent) in learning and processing English words (e.g., Fender, 2003; Wang & Koda, 2005; Wang et al. 2003).

3.5. Involvement Load Hypothesis

The Involvement Load Hypothesis informs the research design of the study which evaluates lexical retention-retrieval. Laufer and Hulstijn's (2001) Involvement Load Hypothesis builds on empirical findings on L2 vocabulary acquisition and Craik and Lockhart's (1972) Levels of Processing framework or Depth of Processing hypothesis. It is paramount in the research design of this study and requires further elaboration to flesh out the ontological assumptions and tenets.

Firstly, the involvement load theory subscribes to the specific definition of task within the task-based approach – it is a meaning building and

communication problem-solving activity which simulates real-world communicative tasks; task completion is somewhat important and an assessment follows suit. Laufer and Hulstijn (2001) reinforce Skehan's (1998) tenet that task design should be developed to facilitate learners' focus on language form naturally and not artificially. Specifically, task requirements should resemble communicative activities outside the classroom in purpose and process although the task-based approach may include contrived and non-communicative tasks like filling in gaps in a cloze passage which can induce similar involvement loads. It is noted that different words can induce different degrees of involvement loads although the involvement load of all target words can be designed to be mostly similar in a classroom activity.

The Involvement Load Hypothesis is described as a motivational-cognitive construct of involvement consisting of two cognitive components (search and evaluation) and one motivational component (need). The ontological assumptions are as follows:

Assumption One: Retention of words when processed incidentally, is conditional upon the following factors in a task: need, search and evaluation.

(Laufer & Hulstijn, 2001, p. 14)

Assumption Two: Other factors being equal, words which are processed with higher involvement load will be retained better.

(Laufer & Hulstijn, 2001, p. 15)

Assumption Three: Other factors being equal, teacher/researcher-designed tasks with a higher involvement load will be more effective for vocabulary retention than tasks with a lower involvement load.

(Laufer & Hulstijn, 2001, p. 17)

Laufer and Hulstijn evaluated a few reading tasks according to the three components of task-induced involvement load which are summarised in Table 3.3. A minus (—) indicates the absence of an involvement variable, a plus (+) indicates the presence of a variable, and a double plus (++) shows the strong version of an involvement.

Table 3.3

Task-Induced Involvement Load

| Task | Status of TWs | Need | Search | Evaluation |
|--|--|------|--------|--|
| 1. Reading and comprehension questions | Glossed in text but irrelevant to task | — | — | — |
| 2. Reading and comprehension questions | Glossed in text and relevant to task | + | — | — |
| 3. Reading and comprehension questions | Not glossed but relevant to task | + | + | —/+ (depending on word and context) |
| 4. Reading and comprehension questions and filling gaps | Relevant to reading comprehension | + | — | + |
| 5. Reading codeswitched text and comprehension/ vocabulary questions and translation and vocabulary production | Relevant to reading comprehension and vocabulary questions | + | ++ | ++ |

Note. Adapted from “Incidental vocabulary acquisition in a second language: The construct of task-induced involvement,” by B. Laufer and J. Hulstijn, 2001, *Applied Linguistics*, 22(1), p. 18. Copyright 2001 by Oxford University Press.

In reference to Table 3.3, the first reading comprehension task consists of unfamiliar L2 TWs which are glossed in the text margin and comprehension questions which do not require focus on the TWs – such a task design fails to induce any need to focus on the glossed L2 words, and does not lead to a search for their meanings since they are provided in the glosses. Also, evaluation of word meanings is not required. The second reading comprehension task with glossed words that are relevant to the questions will induce a moderate need to look at the glosses but it will not induce search and evaluation. The third task is

similar to task 2 except for the absence of glosses, which will not only induce need but also search. The presence or absence of evaluation may vary with the ease or difficulty of a word and/or context. If the unknown word has only one meaning, and if the context is highly constrained, then there is no decision needed to evaluate and select the appropriate meaning. In the case of a polysemous word, the reader needs to pick the meaning which is most relevant in the context. If the task requires the learner to demonstrate productive vocabulary knowledge by writing a sentence illustrating the word meaning, this would intensify the evaluation component. The fourth task involves the same text but with the TWs replaced by gaps to be filled by the learner. The TWs are listed at the end of the text with translations and explanations. This would induce a moderate need, but no search since the word meanings are provided, and a moderate evaluation, since all the words in the list have to be assessed against each other and in the context of the gaps.

The fifth task mirrors the key attributes of the experimental treatment of this study. It is argued that the task induces a moderate need to focus on TWs (need), and that the learner needs to search for word meanings by guessing them from context (search), similar to Task 3. The difference in Task 5 is that there are specific questions eliciting and assessing students' understanding of the TWs which would lead to a greater relevance of the TWs. Reading the codeswitched text facilitates guessing from context for the L2 learner yet does not take away the elaboration or search component of the involvement load. Hence, the search component is strengthened in Task 5. The focus of the study is on polysemic TWs so that there is a need for evaluation. Also, the VKS was

used to elicit students' translations or synonyms, as well as producing sentences illustrating the contextual meaning of TWs. All these requirements boost the evaluation component.

3.6. Bilingual Memory Models

The lexical representation models discussed here are related to two questions concerning lexical inferencing – to what extent do late second language learners rely on L1 to access L2 word concepts? Can high-ability students develop L2 word conceptual store independent of L1? The organisation of lexicosemantic knowledge in bilingual memory has been the subject of modeling by several cognitive psychologists and linguists based on cumulative empirical findings. De Groot and Hoeks (1995) argue that bilingual memory organisation is not static and a valid psycholinguistic model needs to account for variant performance among bilinguals according to proficiency levels, although they recognized that there are other variables involved in modulating bilingual memory structure. Overall, the models aimed to postulate based on empirical findings (1) whether the bilingual conceptual system is shared or differentiated as language-specific stores, (2) that there are processing linkages at word form level (lexeme) and conceptual level (lemma) between translation equivalents, (3) and whether these links are symmetrical or asymmetrical in strength, or whether the only access to concepts is via L1 lemma.

The early work by Potter et al. (1984) is the first influential work to describe the bilingual memory in a systematic and cogent manner. Potter et al. (1984) tested 3 hypotheses regarding L2 word processing and its memory organisation. All 3 hypotheses differentiate conceptual meanings from word forms. They postulates that word meanings are stored in a common conceptual memory while language-specific word forms are stored separately. Recent empirical research has corroborated the existence of semantic convergence in the bilingual language faculty (e.g., Ameel et al., 2009). Their first hypothesis is the *word association hypothesis* which posits direct bidirectional lexical associations between L1 and L2 word forms. Recently, a lexical decision semantic priming study employing ERPs and response times (RTs) showed that the locus of lexical linkages is at the level of word form (Elston-Güttler et al., 2005). Lexical connections refer to L1 word forms related to L2 counterparts, particularly cognates in similar or related language pairings which are demonstrated in antecedent studies cross language priming studies (e.g., De Groot, 1992b, 1993; Van Hell and De Groot, 1998a, 1998b). Potter et al. also proposed a different theory called the *concept mediation hypothesis* which states that L2 word forms are bidirectionally linked to the underlying common conceptual store. This is illustrated in Figure 3.4.

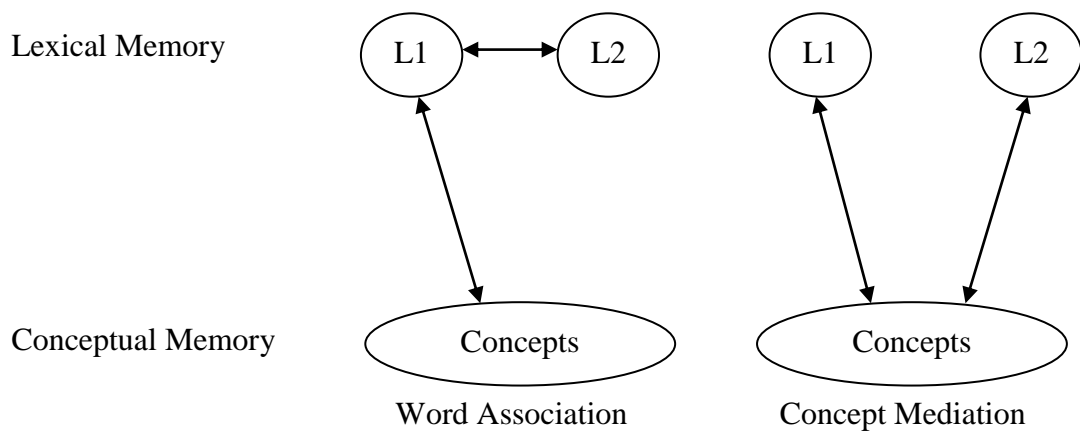


Figure 3.4. Two lexicosemantic organisations of bilingual memory. Adapted from “Lexical and conceptual representation in beginning and proficient bilinguals,” by M. C. Potter, K. F. So, B. von Eckardt and L. B. Feldman, 1984, *Journal of Verbal Learning and Verbal Behavior*, 23, p. 25. Copyright 1984 by Reed Elsevier.

Potter et al. (1984) proposed an intermediate model in which L2 learners begin with only L1-L2 lexical links or the word association stage, and gradually develop direct conceptual links between L1 and the conceptual store or concept mediation stage such that conceptual links replace lexical links as the means to connect L2 word forms and conceptual meanings. Potter et al. (1984) further posited that the concept mediation stage may eventually replace the word association stage. One such model which also captures this developmental process is Kroll and Stewart’s (1994) asymmetrical model of bilingual representation or RHM as shown in Figure 3.5.

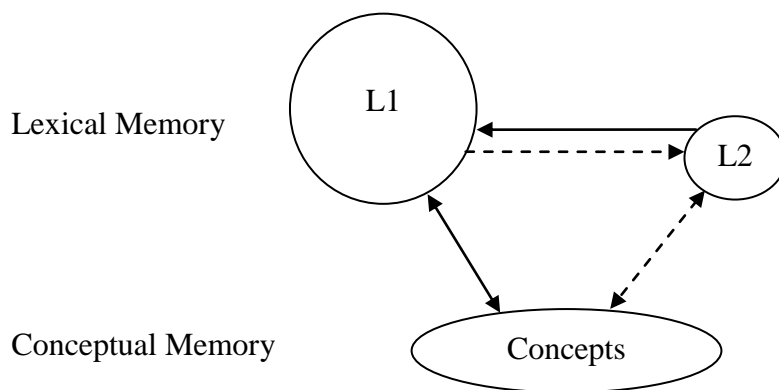


Figure 3.5. The asymmetrical model of bilingual representation. Adapted from “Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations,” by J. F. Kroll and E. Stewart, 1994, *Journal of Memory and Language*, 33, p. 158. Copyright 1994 by Reed Elsevier.

According to Kroll and Stewart (1994) and Kroll and De Groot (2005), both lexical and conceptual links are active but vary in activation level depending on L2 fluency. RHM postulates that L2 learners of all proficiency levels employ lexical links with L1 to access concepts, which are represented by bold lines from L2-L1 and L1 to the conceptual system. RHM agrees with the word association and conceptual mediation models that the lexical and conceptual links are bidirectional. The beginning learner has only lexical links initially, similar to Potter et al.’s Word Association hypothesis, and as proficiency increases, conceptual links are also acquired. Intermediate to advanced L2 learners can access direct concepts via L2 but direct L2 concept mediation is considered weaker than L1 concept mediation, as the former is represented by the dotted line between L2 and conceptual store while the bold line between L1 and the conceptual store represents the latter. The lexical links remain in L2 learners of all proficiency levels and are assumed to be stronger than the eventually acquired conceptual links. This view is further elaborated

by Kroll and Stewart's (1994) findings that (1) L1-L2 is faster than picture naming in L2, and (2) L1-L2 translation is slower than L2-L1 translation, which is more pronounced in low proficient learners. The reasons are that the former required concept mediation which is more difficult due to the weak L2 conceptual links while the latter required lexical associations between L2 and L1 which is easier owing to the strong L2-L1 lexical links and L1 conceptual links.

The model suggests that L2 learners tend to translate more efficiently from L2 to L1 rather than vice versa. The asymmetric sensitivity to conceptual features is similarly borne out in category interference and Stroop tasks based on a review of past studies by Kroll and Stewart (1994). Also, the RHM predicts that cross-linguistic semantic priming will be stronger from L1-L2 than from L2-L1 – a postulation that is substantiated by empirical findings (e.g., Chen and Ng, 1989; Park, Badzakova-Trajkova and Waldie, 2012). RHM's postulation of strong lexical links is in alignment with Green's Inhibitory Control (IC) model (1998, 2007, as reported in Ong and Zhang, 2010), which proposes that there is parallel activity of the two languages but the RHM added the concept of asymmetrical activation of conceptual links based on research findings. A comprehensive review and study by Dimitropoulou, Duñabeitia and Carreiras (2011) clarified that the asymmetric cost is limited to sequential and/or unbalanced bilinguals.

Recent empirical literature has supported the parallel access hypothesis, a connectionist-based perspective, which states that the bilingual recruits both

languages simultaneously when processing stimuli or input bottom-up and/or top-down. Priming and bilingual Stroop studies have confirmed that bilinguals activate both languages in parallel while reading (e.g., Chen & Ho, 1986; Beauvillain & Grainger, 1987; Grainger & Beauvillain, 1987; Grainger and Dijkstra, 1992; La Heij, 2005; Li, 1996; Marian & Spivey, 2003a, 2003b; Preston & Lambert, 1969; Spivey & Marian, 1999). While there is no question of parallel activation of languages in the bilingual mental faculty, Marian and Spivey (2003b) suggest that the strength of linguistic activation varies depending on stimuli, linguistic background and language mode. Correspondingly, Green's (1998, 2007) IC model states that both languages are activated concurrently within the bilingual lexico-semantic system, alternating between selected and active levels of activation. Hence, it can be seen that a bilingual's L1 is activated while reading a L2 text.

Also, another asymmetrical difference highlighted by RHM is the size of the L1 lexicon which is clearly bigger than the L2 lexicon. Empirical results by Bialystok et al. (2010), Bialystok and Feng (2009) and Bialystok, Craik and Luk (2008) confirmed that the L1 lexicon is significantly larger than L2 lexicon in bilinguals. It is further proposed that gradually over time, the L2 conceptual link would grow stronger as L2 proficiency increases. Recent evidence converges on L2 vocabulary acquisition as a cumulative and time-intensive course (Grabe, 2009).

Cognitive SLA research has affirmed the RHM framework in both bilinguals and trilinguals (e.g., De Groot & Hoeks, 1995; Kroll & Sholl, 1992).

Altarriba and Mathis (1997) among others corroborate that L2-L1 lexical links are relied on by beginning L2 learners in processing L2 words in a translation recognition task. Slower mean response times were recorded for orthographically related and semantically unrelated English word-Spanish word pairs, which imply that there is a lexical interference effect.

However, Barcroft and Sunderman (2008) criticized RHM for glossing over L2 vocabulary acquisition process with dotted lines representing weak conceptual associations which are vaguely strengthened over time due to increased L2 proficiency. Nevertheless, it can be seen that RHM is a macro-level model that accounts for L1 and L2 processes. What are the interacting variables that raise L2 vocabulary acquisition? A discussion of these variables in the preceding chapter has shed light on these same variables as specific parameters that can be manipulated to test the relative importance of each variable. Three of these variables are encapsulated in the Involvement Load Hypothesis which was discussed in the preceding section of this chapter. A discussion of other important variables within Haastrup's (1991) hierarchy of cue levels, namely topic familiarity and contextual cues was detailed in Section 3.2 of this chapter.

Nan Jiang's (2000, 2002, 2004b) LRDM is built on Kroll and Stewart's (1994) RHM of bilingual memory organisation and Levelt's (1989) model of lexical representation. Both models are similar and differ slightly in focus – Jiang's model focuses on L1-to-L2 conceptual transfer and the progressive development of L2 leading to direct L2 conceptual association with conceptual

store at the word acquisition level rather than at a holistic language proficiency level of postulation similar to RHM. Jiang's model is diagrammatically represented in Figures 3.6 and 3.7.

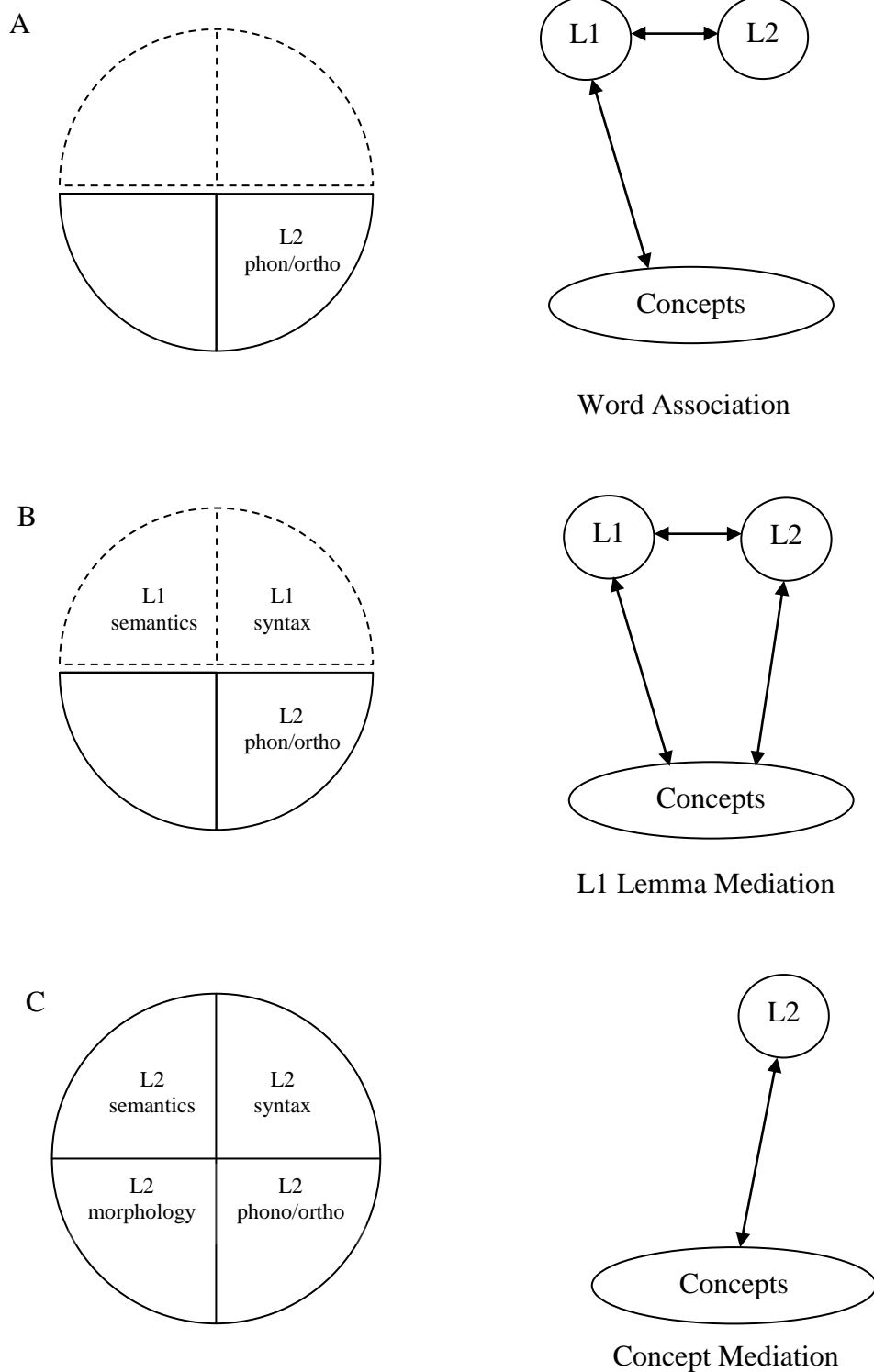


Figure 3.6. L2 Lexical Representation and Development Model. Adapted from "Lexical representation and development in a second language," by N. Jiang, 2000, *Applied Linguistics*, 21(1), p. 51-54. Copyright 2000 by Oxford University Press.

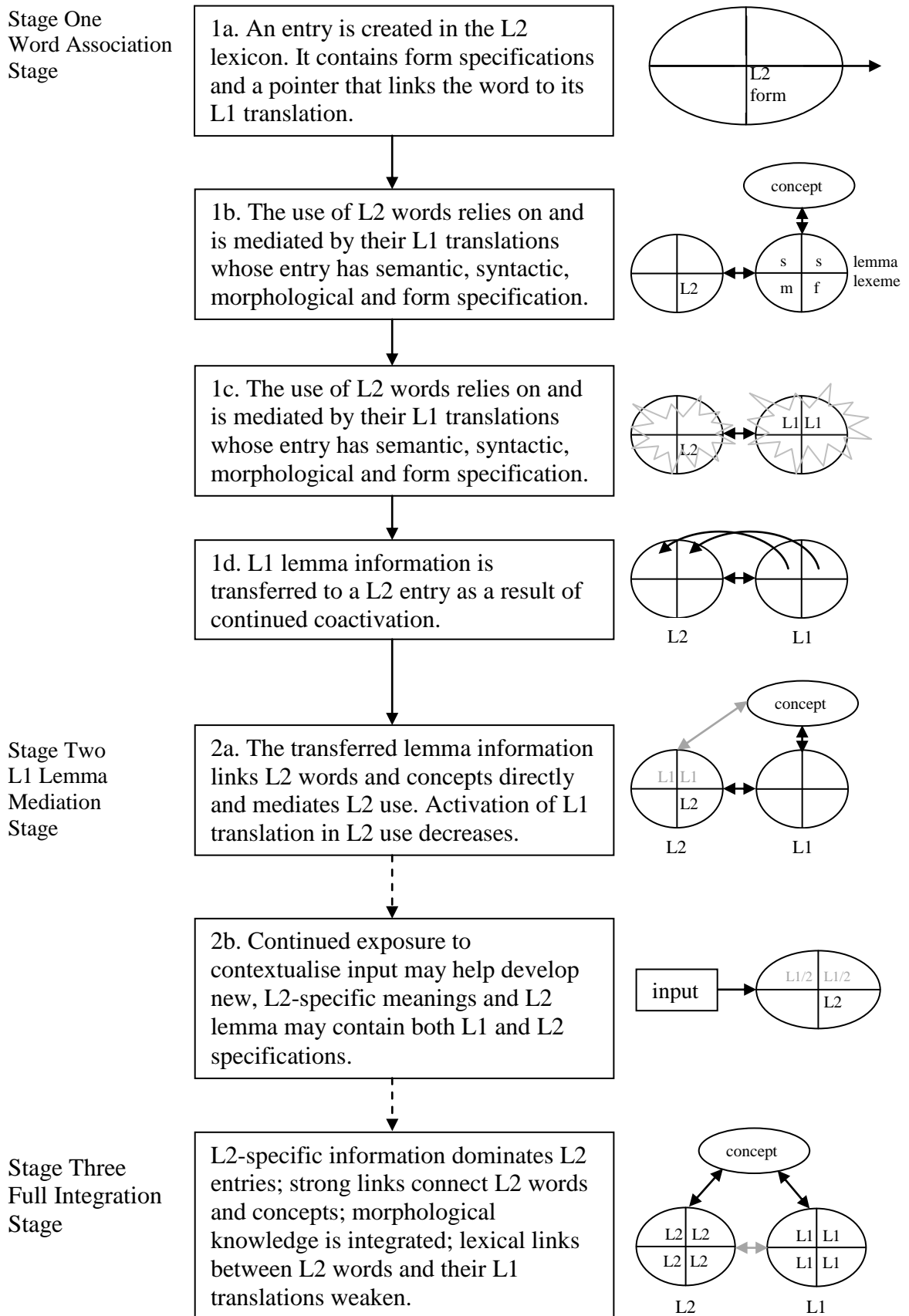


Figure 3.7. Stages and processes of adult L2 vocabulary acquisition. Adapted from “Semantic transfer and its implications for vocabulary teaching in a second language,” by N. Jiang, 2004b, *The Modern Language Journal*, 88, p. 418. Copyright 2004 by John Wiley & Sons, Inc.

In Figure 3.6, the processing models indicated as A and B are similar to Potter et al.'s (1984) word association model and concept mediation models respectively but they are further supplemented with L2 lexical representation or entry models showing that the early stage bilingual associates L2 word form information with L1 translation equivalents and the advanced bilinguals accessing L2 word meanings directly. Semantic priming studies have shown that semantic and translation access can be found across markedly dissimilar orthographies (see Altarriba & Basnight-Brown, 2007; cf. De Bot, Broersma & Isurin, 2009). Jiang believes that direct conceptual links are largely unachievable by L2 learners. This postulation appears to be affirmed by a recent lexical decision study by Dimitropoulou, Duñabeitia and Carreiras (2011) which found that L2 proficiency does not reduce the asymmetry between L1-L2 and L2-L1 translation directions. They share Jiang's pessimism that most L2 learners, even highly proficient ones, do not develop direct L2 conceptual links but hedge that native-like L2 proficiency is required for symmetric effects or direct L2 conceptual links to appear. Most L2 words stabilise at a proposed intermediate stage illustrated in Figure 3.3 which is the novel contribution of Jiang's model, based on preceding findings of L1 transfer and influence in L2 learners (see Jarvis, 2009 for a review), with more recent evidence for L1 transfer in the acquisition of L2 collocations (Yamashita & Jiang, 2010). Jiang postulates that as L2 proficiency increases, associations between L2 words and L1 translations or lemmas are strengthened. In other words, L1 lemmas are seen to be attached to L2 formal features to form lexical entries. Jiang called this stage the "L1 lemma mediation" stage as L2 word conceptual access is mediated by L1 lemmas. L2 words are seen to be linked to

conceptual representation directly via L1 lemmas and through word association with their L1 translation equivalents. The former or conceptual linkage is described as weak and not highly integrated into the L2 entry. This entails the loss of L2-specific semantic features. Recent empirical evidence has shown that even proficient bilinguals drop L2-specific semantic features in favor of shared categories in defining concrete words (Ameel et al., 2009). Jiang (2000) stresses that the stages in the LRDM describe the progressive acquisition of a target word and not linguistic proficiency level per se as RHM postulates.

Jiang's L1 lemma copying hypothesis is substantiated by empirical findings by several studies which found that learners outperformed their peers when L1 is used in FFI or employed in successful acquisition of verbs (e.g., Laufer & Girsai, 2008; Giacobbe (1992). Also, studies reviewed earlier like Altarriba and Mathis (1997) and Prince (1996) used L1 translations which aid beginning learners' conceptual mediation of unknown L2 words.

3.7. Further Refinements to RHM: DFM and MHM

While several picture naming and category interference studies agree that lowly proficient learners develop lexical and not conceptual links (e.g., Chen & Leung, 1989; Kroll & Curley, 1988), Altarriba and Mathis (1997), among others, state that L2 conceptual development is not precluded in beginning learners as predicted by HRM. Dufour and Kroll (1995) developed a slightly modified developmental version of RHM which postulates that proficiency is positively correlated with the strength of L2 conceptual connections – lowly proficient bilinguals have weak L2 concept connections while highly proficient

bilinguals have relatively strong L2 concept connections. Several semantic priming studies using ERPs, which measure online electrical activity of the brain in response to a single stimulus or event of interest evident from a series of multiple trials recorded in electroencephalography (EEG), have corroborated the proficiency effects on L2 conceptual connections besides corroborating functional magnetic resonance imaging (fMRI) evidence (e.g., Kotz, 2001; Kotz and Elston-Güttler, 2004). The N400 effect, a measure of typical cognitive response to meaningful stimuli, is observed in both L1 natives and L2 learners although the N400 in the latter is slightly delayed (e.g., Ardal et al., 1990; Kotz & Elston-Güttler, 2004). The data indicate that associative processing in L2 learners is sensitive to proficiency level.

Altarriba and Mathis (1997) employed a Spanish-English translation recognition task; English monolingual participants showed conceptual interference inferred from slower mean response times in evaluating semantically related English word-Spanish word pairs compared to decoupling semantically unrelated English word-Spanish word pairs. This perceived conceptual interference occurred after just one initial session involving viewing Spanish words paired with English translations displayed on a computer screen together with a voiceover articulating the word pairs. Also, the session involved a written matching test of the same English-Spanish pairs, with subsequent correction and feedback from the researchers. Another test followed where participants matched the correct English words with their Spanish counterparts and filled in gaps of English sentences with Spanish words from a list. It is unclear if the research design used by Altarriba and Mathis (1997) is incidental

or intentional, but it is noted that the learning task induces moderate involvement load similar to Task 4 in Table 2 as the participants need to focus on the target Spanish words and evaluate against each Spanish word and the sentential contexts of the gaps. It can then be seen that task induced involvement load may have contributed to the incidental vocabulary learning of the participants. Altarriba and Mathis (1997) argue that it is local lexical knowledge that varies from word to word rather than systemic language proficiency per se that differentiates learners according to lexical and conceptual development. This view is echoed by Jiang (2000) who suggests that words in a learner's lexicon are likely to be at varying stages of development. Beginning learners can already form conceptual links between L2 and the conceptual system, which is contrary to RHM (but not the later developmental version of RHM) which postulates that L2 conceptual links are weakly represented even in highly proficient bilinguals. This view is corroborated by Stroop literature where evidence agrees that there is conceptual mediation in L2-L1 translations as well as L1-L2 translations (e.g., La Heij et al., 1996). However, these findings support the L1 lemma mediation hypothesis rather than Potter et al.'s (1984) concept mediation hypothesis in that learners map L1 lemma onto L2 words. It is noted that semantic priming and translation priming literature that appear to support conceptual mediation actually support the L1 lemma mediation hypothesis.

Yet another criticism of RHM is the model accounts for only conceptual equivalence between languages and disregard cross-linguistic semantic differences by the portrayal of the conceptual system as unified and shared

between the languages (Pavlenko, 2009). De Groot and Nas (1991) argued that there are separate conceptual stores in L1 and L2. Based on subsequent studies by De Groot and colleagues (e.g., De Groot, 1993; De Groot & Keijzer, 2000; Lotto & De Groot, 1998), noncognates, abstract words, and verbs are more likely to be stored in discrete L1 and L2 conceptual memory while concrete words, cognates and nouns are more likely to be located in a shared or common memory store. De Groot (1992a, 1992b) proposed the DFM which reflects findings that there are longer latencies in translating abstract words relative to translating concrete words (e.g., De Groot, 1993, 1995; Kroll & Stewart, 1994; Van Hell & De Groot, 1998b). It is inferred that semantic features of abstract words are less shared than semantic features of concrete words and cognates. In essence, DFM postulates two levels of semantic memory, namely one which consists of nonlinguistic concepts that are accessible independent of language, while the other contains language-specific semantic features that may fully or partially overlap. This two-level postulation parallels Levelt et al.'s (1999) theory of lexical access in speech production which states that the conceptual stratum is made up of a language-independent store of notions and language-particular lexical concepts (Levelt et al., 1999, reported in Ong & Zhang, 2010).

Despite Kroll and Stewart's (1994) finding that cognates are translated faster than non-cognates, they did not consider that the conceptual store could be divided between language-specific concepts and common concepts but inferred that the bilinguals rely on both L1 and L2 direct conceptual connections and not just on word association or lexical links when processing cognates. However, it is noted in this study that the languages investigated,

namely English and Chinese, are dissimilar in several levels between a logographic language and an alphabetic language – orthographically, phonologically, morphologically and syntactically with a general lack of cognates. Jiang (2000, 2004a) found that morphological information is less susceptible to lexical transfer than semantic/syntactic information as the former is language-specific. This view is supported by Zhang's finding (2002) that Chinese EFL learners retained L2 words better from direct strategy instruction on English morphology. Studies have shown that lexical transfer can be accomplished via highly dissimilar orthographies (e.g., Altarriba & Basnight-Brown, 2007), although it has been described by Jiang (2000) that the link between L2 lexical items and direct conceptual representations is weak and is largely mediated by L1 lemmas at the L1 lemma mediation stage. The DFM is diagrammatically represented in Figure 3.8, showing a representation of two pairs of Dutch-English translations. DFM is in agreement with RHM and empirical findings that the conceptual store is shared across two languages, as represented by units or features indicated as nodes at the semantic level which are accessible to both languages.

Nevertheless, DFM posits that combinations of conceptual features are language-specific. It can be seen that the lexical nodes *Vader* and *Father* share several conceptual nodes indicated by blackened nodules, showing the semantic similarity between the concrete words is strong. In contrast, the abstract pair shares far fewer conceptual nodes (marked by darkened nodules), indicating their weak semantic correspondence. The key merit of DFM is the consideration of cross-linguistic differences (Pavlenko, 2009).

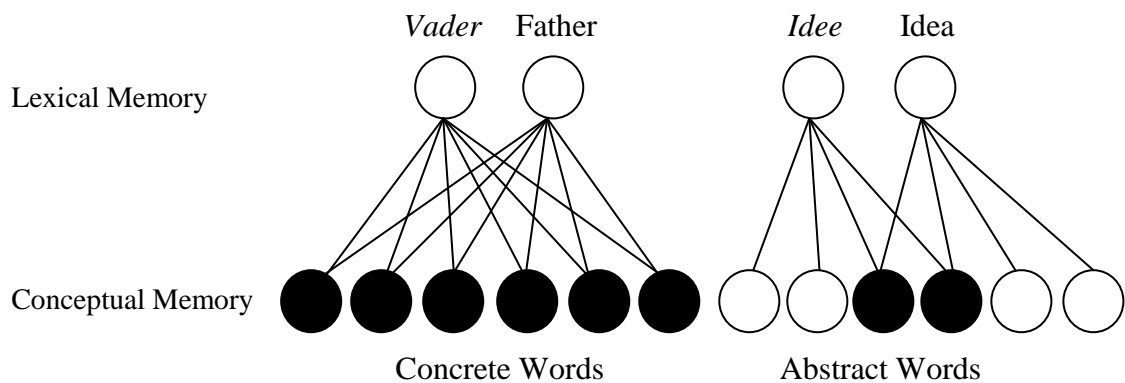


Figure 3.8. The Distributed Feature Model. Adapted from “Determinants of word translation,” by A. M. B. De Groot, 1992a, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 18, p. 1016. Copyright 1992 by American Psychological Association.

Recently, RHM has been modified by Pavlenko (2009), who considered criticisms of the RHM and incorporated cross-linguistic differentiation between semantic and conceptual representations in the DFM. According to Pavlenko (1999), every word carries three basic components: lexical (or word form which corresponds to lexical level postulated in RHM), semantic (similar to language-specific semantic features or lexical memory of DFM), and conceptual information (universal nonlinguistic concepts or conceptual memory of DFM).

Pavelenko (2009) points out that DFM has inherent weaknesses – (1) it lacks the developmental aspect in predicting the learning of partial translations, (2) it does not consider processing differences in prototypical or universal meanings and context-dependent meanings, and (3) it myopically equates strength of interlingual connections with degree of semantic correspondence without consideration of other factors. Strength of interlingual and semantic connections is inferred from reaction-time tasks such as lexical decision, priming and Stroop interference tasks among others (Altarriba and Basnight-

Brown, 2009). However, the strength of interlingual links can be affected by contexts of word acquisition and use, cognate word forms, word activation levels in the bilingual language faculty, frequency of coactivation of collocates, and bilingual proficiency levels (De Groot, 2002; Kroll & Tokowicz, 2005). Nevertheless, frequency and cognate status are lexical and not conceptual aspects, particularly when the latter can consist of partial equivalence and false cognates. Studies conducted in the DFM tradition which focus on linguistic categories in bilingual representation cannot differentiate between shared conceptual overlap between languages and bilinguals' erroneous assumptions of shared concepts. Another weakness of the DFM model, (4) is the overgeneralisation of concrete words as semantically shared between languages. There are concrete words that are cross-linguistically different, either partially or fully (Pavlenko, 2009).

Figure 3.9 shows the schematic diagram of the Modified Hierarchical Model (MHM) which retains the merits of RHM and DFM and addresses their shortcomings based on empirical findings. Within the MHM framework, Pavlenko (2009) succinctly describes three distinct forms of conceptual equivalence relationships between languages that influence L2 vocabulary learning and which, in turn, underlie the key features of MHM:

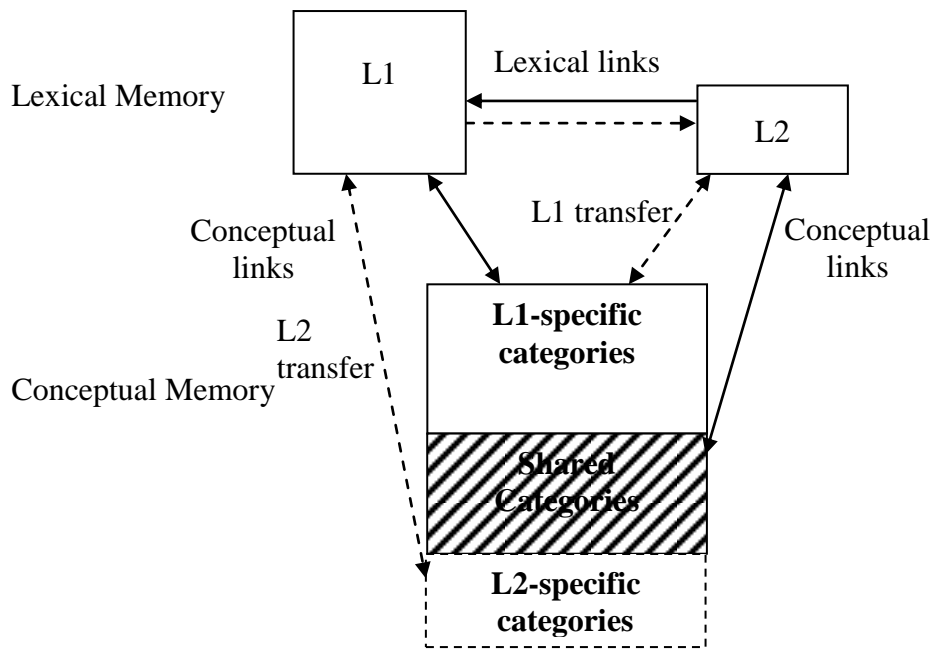


Figure 3.9. The modified hierarchical/asymmetrical model of bilingual representation. Adapted from *Conceptual representation in the bilingual lexicon and second language vocabulary learning* (p. 147), by A. Pavlenko, 2009, in A. Pavlenko (Ed.), *The bilingual mental lexicon: Interdisciplinary approaches*, Clevedon: Multilingual Matters. Copyright 2009 by Multilingual Matters.

- (1) *Conceptual equivalence* facilitates L2 vocabulary learning through positive transfer; the main learning task in this context is the establishment of links between L2 words and already existing concepts;
- (2) *Partial (non) equivalence* facilitates learning through partial overlap (positive transfer), yet also complicates it when learners assume complete equivalence and display negative transfer; the main L2 learning task in this context is conceptual restructuring;
- (3) *Non-equivalence* simultaneously complicates learning, as learners have to develop new categories, and facilitates it through the absence of competing representations; the L2 learning task here involves development of a new linguistic category that allows

learners to map a new word onto real-world referents; this task may be easier in the case of new objects and more challenging in the case of abstract or emotion categories.

(Pavlenko, 2009, p. 152-153)

Full or partial conceptual equivalence can be seen to be in parallel with lexicalisation, as lexicalised words in L2 have corresponding counterparts or near-counterparts in L1. Non-equivalent words are akin to non-lexicalised words in the L2 - words with no corresponding counterparts in the L1. Pavlenko further speculates that in the case of partial (non) equivalence, conceptual restructuring may have four possible outcomes:

- (1) Coexisting representations, where speakers conform to the constraints of each language;
- (2) Partial restructuring
- (3) Converging representations distinct from the categories mediated by languages A and B; and
- (4) Shift toward the L2 category.

(Pavlenko, 2009, p. 153)

The notable differences of MHM with earlier models lie in the conceptual organisation, conceptual transfer and L2 conceptual restructuring and development. The differences are as follows:

Conceptual Organisation - MHM denotes separated language-specific stores in the conceptual system, as informed by DFM and recent empirical findings, rather than a unified conceptual system posited in RHM. Furthermore, Singleton (2007) concluded that recent psycholinguistic evidence favors a differentiated conceptual store. Notably, the largest store is the L1-specific categories, followed by shared categories and L2-specific categories. These separate stores consist of language-specific stores that match word forms of one language while the activation of conceptual and lexical links to the other language would terminate because of non-lexicalisation, leading to breakdowns in fluency and resulting in codeswitching and word borrowings (Pavlenko, 2009; c.f. Ong & Zhang, 2010). The conceptualizer, as postulated by Green (1998, as reported in Ong & Zhang, 2010), is assumed to be linguistically undifferentiated. However, in the MHM, linguistic and social contexts affect the conceptualiser such that they activate language-specific lexical concepts while activation in the other language terminates. This proposition is not new – Paradis (1978, as reported in Paradis, 2007) accounts for Kolars’ (1968) experimental findings that were inconsistent with the one-store hypothesis and the two-store hypothesis (L1 and L2-specific stores) but show partial adherence to both hypotheses by postulating a three-store system similar to Pavlenko’s model.

Conceptual transfer – MHM takes into account two types of conceptual transfer, namely semantic and conceptual transfers. In Figure 3.7 based on an illustrative example of semantic transfer as described by Pavlenko (2009), the Finnish word *kiele* is mapped onto the wrong polysemic concept shared with the word “language”, indicated by the dotted line. The learner needs to inhibit

the erroneous link and relink the concepts of tongue and language enclosed in bubbles to the correct English word “tongue”.

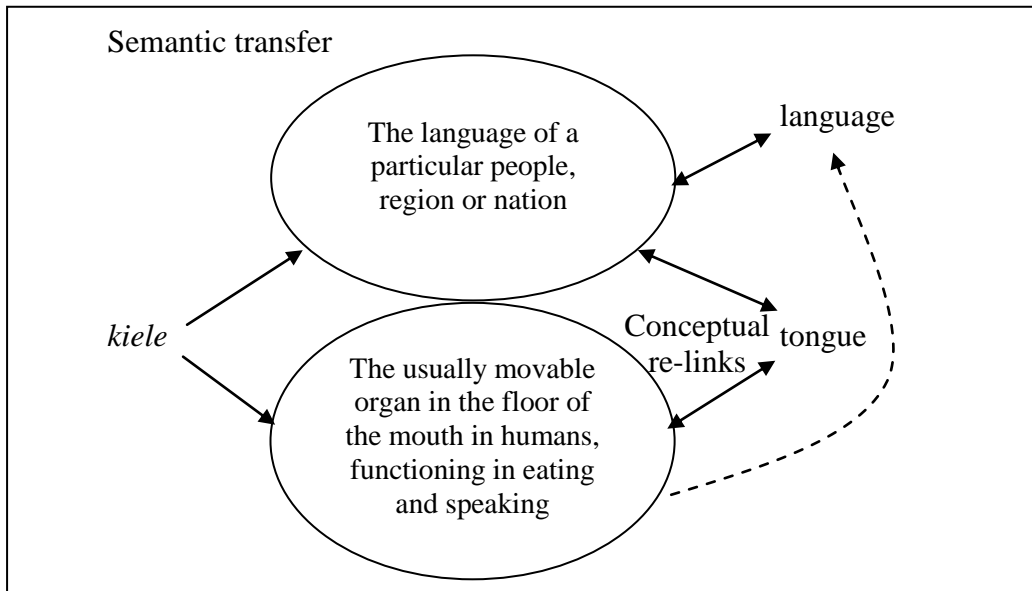


Figure 3.10. Diagrammatic illustration of semantic transfer based on Pavlenko’s (2009) described example

In Figure 3.8, conceptual transfer refers to an incomplete knowledge of the structure of the concept *Chashka*, due to an overlap region denoted by the concept of cup and subsequent erroneous extension to include the concept of paper composition. The learner has to restructure the concept of *Chashka* moving away from the paper concept to non-paper concept while retaining the overlapping cup concept.

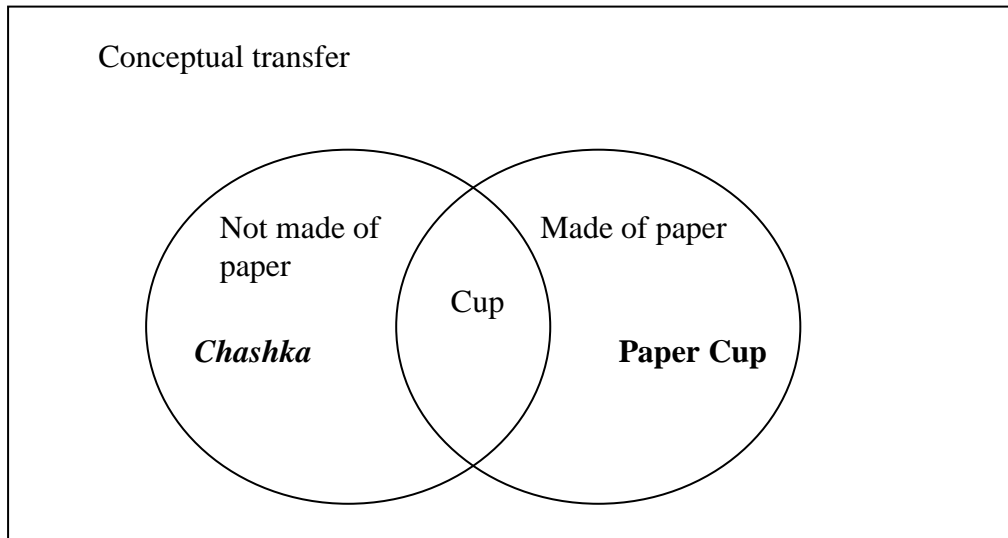


Figure 3.11. Diagrammatic illustration of conceptual transfer based on Pavlenko's (2009) described example

L2 conceptual restructuring and development – Pavlenko states that the most important goal of L2 vocabulary learning is conceptual restructuring and development of native-like linguistic categories, which contrasts with the assumption of RHM that the key aim of second language vocabulary acquisition is the development of direct L2 conceptual mediation. This claim is not new – Ringbom (1983) and Giacobbe (1992) have found that L2 words that are mapped to L1 concepts undergo a process of conceptual restructuring leading to the remapping of linguistic forms to new concepts. However, Jiang (2002) qualifies this finding with a statement that conceptual recombination is limited to a small proportion of L2 words, even in the case of highly proficient bilinguals. Jiang (2004b) further adds that natural contexts of difficult words play a limited role in semantic restructuring. Pavlenko concedes that the developmental process is incremental and gradual, and likely limited to shared categories, although she indicates in the MHM that formation of L2-specific categories is possible but weak with a conceptual L2 transfer or link to L1.

In a review of behavioral studies employing semantic priming, ERP and fMRI data, Kotz and Elston-Güttler (2007) found that semantic features are largely shared across languages, essentially downplaying the notion of separate language-differentiated stores. Also, recent categorisation and naming studies show that there is semantic convergence in the bilingual language faculty (e.g., Ameel et al., 2009; Wolff and Ventura, 2009). According to Ameel and colleagues, semantic overlap of words in two languages may not solely be a property of word classes (e.g., abstract v. concrete words; nouns vs. verbs), but a function of the speaker's linguistic status (monolingual vs. bilingual).

As discussed earlier in this chapter, DFM accounts for the lexical overlap of concrete words/nouns and lexical discreteness of abstract words/verbs. Ameel, Malt, Storms and Van Assche (2009) found that DFM can be adapted to account for differences in activated conceptual networks of words in bilingual memory in comparison with monolingual memory. Building on the DFM framework, Ameel, Storms, Malt and Sloman, (2005) and Ameel et al. (2009) differentiate the phenomenon of semantic simplification of concrete words in bilinguals relative to monolinguals, as illustrated in A in Figure 3.12. In A of Figure 3.12, the nodules on the lexical level symbolise approximate translation equivalents in Language 1 and Language 2 for monolinguals. The blackened nodes on the conceptual space represent semantic features that are relevant to the words, while the white nodes are language-specific features that are not shared across the words. B in Figure 3.12 is noticeably different in that the bilingual perceived the lexical words in both languages as conceptually similar with less language specificities, as indicated by the unconnected white nodes on the semantic level. The lower panel represents the less complex

category structure for bilinguals as compared to monolinguals (Ameel et al., 2009).

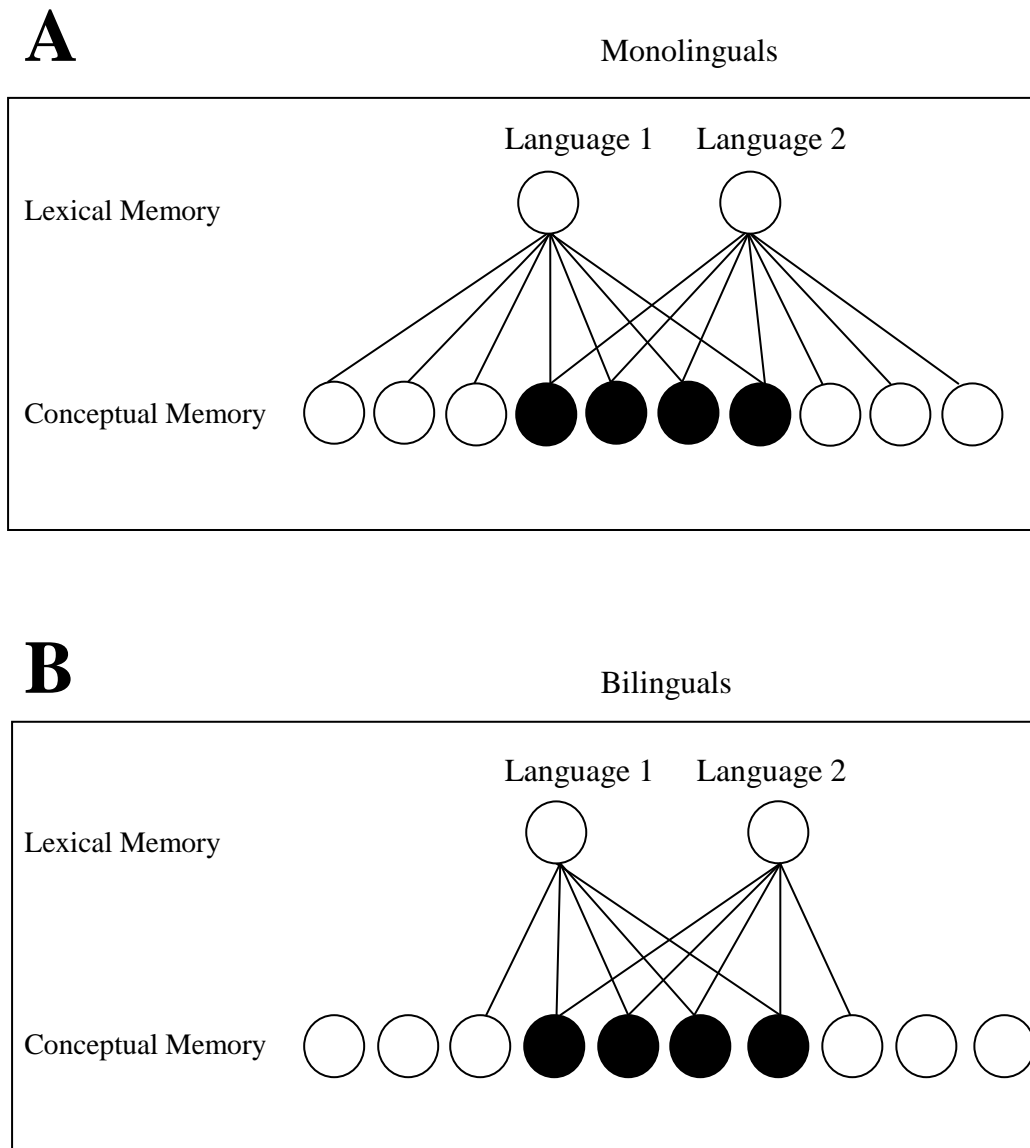


Figure 3.12. Schematic representation of the monolingual lexicon (A) and the bilingual lexicon (B). The lower panel represents the less complex category structure for bilinguals as compared to monolinguals. Adapted from “Semantic convergence in the bilingual lexicon,” by E. Ameel, B. C. Malt, G. Storms and F. Van Assche, 2009, *Journal of Memory and Language*, 60, p. 287. Copyright 2009 by Reed Elsevier.

However, Ameel et al. caution that the schematic representation of the bilingual faculty may not be sufficiently nuanced to capture situations when L1 specificities are retained while L2 specificities are dropped, and conversely. The two possibilities are diagrammatically illustrated in A and B in Figure 3.13 respectively. They conceded that more evidence is needed to further corroborate the finding that the linguistic idiosyncrasies of one language are imposed on the other language. It is noted that further evidence can be found in a study by Navracsics (2007) showing that bilinguals tended to produce more lexical equivalents in L2 nouns than native L1 speakers. Ameel and colleagues further speculated, based on the findings that abstract words have relatively fewer shared semantic features than concrete words, that abstract words are likely to be less susceptible to convergence through simplification than concrete words. Hypothetically, semantic simplification of abstract words would result in stripping away substantial language-specific concepts that underlie meaning.

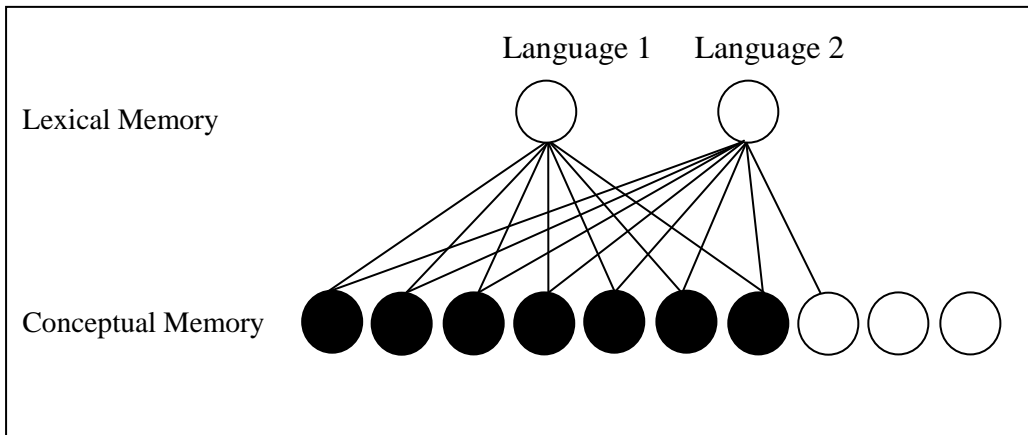
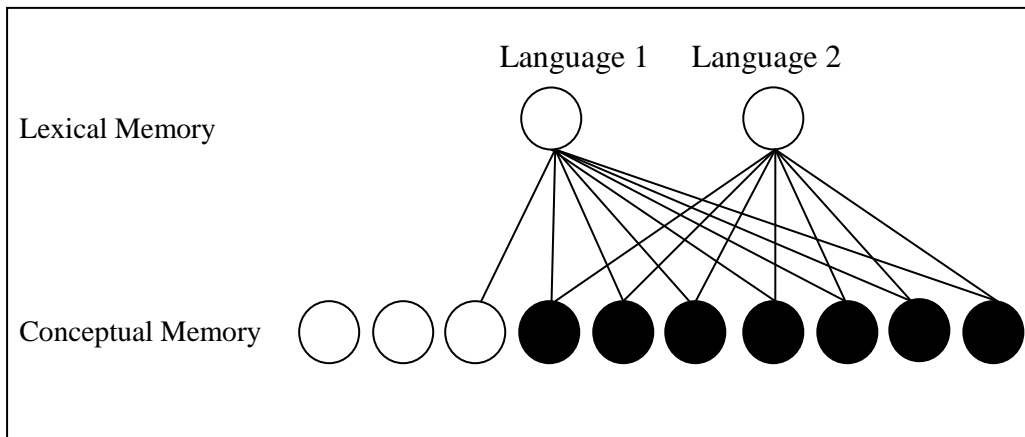
A**B**

Figure 3.13. Two moderate versions of the less complex bilingual category structure that allows the language specificities of one language to be retained, while the specificities of the other language are dropped. Specificities of L1 are retained (A). Specificities of L2 are retained (B). Adapted from “Semantic convergence in the bilingual lexicon,” by E. Ameel, B. C. Malt, G. Storms and F. Van Assche, 2009, *Journal of Memory and Language*, 60, p. 288. Copyright 2009 by Reed Elsevier.

The implications of Ameel et al.'s (2009) seminal study are profound, in conjunction with Pavlenko's MHM. Firstly, concrete words tend to be simplified within the bilingual language faculty in that language-specific semantic features are deactivated in favour of shared semantic features. This would imply that the representation of shared categories in MHM could be larger than hypothesized. Ameel et al.'s findings are in alignment with neuroimaging studies corroborating the convergence hypothesis for semantic memory. The hypothesis is that L2 processing increasingly integrates L1 features with raised L2 proficiency. Specifically, proficiency levels and age of acquisition (AoA) are key influencing variables affecting cerebral activity and semantic processes, although neuroimaging findings indicate that AoA may not be a critical variable in conceptual processes. Illustratively, Illes et al. (1999) showed that proficient late bilinguals localise L1 and L2 semantic processing within a specific brain region, suggesting that the same neurons or cognitive functions are recruited. Also, activation of the left inferior frontal gyrus during semantic judgment is similar between monolinguals and highly proficient bilinguals. Chee et al. (2001) affirm that linguistic proficiency is key during semantic processing. Comparing semantic judgment of English words and Chinese characters in English-Chinese bilinguals with varying levels of proficiency, the results reveal that higher proficiency is negatively correlated with reduced response times and error rates.

In a sentence-level semantic processing study, Chee et al. (1999) compared sentence comprehension against fixation or cued word generation in proficient bilinguals and found that the pattern of neural activation in

processing Chinese words was similar to that observed for English word processing. Specifically, the activated brain regions are prefrontal, temporal, superior parietal and anterior supplementary motor area in both L1 and L2 processing. In sum, overall evidence suggests that there is a rather similar network underlying semantic processes in L1 and L2. Differing neural activity during L2 semantic processing is a function of proficiency rather than AoA although AoA does influence proficiency to a certain extent.

The findings by Ameel and colleagues, and neuro-imaging studies are in alignment with predictions of Jiang's (2000, 2002) L1 lemma mediation hypothesis or the LRDM. It is expected in this study that EFL learners would offer simplified translations of L2 words that are stripped of L2-specific semantic features, particularly concrete nouns. However, as there is no systematic comparison between the definitions of English words given by bilinguals and monolinguals in this present study, an interesting research direction of corroborating Ameel et al.'s findings in Chinese-English bilinguals falls outside this study's scope.

In the present study, the expectation in assessing L2 learners' translations of L2 words is that language-specific conceptual features of an L2 concrete word may be dropped while shared conceptual features with L1 are retained in L2 learners' inferences of TWs. This simplification is likely less pronounced in abstract words based on the prediction formed by Ameel and colleagues.

3.8. Summary

The theoretical framework as expounded in this chapter informs the research design which is detailed in the following Chapter 5. The framework is dominated by theories in second language vocabulary acquisition and cognitive psychology. However, in the purposive sampling of participants, sociolinguistic factors will be factored in to ensure sociolinguistic homogeneity of participants. This would control sociolinguistic variables which may influence results if left unchecked.

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.1. Chapter Overview

This chapter describes the research design and methodology of this study in a detailed account of the research conducted. It begins with a schematic diagram detailing the methods used and data culled. This will be followed by the socio-political and sociolinguistic profiling of the subjects who participated in this study. What ensues is a description of a piloting process for validating the data collection instruments. These consist of L2 reading passages, surveys eliciting the students' topic familiarity, interest level and passage sight vocabulary and concurrent think-aloud protocols. The procedures for coding and categorizing the research instruments are then detailed in the process of delineating these instruments. As the data were obtained from different research instruments, triangulation of the different data on the same phenomenon was able to be accomplished. Conceptualisations and rationale regarding triangulation as a research approach are also reviewed and discussed. Triangulation is required to increase reliability of comparisons made when interpretative results are presented.

4.2. Design and Methodology

A schema adumbrating the experimental design of the pilot study and the main study is shown in Table 4. The study can be seen as consisting of a piloting stage employed to validate the reading passages as assessment tools, to

obtain students' topic familiarity and interest level ratings, and to aid in the selection of target words based on high counts of L2 words rated by the pilot study participants as difficult.

Table 4.1

A Schematic Table Outlining Experimental Research Design of the Piloting Stage and Main Study

| <i>Stage</i> | <i>Piloting</i> | <i>Main Study</i> | | | | | |
|--|---------------------------|---|----|----|--------------------------------------|----|----|
| Pre-Test, VLT Sociolinguistic Survey | Mixed (N = 25) | Mixed (N =155) | | | | | |
| Formation of Experimental and Comparison Groups | Graded Reading Tasks Only | Experimental Group – Codeswitched Reading | | | Comparison Group – L2 Graded Reading | | |
| 1 st R & V Task | Mixed | LA | MA | HA | LA | MA | HA |
| 2 nd R & V Task | Mixed | LA | MA | HA | LA | MA | HA |
| Immediate Retrieval | | LA | MA | HA | LA | MA | HA |
| 3 rd R & V Task | Mixed | LA | MA | HA | LA | MA | HA |
| Delayed Retrieval | | LA | MA | HA | LA | MA | HA |
| 4 th R & V Task | Mixed | LA | MA | HA | LA | MA | HA |
| Post-Test | | LA | MA | HA | LA | MA | HA |
| Reading tasks for concurrent think-aloud protocols | | 13 student informants | | | | | |

Note. R & V refers to “reading and vocabulary” which is a lexical inferencing task. “Mixed” in the pilot study refers to the non-differentiation of students according to ability or English proficiency levels. VLT refers to Vocabulary Levels Test (1990, 2001).

A pre-test consisting of a L2 reading passage with VKS-based items evaluating students' knowledge level of five TWs was carried out (see Appendix B for a sample reading text and Appendix D for a sample list of VKS-based test items), alongside two specific rating scales eliciting students' responses on topic familiarity (see Appendix I) and interest level towards the reading text (see Appendix J). Huckin and Coady (1999) have shown that reading texts that are interesting to participants boost incidental vocabulary acquisition based on a review. In this study, pilot participants were asked to rate the interest level of each reading text on a 5-point Likert scale.

The purpose of the pre-test is to evaluate students' prior vocabulary depth in lexical inferencing. A sociolinguistic questionnaire which requested participants' linguistic and social backgrounds was also distributed and collected from the students. Subsequently, a reading and vocabulary task was implemented weekly, over a period of six weeks. Each reading and vocabulary task was similarly fashioned like the pre-test consisting of a reading passage and five VKS-based test items assessing students' knowledge level of TWs. The reading and vocabulary tasks are lexical inferencing tasks that are designed as intentional vocabulary learning activities. Students are informed before the task that the objective is to infer English target word meanings found in reading texts. Also, a recall test was given in Week 2 followed by a delayed retrieval in Week 3. Introspective protocols in the form of concurrent think-alouds were carried out with a smaller group of twelve student-informants.

Regarding the retrieval tests, this study adopts the incidental vocabulary learning research design (Laufer & Hulstijn, 2001). Laufer and Hulstijn (2001) noted that many empirical studies following the seminal work of Craik and Lockhart (1972) and Craik and Tulving (1975) employed the incidental learning condition. As discussed in Chapter 2, incidental learning is distinguished from intentional learning in terms of methodological differences - the former's lack of notice to subjects about a subsequent recall test while the latter is designed with an early notification of a recall test (Laufer & Hulstijn, 2001). The empirical design of incidental vocabulary learning is also defended by Laufer and Hulstijn (2001) as a more controlled experiment in which the pedagogical usefulness or effect of a reading task is able to be isolate relative to the intentional learning condition. In this condition, learners may use various methods of retaining words in memory if told in advance of an impending recall test. Positive retention gains were shown by participants after they were given pre-notification of a recall test in a study by Barcroft (2007). Laufer and Hulstijn (2001) criticize the lack of control in intentional vocabulary learning research design. This accounts for the prevalence of incidental design in most studies. In this present study, an immediate recall test was conducted once followed by a delayed retrieval a week later without pre-notification to eliminate the possibility of students' perceived predictability of recall assessments if recall tests were conducted for every lexical inferencing task.

4.3. Description of Participants/Sample

Participants

Purposive sampling was used to select a sociolinguistically homogeneous population sample - the participants of the study are young adult Chinese students from senior middle high schools in the People's Republic of China who are learning ESL/EFL in an intensive English bridging programme for a year at a Singapore-based university to prepare them for entry into that university to pursue undergraduate degree studies in engineering fields. They are high academic achievers - crème de la crème of the Chinese education system who accepted scholarships from the Singapore government to study at that university. Their L1 is Chinese, or Putonghua, while their L2 is English. Hence, it is assumed that the participants, as high achievers in the Chinese education system, are highly proficient in their mother tongue or Chinese. They can be deemed as non-English majors (Zhang, 2008), and sequential bilinguals since they are first exposed to Chinese from infancy at home and the community and early childhood/primary education, followed by formal English learning significantly later in life although English learning takes place before the age of ten - from the third year of primary education as a foreign language subject in Chinese-medium schools (Hu, 2009; Jiang, 2003; Zhang, 2008). English is a required language subject to be learned in the school system for at least six years coupled with another two years at tertiary level (Zhang, 2010). Although Chinese-English 'bilingual education' public programmes of English-medium instruction in non-language subjects at the primary and secondary levels started from the year 2000 onwards in Shanghai followed increasingly by public schools located in other provinces, this is not compulsory for all Chinese

students. Also, not all elementary schools offer English (Qiang & Wolff, 2007; Yang, 2006). Chinese students are described as in a largely monoglossic environment dominated functionally by Chinese language in community and home domains with limited exposure to English input and little use of English at home and the wider community (Yang, 2006; Zhang, 2010). However, this situation is quickly changing due to the Chinese government's drive to rapidly increase English proficiency of their population as the international profile of China rises (Qiang & Wolff, 2007). Variability in English proficiency among the students is expected and thus it is important that the participants' English proficiency levels be measured although all of them are high academic achievers of the Chinese education system. VLT test results (50%) and pre-test scores (50%) were used to place the participants into three proficiency level groups, namely, high-ability group, middle-ability group, and low-ability group.

Permission to collect data from these students was solicited from the Ministry of Education, Singapore and the University concerned before participation information sheets and consent forms were distributed to the students for their understanding of the research project objectives and their voluntary signed consent. A total of 155 participants (out of an original group of 164) were divided into two groups, namely the experimental group and the comparison group. However, there was a marginal attrition rate of participants (in a range of 0 to 5 students) during the course of six data collection sessions. The main survey which consists of the four lexical inferencing tasks and two recall tests yielded between 154 to 155 responses.

4.4. Ethnographic and Ethical Considerations

A brief synopsis and an email were typed and sent to the Ministry of Education, Singapore, to inform them of the objectives and importance of the study, and request their permission to carry out the study with the students. Approval was granted by Ministry of Education to collect survey-based data from the student participants. Participant information sheets and consent forms for the director of department, school chair and student participants were designed to detail the brief research objectives of the data collection and secure the consent and cooperation from all parties involved in the project data collection (See Appendices A1 to A6 for the participant information sheets (PISs) and consent forms).

4.5. Eclectic Methodology: The Instruments

4.5.1. Receptive or breadth English vocabulary knowledge

Breadth knowledge size is defined by Laufer (1998) and Qian (2002) as the quantity or size of acquired words with minimally superficial knowledge. Similarly, Nation (2001) refers to breadth of vocabulary knowledge as the quantity of lexical items known to the learner at a particular level of language proficiency. The students' passive or receptive vocabulary knowledge were measured by Nation's (1990, 2001) *Vocabulary Levels Test* (VLT) which consists of 90 words derived from five word frequency levels (2000, 3000, 5000, the University Word List (UWL)/Academic Word List (AWL), and 10,000 words). Specifically, VLT Version 2, an updated form of Nation's VLT developed by Schmitt, Schmitt and Clapham (2001) was adopted. The reason for the amalgamation of AWL with UWL is that the former has a superior

coverage of academic vocabulary and subject areas (Coxhead, 2000). There are six sections per frequency level – each section lists six words determined to be of a specific frequency range and three possible word definitions. Participants were asked to select three words and match them to their correct meanings (see Nation, 2001, p. 416-424 for a complete version of the test). The test has been validated and frequently used and established as a general measure that approximates participants' receptive English vocabulary size at different frequency levels in several vocabulary studies (Henriksen, Albrechtsen, & Haastrup, 2004). The test scores reflect the extent of lexical knowledge of each student deemed sufficient to read the expository texts used in this study. The maximum score of VLT is 150.

4.5.2. Reading texts

A total of eight expository texts were taken from General Certificate of Education Advanced level (GCE 'A' level) preliminary General Paper 2 examinations designed by junior colleges in Singapore for students to prepare them for the GCE 'A' level General Paper examinations (see Appendix B for a sample reading text). The reading passages were not available in China nor were they used for the English bridging program, so the participants had not read the passages before. The readability of the eight texts ranged between 10.7 and 11.4 on the Flesch-Kincaid Grade Level readability scale, with a mean value of 10.9. The range is translated to be appropriate for native speakers in grades 10 and 11 whereas the student participants had completed an English bridging programme which is equivalent to Grades 10 to 11.

In this study, student participants' (n = 155) topic familiarity of the reading passages used in the study were surveyed and five topics that are generally familiar (means between 2.54 to 3.73) were chosen. Also, studies have shown that reading texts that are interesting to participants is a factor of incidental vocabulary acquisition based on a review by Huckin and Coady (1999). In this study, pilot participants were asked to rate the interest level of each reading text on a 5-point Likert scale. Three texts were discarded because their topic familiarity means were closest to 1 and 5 respectively. This helps to discount topics that are deemed very unfamiliar and very familiar by most students to control the likelihood of topic familiarity or unfamiliarity as a strong influencing variable. Also, the three passages registered between 1.8 to 3.4 means which indicate low levels of interest from students in comparison of means between 3.4 to 4.1 for the other reading texts. Each passage contained 530-600 words, of which five TWs were selected in each text. The TWs are based on words that are most frequently circled as difficult or unknown in a pilot study involving a class of 25 EFL learners of a similar sociolinguistic background with the participants of the main study. Unknown words do not exceed more than 2% in each text, as precedent findings show that learners are required to know at least 95% of the running text to infer the unfamiliar word meanings (Cheng & Truscott, 2010; Laufer, 1989; Liu & Nation, 1985). Correspondingly, Laufer (1997, 2005) states that if lexical coverage or known words in a text falls below 95%, guessing unknown word meanings is out of the reach of L2 learners. The optimal threshold is 98% of lexical coverage (Hirsh & Nation, 1992; Hsueh-Chao & Nation, 2001; Schmitt, Jiang, & Grabe, 2011). Nation (2001) states that the appropriate text coverage level range for extensive

reading targeted for vocabulary growth should be between 95% and 98%. The only dissenting voice is Maxim (2002) who found that difficult texts can be used with beginning learners although the percentage level of unknown words in a reading passage was not stated.

The experimental research design is to modify existing reading L1 texts by translating the texts into Chinese but retaining five TWs in L2 in each reading text (See Appendix C for a sample codeswitched reading text). A native Chinese speaker who is effectively bilingual and a Chinese university teacher was hired to translate the graded readers into Chinese, save the target words which remain in English. Textual cohesiveness was maintained with codeswitched words inserted in text. This study follows the precedent set by Macaro and Mutton's (2009) study in adopting Myers-Scotton's (2005) Matrix Language Frame Model (MLFM) and Poplack's (1988) CS parameters as the guidelines in codeswitching TWs in the reading passages. MLFM states that one language, otherwise known as the matrix language, provides the morphosyntactic framework while the embedded language largely obeys the matrix language grammatical rules. The principled modification of the reading texts adheres to MLFM in presenting the embedded L2 TWs. These texts were used in vocabulary teaching with the experimental group. L2-medium graded reading texts (non-translated texts) will be used with the comparison group.

4.5.3. Piloting of reading tasks and selection of target words

A pilot study was carried out before the experiment with a separate group of 25 learners with a similar sociolinguistic background as the

participants of the main study. Generally, the purpose of the piloting stage is to validate the data collection instruments. The goals were (1) to test the readability of the reading texts based on the generalizability of the pilot group with the main study participants and (2) to select TWs that are deemed by the pilot group as difficult since it can be extrapolated that the selected words are likely to be considered difficult or unfamiliar by the main study participants.

Selection of TWs is based on the pilot group finding. The seven reading passages were given to the pilot study participants and they were asked to circle words that are unfamiliar or difficult. For each reading passage, the number of difficult words against the total number of words per text was calculated to check that lexical coverage is within the 95% to 98% range. The top five most difficult words per text were chosen as the TWs.

Pulido (2007a) found that lexical coverage or passage sight vocabulary is positively correlated with lexical retention. She randomly selected non-TWs and asked participants to translate these selected non-TWs as it was not practical to test every non-TW from each reading passage. The translations were rated along a three-point scale presumably by Pulido. However, the problem with this approach are that not all L2 words have L1 equivalents. Also, she did not ensure that at least two raters rate the translations to reduce bias. In the present study, two Chinese-English bilinguals who were second-year undergraduates and recruited as research assistants evaluated the translations. They were trained on how to evaluate and award points based on an answer key and marking criteria. Inter-rater reliability as indicated by Cronbach's alpha

was 0.92, showing that variance in scoring the lexical inferencing tasks is generally low.

4.5.4. Vocabulary Knowledge Scale

Vocabulary learning occurs incrementally (Macaro, 2003; Nagy et al., 1985); this implies that an incremental scale is needed to assess vocabulary knowledge. Paribakht and Wesche's (1993, 1996, 1997) Vocabulary Knowledge Scale (VKS) is used to assess study participants' receptive or passive vocabulary (see Wesche & Paribakht, 1996). Richards and Malvern (2007) affirm that VKS is the most well-known evaluation tool of levels of knowledge – an integrated measure of multiple vocabulary knowledge receptive and productive, and of different facets of depth of understanding, which is useful for data triangulation. File and Adams (2010) elaborate that the key merit of the VKS is its discriminative power in categorizing levels of self-reported knowledge about a specific word. However, there are detractors who question VKS's mixing of different aspects of vocabulary knowledge (e.g. Laufer & Nation, 2012; Macaro, 2003). Nevertheless, for the purposes of evaluating students' lexical inferences and word familiarity, VKS is deemed appropriate for this study (see Chapter 7 for a discussion of VKS's strengths and weaknesses).

The VKS elicits study participants to declare and rate their understanding of a target word on a five-point scale of statements, varying from non-familiarity of a word to productive vocabulary knowledge of the word. Points 3 and 4 of the VKS test students' passive vocabulary which is defined as

learners' understanding of word meanings (Laufer, 1998). Point 5 of the VKS evaluates students' free-active vocabulary, or productive vocabulary knowledge of a TW. The VKS has been demonstrated in previous studies to be sufficiently sensitive to measuring incremental gains in the initial stage of word learning (Paribakht & Wesche, 1993, 1997). Additionally, it facilitates analysis of individual and grouped scoring categories for more detailed information on what has been learnt; in this study, the foci are on measuring the level of inferred word knowledge and inferring behavior of participants. The VKS is shown in Figure 13.

| | | |
|---|--|----|
| 1 | I don't remember having seen this word before and I don't know what it means | |
| 2 | I have seen this word before, but I don't know what it means | |
| 3 | I may or may not have seen this word before, and I think it means _____. (Write a synonym, definition or a translation) | >> |
| 4 | I know this word. It means _____. (Write a synonym, definition or a translation) | >> |
| 5 | I can use this word in a sentence. Write a sentence with the word in it. (IMPORTANT: If you can do option 5, please do option 4 as well) | >> |

Figure 4.1. Modified vocabulary knowledge scale. Adapted from “Enhancing vocabulary acquisition through reading: A hierarchy of text-related exercise types,” by T. Paribakht and M. Wesche, 1996, *The Canadian Modern Language Review*, 52(2), p. 178. Copyright 1996 by University of Toronto Press.

The original wordage of point 3 is “I have seen this word before, and I think it means...” (Paribakht & Wesche, 1996, p. 178). This statement

precludes a respondent who is unfamiliar with the word form from guessing the target word meaning. Perceived familiarity with the word form may not be a prerequisite before qualification to guess the word meaning. I modified the wording to include respondents who may not be familiar with the word form and are willing to guess the word meaning despite the lack of acquaintance with its formal word features. Sample VKS-based test items can be accessed in Appendix D. The pretest, posttest and the eight reading and vocabulary tasks used the VKS to assess participants' vocabulary performance.

Scoring of the VKS tests was based on Vidal's (2011) scoring operationalisations which added three more categories to Paribakht and Wesche's (1997) 5-point scoring scale. The modifications better reflect and capture more fully the varied levels of word knowledge. However, Vidal (2011) tested nonwords which are not relevant to this study so one of the additional categories meant for nonwords was omitted. Two research assistants who are Chinese-English bilingual students and the researcher scored all the VKS tests (pretest, learning, and posttest) for all 100 participants. Interrater reliability was high at 92%, and all disagreements were resolved through discussion. Scores of the pretest, lexical inferencing exercises and posttest for each participant were computed by totaling scores for each target word. The modified scoring scale is as follows:

0 point: does not recognize the word

1 point: recognizes having seen/heard the word

2 points: has a vague/partial idea of the meaning of the word

2.5 points: has a vague/partial idea of the meaning of the word but produces a clear example, similar to the one in the reading

3 points: shows a full understanding of the meaning of the word

4 points: shows a full understanding of the meaning of the word and is able to provide a Chinese translation or use the word in a sentence

5 points: shows a full understanding of the meaning of the word and is able to provide a translation and use the word in a sentence.

Based on this scoring scale, the maximum score for each lexical inferencing task consisting of five target words is 25.

4.5.5. Target words and assessment of contextual cues and linguistic cues

The list of TWs can be found in Appendix E. Following the precedent of Chen and Truscott's (2010) study, lexicalised words are defined by their correspondence with Chinese translation equivalents based on several online dictionaries that Chen and Truscott consulted (<http://dictionary.cambridge.org>, <http://www.meriam-webster.com>, http://en.wiktionary.org/wiki/Wiktionary:Main_Page, <http://dictionary.babylon.com>, <http://www.online-dict.com>) and the evaluations of two Chinese native speakers who were two student research assistants.

The TWs were classified as one of three main word types conceptualised by Haastrup, Albrechsten and Henriksen (2004), namely (1) words with no linguistic cues to meaning, (2) words with potential cues to meaning in the form of affixes and (3) words that have more than one linguistic

cue to meaning: a core portion plus a prefix and/or suffix. Nevertheless, Jiang (2000) attests that morphological information is language-specific and is consequently less susceptible to transfer from L1, particularly in typologically dissimilar Chinese and English (Jiang, 2004a). Also, Zhang's (2002) study shows that without strategy intervention, EFL learners tended not to rely on English morphological clues, which are deemed as bottom cues that do not lead to word meanings by themselves.

Beck, McKeown and Kucan (2002)'s four types of natural word contexts, were used in assessing the helpfulness of contextual cues proximate to the target words (see Table 3). The four types are (1) misdirective contexts; (2) nondirective contexts; (3) general contexts; (4) directive contexts. Misdirective contexts lead students to the wrong meaning. Nondirective contexts provide no assistance in directing a student to any particular meaning for a word. General contexts provide a minimal level of support. Only directive contexts provide a strong set of clues for guessing the right meaning for a word. Hence, a key criterion in the selection of target words is the presence of directive or transparent contexts.

4.5.6. Retention-retrieval tests

The study takes into account that encoding and retrieval tasks should match (Matlin, 2008). Five minutes after students completed and submitted the reading and vocabulary exercise, they were required to complete a recall test on the words that they read without prior notice. The test is kept deliberately open-ended to encourage students to recall as many words as they can from the

reading text, including TWs and running words. Recall was indicated by (1) the shallow-retrieving task of recalling L2 target word forms, and (2) the deep-retrieving task of recalling their word meanings. The students were asked to write down the contextual meanings of the words if they know them in Chinese or English. The option given to use either language to express word meanings was to reduce any potential obstacles in expressing in their L2. Only correctly guessed meanings were counted towards recall success. A delayed retrieval test was conducted a week later. Two research assistants and the researcher rated the test responses, with an acceptable Cronbach's alpha of 0.94. Recall success was measured in the following manner:

0 point: wrong or missing recall

1 point: a partially correct recall of a target word form

2 points: a correct recall of a target word form

2.5 points: a correct recall of a target word form with a partially correct meaning or translation.

3 points: a correct recall of a target word and its contextual meaning or translation.

A sample immediate recall test is shown in Appendix F while a delayed retrieval is shown in Appendix G.

4.5.7. Introspective protocols

Verbal protocol data were elicited from a total of thirteen informants who volunteered from a selected pool of Chinese ESL students studying at the

University participating in the study and similarly streamed into three proficiency groups as the main study participants based on their VLT scores. These thirteen informants were of similar sociolinguistic backgrounds as the pilot and main study participants. Introspective method or concurrent think aloud was employed in the present study. The key strength of this method is that they reveal informants' online processing, which cannot be gleaned from the VKS scores and statistical results. According to Albrechtsen, Haastrup and Henriksen (2008), the validity of introspective methods stems from the following two assumptions: (1) information recently attended to by an individual is stored in short-term memory and is directly accessible for producing verbal reports which reconstruct and describe as closely as possible what goes on in the mind or mental processes, (2) think-aloud grants access to conscious processes only and what informants report is what they pay attention to.

Concurrent think aloud was used to uncover the knowledge sources that informants recruited in their efforts to arrive at a guessed meaning for a TW. Concurrent protocols are considered most reflective of the participants' thought processes – retrospective reports suffer from veridicality, or inaccurate reporting of thought processes after completing the task (Bowles, 2010). Hence, in this study, only introspective reports were employed. However, a plausible drawback of introspective reports is reactivity or interference in cognitive performance and extension of time taken to complete the task. In a comprehensive review of empirical evidence on introspective verbalisations in SLA, Bowles (2010) found that thinking aloud and completing a task

concurrently has a minimal effect on performance. Time on task is significantly increased – however, the lexical inferencing task was neither a timed task nor did it carry a time penalty so reactivity for latency is a non-issue.

Although think-alouds may have inherent shortcomings such as incomplete and/or incoherent reporting (Alrechtsen, Haastrup & Henriksen, 2008), the verbal reports show no communication lapses that undermine transcription and interpretation.

The analytic framework devised by Haastrup (1991) and reiterated by Haastrup, Albrechtsen and Henriksen (2004) and Albrechtsen, Haastrup and Henriksen (2008) was adopted. Three processing types of the framework are (1) pure top processing, (2) top-ruled processing and (3) bottom-ruled processing. Potentially effective processing refers to both pure top processing and top-ruled interactive processing. The guesses were also scored using the same scoring scale used for the VKS. In terms of knowledge source identification, Wesche and Paribakht's (2010) taxonomy of KS use in L1 and L2 lexical inferencing is used.

4.6. Instrumentation

The data were culled in a lecture theatre and language laboratory at the University. The lecture theatre was able to accommodate the large sample size of 155 participants for the R & V tasks, while the language laboratory seating with individual cubicles facilitated minimal interaction between researcher/research assistants and the informants and audio recordings of verbalised thoughts. A total of thirty informants participated in the protocol

data collection. In sum, a total of 155 participants were involved in the data collection. A lack of motivation to complete the lexical inferencing tasks and verbalisation reports can occur which would skew or distort results (Nation, 2007a). To maintain motivation to complete the tasks, monetary rewards ranging from ten dollars in cash for students who completed the verbal reports and fifty dollar shopping vouchers for students who completed all reading and vocabulary tasks were offered. For the reading and vocabulary/lexical inferencing data collection, each R & V (lexical inferencing) exercise was typically completed in thirty to forty-five minutes of the students' after-class time. They were told to refrain from referring to dictionaries during all lexical inferencing tasks with the researcher, two research assistants and two lecturers invigilating the sessions. Between 154 and 155 participants completed four R & V tasks and retrieval tests. Results of four additional R & V tasks were discarded because of high attrition of student participants which pared down the number of participants below 100. Students had already been preassigned equally into eight groups by their teachers. I assigned students in groups 1-4 as the graded readers group (GR group) while students in groups 5-8 are grouped together as the codeswitched reading group (CS group). Both GR and CS groups read the same reading text – the CS group, being the treatment group, was given the codeswitched version while the GR group is given the graded reading text version in English. The codeswitched version matched the graded reader in content except that the context was presented in L1, save the target words. As aforementioned, the codeswitched texts follow a codeswitching parameters delineated by Poplack (1988) and Myers-Scotton's (2005) MLFM.

The posttest had a reduced number of participants (150 students). They were given a reading passage and a separate answer booklet for them to record their answers. After the second lexical inferencing task, each student was given a recall test about five minutes after submission of answer booklets. A delayed recall test was given a week later to check for long-term retention of TWs.

Thirteen participants were trained in advance to prepare and qualify them for online verbalisation. They were given two CS reading texts with ten target words which they were required to guess their meanings. The informants were encouraged to verbalise their thoughts during inferencing. Student participants who gave insufficient verbalisation during the preparatory session were given suggestions to articulate all mental attempts to arrive at proposed meanings, including discarded attempts. The introspective data collection was carried out at a language laboratory that is equipped with digital audio recording instruments with individual cubicles which reduced audio interferences from concurrent verbal reports. The informants were given the choice of speaking in Chinese and/or English. The digital recordings of the introspective verbal reports were transcribed by the researcher and verified by two research assistants for accuracy.

4.7. Confirming Findings: Triangulating

Triangulation or cross examination is crucial to the validation of the study findings through cross verification from more than two data sources (Cheng, 2005). Denzin (1978a, 1978b, reported in Zhang, 1999) identified four types of triangulation, namely (1) data triangulation – the use of more than two data sources in a study, (2) investigator triangulation – the use of more than two

different raters or assessors, (3) theory triangulation – the use of several theoretical perspectives to interpret data, and (4) methodological triangulation – the use of more than two methods to examine a problem. A fifth type added by Janesick (1994, reported in Zhang, 1999) is interdisciplinary triangulation – the use of more than one discipline to inform research design and enrich understanding. Furthermore, Creswell and Clark (2006) recommend that a mixed methods approach or a blend of qualitative and quantitative methods be adopted in triangulation. I relate each triangulation type with the steps taken to fulfill the triangulation feature:

- (1) Data triangulation — besides obtaining questionnaire ratings and VKS scores, protocol analyses of concurrent think aloud protocols were employed to triangulate findings.
- (2) Investigator triangulation — in scoring participants' responses on the VKS and the retention-retrieval tests, two research assistants who are Chinese-English bilingual undergraduate students and the researcher rated and scored the participants responses, with a high inter-rater reliability or internal consistency. Similarly, the transcriptions of verbal reports were checked for accuracy by the two research assistants.
- (3) Theory triangulation — the use of multiple perspectives is evident in the theoretical framework chapter, where postulations of bilingual memory models were compared and evaluated. MHM is deemed the most defensible framework which draws the strengths of earlier models such as RHM and DFM. MHM is substantiated and further modified in view of recent empirical findings, including results based on neuro-imaging,

RTs and ERPs. Also, the involvement load hypothesis, Haastrup's coding framework, comprehensible input hypothesis and antecedent findings on visual saliency were employed in data interpretation.

- (4) Methodological triangulation — this relates to data triangulation as more than two methods were used to obtain data, namely questionnaires, reading and vocabulary tests (VKS), VLT and verbal protocols (concurrent think aloud).
- (5) Interdisciplinary triangulation — both theories and empirical findings from the fields of cognitive SLA, applied SLA and cognitive/experimental psychology were used to inform the research design.

In adherence to Creswell and Clark's (2006) recommendation for a mixed-methods approach, this study used various statistical tests which are quantitative methods while the qualitative methods (concurrent think alouds) were also used to corroborate statistical results.

4.8. Data Processing and Analysis

In what follows, research questions will be recapitulated and related to specific data analyses used to present the relevant results.

(Research Question 1a) Is the strategy of using Chinese-English code-switched reading tasks a more effective intentional vocabulary-specific method for EFL learners to successfully infer unknown L2 TWs than graded readers?

(Research Question 2a) Is the recall of TWs by EFL learners enhanced by reading code-switched texts relative to their counterparts reading graded readers in an incidental learning design?

To answer the two research questions, regarding level of successful lexical inferencing and successful recall respectively, VKS scores for TWs within directive contexts by the experimental and comparison groups were submitted to independent-samples t-tests to compare group means via SPSS. Cohen's *d* was calculated by an online calculator at <http://www.uccs.edu/~lbecker/> as recommended by Larson-Hill (2010), to measure the difference between the two independent sample means, and indicate the effect sizes. Also, a repeated-measures ANOVA was conducted to check for a statistical effect between the pretest and posttest. Retention was measured by (1) the shallow-retrieving task of recalling the orthographic forms of L2 lexical items, and (2) the deep-retrieving task of recalling the contextual meanings of L2 lexical items. Independent-samples t-tests were conducted on both immediate retrieval and delayed retrieval. Statistical findings will be reported in Chapter 5. Protocol analyses of introspective protocols were used to triangulate with statistical findings, specifically (1) to identify whether potentially effective processing (pure top processing and top-ruled interactive processing) was facilitated by the presentation of contextual cues in L1, and (2) whether the L1 had significantly contributed to the experimental students' lexical inferencing. Protocol findings will be reported in Chapter 6.

(Research Question 1b) How effective are codeswitched reading tasks in raising lexical inferring behavior relative to graded readers?

A partial bivariate correlation test between the number of tries/attempts and VKS scores while controlling for pre-knowledge of target word meanings was performed, with the correlation coefficient as Pearson's r . Pre-knowledge refers to participants' self-reported familiarity and evidence of successful receptive and/or productive knowledge of target word meanings which can be an influencing variable that should be controlled. The calculation of confidence intervals for r is done via an online calculator at <http://vassarstats.net/rho.html> as SPSS does not compute confidence intervals for correlation coefficients. Also, an independent-samples t-test comparison was made between the experimental and comparison groups in terms of the number of student respondents who selected option 3, option 4 and/or 5 of the VKS. The statistical findings (reported in Chapter 5) will be corroborated by verbal protocol findings (reported in Chapter 6).

(Research Question 1c) Does the use of codeswitched reading tasks lead to differential effects on lexical inferencing among beginning learners, intermediate learners and advanced learners?

(Research Question 2b) Does the use of codeswitched texts lead to differential effects on lexical retention-retrieval among advanced learners, intermediate learners and basic learners?

Regarding the two specific questions, whether the level of successful lexical inferencing and lexical retention-retrieval are functions of reading and vocabulary proficiency level, a comparison of the mean scores of the three ability levels in the CS group and GR group was performed by two-way

analysis of variance (ANOVA) tests. Post-hoc Tukey tests were run to identify the site of significant effects for ability level. The statistical findings (reported in Chapter 5) will be corroborated by protocol analyses of the think-aloud protocols (reported in Chapter 6).

(Research Question 3) Regarding English target words that lack one-to-one meaning equivalence in Chinese, will learners proffer target word definitions that are partially equivalent or fully equivalent to target word meanings?

A semantic analysis of the word definitions and proffered by the student respondents would address the research question. When encountering English words which have partial equivalence in L1 translation equivalents, it is not clear whether students would give partially equivalent definitions or definitions that are fully or closely equivalent to TW meanings found in context. The participants' word definitions, translations and productive sentences derived from VKS tests and think-aloud verbal protocols are examined to address this question. Findings will be reported in Chapter 6.

Table 4.2 summarised the research questions and match them with the data collection instruments and analysis procedures.

Table 4.2

Summary of Research Questions, Data Collection Instruments and Analysis Procedures

| Research questions | Data collection instruments | Analysis procedures |
|--|---|---|
| <p>1a. Is the strategy of using Chinese-English code-switched reading tasks a more effective intentional vocabulary-specific method for EFL learners to successfully infer unknown L2 TWs than graded readers?</p> | <p>VKS-based codeswitched reading tasks for treatment group and graded readers for comparison group</p> <p>Concurrent introspective think-aloud protocols</p> | <p>VKS scores for TWs by the experimental and comparison groups were submitted to independent-samples t-tests to compare group means via SPSS.</p> <p>Cohen's <i>d</i> was calculated by an online calculator at http://www.uccs.edu/~lbecker/ as recommended by Larson-Hill (2010), to measure the difference between the two independent sample means, and indicate the effect sizes.</p> <p>A repeated-measures ANOVA was conducted to check for a statistical effect between the pretest and posttest.</p> <p>Protocol analyses of introspective protocols were used to triangulate with statistical findings, specifically (1) to identify whether potentially effective processing (pure top processing and top-ruled interactive processing) was facilitated by the presentation of contextual cues in L1, and (2) whether the L1 had significantly contributed to the experimental students' lexical inferencing.</p> |

| | | |
|--|---|---|
| <p>1b. How effective are codeswitched reading tasks in raising lexical inferring behavior relative to graded readers?</p> | <p>VKS-based codeswitched reading tasks for treatment group and graded readers for comparison group</p> | <p>A partial bivariate correlation test between the number of tries/attempts and VKS scores while controlling for pre-knowledge of target word meanings was performed, with the correlation coefficient as Pearson's r.</p> <p>The calculation of confidence intervals for r is done via an online calculator at http://vassarstats.net/rho.html as SPSS does not compute confidence intervals for correlation coefficients.</p> <p>An independent-samples t-test comparison was made between the experimental and comparison groups in terms of the number of student respondents who selected option 3, option 4 and/or 5 of the VKS.</p> |
| <p>1c. Does the use of codeswitched reading tasks lead to differential effects on lexical inferencing among beginning learners, intermediate learners and advanced learners?</p> | <p>VKS-based codeswitched reading tasks for treatment group and graded readers for comparison group</p> <p>Concurrent introspective think-aloud protocols</p> | <p>A comparison of the mean scores of the three ability levels in the CS group and GR group was performed by two-way analysis of variance (ANOVA) tests. Post-hoc Tukey tests were run to identify the site of significant effects for ability level.</p> <p>Scores of informants' guesses made during concurrent protocols were tabulated and compared across three ability groups.</p> |

| | | |
|--|---|---|
| <p>2a. Is the recall of TWs by EFL learners enhanced by reading code-switched texts relative to their counterparts reading graded readers in an incidental learning design?</p> | <p>Immediate recall and delayed retention-retrieval tests</p> | <p>Independent-samples t-tests were conducted on both immediate retrieval and delayed retrieval.</p> |
| <p>2b. Does the use of codeswitched texts lead to differential effects on lexical retention-retrieval among advanced learners, intermediate learners and basic learners?</p> | <p>Immediate recall and delayed retention-retrieval tests</p> | <p>A comparison of the mean scores of the three ability levels in the CS group and GR group was performed by two-way analysis of variance (ANOVA) tests. Post-hoc Tukey tests were run to identify the site of significant effects for ability level.</p> |
| <p>3. Regarding English target words that lack one-to-one meaning equivalence in Chinese, will learners proffer target word definitions that are partially equivalent or fully equivalent to target word meanings?</p> | <p>VKS-based codeswitched reading tasks for treatment group and graded readers for comparison group Concurrent introspective think-aloud protocols</p> | <p>A semantic analysis of the word definitions and proffered by the student respondents for the VKS-based codeswitched reading tasks and graded reading tasks and think-aloud verbal reports. The participants' word definitions, translations and productive sentences derived from VKS tests and think-aloud verbal protocols were evaluated.</p> |

CHAPTER FIVE

QUANTITATIVE ANALYSES:

PRESENTATION OF DATA AND RESEARCH

FINDINGS

5.1. Chapter Overview

In this chapter, the findings drawn from a battery of reading and vocabulary tasks using quantitative statistics are reported and analysed. Specifically, the lexical inferences made by student participants are measured by the VKS and the scores are computed into SPSS to be analysed using independent-samples t-tests and factorial ANOVA. The students' inferring behaviour, namely, the number of tries (including successful, partially successful and unsuccessful guesses) and pre-knowledge of TWs were also computed for statistical comparison via independent-samples t-tests and correlation analysis. Also, the immediate retrieval and delayed retrieval test scores were computed into SPSS for statistical analysis, using independent samples t-tests and factorial ANOVA. The purposes of the t-tests and ANOVA are to quantify the extent of group differences between treatment group and comparison group, and ability levels within each of these two groups in terms of lexical inferencing, lexical retention-retrieval, number of tries and pre-knowledge of TWs; the correlation tests investigate the relationships between the number of tries and successful inferencing across the vocabulary tasks. Research questions will be reiterated in italics to structure the presentation of findings,

5.2. Participants

Gender ratio was not even or equal when sampling was purposive or judgmental in nature. Out of an original 164 participants, 155 participants attended most of the data collection sessions. The gender breakdown was 84 females and 71 males out of a total of 155 participants. A range of 0 to 5 students absented themselves from one or more data collection sessions (from a total of 6 data collection sessions). These attrition cases have a gender breakdown of four males and one female. However, gender is not an issue in second language vocabulary acquisition so this apparent imbalance is treated as a non-issue. The specific number of subjects who were classified at three different English proficiency levels is as follows: low, $N = 55$, medium, $N = 47$, high, $N = 53$. The participants' prior knowledge or pre knowledge of the target words were surveyed via the VKS and a 2×3 factorial ANOVA was conducted to examine the effects of grouping and ability levels on participants' reported prior knowledge of the target words across all four lexical inferencing tasks. Results show that there are no statistical effects for grouping except for the second lexical inferencing task – the GR group's reported pre-knowledge is statistically higher than the CS group for the second lexical inferencing task. Notably, the separate means of the three ability levels in the CS group are generally lower than the means of the three ability levels in the GR group. There are statistical effects for ability levels save the third lexical inferencing task – reported pre-knowledge of target words are statistically significant at the three ability levels in a progressive manner with high-ability students reporting highest level of pre-knowledge followed by middle-ability students and low-ability students. Generally, pre-knowledge of target words show a linear

relationship with ability levels in both CS and GR groups. –Table 5.1 summarises the results.

Table 5.1

Summary Factorial ANOVA Results for Reported Pre-Knowledge of Target Words Across 4 Lexical Inferencing Tasks

| Vocabulary task | Group | Ability | Mean | SD | N | F-value | p-value | Partial Eta Squared |
|-----------------|-------|---------|------|------|----|---------------------------------------|-----------------------|---------------------|
| First | CS | H | 1.13 | 1.46 | 30 | F _{1,148} =0.05 (Group) | p = .823 (Group) | .000 (Ability) |
| | | M | 0.81 | 1.57 | 21 | | | |
| | | L | 0.41 | 0.93 | 27 | | | |
| | GR | H | 1.22 | 1.70 | 23 | F _{1,148} =3.48 (Ability) | p = .033 (Ability) | .045 (Ability) |
| | | M | 0.68 | 1.35 | 25 | | | |
| | | L | 0.57 | 1.07 | 28 | | | |
| Second | CS | H | 0.70 | 1.06 | 30 | F _{1,148} 7.62 (Group) | p = .007 (Group) | .049 (Ability) |
| | | M | 0.38 | 0.67 | 21 | | | |
| | | L | 0.26 | 0.53 | 27 | | | |
| | GR | H | 1.35 | 1.43 | 23 | F _{1,148} =3.7 (Ability) | p = .027 (Ability) | .047 (Ability) |
| | | M | 0.77 | 1.31 | 26 | | | |
| | | L | 0.68 | 1.25 | 28 | | | |
| Third | CS | H | 0.70 | 3.81 | 30 | F _{1,148} =0.26 (Group) | p = .613 (Group) | .002 (Group) |
| | | M | 0.43 | 3.30 | 21 | | | |
| | | L | 0.44 | 3.78 | 27 | | | |
| | GR | H | 0.91 | 1.19 | 22 | F _{1,148} =1.89 (Ability) | p = .155 (Ability) | .025 (Ability) |
| | | M | 0.50 | 0.99 | 26 | | | |
| | | L | 0.43 | 0.96 | 28 | | | |
| Fourth | CS | H | 0.87 | 1.38 | 30 | F _{1,148} =3.02 (Group) | p = .084 (Group) | .020 (Group) |
| | | M | 0.62 | 1.07 | 21 | | | |
| | | L | 0.48 | 0.94 | 27 | | | |
| | GR | H | 1.48 | 1.41 | 23 | F _{1,148} =3.61 (Ability) | p = .029 (Ability) | .046 (Ability) |
| | | M | 0.73 | 1.04 | 26 | | | |
| | | L | 0.71 | 1.01 | 28 | | | |

5.3. Comparisons between Experimental Group and Graded Readers Group in Level of Successful Guesses

Research Question 1a: Is the strategy of using Chinese-English codeswitched reading tasks a more effective intentional vocabulary-specific method for EFL learners to infer unknown L2 TWs successfully than using graded readers?

Independent-samples *t*-tests were submitted to SPSS for the VKS performance of student participants in the CS (treatment) group and the GR (control) group across four reading and vocabulary tasks which measured their levels of successful lexical inferencing. The summary results for the lexical inferencing tasks are listed in Table 5.2. The results exceeded the $p = .05$ significance level of Levene's Test for Equality of Variances which indicate that equal variances can be assumed without using Welch's procedure.

Table 5.2

Independent-Samples T-Test Summary Results for Reading and Vocabulary (Lexical Inferencing) Tasks

| Vocabulary task | Group | 95% CI | Mean | SD | N | <i>t</i> -value | <i>p</i> -value | Effect size |
|-----------------|-------|--------|-------|------|----|-----------------|-----------------|-------------|
| First | CS | 1.89, | 10.32 | 3.85 | 78 | 4.76 | $p < .0005$ | $d=.77$ |
| | GR | 4.57 | 7.09 | 4.55 | 76 | | | |
| Second | CS | 1.25, | 9.86 | 3.9 | 78 | 3.85 | $p < .0005$ | $d=.62$ |
| | GR | 3.88 | 7.3 | 4.37 | 77 | | | |
| Third | CS | 3.60, | 10.87 | 3.75 | 78 | 7.58 | $p < .0005$ | $d=1.22$ |
| | GR | 6.14 | 6 | 4.21 | 76 | | | |
| Fourth | CS | 3.58, | 12.44 | 3.34 | 78 | 8.0 | $p < .0005$ | $d=1.29$ |
| | GR | 5.92 | 7.69 | 4.02 | 77 | | | |

Table 5.2 shows that the difference in lexical inferencing performance between the CS group and GR group is statistically significant ($p < .0005$). The findings show that the CS group outperformed the GR group across the four lexical inferencing tasks, with effect sizes ranging from medium in the first two tasks ($d = .77$; $d = .62$) to large in the following two tasks ($d = 1.22$; $d = 1.29$). The increasing effect sizes could suggest that repetition of exposure to CS reading could have a positive effect on successful lexical guessing although it is acknowledged that more tasks conducted over a longer period of time is needed to corroborate this speculation. The CS group's means suggest that most student participants gave at least three to four successful guesses for each lexical inferencing task although partially correct answers and guesses compounded by translation equivalents and TW application in a sentence constitute a minor component of some of the students' scores; the GR group's means show that most student participants gave at least two successful guesses in combination with at least one partially correct guess. In the second lexical inferencing task, the GR group has a statistically higher effect of pre-knowledge of target words than the CS group but this advantage possessed by the GR group is overruled by the successful lexical inferencing performance of the CS group albeit with the smallest effect size of $d = .62$.

A repeated-measures ANOVA was run to test for a longitudinal-based statistical effect or significance in lexical inferencing performance after the battery of vocabulary tasks, including the use of CS texts ($F_{1,148} = .332$, $p = .57$, partial eta-squared = .002, power = .088). The RM ANOVA test shows that there is no statistical significance for the CS and GR groups after the series of

lexical inferencing tasks. The pretest/posttest consists of a graded reader text with five TW meanings to guess. As there is no statistical effect shown between the pretest and posttest, it can be seen that the battery of CS and GR lexical inferencing tasks did not significantly influence the lexical inferencing performance of the student participants.

Research Question 1b: How effective are codeswitched reading tasks in raising lexical inferring behaviour relative to graded readers?

Lexical inferring behaviour refers to the number of tries students made in guessing the meanings of TWs. This includes guesses that are successful, partially successful and unsuccessful. Students who are unfamiliar with target word meanings typically skip or avoid inferring them. However, in CS texts, the word contexts are presented in the students' mother tongue which would increase a sense of familiarity which would encourage them to make inferences of the target word meanings. A partial bivariate correlation test was conducted to test the relationship between tries and VKS scores while controlling for pre-knowledge of target word meanings – an effect size of the correlation coefficient or Pearson's r would show that the most significant portion of tries are successful and partially successful relative to unsuccessful guesses.

Table 5.3

Partial Correlation Summary Results Between Total Tries and VKS Scores

| Vocabulary task | 95% CI | <i>r</i> value | <i>p</i> -value | N | R ² |
|-----------------|----------|----------------|------------------|-----|----------------|
| First | .72, .84 | .79 | <i>p</i> < .0005 | 154 | .62 |
| Second | .67, .81 | .75 | <i>p</i> < .0005 | 155 | .56 |
| Third | .71, .84 | .78 | <i>p</i> < .0005 | 154 | .61 |
| Fourth | .76, .87 | .82 | <i>p</i> < .0005 | 155 | .67 |

As can be seen in Table 5.3, all four lexical inferencing tasks show statistical significance in correlating tries with VKS scores - the effect sizes are large, as indicated by R² values ranging from .56 to .67. This implies that the proportion of successful and partially successful guesses outweigh the unsuccessful guesses. The finding establishes a positive correlation between the total number of tries or attempts and successful lexical inferencing as indicated by VKS scores.

Independent-samples *t*-tests were conducted on the four lexical inferencing tasks to compare for statistical effects between the group mean differences in lexical inferencing performance by the CS group and GR group. Welch's procedures were used to control for the differences in variances as the *p*-values for the Levene's Test for Equality of Variances are lower than .05. Table 5.4 details the summary results.

Table 5.4

Independent-Samples T-Test Summary Results for Tries at Lexical Inferencing

| Vocabulary task | Group | 95% CI | Mean | SD | N | t-value | p-value | Effect size |
|-----------------|-------|--------|------|------|----|---------|-----------|-------------|
| First | CS | .71, | 4.19 | 1.28 | 78 | 4.85 | p < .0005 | d=.78 |
| | GR | 1.70 | 2.99 | 1.76 | 76 | | | |
| Second | CS | .46, | 4.14 | 1.24 | 78 | 3.96 | p < .0005 | d=.64 |
| | GR | 1.38 | 3.22 | 1.63 | 77 | | | |
| Third | CS | 1.1, | 4.44 | .766 | 78 | 6.97 | p < .0005 | d=1.13 |
| | GR | 1.98 | 2.89 | 1.79 | 76 | | | |
| Fourth | CS | .83, | 4.51 | .86 | 78 | 5.96 | p < .0005 | d=.96 |
| | GR | 1.66 | 3.27 | 1.61 | 77 | | | |

Table 5.4 shows a statistical effect for group in guesses – the CS group consistently made more guesses than the GR group, with pre-knowledge of target word meanings being controlled, as indicated by medium to large effect sizes across the four lexical inferencing tasks (d = .78; d = .64; d = 1.13; d = .96). The relatively higher incidences of guesses by the CS group partially accounts for the higher rate of successful lexical inferencing in comparison to their GR group counterparts.

Research Question 1c: Does the use of codeswitched reading tasks lead to differential effects on lexical inferencing among beginning learners, intermediate learners and advanced learners?

A 2×3 factorial ANOVA examining the effects of grouping (CS/GR) and ability on the four lexical inferencing tasks shows statistical effects for grouping and ability level.

Table 5.5

Factorial ANOVA Summary Results for the Lexical Inferencing Tasks

| Vocabulary task | Group | Ability | Mean | SD | N | F-value | p-value | Partial Eta Squared |
|-----------------|-------|---------|-------|------|----|-------------------------------|---------------------------|---------------------|
| First | CS | H | 11.67 | 3.43 | 30 | $F_{1,148}=20.10$ (Group) | p < .0005 (Group) | .124 (Group) |
| | | M | 9.71 | 3.94 | 21 | | | |
| | | L | 9.30 | 3.92 | 27 | | | |
| | GR | H | 8.35 | 3.77 | 23 | $F_{1,148}=4.25$ (Ability) | p =.016 (Ability) | .054 (Ability) |
| | | M | 6.88 | 5.81 | 25 | | | |
| | | L | 6.25 | 3.71 | 28 | | | |
| Second | CS | H | 11.37 | 3.89 | 30 | $F_{1,148}=13.64$ (Group) | p < .0005 (Group) | .084 (Group) |
| | | M | 10.10 | 3.82 | 21 | | | |
| | | L | 8.00 | 3.28 | 27 | | | |
| | GR | H | 8.52 | 4.14 | 23 | $F_{1,148}=5.19$ (Ability) | p = .007 (Ability) | .065 (Ability) |
| | | M | 6.50 | 4.57 | 26 | | | |
| | | L | 7.04 | 4.32 | 28 | | | |
| Third | CS | H | 11.88 | 3.81 | 30 | $F_{1,148}=55.35$ (Group) | p < .0005 (Group) | .272 (Group) |
| | | M | 11.02 | 3.30 | 21 | | | |
| | | L | 9.63 | 3.78 | 27 | | | |
| | GR | H | 7.59 | 3.70 | 22 | $F_{1,148}=4.67$ (Ability) | p = .011 (Ability) | .059 (Ability) |
| | | M | 5.54 | 4.42 | 26 | | | |
| | | L | 5.18 | 4.19 | 28 | | | |
| Fourth | CS | H | 14.03 | 3.01 | 30 | $F_{1,148}=64.95$ (Group) | p < .0005 (Group) | .304 (Group) |
| | | M | 11.90 | 3.25 | 21 | | | |
| | | L | 11.07 | 3.13 | 27 | | | |
| | GR | H | 8.78 | 3.74 | 23 | $F_{1,148}=8.13$ (Ability) | p < .0005 (Ability) | .098 (Ability) |
| | | M | 8.19 | 4.35 | 26 | | | |
| | | L | 6.32 | 3.64 | 28 | | | |

In reference to Table 5.5, the differences between the groups (CS and GR) and differences among the three ability or proficiency levels within each group are statistically significant. The effect sizes of the group differences range from medium and small for the first two tasks ($R^2 = .124$; $R^2 = .084$) to large for the subsequent two tasks ($R^2 = .272$; $R^2 = .304$). The effect sizes for ability levels are significantly smaller than those of groups. Pairwise comparisons of ability levels means using Tukey's contrasts found statistical differences between high-ability group and middle-ability group, and between high-ability and low-ability groups, but not between middle-ability group and low-ability group. The results suggest that high-ability students benefit the most from CS reading, while there is no statistical difference between middle-ability and low-ability students. Post hoc Tukey's results are shown in Table 5.6.

Table 5.6

Post Hoc Tukey's Test Results on All Pairwise Comparisons of Ability Levels in Terms of Lexical Inferencing Performance

| Task | Ability | Ability | Mean Difference | Std. Error | p-value | 95% CI | |
|--------|---------|---------|-----------------|------------|---------|-------------|-------------|
| | | | | | | Lower Bound | Upper Bound |
| First | H | L | 2.48* | .798 | .006 | 0.59 | 4.37 |
| | | M | 2.05* | .836 | .040 | 0.07 | 4.03 |
| | M | H | -2.05* | .836 | .040 | -4.03 | -0.07 |
| | | L | 0.43 | .829 | .863 | -1.53 | 2.39 |
| | L | H | -2.48* | .798 | 0.06 | -4.37 | -.059 |
| | | M | -0.43 | .829 | .863 | -2.39 | 1.53 |
| Second | H | L | 2.62* | .774 | .003 | 0.79 | 4.46 |
| | | M | 2.03* | .806 | .035 | 0.12 | 3.93 |
| | M | H | -2.03* | .806 | .035 | -3.93 | -0.12 |
| | | L | 0.60 | .799 | .736 | -1.29 | 2.49 |
| | L | H | -2.62* | .774 | .003 | -4.46 | -0.79 |
| | | M | -0.60 | .799 | .736 | -2.49 | 1.29 |
| Third | H | L | 2.70* | .756 | .001 | 0.91 | 4.49 |
| | | M | 2.08* | .787 | .025 | 0.22 | 3.94 |
| | M | H | -2.08* | .025 | .025 | -3.94 | -0.22 |
| | | L | 0.63 | .700 | .700 | -1.21 | 2.46 |
| | L | H | -2.08* | .001 | .001 | -4.49 | -0.91 |
| | | M | -0.63 | .700 | .700 | -2.46 | 1.21 |
| Fourth | H | L | 3.10* | .682 | .000 | 1.49 | 4.71 |
| | | M | 1.90* | .710 | .022 | 0.22 | 3.58 |
| | M | H | -1.90* | .710 | .022 | -3.58 | -0.22 |
| | | L | 1.20 | .703 | .208 | -0.47 | 2.86 |
| | L | H | -3.10* | .682 | .000 | -4.71 | -1.49 |
| | | M | -1.20 | .703 | .208 | -2.86 | 0.47 |

Note. * The mean difference is significant at the .05 level.

Overall, the results show that *Matthew Effects* are present (Stanovich, 1986). Matthew effects in education are defined by Stanovich (1986) as “the facilitation of further learning by a previously existing knowledge base that is rich and elaborated” (p. 381). Stanovich (1986) further elaborated that a learner with a large knowledge base enables the learner to acquire even greater knowledge at a faster rate. In this study, learners with large passive vocabulary knowledge, defined as high-ability students, made the greatest gains in successful lexical inferencing and lexical retention-retrieval. Differential effects among the ability levels within the CS group and GR group are evident. English proficiency or ability levels as measured by the VLT is a significant factor underlying lexical inferencing performance – high-ability students register the highest VKS scores, followed by the middle-ability students and low-ability students.

5.4. Comparisons between Experimental Group and Graded Readers Group in Retention-Retrieval of Lexical Target Words and Word Meanings

Research Question 2a: Is the recall of TWs by EFL learners enhanced by reading codeswitched texts relative to their counterparts reading graded readers in an incidental learning design?

Independent-samples t-tests were conducted on the immediate retrieval and delayed retrieval to ascertain whether the treatment group (or codeswitched reading or CS group) and graded readers (GR) group differed in their immediate recall scores (CS mean = 9.76, sd = 3.79, N=78; GR mean = 6.95, sd = 4.57, N=76), the 95% CI for the difference in mean is 1.47, 4.15 ($t = 4.14$, p

< .0005, $df = 145.51$ using Welch's procedure). The null hypothesis in this case is rejected as the difference in group means is statistically significant. The CS group outperformed the GR group in immediate lexical retention-retrieval. Effect size for the difference between groups is medium ($d = 0.69$).

This group difference is further shown in the delayed retrieval (CS mean = 8.21, $sd = 4.58$; GR mean = 3.18, $sd = 3.19$), while the 95% CI for the mean difference is 3.77, 6.28 ($t = 7.92$, $p < .0005$, $df = 137.77$ using Welch's procedure).

The effect size for the difference between means is large ($d = 1.27$) which indicates that the CS group retained and recalled significantly more words than the GR group in a delayed retrieval.

Research Question 2b: Does the use of codeswitched texts lead to differential effects on lexical retention-retrieval among advanced learners, intermediate learners and basic learners?

A 2×3 factorial ANOVA examining the effects of grouping (CS/GR) and ability on the immediate retrieval shows a statistically significant effect for grouping ($F_{1,148} = 16.463$, $p < .0005$, partial eta squared = .1) and for ability level ($F_{1,148} = 6.67$, $p = 0.02$, partial eta square = .083). The descriptive statistics show that performance is positively correlated with ability level, with high-ability students scoring the highest means (CS mean = 10.95, $sd = 3.66$; GR mean = 8.46, $sd = 4.59$) followed by middle-ability students (CS mean = 10.52,

sd = 3.87; GR mean = 6.85, sd = 4.50) and low-ability students (CS mean = 7.83, sd = 3.19; GR mean = 5.86, sd = 4.46). The effect size is $R^2 = .18$ which is medium (Larson-Hall, 2010). The performance is similar in the delayed retrieval albeit a general decline in performance recall. Statistical effects are found in grouping ($F_{1,148} = 66.28$, $p < .0005$, partial eta-squared = .31) and ability level ($F = 9.65$, $p < .0005$, partial eta-squared = .12). Also, the high-ability students in both CS and GR groups scored the highest means (CS mean = 9.63, sd = 4.47; GR mean = 4, sd = 3.40), followed by middle-ability students (CS mean = 9.43, sd = 4.29, GR mean = 3.60, sd = 3.84) and low-ability students (CS mean = 5.69, sd = 3.94; GR mean = 2.16, sd = 1.98). The effect size ($R^2 = .38$) is large; this means that the CS group regardless of ability level retained TWs and their meanings better than GR group, with proficiency as the second significant IV.

Table 5.7

Post hoc Tukey's test results on all pairwise comparisons of ability levels in terms of retention-retrieval performance

| Task | Ability | Ability | Mean Difference | Std. Error | p-value | 95% CI | |
|---------------------|---------|---------|-----------------|------------|---------|-------------|-------------|
| | | | | | | Lower Bound | Upper Bound |
| Immediate Retrieval | H | L | 3.07* | .785 | .000 | 1.21 | 4.93 |
| | | M | 1.41 | .817 | .201 | -0.53 | 3.34 |
| | M | H | -1.41 | .817 | .201 | -3.34 | 0.53 |
| | | L | 1.66 | .806 | .101 | -0.25 | 3.57 |
| | L | H | -3.07* | .785 | .000 | -4.93 | -1.21 |
| | | M | -1.66 | .806 | .101 | -3.57 | 0.25 |
| Delayed Retrieval | H | L | 3.36* | .723 | .000 | 1.65 | 5.07 |
| | | M | 1.05 | .752 | .347 | -0.73 | 2.83 |
| | M | H | -1.05 | .752 | .347 | -2.83 | 0.73 |
| | | L | 2.31* | .742 | .006 | 0.55 | 4.07 |
| | L | H | -3.36* | .723 | .000 | -5.07 | -1.65 |
| | | M | -2.31* | .742 | .006 | -4.07 | -0.55 |

Note. * The mean difference is significant at the .05 level.

Post-hoc Tukey HSD tests found that there is a statistical difference between high-ability students and low-ability students, but not between high-ability students and middle-ability students for the immediate retrieval (see Table 5.7). However, high-ability students performed statistically different from low-ability students; a similar pattern was seen between middle-ability students and low-ability students. Similar to the case of lexical inferencing, proficiency is a significant independent variable which influences retention-retrieval performance.

The partial correlation tests show a positive relationship between total number of guesses and VKS scores while controlling pre-knowledge of target word meanings. Together with the findings that the CS group outperformed the GR group in both retrievals, it can be seen that unfamiliar words guessed with some difficulty and moderated by transparent contexts presented in L1 lead to higher lexical retention-retrieval relative to contexts presented in L2. This result agrees with Laufer's (2005) assertion that learners should be familiar with most words in immediate proximity of unfamiliar target words in order to guess the target word meanings successfully; the target words should also entail some degree of difficulty in guessing. Words that are easily guessable without interfering with reading are likely not retained compared to words that are less guessable or are guessed with some difficulty. This view is substantiated by research findings by Haastrup (1991), Jacoby, Crail and Begg (1979) and Mondria and Wit-de Boer (1991).

5.5. Summary

In this chapter, the data gained from the lexical inferencing tasks and retrieval tests are presented and analysed using the statistical methods described in Chapter Four. Firstly, group differences in lexical inferencing performance between the treatment or CS group and the control or GR group are statistically different with substantial effect sizes across all four lexical inferencing tasks. This is despite an advantage of higher reported pre-knowledge of target words by the GR group in the second lexical inferencing task. The CS group noticeably guessed more target word meanings successfully than their GR group counterparts. L2 proficiency or ability is a second independent variable

that has a statistical effect on lexical inferencing performance – proficiency is positively correlated to successful lexical inferencing in that high-ability students performed best, followed by middle-ability and low-ability students. In three out of four lexical inferencing tasks, proficiency is statistical in its effect on reported pre-knowledge of target words – pre-knowledge of target words is a function of proficiency. This is consistent with prior empirical findings that proficiency correlates with vocabulary sizes (e.g. Laufer, 1998).

In the retrieval tests, there is a statistical effect for the groups – CS group outperformed the GR group in lexical retention-retrieval. Although there is an expected dip in recall scores for the delayed retrieval, the effect size of the statistically significant difference between the groups increased – the CS group increased its lead over the GR group.

CHAPTER SIX

QUALITATIVE ANALYSIS –

PRESENTATION OF DATA AND RESEARCH

FINDINGS

6.1 Chapter Overview

In this chapter, I examine the think-aloud protocols of thirteen participants which are coded according to a modified Wesche and Paribakht's (2010) taxonomy of knowledge source use of L1 and L2 lexical inferencing and Albrechtsen, Haastrup and Henriksen's (2008) coding framework of P1 and P2 processing continuum. Wesche and Paribakht's coding scheme is used to identify L1-based or L2-based knowledge sources that are professedly used by the participants while guessing the target word meanings; Albrechtsen, Haastrup and Henriksen's coding framework is used to analyse effective processing and ineffective processing. As the rationale for using the frameworks of Wesche and Paribakht (2010), and Albrechtsen, Haastrup and Henriksen (2008) is discussed in Chapter 4, only findings are presented in this chapter. Notably, the modifications done to Wesche and Praibakht's taxonomy of knowledge sources in the context of codeswitched texts will be detailed and explained in the following section. Hence, a recapitulation of the coding schemes will be shown for ease of reference. I will also present representative responses to the lexical inferencing tasks which illustrates partial meaning equivalence between Chinese and English. A summary ensues after the presentation of qualitative data and findings.

6.2 Data Processing

Students' online verbalisations are audio recorded and transcribed by an experienced Chinese-English bilingual transcriber. The transcriber is a Singaporean Chinese who holds a top university degree and has worked as a researcher for an international market research company. Students' utterances which are in Chinese are first transcribed in Chinese characters and romanised Chinese (hàn yǔ pīn yīn) before being translated to English. Utterances in English are directly transcribed in written English. Total duration of the audio recordings of thirteen student participants is 8 hours, 6 minutes and 40 seconds long. Each student participant read two codeswitched reading texts during the think-aloud protocol recording session and guessed the contextual meanings of ten English target words.

6.2.1. Codes used in analysing the data

As aforementioned in Chapter 4, Wesche and Paribakht's (2010) taxonomy of knowledge use in L1 and L2 lexical inferencing is used as the two languages were presented in the code-switched texts to student participants involved in the think-aloud protocol session. However, the taxonomy of knowledge use was applied for unilingual texts in Wesche and Paribakht's (2010) study. Bearing in mind that the present study employed codeswitched texts consisting of graded reading texts translated in Chinese from English save the target words which remain in English in situ, Wesche and Paribakht's coding scheme was modified to suit the codeswitched format and account for the prevalence of text presented in the L1 or Chinese with the exception of English target words – see the modified version of Wesche and Paribakht's

taxonomy of knowledge sources in Figure 6.1. Also, the codeswitched texts follow a codeswitching parameter delineated by Poplack (1988) in that there are no codeswitched bound morphemes, especially when the morphological systems of Chinese and English are dissimilar and do not afford any inter-morphological switches. However, as the dominant or matrix language is Chinese, the syntactic frame of the reading texts adhere to Chinese, in accordance to Myers-Scotton's (2005) MLFM.

Keeping in mind that the majority of words in the codeswitched texts are in Chinese, save the target words which are in English and that the morphosyntactic frame is Chinese, we can see that sentence knowledge in terms of sentence meaning, sentence grammar and punctuation are in L1, as opposed to L2 as previously presented in the unmodified version of Wesche and Paribakht's taxonomy of knowledge sources (cf. Figure 3.11). In terms of discourse knowledge, discourse meaning and text style and register are in L1 and they are modified to reflect that they are L1-based. However, formal schemata remains in L2 as the texts were translated from English to Chinese. The modified Wesche and Paribakht's taxonomy of knowledge sources is shown in detail in Figure 6.1.

| |
|---|
| <p>Linguistic Sources</p> <p>L2-based sources</p> <ul style="list-style-type: none"> • Word Knowledge <ul style="list-style-type: none"> ○ <i>Word Association</i>: Association of the target word with another familiar word or a network of words. ○ <i>Word Collocation</i>: Knowledge of words that frequently occur with the target word. ○ <i>Word Morphology</i>: Morphological analysis of the target word based on knowledge of grammatical inflections, stem, and affixes. ○ <i>Word Form (written)</i>: Knowledge of formal (orthographic or phonetic) similarity between the target word, or a part of it, and another word and mistaking the target word for another word resembling it. • Discourse Knowledge <ul style="list-style-type: none"> ○ <i>Formal Schemata</i>: Knowledge of the macro structure of the text, text types and discourse patterns and organisation. <p>L1-based sources</p> <ul style="list-style-type: none"> • L1 Collocation • Knowledge of words in L1 that have collocational relationship with the L1 equivalent of the target word, assuming that the same relationship exists in the target language. • Sentence Knowledge <ul style="list-style-type: none"> ○ <i>Sentence Meaning</i>: The meaning of part or all of the sentence containing the target word ○ <i>Sentence Grammar</i>: Knowledge of the syntactic properties of the target word, its speech part and word order constraints ○ <i>Punctuation</i>: Knowledge of rules of punctuation and their significance. • Discourse Knowledge <ul style="list-style-type: none"> ○ <i>Discourse Meaning</i>: The perceived general meaning of the text and sentences surrounding the target word (i.e. beyond the immediate sentence that contains the target word). ○ <i>Text Style and Register</i>: Knowledge of stylistic and register variations in word choice. |
| <p>Non-Linguistic Source</p> <ul style="list-style-type: none"> • Word Knowledge <p>Non-linguistic knowledge, including knowledge of the topic of the text and other related background knowledge.</p> |

Figure 6.1. Modified bilingual study taxonomy of KS use in L1 and L2 lexical inferencing

The bilingual participants in this study inferred in either their L1 (Chinese) or in their L2 (English) and the linguistic KSs that they reported using are indicated as L1-based or L2-based. It is noted that L1 word collocation is not a reliable KS as collocates differ cross-linguistically. Also, it is noted that L1 word form is not a KS for ESL/EFL speakers whose L1 (Chinese) is typologically distant from English.

6.3. Readers' Use of Knowledge Sources: Types and Patterns

6.3.1. Summarised findings

Think-aloud protocol findings are summarised and tabulated in Table 6.1 which shows the participants' VLT scores, language or languages used in the verbalisations, total number of correct guesses, number of non-attempts, L1-based KSs and L2-based KSs based on Wesche and Paribakht's (2010) modified bilingual study taxonomy of KS us in L1 and L2 lexical inferencing and further categorised as successful and unsuccessful uses, number of pre-knowledge or prior knowledge of TWs, general world knowledge and the type of P1 or P2 processing as defined by Albrechtsen, Haastrup and Henriksen's (2008) coding framework.

Table 6.1

Summarised and Collated Think-Aloud Protocol Findings

| P | VLT Score | Language/s used in think-aloud | No. of successful guesses ¹ (n=10) | Non-attempts | L1-based knowledge source uses | | L2-based knowledge source uses | | Prior knowledge of TW | World Knowledge | P1/P2 Processing |
|---|-----------|--------------------------------|---|--------------|---|---|--------------------------------|-----------------------|-----------------------|-----------------|---------------------|
| | | | | | Successful | Unsuccessful | Successful | Unsuccessful | | | |
| A | 140 | English | 8 | - | discourse meaning (x4); sentence meaning (x4) | sentence meaning (x2) | - | - | - | - | P1 |
| B | 136 | English | 8 | - | discourse meaning (x3); sentence meaning (x5); | sentence meaning (x2) | - | - | - | - | P1 |
| C | 135 | Chinese | 4 | 1 | sentence meaning (x4) | discourse meaning (x1) sentence meaning (x4) | - | word association (x1) | - | - | P1 and P2 Section 4 |
| D | 132 | Chinese | 5 | - | discourse meaning (x1) sentence meaning (x4) | sentence meaning (x5) | - | - | - | - | P1 |
| E | 131 | Chinese and English | 2 | - | sentence meaning (x2) | sentence meaning (x8) | - | - | - | - | P1 |

| | | | | | | | | | | | |
|---|-----|---------------------|---|---|---|---|---|---|---|---|----|
| F | 130 | Chinese | 6 | - | discourse meaning (x3) | sentence meaning (x4) | - | - | 3 | - | P1 |
| G | 123 | Chinese and English | 4 | - | sentence meaning (x4) | discourse meaning (x1) sentence meaning (x5) | - | - | - | - | P1 |
| H | 123 | Chinese and English | 5 | 4 | sentence meaning (x3) | sentence meaning (x1) | - | - | 2 | - | P1 |
| I | 115 | Chinese | 5 | - | sentence meaning (x5) | sentence meaning (x5) | - | - | - | - | P1 |
| J | 115 | Chinese | 5 | 1 | discourse meaning (x2) sentence meaning (x3) | sentence meaning (x4) | - | - | - | - | P1 |
| K | 109 | English | 5 | - | sentence meaning (x5) | discourse meaning (x1) sentence meaning (x4) | - | - | - | - | P1 |
| L | 102 | Chinese | 2 | 3 | sentence meaning (x2) | sentence meaning (x5) | - | - | - | - | P1 |
| M | 100 | Chinese | 4 | 2 | discourse meaning (x1) sentence meaning (x3) | discourse meaning (x4) | - | - | - | 1 (connected to a sentence meaning which participant extrapolated to the wider context) | P1 |

¹Note: Successful guesses include guesses that are not one-to-one translation equivalents but are deemed as more than partial guesses.

Table 6.2

Selected Target Words With Their Contextual Meanings, English Dictionary Meanings and English-Chinese Dictionary Translation Equivalents

| Target Words | Verbatim occurrences of target words at paragraph level in graded readers (with target words in boldface) | Contextual Meanings | English Dictionary Meanings | English-Chinese Dictionary Translation Equivalents |
|--------------|--|--|---|--|
| Furore | The furore over cartoons of the Prophet Muhammad, published in a Danish newspaper as a satirical comment, is becoming more widespread. Incidences of violence may be isolated, but verbal barbs have been flying from all sides and in all directions. Everyone seems to have something to say about either the cartoons themselves, or about the response to the publication of the cartoons, and even the response to the responses. Some are offended by the irreverence of the cartoons. Others are indignant that the newspaper, a bastion of free speech in Denmark and many other countries, is being criticised for simply expressing the cartoonists' "personal opinions". Still others are dismayed that supporters of the Danish newspaper view the expression of potentially inflammatory comments as an entitlement. | Conflation of conflicting and differing views expressing offence, indignation and dismay | "Furore is a very angry or excited reaction by people to something" (p. 591, Collins Cobuild English Language Dictionary, 1987) | kuángnù duimǒu 狂怒, 对某 shìfēichángshēng qì 事非常生气 huòxīngfēndefǎn 或兴奋的反 yīng 应 (outrage, react very angrily or excitedly to something) |
| Heinous | In this age of diversity, it is widely believed that all cultures are equal. Western culture, claim the intellectuals, is in no way superior to that of African tribalists or Eskimo seal hunters. There are no objective standards, they say, that can be used to evaluate the moral standing of different groups. They assert that to deny the equality of all cultures is to be guilty of the most heinous of intellectual sins: "ethnocentrism", which is a belief in the superiority of one's ethnic background. This is to flout the sacred principle of cultural relativism. I disagree with the relativists - absolutely. | Reprehensible | "Something that is heinous is extremely evil" (p. 678, Collins Cobuild English Language Dictionary, 1987) | jí kěhènde jí kě 极可恨的, 极可 wùde jí huàide 恶的, 极坏的 (extremely hateful, extremely evil and extremely bad) |

| | | | | |
|------------|---|--|---|---|
| Promethean | Nobody knows what technological possibilities will emerge for human self-modification. But we can already see the stirrings of Promethean desires in how we prescribe drugs to alter the behaviour and personalities of our children. The environmental movement has taught us humility concerning our human nature. If we do not develop it soon, we may unwittingly invite the transhumanists to deface humanity with their genetic bulldozers. | Boldly innovative and creative without regard for consequences | “Having to do with Prometheus, or like him in his skill or suffering” (p. 800, The New Lexicon Webster’s Encyclopedic Dictionary of the English Language, 1992) | fù yǔ shēng mìng 赋予生命 de shǐyǒushēng jī 的; 使有生机 de yǒngyú chuàng 的; 勇于创 zàode 造的 (life giving; creative; boldly innovative) |
| Lacerating | We must all confront this one truth: that what may be possible for a minority of humankind, albeit at great cost, simply cannot work for the whole of humankind. Our kind of progress depends on lacerating the Earth, on gouging out its riches, on flaying off its life-sustaining skin of soil and forest, on poisoning its pure air, on defecating copiously on its pure water. For some people, such language may be a little 'emotive', but this is what activities like open-cast and deep mining, deforestation and pollution amount to. | Damaging (in a metaphorical sense) | “If something lacerates your skin, it cuts it badly and deeply” (p. 805, Collins Cobuild English Dictionary, 1987) | huápò sī liè 划破, 撕裂 (cutting, tearing) |

The tabulated results shown in Table 6.1 suggest that proficiency is a modulating variable affecting lexical inferencing. Matthew effects are shown in an ability-level comparison of students who score the highest VLT scores achieving the highest lexical inferencing scores, while the lowest VLT performing students conversely score the lowest lexical inferencing scores. However, the middle-ability students (as defined by their VLT scores) show mixed inferencing performance, with one student sharing the lowest score with one of the low-ability students. Keeping in mind that the sample size is small, that proficiency was solely defined by VLT scores and that the results are not intended to be interpreted quantitatively or statistically, the results are generally consistent with statistical results presented in the earlier chapter (see Chapter 5) - proficiency is a deterministic variable underlying lexical inferencing performance. The finding corroborates Kroll and Stewart's (1994) RHM and Pavlenko's (2009) MHM which state that learner proficiency is a deterministic variable of learner performance in receptive and productive vocabulary tasks.

It is also interesting to note that across the ability levels, student participants used largely similar knowledge sources, namely, discourse meaning and sentence meaning. This trend can be seen as a preference among students to use top strategies which are L1-based. This preference can also be seen as a default of codeswitched reading because word contexts were presented in a transparent, comprehensible and meaning-bearing way to the students via the L1. Despite the predominant use of top strategies or contextual cues, differences in performance remain. The performance differences can be

accounted for by the use of metalinguistic knowledge or strategies which will be elaborated on in Section 6.3.3.

6.3.2. L1 and L2 knowledge sources

Based on Table 6.1, more L1-based KSs were used since CS texts were used during the protocol sessions. As previously mentioned in Chapter Five, Matthew effects can be seen in the successful and unsuccessful use of L1-based KSs, with the high-ability students being able to harness the L1 KSs more efficiently than lower-ability students.

Research question 3: Regarding English target words that lack one-to-one meaning equivalence in Chinese, will learners proffer target word definitions that are partially equivalent (like L1 translation equivalents) or fully/closely equivalent to target word meanings?

The English TW contextual meanings that lack full equivalents in Chinese and were tested in the think-aloud protocol sessions and lexical inferencing sessions are listed in Table 6.2. In reference to Table 6.2, the first column shows the target words, followed by their contextual occurrences quoted from the texts used in this study. The third column indicate the target word definitions or denotational meanings according to established English dictionaries and the fourth column shows the Chinese translation equivalents according to online English-Chinese dictionaries, with English paraphrases in parentheses. Lin and Ahrens (2005) found that different English dictionaries may proffer varying word definitions so a number of English dictionaries were

consulted, namely Sinclair's (1987) edited *Collins Cobuild Dictionary of the English Language*, Cayne's (1992) edited *The New Lexicon Webster's Encyclopedic Dictionary of the English Language* and Pickett's (1992) edited *The American Heritage Dictionary of the English Language*. Also, online English-Chinese bilingual dictionaries recommended by Chen and Truscott (2010) were also referred to for checking of Chinese translation equivalents, namely, <http://dictionary.cambridge.org>, <http://www.merriam-webster.com>, http://en.wiktionary.org/wiki/Wiktionary:Main_Page, <http://dictionary.babylon.com>, <http://www.onlinedict.com> (Chen and Truscott, 2010, p. 697). The dictionary meanings for the four words do not deviate significantly among the dictionaries consulted.

Table 6.2 shows semantic discrepancies between the contextual meanings used in the reading texts and English dictionary definitions. Notably, they are abstract words which tend to have less semantic correspondence between languages than concrete words (De Groot, 1992). However, the Chinese translation equivalents are similar to their English dictionary counterparts with an apparent exception of the word definitions of "Promethean". While the Chinese definition of Promethean indicates the characteristics of Prometheus, the English definition of Promethean presupposes the reader to be familiar with the Greek mythological figure Prometheus. However, other English dictionaries did indicate similar meanings as the Chinese translation equivalents.

In what follows, I present excerpts taken from think-alouds or verbal reports with a focus on inferring the words “heinous” and “furore”. I will also present definitions given by students for the lexical inferencing tasks with a focus on inferring the words “Promethean” and “lacerating”. The clues found in the directive context of “heinous” are in the portrayal of a controversial conflict between multiculturalism and ethnocentrism, from a multiculturalist point of view. This view regards ethnocentrism negatively, as indicated in words like “guilty”, “intellectual sins” and “flout”. “Heinous” in this context is to indicate the objectionableness and censurability of ethnocentrism. The following excerpt was taken from Participant B’s verbalisation on guessing the word “heinous”:

I think they are right because our cultures are equal, no cultures more superior to others and I guess the meaning of “heinous” just to... as the most evil or the baddest.

(Participant B, VLT score = 136)

Participant B is considered a high-ability student as the VLT score is one of the highest in the sample. She used L1-based discourse meaning to infer the meaning of the TW, as indicated by her agreement with the proximal sentences surrounding the TW. It can be seen that the word definition matches the English dictionary meaning and Chinese translation equivalent. However, the semantic feature of reprehensibility as part of the word used in the reading passage is not indicated. Participant B inferred the simplified meaning of heinous but the specific feature of reprehensibility is not articulated. Participant J, a low-ability student as defined by the VLT score of 115 also came close to

the meaning of heinous as shown in an excerpt of her verbal report below which was uttered in Chinese, followed by an English translation of the excerpt.

zhège dān cí yīnggāishì gè fù miàn de dān cí yīnwéi sī xiǎng dà jì 。 。 。 dà jì
这个单词应该是个负面的单词，因为思想大忌。。。大忌

jiù shì shǔ yú rén lèi bù xiǎng chǎn de yí gè lǐ lùn jiù shì zhǒng zú zhōng xīn lùn
就是属于人类不想触犯的一个理论，就是种族中心论。

yīnwéi zhǒng zú zhōng xīn lùn zài hěnduō guó jiā gěi rén zào chéng guò wú shù de bù kě
因为种族中心论在很多国家给人造成过无数的不可

mó miè de shāng hài suǒ yǐ zhè shì wǒ men bù xiǎng kàn dào de suǒ yǐ zhè ge zuì
磨灭的伤害，所以这是我们不想看到的。所以这个最

yán zhòng de wǒ xiǎng tā de yì sī yīng gāi shì zuì yán zhòng zuì bù
严重的“heinous”，我想它的意思应该是最严重，最不

kě ráo shù de
可饶恕的。

(*Translation:* This word should be a negative word, because intellectual sin... a sin belongs to an argument that people do not wish to commit, which is ethnocentrism. Because ethnocentrism has caused a lot of hurt that cannot be erased in many countries, so it is something that we do not wish to see. So this most serious “heinous”, I think its meaning is the most serious, the most unforgiveable.)

(Participant J, VLT score = 115)

Similar to the case of Participant B, Participant J was able to infer the semantic feature of extremity and a general semantic feature of wrongdoing. Participant J relies on sentence meaning when she mentions the expression

“intellectual sin” and pondered on it before she arrived at her guess. However, it can also be seen that she combined L1-based discourse meaning with L1-based sentence meaning to arrive at her inference. However, the semantic feature of reprehensibility is not indicated; instead, Participant J added a semantic feature of unforgivableness which is not relevant to the contextual meaning of heinous.

In the case of inferring the word “furore”, the directive context is a controversial conflict over the satirical cartoons of the Prophet Muhammad which ignited reactions that consist of offense, indignation and dismay. What follows is an excerpt taken from a verbal report by Participant A guessing the meaning of “furore”.

Okay, moving to the second passage, it says that “furore”... I think this sentence means, I think this word means an anger, because this whole sentence talks about the mocking of Prophet Muhammad.

(Participant A, VLT score: 140)

Participant A used L1-based sentence meaning to infer the TW meaning. Although the meaning Participant A proffered matches both the English and Mandarin dictionary meanings, it is a simplified meaning which omitted the conceptual feature of the conflation of differing reactions.

The following excerpt was taken from Participant F’s think-aloud report which showed her inferencing process in guessing the TW “furore”, followed by an English translation.

yīng gāi shì zhǐ nà zhǒng biàn lùn yīn wéi hòu miàn de yán lùn shuō zài
“Furore” 应该是指那种辩论，因为后面的言论说在

debào zhǐ fā biǎo le yī piān kǎ tōng de yì xiē píng lùn suǒ yǐ wǒ jué de shì
Danish 的报纸发表了一篇卡通的一些评论，所以我觉得是

zhī hòu yǐn qǐ le yì chǎng biàn lùn
之后引起了一场辩论。

(*Translation:* “Furore” should be a kind of debate, because the latter statement says that the Danish newspapers expressed some comments on a comic, so I feel that it has caused a debate after that.)

(Participant F, VLT Score = 130)

Participant F used L1-based discourse meaning to guess the TW. However, she managed to capture only the general context of the paragraph by defining the TW as a debate – referring to the controversial conflict over the Prophet Muhammad cartoons. Participant F overlooked the semantic feature of the conflation of strong and differing reactions.

A semantic analysis of the guesses written by students for the TWs “lacerating” and “Promethean” are shown in Tables 6.3 and 6.4. Each row indicates an archetypal or representative inference/s which other semantically equivalent or near-equivalents are classified together. These representative inferences are shown in either English or Chinese, based on students’ written guesses. Chinese expressions are accompanied by English translations in parentheses unless there are other representative inferences in English. Some

students gave more than one word or Chinese expression for each word – only the word which is regarded as semantically closer to the core conceptual features of the TWs was counted. In the case of two different words which are deemed as non-semantic features of the TW, only the word in the initial position was counted while the other word was omitted from the analysis. The second column indicates the numerical occurrences of each categorical semantic inference from the CS group while the third column indicates the frequencies registered by the GR group. The rows that are shaded in grey indicate that the inferences match the full semantic features of the TWs.

Table 6.3

Compiled Responses to “Lacerating”

| | CS Group (N = 78) | GR Group (N = 77) |
|--|----------------------|----------------------|
| Damage; 破坏 | 35 | 5 |
| Pollute; Contaminate; 污染 | 2 | 2 |
| Overexploit; Exploit; 剥削 | 2 | 2 |
| 消耗 (expend); 过度利用 (overuse); Consume; 榨取 (bleed dry) | 2 | 2 |
| Cut; Cutting Something (eg. Skin) Badly and Deeply; Slicing | 0 | 6 |
| Tear; 撕破; 撕裂病 | 1 | 2 |
| Destroy | 7 | 1 |
| Tear up something into parts | 1 | 0 |
| Hurt; Harm; 伤害 | 1 | 5 |
| Wreak havoc on | 0 | 1 |
| Dividing | 0 | 1 |
| Breaking; 打破 | 1 | 2 |
| Scratch or pain | 0 | 2 |
| Get or use something from; making use of | 0 | 2 |
| Sacrifice; 牺牲 | 5 | 0 |
| Reduce | 1 | 0 |
| Occupying | 0 | 1 |
| Exploring | 0 | 1 |
| Depriving | 0 | 1 |
| Give up | 1 | 0 |
| | 19 non- attempts | 41 non- attempts |

Table 6.4

Compiled Responses to “Promethean”

| | CS Group (N = 78) | GR Group (N = 77) |
|--|----------------------|----------------------|
| Boldly innovative and creative without regard for consequences | 0 | 0 |
| Creative; Innovative; Brave to innovate; 勇于创造; 独创性的 | 8 | 8 |
| 普罗米修斯一般 (Prometheus-related) | 2 | 1 |
| Original, unique | 1 | 1 |
| Vital | 0 | 1 |
| Special | 1 | 0 |
| A kind of thoughts | 0 | 1 |
| Energetic | 0 | 1 |
| 支持者 (supporter) | 1 | 1 |
| 超人类议 (Superhuman) | 3 | 0 |
| Stubborn, headstrong, opinionated | 1 | 0 |
| fighter | 1 | 0 |
| reformer | 1 | 0 |
| People who advocate super-humanitarianism | 1 | 0 |
| 人 (human) | 1 | 0 |
| 强烈 (strong) | 1 | 0 |
| 希望改进自己的 (Someone who wants to improve oneself) | 1 | 0 |
| | 55 non-attempts | 63 non-attempts |

Both tables show that the CS group made more guesses than the GR group, which is consistent with the finding reported in Chapter 5 that there is a statistical difference between the two groups in the number of guesses or tries. Table 6.3 indicates that the CS group of student participants made significantly more inferences that are deemed full conceptual features of the word “lacerating” in context than the GR group of students. The core semantic features are metaphorical meanings of “lacerating” which students picked up. These metaphorical meanings have direct Chinese translation equivalents. It is

suggested that the higher transparency in sentential and discourse contexts found in CS texts may have aided the students in the CS group to perceive and infer the metaphorical meanings of the TW.

In Table 6.4, both groups achieve an equal number of inferences matching the semantic features of creativity and innovation. However, the semantic feature of disregard for negative consequences was not inferred. This indicates that the students, regardless of group, inferred the simplified meaning of “Promethean”. It is noted that there are more non-attempts relative to the case of “lacerating” – this could be due to the perceived cultural opaqueness of “Promethean”. The full semantic features of the TW’s contextual meaning are not lexicalised in a comparable word in Chinese but it can be explained in a rather long and elaborate sentence in Chinese, which is 不顾后果大胆创新 (boldly innovative without regard for consequences).

It can be seen that in the case of the words “furore”, “heinous”, “lacerating” and “Promethean”, they are word meanings which do not fully match L1 translations and denotational meanings. While many students were able to infer the metaphorical meaning of “lacerating” successfully from context, students were unable to pick up the full semantic features of the other three words. Words which are deemed of partial semantic equivalence require a process of semantic restructuring of L1 equivalents or translations. Jiang (2004c) states that a very powerful context is needed to override the mediated meaning from L1 concept. I propose that a deliberate teaching approach such as FFIs

would be most appropriate in guiding semantic restructuring in ESL/EFL learners.

6.3.3. Effective and ineffective processing

As mentioned previously in Chapter 3, the coding model by Albrechtsen, Haastrup and Henriksen (2008) was used to code processing types consisting of knowledge sources as found in protocol analyses of introspective verbal protocols (see Figure 3.12 for the coding framework). An important distinction is made by Haastrup, Albrechtsen and Henriksen (2004) and Albrechtsen, Haastrup and Henriksen (2008) between *potentially effective processing* and *ineffective processing*. Effectiveness is identified by a qualified inference which is semantically founded in the context. Potentially effective processing encompasses P1 processing or pure-top processing and P2 processing Sections 1 and 2 on the continuum, or interactive top-ruled processing. Ineffective processing refers to Sections 3 and 4 P2 processing. In reference to Table 6.1, the participants used P1 processing with the exception of one participant, who used both P1 and P2.4 processing (top-ruled processing in the form of context-ruled processing with activation but no integration of linguistic cues. To recapitulate a previous discussion in Chapter 3, Albrechtsen, Haastrup and Henriksen (2008) had previously found that there are differences between lexical inferencing processes used and proficiency levels. Matthew effects are shown in a comparison of highly proficient learners and low ability learners. Highly proficient learners tended to use advanced processing, showed adaptability in the use of appropriate processing types for different word types and were successful in identifying precise word meanings in context.

The following excerpt is taken from Participant A, a high-ability student, when the word meaning of “unprecedented” was inferred.

Okay, and then the fifth paragraph, the first sentence talks about because of all these western civilisations, core achievements, humans are able to gain in terms of freedom, wealth, health, comfort and life span, and all these development are considered unprecedented. I think I know what it

means. It means ^{shǐwúqián lì} 史无前例 (*translation*: no prior example in history). It

means it never happened before.

(Participant A, VLT Score: 140 (highest))

It can be seen that participant A successfully used P1 processing as evidenced by the exclusive use of contextual cues, indicated by references to a specific paragraph (“fifth paragraph”) and sentence (“first sentence”), which are discourse meaning and sentence meaning respectively. Participant A gave the correct inference in Chinese before augmenting it with an English translation. Another excerpt illustrates an instance of successful P1 processing by Participant I, a middle-ability student.

zhè jù huà jiǎng dào qǐ méng shí dài , jiǎng de xī fāng de qǐ méng shí dài 。 dān cí
这句话 讲到 启蒙 时代， 讲的 西方 的 启蒙 时代。 单词

de yì sī yīng gāi shì fā zhǎn dào le yī gāo fēng
“zenith” 的意思 应该是 发展 到了一 高峰。

(*Translation:* This sentence mentioned the Age of Enlightenment - it talks about the Western's Age of Enlightenment. The word “zenith” should mean that it has developed to its peak.)

(Participant I, VLT Score = 115)

Participant I, speaking in Chinese, identified the crucial sentence meaning which informed the successful guess of the word “zenith”. Another case of using sentence meaning as a knowledge source for a successful inference is shown in the following excerpt taken from Participant M's verbal report. Participant M is a low ability student, with the VLT score of 100. Despite her ability level, she did successfully infer four out of ten TWs using P1 processing.

tā de xī fāng wén míng de yī zhǒng zōng zhǐ qí shí jiù shì zài chàng dǎo yì zhǒng lǐ
它的西方文明的一种宗旨其实就是在倡导一种理

xìng xuān chuán lǐ xìng huò shì chàng dǎo lǐ xìng rén quán de zì yóu hé jì shù jìn
性，宣传理性或是倡导理性人权的自由和技术进

bù suǒ yǐ zhè ge yīng gāi shì xuān chuán chàng dǎo de yì sī
步。所以这个“advocates”应该是宣传，倡导的意思。

(*Translation:* The one type of principle of the Western civilisation is to promote reason or advocate reason, rights, freedom and technological progress. So this “advocates” should mean promote, advocate.)

(Participant M, VLT score = 100)

Similar to the case of Participant I discussed earlier, Participant M also used sentence meaning to guess successfully the meaning of the word.

However, she extrapolated it to a wider context of “western civilisation” and presented her understanding as a generalisation.

However, the use of potentially effective processing, particularly P1 processing per se, does not guarantee successful inferencing. According to Albrechtsen, Haastrup and Henriksen (2008), lexical inferencing is a procedural skill, which refers to P1 and P2 processing types, and is one of three dimensions of ability; the other two aspects are declarative lexical knowledge (size and depth) and inferencing success. They also investigated writing skills in their study which does not fall within the scope of this study. Declarative lexical knowledge and inferencing success are closely related to proficiency and this may explain why Matthew effects continue to be evident in the results.

In the case of Participant J, while inferring the word “advocate”, she managed to grasp the discourse and sentence meanings surrounding the TW. However, her inference was wrong, as shown in the following excerpt.

tā qǔjué 。 。 “advocates” 。 。 。 lái zì yú 。 。 。 shōu yì yú 。 。 。 zhè lǐ
它取绝。 。 “advocates”。 。 。 来自于。 。 。 收益于。 。 。 这里

zhè jù dān cí de yì sī shì lái zì zì huò shòu yì shòu huò yǒu shén me gòng xiàn huò
这句单词的意思是来自或受益受或有什么贡献。 。 。 或

zhè tā gòng xiàn gěi bié de dōng xī shòu yì 。 。 。 tā gòng xiàn le lǐ xìng rén
者它贡献给别的东西受益。 。 。 它贡献了理性，人

quán zì yóu hé jì shù jìn bù 。 。 。 zhè lǐ “advocates” shì 。 。 。 shǒu xiān
权，自由和技术进步。 。 。 这里“advocates”是。 。 。 首先

zuò zhě píng jià shuō xī fāng wén míng de wēi dà shì kè guān shì shí zhè yàng de píng
作者评价说西方文明的伟大是客观事实，这样的评

jià qǔ jué yú yí gè wéi yī zhèng què de biāo zhǔn shì yī kào huò zhě lái zì yú lǐ
价取绝于一个唯一正确的标准是依靠或者来自于理

xìng rénquán zì yóu hé jì shù jìn bù 。 。 。 yě jiù shì lǐ xìng rénquán zì
性，人权，自由和技术进步。。。也就是理性，人权，自

yóu hé jì shù jìn bù gěi le xī fāng wén míng zhè yàng de kè guān píng jià
由和技术进步给了西方文明这样的客观评价。

(*Translation:* It is taken from... “advocates”... it comes from... benefits from... The meaning of this word is derived from some benefits or contributions... or it has contributed to or given other things some benefits... it has contributed to reason, right, freedom and technological progress... “advocates” here is... firstly, the author commented that the greatness of the West is an objective fact. This assessment is based on the only proper standard and relies or comes from reason, right, freedom and technological progress... which also means that reason, right, freedom and technological progress have given the Western civilisation such an objective assessment.)

(Participant J, VLT score = 115)

Participant J misread the paragraph, particularly the sentence which stated that the only proper standard for evaluating a government or society is one which advocates reason, rights, freedom and technological progress. In the Chinese translation found in the codeswitched text, the translated sentence mirrors the English sentence syntactically and semantically with a few added auxiliary words that do not affect the interpretation and sentence meaning, as shown in Table 6.5.

Table 6.5

A Comparison of Sentence Contexts of “Advocate” in English and Chinese

| |
|--|
| This assessment is based on the only proper standard for judging a government or a society, which advocates reason, rights, freedom, and technological progress. |
|--|

| |
|--|
| 这样的评价取决于一个用来评判政府或社会的唯一正确的标准，它 advocates 理性、人权、自由和技术进步。 |
|--|

Participant J misread the sentence as a cause-effect relationship - indicated by her inference of “advocate” as “contributed to” - rather than a categorical argument. As the contextual words are familiar to Participant J, this may not be a case of proficiency deficiency but it could be a case of a meta-reading skill lapse – a case of jumping to a conclusion without a careful consideration of other possibilities that may render the whole paragraph in a more cohesive and coherent manner. This finding relates to Huckin and Bloch’s (1993) lexical inferencing model which includes a metalinguistic strategic component consisting of a series of strategies in generating and testing semantic hypotheses. Building on Huckin and Bloch’s lexical inferencing model and Pressley and Afferbach’s (1995) reading strategies, Nassaji (2004) identified three main strategies in lexical inferencing, namely, *identifying*, *evaluating* and *monitoring* strategies. The latter two strategies are most relevant to Huckin and Bloch’s metalinguistic strategic component. Table 6.6 details the definitions of Nassaji’s evaluating and monitoring strategies.

Table 6.6

Nassaji's (2004) definitions of evaluating and monitoring strategies

| | |
|------------|---|
| Evaluating | Verifying: The learner examines the appropriateness of the inferred meaning by checking it against the wider context. |
| | Self-Inquiry: The learner asks himself or herself questions about the word or the meaning he or she has already inferred. |
| Monitoring | The learner shows a conscious awareness of the problem by judging its ease or difficulty. |

Note. Adapted from “The relationship between depth of vocabulary knowledge and L2 learners’ lexical inferencing strategy use and success.” by H. Nassaji, 2004, *The Canadian Modern Language Review*, 61(1), p. 117. Copyright 2004 by University of Toronto Press.

In reference to Table 6.6, Nassaji did not elaborate on the key knowledge sources used in verifying hypothesised word meanings in context. Instead, he vaguely refers to a “wider context” as the evidence or knowledge source. In this study, I found that the knowledge and identification of types of claims is an important knowledge source that is tapped on in *verifying* accurately semantic hypotheses or inferred word meanings. Knowledge of claim types is an important and overlooked component in verifying word meanings.

Although this type of metalinguistic knowledge appears to be positively correlated to proficiency, its deficiency can also be found in lexical inferencing by high-ability students, albeit in reduced numbers. An illustrative example is

shown in an excerpt taken from Participant A, who scored the highest VLT score of 140.

Okay, the following sentence talks about logic slowly in the 18th century developed to zenith. I'm not very sure about the meaning of this word, but at the back of this sentence, it says that this period is also known as the enlightenment period, so may be “zenith” means enlightenment?

(Participant A, VLT score = 150)

Participant A made an inference based on a fallacious assumption that one of the words within the sentence context is a synonym. Again, this is a procedural skill lapse in that the participant should also test other semantic hypotheses that can be the TW meaning such as the presence of a semantic network proximal to the TW which would help infer the word meaning successfully. In the case of the word “zenith”, the inclusion of the discourse focus on the core achievements of Western civilisation and the culmination of the rule of reason to reach the Age of Enlightenment would lead to the inference that the word “zenith” refers to a peak or top achievement of Western civilisation. We now refer to a parallel case of Participant M who scored the lowest VLT score, who was inferring the semantic meaning of “zenith”.

lǐ xìngzhǔ yì zài shí bā shì jì dào le diānfēng , suǒ yǐ zhè ge shí qī yě chēng zuò
理 性 主 义 在 十 八 世 纪 到 了 颠 峰 ， 所 以 这 个 时 期 也 称 作

qǐ méng shí dài yīn wéi zài 。 。 。 zhè ge “zenith” yīng gāi shì diānfēng de yì
启 蒙 时 代 ， 因 为 在 。 。 。 这 个 “zenith” 应 该 是 颠 峰 的 意

si yīnwéizài yì zhǒng tè shūde qíngkuàng 。 。 。 shí dài 。 。 。 yīng gāi shì tā zài
思，因为在一种特殊的情况。。。时代。。。应该是它在

tè dìng de qíngkuàng zhī xià , zài tè dìng de shè huì , zhè zhǒng sī xiǎng huò shì lǐ
特定的情况之下，在特定的社会，这种思想或是理

xìng zhǔ yì fā zhǎn dào yì zhǒng chéng shú huò shì tè shū de yì zhǒng shí qī , yīn
性主义发展到一种成熟或是特殊的一种时期，因

cǐ yě chéng wéi le yì zhǒng qǐ méng shí dài
此也成为了一种启蒙时代。

(Translation: The rule of reason has reached its peak in the 18th century, so this era is also termed as the Age of Enlightenment because in... this “zenith” should mean the peak because in a type of special circumstance... era... it should be that it is in a specific circumstance, in a specific society, this type of thoughts or rule of reason has developed to a mature or a special kind of era, and so it is termed as a type of Age of Enlightenment.)

(Participant M, VLT score = 100)

Participant M successfully inferred the meaning of zenith after a careful consideration of the development of the rule of reason to reach a period called Age of Enlightenment. Her inference that the trajectory has reached a summit or peak which accounts for a name used to specially mark the period led to her correct hunch. This ability is not outside the reach of students who may not possess large passive vocabularies – metalinguistic strategies could be explicitly taught in class to students to maximise their lexical inferencing success. In this case, a consideration of the discursal trajectory is key to Participant M’s inferencing success.

The findings show that CS reading texts can facilitate successful inferencing. Although learners, including high-ability students, infer simplified L2 meanings instead of full contextual meanings, their chances of lexical inferencing success are significantly raised while using CS texts. The findings reported in this chapter also show that metalinguistic strategies are needed to generate and test semantic hypotheses which would lead to correct guesses. Matthew effects continue to be evident in the qualitative findings which are consistent with the quantitative findings.

CHAPTER SEVEN

GENERAL DISCUSSION AND SUMMARY OF FINDINGS

7.1. Chapter Overview

This chapter further comments and discusses the quantitative and qualitative findings of the study in the wider context of theoretical models and relevant findings in the field. The chapter also summarises the results and points out the novel contributions and significance of the study.

7.2. Patterns of Performance in Terms of Successful Guesses and Recall

This study is the first of its kind to investigate the role and efficacy of codeswitched reading tasks as an intervention strategy in second language vocabulary acquisition, specifically in an English as a second/foreign language learning course at the pre-university level.

The quantitative and qualitative findings of this study have corroborated important insights of the role of codeswitched reading in second language vocabulary acquisition. The findings have shown that codeswitched reading has raised successful lexical inferencing relative to graded reading as indicated by statistically significant differences between the treatment group and comparison group. Word contexts presented in L1 have increased in transparency and comprehensibility to ESL students who used them to infer unfamiliar L2 words, as indicated by the reported statistical effect shown in lexical inferencing

performance between the CS group and GR group. This is in alignment with Barcroft's (2004) lexical input processing approach which is based on a synthesis of the empirical literature – meaning-bearing comprehensible input should be used in presenting new words for second language vocabulary learning. Barcroft (2004) explained that an unfamiliar L2 word meaning is more readily and successfully guessed if a learner understands or comprehends most of the context in which the word is situated in.

The findings of this study also confirm the consensus among second language acquisition researchers that new L2 words are mapped to existing L1 concepts (e.g, Ellis, 1997; Giacobbe, 1992; Hall, 2002; Jiang, 2000, 2002, 2004b, 2004c). Potter et al.'s (1984) word association hypothesis and Jiang's (2000, 2002, 2004b) LRDM or the lemma mediation hypothesis are confirmed in this study in relation to two aspects. Firstly, the higher lexical inferencing success with codeswitched reading can be accounted for by the learners' ease of access to L2 word concepts via L1, as further evidenced by the verbal protocol analysis which showed a predominant use of L1-based knowledge sources to guess L2 target words; secondly, learners use the L1 to mediate access to L2 word concepts as shown in earlier studies (Altarriba and Mathis, 1997; Chen, 1990). Participants continue to rely on L1 concepts to define L2 words which carry semantic nuances that are not shared in L1. This results in simplified word definitions that omit semantic features from L2 word meanings in context. In both the think-alouds and lexical inferencing tasks, students proffered definitions that are simplified from the L2 words in context. This finding is also consonant with the findings of Ameel et al. (2005) and Ameel et al. (2009) who

found that bilinguals tend to simplify L2 word meanings because the L1 translation equivalents do not cover meaning nuances or semantic features that are used in context. This study's finding is also in partial agreement with the predictions of Pavlenko's (2009) MHM which states that there is a store of shared semantic features in L1 and L2. However, MHM postulates a separate store of L2 conceptual features and a store of L1 conceptual features. This study's findings are unable to show evidence for a separate L2 conceptual store while a L1-specific conceptual store is not within the scope of this present study.

The focus of this study on the initial lexical form-meaning mapping or comprehension stage, which is equivalent to the word association and L1 lemma mediation phases in Jiang's (2000) L2 LRDM, is a central and critical part of word retention and production which predicts successful word use and knowledge in the long-term (Jiang, 2004c). A word sans meaning has a low probability of acquisition in terms of retention, knowledge (passive, active) and fluency. The findings of this study show that new L2 lexical forms are linked to pre-existing meanings or concepts in L1 rather than new meanings being constructed anew or restructured from L1 concepts in the process. The strong links between concepts and L1 words result in L2-L1 translation links once L2 word meanings are understood (Jiang, 2004c). In Jiang's (2004c) study on ten ESL participants, inaccurate and non-idiomatic errors committed by the ESL participants in a lexical appropriateness test of near-synonym pairs show that restructuring of semantic content derived from L1 did not occur, resulting in incomplete semantic development. Notably, the participants are deemed

advanced or highly proficient ESL learners. Adding to this somewhat pessimistic finding, this study finds that even advanced or highly proficient ESL learners do not show semantic restructuring in proffered definitions of L2 words which contain meaning nuances not shared with L1. However, in this study, only initial exposure of target words was investigated; further exposure to contextualised input may lead to semantic restructuring. Some researchers indicate that continued exposure to contextualised input may lead to the formation of new L2 concepts (e.g., Giacobbe, 1992, Strick, 1980). However, recent findings show that semantic restructuring is slow and may not take place in sequential or late adult bilinguals (e.g., Jiang, 2002, 2004c), even after a substantial period of time when incidental exposure was assumed (Schmitt, 1998).

It can be seen that exposure of target words in text alone to learners is inadequate in acquiring full semantic features of L2 which are partially equivalent in meaning to L1 counterparts. Macaro and Mutton (2009) found that inferencing strategies should be taught alongside exposure of target words in text. Perhaps, a more helpful method would be a deliberate teaching approach such as FFIs which involves rich vocabulary instruction (e.g. Laufer, 2003, 2005, 2010). Although FFIs are time consuming and can only afford to cover a small number of words, this limitation is not seen as limiting if FFIs are employed specifically to restructure semantically L2 words that carry meaning nuances that are not shared with L1 translations. Such L2 words which are partially equivalent to L1 counterparts are in the minority as Jiang (2004c) pointed out. Illustratively in this study, contextual meanings of target words that

are partially equivalent to L1 translations and dictionary meanings are 4 words out of a total of 25 words tested in this study. A teacher directed approach is beneficial in the case of L2 word meanings that do not fully match L1 translations and/or denotational meanings. Semantic restructuring as portrayed by de Groot's (1992) distributed model of bilingual conceptual representations is most likely to occur with teacher directed intervention.

Matthew effects are concomitant with the statistically significant differences in lexical inferencing and retention between the CS and GR groups as evidenced in both quantitative and qualitative results - it can be seen that lexical inferencing success is a function of proficiency level, which is consistent with prior empirical findings (e.g., Nassaji, 2004). Empirical literature is consistent in the view that L2 learners' vocabulary knowledge positively correlates with successful lexical inferencing (e.g. Laufer, 1997, Nation, 1999, 2001). A prerequisite of second language vocabulary acquisition is to develop "robust lexical knowledge base" (Nassaji, 2004, p. 126) via a comprehensive vocabulary intervention programme which integrates extensive reading and learning vocabulary from context with explicit vocabulary instruction. I argue that codeswitched reading can be included in such an integrated vocabulary intervention programme to support learning vocabulary contextual learning. Furthermore, codeswitched reading can be done mostly outside class-time limitations as a way to increase vocabulary learning without the substantial time costs of explicit vocabulary instruction which can only teach a very limited number of words within class-time constraints.

Notably, qualitative findings reveal that the lexical inferencing failure for ESL students is not based on proficiency alone. The lack of effective metacognitive strategies used in arriving at correct inferences are found partially to account for wrong guesses. These metacognitive strategies are namely evaluating skills consisting of self-inquiry and verifying, and monitoring skills (Huckin and Bloch, 1993; Nassaji, 2004). These strategies are key to the lexical inferencing process and success. The qualitative findings of this study elaborated on the knowledge sources which Nassaji (2004) vaguely refer to as the “wider context”, namely, knowledge and identification of types of claims and consideration of discoursal trajectory.

Qualitative findings also show that learners used predominantly P1 processing or a reliance on an exclusive use of contextual cues when processing codeswitched texts. Empirical studies by Chern (1993), Hamada and Park (2011), Haynes (1993) and Nassaji (2004) found that learners who reported higher success in lexical inferencing tend to use top or global strategies rather than bottom or local strategies. Bottom or local strategies are rarely used as they are significantly less reliable and effective in arriving at correct guesses. Codeswitched texts increase transparency and comprehensibility of input for lexical inferencing and this encourages students to use top or global strategies to guess new L2 word meanings which are potentially more effective than bottom or linguistic word-level cues (Albrechtsen, Haastrup & Henriksen, 2008).

Results of the think-alouds are consonant with Qian's (2004) study on ESL learners which shows that guessing word meanings using discourse or global meanings is the most preferred lexical inferencing strategy. While Qian's (2004) study shows that participants relied frequently on the immediate semantic content and morphological cues, and rarely used global or discourse meaning, word class and sentence grammar, Qian (2004) did not measure passive or receptive vocabulary knowledge of his participants to find out if the frequencies of tapping of certain knowledge sources are functions of proficiency. In this study, top-down strategies, particularly discourse and sentence meanings, are used to a substantial extent and these appear to account for the advantage that the CS group of students had over their GR counterparts in lexical inferencing performance.

Qian (2004) in his study on Chinese and Korean ESL learners also found that the most frequent strategy used in dealing with unfamiliar English words was to guess their meanings from context – even more frequent than dictionary reference. Table 7.1 reproduced Qian's (2004) finding.

Table 7.1

Qian's (2004) Ranking of Frequencies of Learners' Self-Reported Behaviours in Dealing With Unknown Words While Reading (n = 61)

| Rank | Behaviour | Mean Ranking | SD |
|------|--|--------------|-----|
| 1 | Guess its meaning from the context | 3.59 | .56 |
| 2 | Look up the word in an English-Chinese/Korean dictionary | 3.08 | .95 |
| 3 | Look up the word in an English-only dictionary | 2.97 | .95 |
| 4 | Make a note of the word | 2.95 | .94 |
| 5 | Look for clues to meaning in the word itself | 2.89 | .84 |
| 6 | Ignore the word | 2.74 | .68 |
| 7 | Ask a friend if they know the word | 2.38 | .93 |
| 8 | Ask the teacher for assistance | 2.36 | .86 |

Note. Adapted from *Second language lexical inferencing: Preferences, perceptions, and practices* (p. 162), 2004, by D. D. Qian, in P. Bogaards & B. Laufer (Eds.), *Vocabulary in a second language: Selection, acquisition and testing*, 2004, Philadelphia: John Benjamins. Copyright 2004 by John Benjamins Publishing Company.

This has important implications for the study's findings. As guessing meanings from context is the most frequently used strategy of ESL learners, reading texts must be designed in a way to maximise meaning-bearing input if second language vocabulary acquisition is to be raised. Unfortunately, ESL learners struggle with graded readers and authentic texts written by native speakers of English in guessing word meanings. CS reading is posited as an early-stage intervention that can be used alongside explicit instruction to

encourage lexical inferencing that is within the competent reach of ESL learners.

Chinese students' preference for L1 or Chinese texts in L2 classrooms was previously reported by Johnson et al. (1985, as reported in Lin, 2013). Over 70% of students preferred to work with Chinese texts instead of English-only texts. In light of this, the use of codeswitched texts would facilitate favourable attitudes of students toward ESL learning as the codeswitched texts can match their preferences for Chinese texts while acquiring new English vocabulary. This matching of students' preferences may partially underlie the higher number of guesses that students in the CS group made relative to their GR counterparts as the familiarity and meaning transparency of L1 word contexts raise students' confidence in making inferences with English target words.

Notably, the student participants of this study are sequential bilinguals. RT and lexical decision studies have consistently show that unbalanced or sequential bilinguals tend to show cross-linguistic translation asymmetry. Unbalanced bilinguals tend to be more competent in translating from L1 to L2 rather than vice versa (e.g., Dimitropoulou, Duñabeitia & Carreiras, 2011), which is also supported by Kroll and Stewart's (1994) RHM. Even in highly proficient learners, the asymmetry of cross-linguistic translation is still evident (e.g. Chen & Ng, 1989; Kroll & De Groot, 2005; Kroll & Stewart, 1994; Park, Badzakova-Trajkova & Waldie, 2012; Tzelgov, Henik & Leiser, 1990). According to the parallel access hypothesis, which is consistent with recent neuroimaging, priming and Stroop findings, bilingual speakers process stimuli

or input with concurrent activation of two languages (e.g., Marian & Spivey, 2003a, 2003b; Marian, Spivey, & Hirsch, 2003; La Heij, 2005; Preston & Lambert, 1969). In second language vocabulary acquisition, Macaro, Guo, Chen, & Tian (2009) found that EFL learners were inclined to translate mentally L2 discourse into their L1, which is consistent with the postulation of parallel activation of languages according to the parallel access hypothesis. The understanding is that parallel activation is unavoidable for the bilingual in processing either language. However, in the case of unbalanced bilinguals, they are more competent in L1→L2 translation than in L2→L1 translation. In the case of graded readers, the cognitive demands of translating L2→L1 while reading English-only texts would place additional cognitive demands and slow down processing. In contrast, reading a CS text would draw on the greater competence in the L1→L2 translation process to reduce cognitive demands on the learner who can then concentrate more cognitive resources to lexical inferencing. Macaro and Mutton (2009) proffered a similar explanation that codeswitched texts are advantageous because of a cognitive load reduction on working memory by presenting the context of a target word in the relatively familiar L1 – more cognitive or attentional resources are freed up (which would be involved in reading the context in relatively unfamiliar L2) and channeled to the inferencing of target word meaning.

Semantic similarity between languages at the notional sub-semantic level such as motion, possession, perception, desire, causality, and modality can facilitate L2 vocabulary acquisition, even in typologically dissimilar English and Chinese. For example, Yu (1996a, 1996b) found that Chinese native

speakers who are ESL learners are more competent than their Japanese ESL counterparts in using English motion verbs. Although Chinese and English are typologically dissimilar, they share cross-linguistic semantic meanings in motion verbs; Japanese counterparts are not semantically similar to English motion verbs. Jiang (2004c) states that it is reasonable to make an assumption that most L2 words share similar concepts with L1. However, the typological distance between English and Chinese cannot be understated. The lack of one-to-one meaning correspondence between certain English and Chinese words argues against the use of L1 glosses and bilingual dictionaries. The qualitative findings show that both bilingual and L2 dictionaries are not efficient in capturing meaning nuances used by L2 words in context. De Groot (2012) argues that the contextual approach is best suited for late bilingual learners whose L1 and L2 are typologically distant. In this light, CS reading promotes the contextual approach as advocated by De Groot. Although findings of the study show that CS reading did not appear to enable learners to develop L2 semantic prosody, it is speculated that a far longer period of CS reading may show positive returns although it is acknowledged that this inference requires future empirical support (see Chapter 8 for a discussion of recommendations for further research).

Laufer and Hulstijn's (2001) Involvement Load Hypothesis accounts for the statistical effects seen in two retrieval tests between the recall performance of CS group and GR group. The codeswitched reading tasks promotes depth of processing in facilitating the need, search and evaluation components of the involvement load and as predicted by the Involvement Load Hypothesis, lexical

retention-retrieval performance will be enhanced. The L1 word contexts enhance the meaning-bearing comprehensibility of the input to aid in the search and evaluation components of the task involvement load. In the case of graded readers, it is argued that the search and evaluation components are contingent on the comprehensibility of the word contexts in L2 – the chances of unfamiliar words that hinder comprehensibility are higher if word contexts are presented in L2 compared to word contexts in L1. As previously discussed in Chapter 3, the Involvement Load Hypothesis is supported by empirical research, including reviews of the literature by Laufer and Hulstijn (2001) and Hulstijn and Laufer (2001), and recent studies by Kim (2011) and Peters et al. (2009).

On the other hand, graded readers, despite the modifications done to adjust the readability to suit the students' general reading ability via the Flesch-Kincaid readability tests, contain words, especially polysemous words, which students may not be sufficiently familiar with the words to interpret their intended meanings and string them together to form a rich semantic context to infer the target words. Another disadvantage of graded readers is the presentation of semantically related words in a topic. Foreign language textbooks typically present a topic or schematically homogeneous background/context and vocabulary that is semantically related to the topic. Bolger and Zapata (2011) found that semantically relatedness detracts vocabulary acquisition vis-à-vis semantically unrelatedness. Additionally, they found that contextualisation mitigates the inhibitory effect of semantic relatedness. Bolger and Zapata are aware of some researchers' dissenting view on semantic relatedness as a helpful aid (e.g., Stahl & Nagy, 2006), but they

countered that recent empirical research established the finding that semantic association can hamper vocabulary learning (e.g., Erten & Tekin, 2008; Finkbeiner & Nicol, 2003; Tinkham, 1993; Waring, 1997). It can be seen that contextual support, especially transparent and directive contexts, is the key factor in enhancing vocabulary learning.

The superior retrieval performance of the CS group over the GR group can also be accounted for by the visually salient presentation of codeswitched English target words in context written in L1. This finding is congruent with Macaro and Mutton's (2009) postulation that L1 context "...throws the new word into sharper relief and therefore draws the reader's attention to it" (p. 169). This interpretation that visual salience increases attention to a target words is consonant with findings in research on advertisements which found higher recall of L2 codeswitched items embedded in L1-medium texts (e.g., Bishop & Peterson, 2010). A recent study conducted by Li and Kalyanaraman (2012) on 60 Chinese-English bilinguals' retention-retrieval of codeswitched banner advertisements found that the participants registered higher recall scores for advertisement content and brand names written in English because they attracted higher attention. Participants spent more time and cognitive resources for L2 messages – however, Li and Kalyanaraman (2012) cautioned that this benefit applies only to moderate information processing tasks like shopping online for a product. Any task that is more complex than online shopping such as comprehending the editorial content of a website would not hold any retention advantage for participants if it is presented in English. Conversely, editorial content of websites in Chinese and advertisements in Chinese (which

is the participants' mother tongue) are perceived to be more readable but less memorable. Interestingly, English banner advertisements situated on Chinese editorial website content are more memorable than Chinese banner advertisements on Chinese editorial website content. Li and Kalyanaraman's (2012) findings are consistent with another similar study conducted by Ahn and Ferle (2008) who found that the distinctive nature of English brand names written in the Roman alphabet and embedded in contrasting Korean body texts written in Hangul script led to significantly higher recall scores and brand name recognition than Korean brand names embedded in English texts. This finding supports the view that the relative novelty and distinctiveness of the L2 embedded in a contrasting L1 text aids in retention and recall. Similar to Li and Kalyanaraman's (2012) finding that the retention advantage of the L2 is absent if the L2 is employed to present complex information, Ahn and Ferle (2008) found weaker recall of copy messages (which consist of information about product attributes and/or product usefulness) in English than in Korean. Also, eye-tracking research studies by Altarriba et al. (1996) and Altarriba & Gianico (2002) show that more attentional resources are paid to the codeswitched elements that are the study participants' L2 or foreign language embedded in highly constrained or directive contexts – this finding reiterates the view that codeswitched items which are orthographically marked or dissimilar from the ambient or surrounding text, induce higher attention and lexical retention-retrieval, as the findings of this study also suggest. These findings account for the visual salience of English target words embedded in Chinese contexts which in turn aids retention-retrieval, as seen in this study's findings of codeswitched reading tasks.

The cognitive relieving effect of codeswitched texts which Macaro and Mutton (2009) and Macaro (2009) speculated is consistent with neuro-imaging findings on reading by Chinese-English bilinguals. Empirical results show that Chinese ESL learners rely less on phonology than English native speakers in processing English words and recruited cortical regions associated with visual encoding similar to processing Chinese logographic characters. As previously discussed in Chapter 3, Tan et al.'s (2003) key finding is that Chinese-English bilinguals reading in Chinese or L1 activated cognitive regions (left middle frontal and posterior parietal gyri) which are typically used in spatial information representation and memory and managing inhibitory and excitatory resources, similar to Baddeley and Hitch's (1974) hypothesised functions of the visual-spatial pad and central executive. The finding is consistent with early memory research that shows that Chinese words are processed differently from English words (e.g., Cheung & Kemper, 1993). The visual nature of Chinese logographic characters likely activated the visual-spatial neural system (Tan et al., 2005). Correspondingly, L2 or English reading strongly recruited the visual-spatial neural system and central executive while the cerebral areas mediating English phonemic analysis typically activated in English monolinguals were weakly recruited. Their finding implies that Chinese-English bilinguals may not be fully proficient in processing English phonemically and instead rely on processing English words visually like Chinese characters. The key point is that processing the Roman script-based English visually requires more attentional resources and which may subsequently raise retention if the novelty and distinctiveness of English script are increased by the contrast with predominantly Chinese logographs in a reading text, such as the codeswitched

texts used in this study. This view is substantiated by Hamada and Koda (2011) which found that English L1 users significantly depended more on phonological processing in learning words than Chinese ESL learners. A key difference in English phonological processing and Chinese phonological processing is indicated by a finding by Tan et al. (2005) which shows that the left middle frontal gyrus is recruited for phonological processing of Chinese while left temporoparietal regions are activated for assembling phonology in alphabetic languages like English - this implies that phonological processing in Chinese is markedly different from English phonological processing. In contrast, Chee et al.'s (2000) study on Singaporean Chinese who have greater fluency in English than Chinese shows that semantic processing of Chinese characters is more similar to English word processing than picture processing. Conceptual links in English are seen to be stronger than conceptual links in Chinese for the Singaporean participants. In light of these neuro-imaging findings and this study's findings, it can be posited that codeswitched texts which are predominantly in Chinese characters save the target words in English facilitate higher retention-retrieval in Chinese ESL learners than English graded readers.

There is a consistency in this study's finding that the CS group outperformed the GR group in successful lexical inferencing with Macaro and Mutton's (2009) finding that students in a treatment group who were exposed to French-English codeswitched texts showed higher successful lexical inferencing performance than the comparison group using graded readers. However, this comparison may not be an equitable and valid one because the

treatment group received an assortment of other strategies such as direct teacher prompts, oral elicitations, reading-aloud, think-aloud, use of inferencing strategy metalanguage, rereading instruction, positive reinforcement and insertion of illustrations which the graded readers group did not receive. Hence, the superior performance that the treatment group showed in the lexical inferencing test cannot be attributed solely to the exposure of codeswitched texts.

VKS as a graduated measure of receptive and active vocabulary knowledge was recently criticised for mixing different aspects of vocabulary knowledge – word familiarity, word meaning and word use (Laufer & Nation, 2012; Macaro, 2003). Laufer and Nation (2012) pointed out that the VKS may not be a progressive scale because showing a correct application of a target word in a sentence may not entail full mastery of a word. A learner who correctly applied a target word in a sentence may not necessarily know all polysemous meanings of the target word (Macaro, 2003). This debate relates to Read's (2004) three types of depth lexical knowledge – precision of meaning, comprehensive word knowledge, and network knowledge. Precision of meaning refers to the full knowledge of a word meaning; comprehensive word knowledge consists of the acquisition of all aspects of the form, meanings and uses of a word, which relates to Macaro's (2003) point about knowledge of all synonyms of a word; network knowledge relates to the integration of a word into a lexical network and entails vocabulary fluency in connecting the word with collocates and near-synonyms. Full word mastery or comprehensive word knowledge is not achievable within the span of this study as the focus is on the

acquisition of word meanings as used contextually in the CS reading texts. Learners are assessed only on inferring one contextual meaning per target word, or the precision of meaning. In this light, VKS's shortcomings do not detract from construct validity, nor from the defensibility of the study's findings if VKS is seen solely as a measure of precision of meaning. Another criticism of VKS by Laufer and Nation (2012) is the inconsistent requirement of proof at the five levels. While learner is required to produce a translation equivalent or synonym as evidence of receptive knowledge (and to apply the word in a sentence as evidence of productive knowledge), word familiarity/unfamiliarity is elicited on self-reporting alone. In this study, word pre-knowledge is defined as word familiarity as evidenced by receptive and/or productive knowledge together with self-reported familiarity, as indicated by Options 4 & 5. Options 2 and 3 in the modified VKS are not deemed as word pre-knowledge as either self-reported certainty/familiarity or correct synonym/translation equivalent is absent (see Figure 4.1).

A key methodological strength of this study is the mixed-methods approach employed to enrich data collection and analysis, and to triangulate and corroborate findings derived from two separate approaches. Notably, the use of verbal protocols, as shown in Chapter 6 and this present discussion of findings, has extended our understanding of successful lexical inferencing with codeswitched reading texts by uncovering the cognitive and conscious thought processes of bilingual participants, particularly the types of cues used and knowledge sources employed. The use of think-alouds in second language vocabulary acquisition studies is few and far between, apart from studies

conducted by Haastrup (1991), Albrechtsen, Haastrup and Henriksen (2008), and Wesche and Parikabakht (2010). However, it is noted that think-alouds were conducted as conversations between two persons about word meanings in Haastrup's (1991) study. Veridicality is high in pair think-alouds because of peer influence and possible suppression of hypotheses. Individual think-alouds are more valid processes to analyse because it eliminates peer influence. It is recommended that future vocabulary acquisition studies employ concurrent think-alouds to enrich quantitative findings.

7.3. Summary of Main Findings

A recapitulation of the key findings is as follows:

- Codeswitched reading facilitated higher lexical inferencing success than graded readers among Chinese ESL learners by providing input that is more meaning-bearing and comprehensible than graded readers
- This difference in lexical guessing performance was found to be a function of proficiency levels, which is consistent with prior empirical findings
- Codeswitched reading encourages more ESL learners to guess L2 target word meanings than graded reading. This implies that presenting contexts in L1 raised students' confidence in making lexical inferences. Statistical analyses also show that the majority of the attempts are successful.
- Learners tend to proffer simplified meanings of target words that are partially equivalent to L1 translation equivalents. Findings suggest that

ESL learners continue to rely on L1 to mediate L2 lemma regardless of ability levels.

- Top or global lexical inferencing strategies are predominant across ability levels in codeswitched reading
- A deficiency of metacognitive strategies in guessing, particularly evaluating and monitoring skills, partially accounts for incorrect guesses, besides insufficient declarative vocabulary knowledge
- Codeswitched reading has also been shown to increase lexical retention-retrieval as the CS group of students outperformed the GR group in both immediate and delayed retrievals.
- This difference in recall performance is also a function of proficiency in both groups.

CHAPTER EIGHT

IMPLICATIONS FOR PEDAGOGY, RECOMMENDATIONS FOR FURTHER RESEARCH AND CONCLUSION OF THE STUDY

8.1. Chapter Overview

This chapter opens with a discussion of the study's implications and potential applications for pedagogy in the realm of second language vocabulary acquisition. This chapter also points out directions of future research and inherent limitations of the study; a discussion of the extent of generalisability of the results ensues. The chapter ends with a succinct conclusion of the study which reiterates key points of the study,

8.2. Implications for Pedagogy

A persistent gap in second language acquisition and codeswitching studies was pointed to by Lin (2013), who criticises the fact that current CS research has suffered from being “overly descriptive and repetitive” (p. 209), adding that there is a dearth of design-interventionist studies on written CS. She further highlights a research niche in investigating the role of L1 as part of a specific and organic component of a language curriculum. This view is echoed by Chacón-Beltrán, Abello-Contesse and Torreblanca-López (2010) who state that despite three decades of empirical studies on second and foreign language vocabulary learning, a gap between research and its application to pedagogical materials and tasks remains unfilled. This study takes a step forward by filling

these important niches in codeswitching and second language acquisition vocabulary research and pedagogy. As an interventionist strategy, codeswitching reading is the first study to date in written codeswitching research to investigate pedagogical effects on ESL learners in lexical inferencing and lexical retention-retrieval. Codeswitched reading is shown in this study to be an effective intervention strategy in semantic development. It is suggested that codeswitched reading tasks could plausibly be used as part of a university English vocabulary-specific activity in an English for Academic Purposes curriculum for Chinese ESL learners.

There is a growing body of applied linguists and TESOL scholars who are advocating for principled use of L1 in ESL/EFL (e.g., Barnard & McLellan, 2013; Butzkamm, 2003; Macaro & Mutton, 2009; Tian & Macaro, 2012). Notably, Nation (2003, 2007) found that research supports L1's small but crucial role in conveying meaning and content transparently, or meaning-focused input. L1 is the familiar and effective tool for grasping and communicating meaning and content in the L2. Adding to this scholarly receptiveness, it is noted that there is emerging support for the use of L1 in ESL pedagogy in China (Song & Andrews, 2009) and Taiwan (Raschka, Sercombe, & Chi-Ling, 2009). Also, Tien and Li (2013) found that CS from English to Chinese accelerated L2 conceptual understanding at a Taiwanese university; similarly, Tian and Kunschak (2013) reveal principled use of Chinese in ESL classrooms in Chinese universities. Levine (2013), agreeing with Macaro (2009) that there is no empirical evidence supporting the exclusive role of a monolingual approach in L2 acquisition, argue that the monolingual bias of L2

pedagogy unnecessarily stigmatises L1 use. He further argues that L1 is a resource that is used in forming learner identity as a multilingual user of L2 and L1 and validating the learner as a multilingual subject. He advocates for language task design that incorporates both L1 and L2 rather than an L2-exclusive approach. Codeswitched reading is a principled way of harnessing L1 to support L2 vocabulary learning.

CS reading tasks satisfies Nation's (2007b, 2008) set of criteria for meaning-focused input. Specifically, codeswitched reading tasks match Barcroft's (2004) meaning-bearing comprehensible input requirement when presenting new words. In Chapter 7, it is shown that codeswitched word contexts in L1 increase comprehensibility and content transparency which satisfies both Barcroft's (2004) principle of meaning-bearing comprehensible input and Nation's (2007b, 2008) criterion of high passage sight vocabulary or lexical coverage. The presence of directive word contexts of target words aid in successful lexical inferencing. Importantly, a low number of target words (5 TWs) per reading passage was maintained across the reading tasks with most words serving as contextual input.

Some might argue that the use of CS texts may lack face validity as vocabulary learning tasks for some learners. However, Levine (2013) succinctly addressed this potential hurdle by recommending that teachers should explicitly train students in the metalanguage that linguists use to describe and analyse language learning, including empirical findings relevant to language pedagogy. In this light, teachers are recommended to reveal to students empirical evidence

supporting the principled use of L1 in L2 language classrooms. This would address the potential problem of face validity of codeswitched tasks which some students may have.

After an authoritative review of academic vocabulary interventions, Nagy and Townsend (2012) pointed out that rich vocabulary instruction suffers from protractedness and a severely confined number of vocabulary words that can be adequately addressed. They added that there is a need for less intensive vocabulary intervention to accelerate and increase students' vocabulary banks – the use of codeswitched texts in semantic-specific tasks that involve lexical inferencing and lexical retention-retrieval fills this pedagogical gap. Correspondingly, L1 is used orally by teachers to explain difficult linguistic terms to Chinese ESL learners (e.g., Tian & Kunschak, 2013; Tien, 2009; Tien & Li, 2013). Also, the process of elucidating English concepts is accelerated when L1 was used relative to exclusive L2 use (Macaro, et al., 2009; Tian & Kunschak, 2013; Tien, 2009; Tien & Li, 2013). Macaro, et al. (2009) found that codeswitches may accelerate comprehension in terms of text access less hindered by word forms and/or linguistic meanings which are unfamiliar and inaccessible. This accelerated semantic development is also seen in CS reading tasks as evidenced by the superior performance shown by the CS group in successful lexical inferencing and lexical retention-retrieval. Although it is argued that codeswitched reading is less time-intensive than FFIs and other deliberate teaching programmes, it is not positioned to replace extensive reading as a fast way to acquire L2 vocabulary. CS reading tasks can be a part of an extensive reading and vocabulary intervention programme that also

includes rich vocabulary instruction such as integrated instruction and isolated FFIs which are two types of FFIs. FFIs are shown to lead to higher vocabulary acquisition in terms of learning and retention than incidental exposure (File & Adams, 2010; Laufer, 2010). Again, a clear drawback of FFIs is that only a small number of new vocabulary could be taught to ESL learners in view of limited classroom hours as both methods are time consuming. CS reading tasks can mitigate the time consuming nature of FFI by initiating comprehension and semantic development of words that share L1 and L2 semantic equivalence, while FFI can be employed to restructure L2 words semantically that are partially equivalent to L1 counterparts. Partial semantically equivalent words are a minority (Jiang, 2004c) so deliberate teaching or FFIs, being time consuming, is the most appropriate treatment for the learning and acquisition of partially equivalent words. Another possible application of CS reading tasks is as a post-lesson activity which does not require as much classroom-based guided instruction as other explicit instruction methods. Follow-ups or post-mortems could be conducted by teachers to discuss the answers in class. CS reading tasks can be an initial part of a string of vocabulary recycling and consolidation activities.

A possible problem that may arise from using codeswitching reading tasks is an assumption made by teachers to employ L1 in an unbridled manner rather than in a principled way. Overuse of L1 could be a possible side-effect of implementing L1 in various second language classroom activities (Nation, 2003), and it is paramount that ESL/EFL teachers maximise the use of L2 in

classrooms even as a small but important space is given for the role of L1 in communicating meaning and content.

Nagy and Townsend (2012) noted that simply exposing students to word definitions or elaborations may increase vocabulary acquisition. A couple of more recent studies have shown vocabulary gains from glossed reading texts. For example, Ko (2012) compared no-glossed reading and glossed reading among Korean ESL undergraduates and found that both L1 and L2 glosses lead to significant vocabulary gains measured by a multiple-choice vocabulary test. The glosses that Ko (2012) employed consist of mostly one word synonyms or very brief descriptions that are under six-word long for a word definition. However, Ko (2012) did not measure lexical retention-retrieval of the student participants so we cannot tell if the glossed condition lead to a higher or lower lexical recall in comparison to the non-glossed condition. A study by Kim (2006) found that lexical elaboration or glosses did not lead to significant form-recognition of English vocabulary among Korean EFL learners which suggests that glossed words did not increase retention-retrieval. Also, the multiple-choice vocabulary test is not revealed by Ko (2012) and the extent to which the test can measure vocabulary acquisition accurately is questionable. Paribahkt and Wesche's (1996) VKS would be the most appropriate empirical measurement of semantic acquisition although there are shortcomings of VKS as discussed in Chapter 7. Although Macaro (2009) believed that there is no harm in giving L1 equivalents of unfamiliar English words in a reading activity, simply relying on L1 word meanings (L1 glosses) can lead to overextension and underextension of L2 word meanings (De Groot, 2012). De Groot (2012)

criticizes this parasitic reliance on L1 words in L2 vocabulary learning which will ineluctably result in a “semantic accent” (p. 485) – the overextension and underextension of L2 word meanings due to the lack of one-to-one meaning correspondence between L1 and L2. Such semantic errors would be fossilised in L2 learners over time and remapping them to L2 word concepts would be difficult. The use of bilingual dictionaries also suffers the same problem of semantic accent as L1 glosses. Illustratively, Christianson (1997) found that accurate and appropriate application of dictionary-based references did not consistently correlate positively with language ability as 42% of dictionary referred words were used erroneously. This finding shows that the use of bilingual dictionaries alone can be problematic. Although words in one language that do not have one-to-one meaning correspondence with their counterparts in another language are a minority (Jiang, 2004c), the use of L1 translations should be avoided for such words.

Also, Laufer and Hulstijn’s (2001) Involvement Load Hypothesis downgrades the effectiveness of task simplification by L1 and L2 glosses because glosses take away search and evaluation components of involvement load, reducing depth of processing, which in turn reduces lexical retention-retrieval. The simplification by the provision of L1 translations or L2 glosses generates a weaker involvement as only the need component remains relative to tasks that require learners to infer target word meanings from contextual cues. Words processed with a lower involvement load will be less likely to be retained (Laufer & Hulstijn, 2001; Hulstijn & Laufer, 2001). Recent studies corroborated the finding that a higher level of learner involvement in a task

raises more learning and retention of target words (e.g., Kim, 2011; Peters et al., 2009). Codeswitched reading tasks retain the need, search and evaluation components of the involvement load which maximise a strong involvement and subsequent lexical retention-retrieval. Contrastively, Macaro (2009) claimed that L1 equivalents increased deeper cognitive processing by the L1 lemma mediating conceptual links between L2 words and conceptual store. However, this speculation was not substantiated with empirical evidence. The preferred method which has been shown to increase lexical retention-retrieval is the contextualised approach (Laufer & Hulstijn, 2001). Specifically, this study suggests that codeswitched texts addresses the shortcoming of a limited L2 breadth knowledge by presenting the word contexts in L1 or the language learners are most familiar with, increasing comprehensibility of meaning-focus input.

Similarly, Akbulut (2007) found that access to hypermedia glosses consisting of word definitions, relevant pictures and short videos led to students gaining higher vocabulary scores than access to definitions-only glosses. However, a comprehensive literature review by DeStefano and LeFevre (2007) establishes that a hypertext interface increases cognitive load of decision making and visual processing which consequently hinders reading comprehension. Furthermore, Mangen, Walgermo and Brønneick (2013), in a recent empirical study, found that even electronic linear text without pictures and videos lead to lower reading comprehension scores among Norwegian tenth grade students compared to reading printed texts.

I have previously discussed this aspect of lexical elaboration or glosses at length in Chapter 3 but the recent speculation by Nagy and Townsend (2012) and Ko (2012), among others, that glossed reading can increase vocabulary acquisition has to be tempered by drawbacks reported in the empirical literature. On the other hand, CS reading could be a viable approach to increasing successful lexical inferencing and retention-retrieval as a less-intensive intervention in ESL/EFL vocabulary learning. Nevertheless, a parallel can be drawn between studies by Penno, Wilkinson and Moore (2002) and Silverman and Crandell (2010) that Matthew effects or proficiency-ordered effects in vocabulary acquisition are also present in this study. It appears that high-ability students made the most of the successful lexical inferences and retained more words than lower ability students. However, I must add that I concur with Macaro's (2003) caution that a strategy should not be implemented in isolation but should be combined with other strategies in a wider context of a vocabulary intervention programme. Hence, CS reading tasks which are specific to semantic development of target words can be combined with FFI that develops grammatical, morphological, pragmatic and emotional knowledge of the target words. Codeswitched reading tasks can offer pedagogical applications that aid students' L2 vocabulary acquisition, as part of a comprehensive and thorough vocabulary intervention programme.

A plausible objection from ESL teachers would be that CS reading tasks may deprive learners of the opportunity to develop automaticity in processing the L2. However, it is posited in this study that codeswitched reading tasks are vocabulary-specific tasks used for L2 lexical inferencing. Codeswitched

reading is not intended to supplant graded reading in the areas of reading and reading comprehension. As Levine (2013) pointed out, citing Chavez (2003, reported in Levine, 2013), classroom diglossia can be practiced in that in certain tasks, nearly exclusive L1 use is promoted while in other tasks, nearly exclusive use of L2 is recommended. In this light, codeswitched reading is recommended as a L2 vocabulary-specific task that can aid in L2 lexical inferencing and lexical retention-retrieval.

Another plausible objection from ESL teachers could be that CS reading texts do not perform well in providing information on sentence grammar needed to develop active vocabulary. However, sentence grammar is shown to be a bottom or word-level cue that is not as effective a knowledge source or strategy as top or global cues such as sentential and discourse meanings in generating successful semantic guesses (e.g., Hamada & Park, 2011). Bottom-up cues such as syntactic and morphological word analyses typically do not lead to successful lexical inferences relative to global and contextual cues. Also, skilled students tend to use significantly more contextual cues than word-level cues (e.g., Nassaji, 2004). Importantly, this study's premise is that CS reading tasks specifically aid semantic development. Grammatical and morphological aspects of words can be addressed in follow-up FFI.

I previously discussed one of Nation's (2007b, 2008) four strands for teaching vocabulary in detail, specifically, meaning-focused input for reading. The other three strands are (2) meaning-focused output for speaking and writing; (3) deliberate teaching, such as FFIs which involves rich vocabulary

instruction and (4) developing vocabulary fluency by stressing on practice and making connections with known vocabulary. The incorporation of deliberate teaching with meaning-focused input in a context of meaning-focused output, rehearsal and practice across reading, writing, speaking and listening is the full extent of a comprehensive vocabulary intervention programme as mentioned previously in this chapter.

Globally, China has been the world's biggest source of international students going overseas to study in foreign universities and colleges (ICEF Monitor, 2013). Recent media articles reported that most Chinese students chose to study in English-speaking or Inner Circle countries, especially the United States, United Kingdom, Canada, Australia and New Zealand (Bita, 2014; Chen, 2013; Porter & Belkin, 2013; Tan, 2013; Watt, 2012; Ye, 2013). Notably, approximately 400,000 Chinese students travelled abroad for higher education; 95 percent of Chinese students were self-sponsored; nearly 200,000 of them chose to study in the United States while many others chose Australia and the United Kingdom as the following popular study destinations (Siddiq, 2013). Unsurprisingly, American universities have been actively courting Chinese students to study in the United States to replenish budgetary rollbacks and enrich university coffers (Porter & Belkin, 2013; Siddiq, 2013). Growing affluence among Chinese families in the context of a robust Chinese economy is a major centrifugal force behind much of the phenomenal rise in Chinese students studying overseas (Chen, 2013; Watts, 2012). Also, foreign degrees are generally seen to empower graduates with higher employability and skills than graduates with local degrees (Gareth, 2005). This unabating trend

underlies the centrality of Chinese students' ESL learning, including second language vocabulary acquisition, in many English-medium universities worldwide. This study's findings show that codeswitched reading tasks, as a less-intensive intervention strategy to accelerate vocabulary learning in Chinese ESL students, is a valuable pedagogical tool which can be applied in many universities globally as part of a rich vocabulary intervention programme.

8.3. Recommendations for Further Research

A direction for future research would be to conduct codeswitched reading tasks with ESL learners who are native speakers of languages other than Chinese. Codeswitched reading can be conducted with students from South-East Asian countries where ESL/EFL is growing in strategic importance as a way to connect and build bridges to international economy. De Groot's (2012) recommends that the contextualised approach is most appropriate for learners whose native languages are typologically distant from English, similar to typological dissimilarity between English and Chinese. Following De Groot's (2012) recommendation, codeswitched reading, which uses the contextualised approach, can facilitate successful lexical inferencing as shown in this study. Future studies can investigate the acquisition effects of codeswitched readings tasks in ESL/EFL learners whose L1 is typologically distant from English, such as Tamil, Thai and Burmese.

Another direction is to conduct a similar study with a larger sample of students to investigate if beneficial effects of codeswitched reading can be extended to a more diverse and varied group of learners, such as balanced

bilinguals and trilinguals. Random sampling can be employed, if possible, to check if benefits of codeswitching reading can be extrapolated to wider populations of late L2 learners. Random sampling of study participants can be applied to increase generalisability of findings. The part of this current study's research design which is incidental so as to assess lexical retention-retrieval is limited to one immediate recall test followed by a delayed recall test. A very large sample size addresses the limitation of an incidental research design.

A third research direction is to extend the current study over a longer period of time and investigate the development of L2-specific concepts in bilingual learners. If learners can proffer semantically sensitive L2 word definitions, then an argument for direct L2 conceptual store and links would be persuasive. A long-term study could also assess the rate of growth in vocabulary depth knowledge of specific target words that are polysemous. Codeswitched reading could be compared to graded readers in terms of depth acquisition. In this study, all variables apart from the treatment are controlled to isolate the effects of CS reading on successful lexical inferencing and lexical retention-retrieval. Increasing word exposure and word repetition could be additional experimental variables to be investigated alongside the effects of CS reading tasks in future research. Also, a long-term study would also include additional encounters of target words which would likely increase the probability of acquisition of words that were not remembered or inferred successfully after the initial exposure.

Yet another longitudinal study is to examine the effects of codeswitched reading on receptive vocabulary knowledge growth and vocabulary fluency development. Zhang and Lu (2014) found that participants acquire more low-frequency words than high-frequency words. Conversely, vocabulary fluency generally increases for higher-frequency words. A longitudinal study could investigate the rate of acquisition of low-frequency words in codeswitched reading tasks in comparison with graded readers. Also, with frequent lexical exposure, the study could also examine whether vocabulary fluency can be boosted at a faster rate by codeswitched reading than graded readers.

8.4. Limitations of the Study

A limitation of the study is the purposive sampling in selecting the study participants. The use of purposive sampling, which is a nonprobability sampling technique, has its inherent limitation of generalisability – this limitation will be further qualified in the following section in the generalisability of the study. The reason underlying the choice of participants is the homogeneous sociolinguistic background and profile of the participants – this controls sociolinguistic variables such as the typological distance between the mother tongue and English, the total number of years of English as a second language education and the predominant home language. Unfortunately, these students are Singapore government scholars who are grouped as annual batches or intakes before being matriculated and distributed to the various schools of the University; sampling had to be done on the students as a cohesive batch or intake within a year before the students were distributed to the various schools. Also, sample size could only be maximized if purposive sampling were done.

Given the sample of high academic achievers drawn from various senior middle high schools across China and studying in one of Singapore's top universities, it can be inferred that these student participants are representative of many Chinese students from China who are admitted into top universities around the world, especially in developed countries such as United States, United Kingdom and Australia which have attracted unprecedented numbers of international students from China. However, it is acknowledged that there is a limitation to the extent of extrapolation from this study's findings to the wider population of Chinese ESL learners, both in China and overseas who are not academic high achievers or scholars. It is cautiously speculated that performance levels in lexical inferencing and lexical retention-retrieval – two cornerstone aspects of vocabulary acquisition – would be markedly lower in lower achieving ESL students vis-à-vis highly proficient counterparts, in congruence to the Matthew effects founded on empirical literature.

The proficiency-dependent gains in successful lexical inferencing and lexical retention-retrieval in this study's findings can be seen as a limitation in that gains are not equitable across proficiency levels. Maximal gains can only be observed if students' passive vocabulary knowledge is substantially high. Hence, the recommendation of CS reading tasks is that such should not be employed solely as an early stage intervention but as an integral component of an extensive vocabulary intervention programme targeting different proficiency levels.

Gu (2005) and Zhang and Lu (2014) noted a common shortcoming of most empirical research on vocabulary learning is a focus on the initial learning phase rather than longitudinal vocabulary development. Functional lexicon development that encompasses semantic, syntactic, morphological, pragmatic and emotional aspects entails a gradated process that can only be observed over a substantially long period of time. In this light, this study's limitation is the focus on the initial learning phase of unfamiliar target words embedded in L1 contexts. However, this study's focus on the semantic aspect of vocabulary acquisition via CS reading tasks should be seen as a first step towards understanding principled L1 written use in second language vocabulary acquisition. It is recommended that future research explore the long-term effects of CS reading tasks on vocabulary learning as manifested in various aspects of lexical knowledge, apart from the semantic dimension.

Also, vocabulary knowledge consists of dimensions of passive/breadth and active/depth knowledge and vocabulary fluency. This study's scope is limited to an understanding of a relationship between breadth knowledge and CS reading tasks, and assessing breadth knowledge of target words. Further research, in a similar vein to a longitudinal study done by Zhang and Lu (2014) to investigate the relationship between receptive vocabulary knowledge growth and vocabulary fluency development, is recommended to explore the effects of CS reading in terms of depth knowledge and vocabulary fluency.

The incidental design of the recall component of the study limits findings to one immediate retention test and a delayed retention test. Additional

immediate retention tests would take away the incidental learning mode which isolates the effects of CS reading on retention-retrieval from memorisation strategies and expectations of recall tests. Further research that replicates the incidental learning mode could conduct further recall tests with students reading and inferring target word meanings from CS reading tasks.

Another inherent limitation of the study which was briefly mentioned is the lack of control of gender ratio in the sample. Females outnumber the males in the purposive sample. However, there is no empirical evidence in the literature showing any gender differences in lexical inferencing. Thus, this aspect may not be a significant limitation. In a recent study by Elgort and Warren (2014), they reported five psycholinguistic and neuroscience studies which found that language learning is different between males and females. However, these studies were not relevant to the context of lexical guessing and recall of L2 word meanings. Two of the cited studies focused on visual word processing of pseudo words (Chen, Xue, Dong, Jin, Li, Xue, et al., 2007; Dong, Mei, Xue, Chen, Li, Xue, et al., 2008). The third study mentioned by Elgort and Warren (2014) looked at the differences in processing of phonological properties of English and non-English words (Kaushanskayaa, Marianb, & Yoo, 2011). The fourth study is a book which reviewed the literature up to its published year of 1999 that summarised conflicting evidence of gender differences in verbal fluency, synonym-generation, verbal SAT and verbal intelligence tests (Kimura, 1999). The fifth study looked at gender difference in remembering syntactic properties (specifically the past tense suffix) of words (Ullman, Estabrooke, Steinhauer, Brovetto, Pancheva, Ozawa et al., 2002).

Furthermore, it has been suggested that any gender differences would be insignificant after age and education levels are factored in (Ryan, Kreiner, & Tree, 2008). In this study, both age and educational levels are homogeneous traits of the purposive sample which would filter out any gender-based differences in verbal learning that are relevant to this study.

8.5. Generalisability of the Study: Some Caveats

There is a limitation of vocabulary studies, which this study also shares, in generalising vocabulary interventions to benefit broader measures of vocabulary knowledge and reading comprehension. Evidence that vocabulary interventions can lead to reading comprehension gains is scarce despite the strong correlation between vocabulary knowledge and reading comprehension shown in earlier studies (e.g., Alderson, 2005; Laufer, 1992a; Nation, 1983; Qian, 2002; Zhang, 2010; Zhang & Annual, 2008). The time-intense nature of vocabulary intervention could be a key reason underlying this apparent disconnect. Vocabulary learning is incremental in nature because of the immense vocabulary size and depth which learners need to develop (Schmitt, 2010). It is speculated that significantly longer periods of vocabulary interventions are needed in order to notice any gains in reading comprehension.

Also, the study's focus on semantic development limits the generalisability of the results to other aspects of vocabulary knowledge, such as morphology, syntax, syntagmatic analysis, pragmatics and paradigmatic analysis. Further research is recommended to test CS reading tasks in various knowledge aspects apart from semantic development. That said, words are

essentially units of meaning and the focus on semantic development is unavoidable (Laufer & Nation, 2012). Laufer and Nation (2012) further argue that word meaning is central to vocabulary research and that correct form-meaning association should be the primary focus of vocabulary studies.

As previously mentioned in regards to purposive sampling, generalisability of this study is limited to high academic achievers from China. Future research can explore the generalisability of this study's findings with random population samples. However, theories of L2 acquisition such as Krashen's Comprehensible Input Hypothesis and Laufer and Hulstijn's (2001) Involvement Load Hypothesis support the postulation that codeswitched reading may be beneficial to other ESL learners of a different profile and sociolinguistic background.

8.6. Conclusion

This thesis reports a pioneer study in second language vocabulary acquisition and codeswitching research that investigated codeswitched reading as a less intensive L2 vocabulary intervention strategy in ESL semantic development. It reviews and synthesises findings from the fields of second language vocabulary acquisition, codeswitching, cognitive psychology, advertising research, and neuroscience to account for the results of this empirical study. Findings show that Chinese ESL learners made significant gains in successful lexical inferencing and retention – two key aspects of vocabulary acquisition. Codeswitched reading tasks are shown to aid ESL students' L2 vocabulary acquisition. Similar to lesson time savings that were

seen in studies on the oral use of L1 in explanations of English concepts, CS reading tasks lead to accelerated successful lexical inferencing and retention-retrieval that can potentially increase lesson time savings. In a context of vocabulary intervention methods that are generally time-intensive (Nagy & Townsend, 2012), CS reading tasks can be seen as a valuable strategy that mitigates the time consuming nature of vocabulary intervention measures. Results also show that reaping benefits of codeswitched reading was a function of learners' preexisting richness of semantic systems, or declarative vocabulary knowledge of the L2, which is consistent with studies on other vocabulary intervention strategies. Although the results cannot be extrapolated to learners other than high academic achievers from China, a circumspect speculation is that codeswitched reading could lead to significantly higher lexical inferencing and retention based on prevailing theories of second language vocabulary acquisition.

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APPENDIX A1

PARTICIPANT INFORMATION SHEET (Student)

Project title: EFL Vocabulary Learning Through Codeswitched Reading Tasks
Name of Researcher: Kenneth Keng Wee Ong

Researcher introduction

Kenneth Keng Wee Ong is a lecturer at the Language and Communication Centre, School of Humanities and Social Sciences, Nanyang Technological University and a post graduate student studying for the degree of Doctor of Philosophy (PhD) in Applied Linguistics at the School of Curriculum and Pedagogy, Faculty of Education, University of Auckland, New Zealand.

Project description and invitation

You are invited to participate in this research study which investigates the suitability of reading tasks for English as a Second Language (ESL) students undergoing the SM2 Bridging programme at Nanyang Technological University. The purpose of the series of reading and vocabulary exercises is to measure students' vocabulary competence and gather meaningful feedback for the refinement and customisation of second language vocabulary tasks for ESL students. You will be asked to guess certain target word meanings used in the reading passages. A few of you may also be invited to think aloud as you read and guess the target word meanings. Your voice will be digitally recorded as you think aloud your thought processes while reading a reading passage. Parts of your recording will be transcribed and analyzed for the knowledge sources used to guess target word meanings. Your digital voice recording will be digitally stored for six years before deletion. Should you choose to decline to participate in this research study, you can read the reading passages quietly without attempting the questions. Non-participants do not need to write down your personal particulars or any responses on the reading task sheets.

Project Procedures

The research study will take about 18 hours over a 9-week period, divided as two-hour sessions weekly. During each weekly session, you will be given a reading passage in the form of a test paper. Following the reading passage, you will be asked to guess the meanings of five target words as used in the reading passage. Indicate your best responses for the test items using a pen or pencil. Selected and self-volunteered participants for the think-aloud session will be asked to read a reading passage, and think aloud or state your thoughts as you read and guess the target word meanings. Responses are to be verbalised and not written for student participants selected for the think-aloud session.

Data storage/retention/destruction/future use

The reading tasks consisting of the reading passages and vocabulary tests are paper copies which will be stored securely in a locked office room for a period of 6 years before they are shredded, mixed and discarded. The voices of student participants selected for the think-aloud session will be digitally recorded as they think aloud their thought processes while reading a reading passage. The digital recordings will only be saved by the researcher onto a thumb drive. Parts of the digital recording will be transcribed and analyzed for the knowledge sources used to guess target word meanings. The digital voice recordings will be digitally stored for 6 years before they are deleted.

Right to Withdraw from Participation

Participating in this project is strictly voluntary, and your performance in the test will not in any way influence your SM2 Bridging programme grades. The school chair and centre director have given assurance that your participation or non-participation will not affect your grades or relationship with the University. You are free to withdraw from the research project at any time even after you agreed to participate in the research project, up to the end of the research data collection.

Anonymity and Confidentiality

All the data collected will be kept strictly confidential and will be restricted to research uses. Although your names are required on the test paper for the purpose of statistical computation and analysis, your names will not be used in any subsequent publications of data from this study. Responses on the vocabulary tests will be collated and statistically analysed and presented. Together with the statistical data, selected extracts of the transcribed think-aloud data will be published as results in the researcher's thesis and subsequent research articles.

Summary of Results

If you are interested to read about the findings of this research study, please contact the researcher and he will email the results to you.

Contact Details and Approval Wording

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APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN
PARTICIPANTS ETHICS COMMITTEE ON ...22 Jul 2013... for (3) years,
Reference Number ...9074...

APPENDIX A2

PARTICIPANT INFORMATION SHEET (Director, Language and Communication Centre)

Project title: EFL Vocabulary Learning Through Codeswitched Reading Tasks
Name of Researcher: Kenneth Keng Wee Ong

Researcher introduction

Kenneth Keng Wee Ong is a lecturer at the Language and Communication Centre, School of Humanities and Social Sciences, Nanyang Technological University and a post graduate student studying for the degree of Philosophy in Applied Linguistics at the School of Curriculum and Pedagogy, Faculty of Education, University of Auckland.

Project description and invitation

Kenneth Keng Wee Ong would like to seek your permission to invite Senior Middle High Year 2 (SM2) students enrolled in the bridging programme to participate in a research study which investigates the suitability of reading tasks for English as a Second Language (ESL) students undergoing the SM2 Bridging programme at Nanyang Technological University. The purpose of the series of reading and vocabulary exercises is to measure students' vocabulary competence and gather meaningful feedback for the refinement and customisation of second language vocabulary tasks for ESL students. Student participants will be asked to guess certain target word meanings used in the reading passages. A few of the students will be invited to think aloud as they read and guess the target word meanings. Their voices will be digitally recorded as you think aloud your thought processes while reading a reading passage. Parts of the digital recordings will be transcribed and analyzed for the knowledge sources used to guess target word meanings. The digital voice recording will be digitally stored for six years before deletion. Should students choose to decline to participate in this research study, they can read the reading passages quietly without attempting the questions. Non-participants do not need to write down their personal particulars or any responses on the reading task sheets.

Project Procedures

The research study will take about 18 hours over a 9-week period, divided as two-hour sessions weekly. During each weekly session, you will be given a reading passage in the form of a test paper. Following the reading passage, student participants will be asked to guess the meanings of five target words as used in the reading passage. Participants are to indicate their best responses for the test items using pens or pencils. Selected and self-volunteered participants for the think-aloud session will be asked to read a reading passage, and think aloud or state your thoughts as you read and guess the target word meanings.

Responses are to be verbalised and not written for student participants selected for the think-aloud session.

Data storage/retention/destruction/future use

The reading tasks consisting of the reading passages and vocabulary tests are paper copies which will be stored securely in a locked office room for a period of 6 years before they are shredded, mixed and discarded. The voices of student participants selected for the think-aloud session will be digitally recorded as they think aloud their thought processes while reading a reading passage. The digital recordings will only be saved by the researcher onto a thumb drive. Parts of the digital recording will be transcribed and analyzed for the knowledge sources used to guess target word meanings. The digital voice recordings will be digitally stored for 6 years before they are deleted.

Right to Withdraw from Participation

Participating in this project is strictly voluntary, and student performance in the test will not in any way influence their SM2 Bridging programme grades. The students are free to withdraw from the research project at any time even after they agreed to participate in the research project, up to the end of the research data collection.

Anonymity and Confidentiality

All the data collected will be kept strictly confidential and will be restricted to research uses. Although student names are required on the test paper for the purpose of statistical computation and analysis, their names will not be used in any subsequent publications of data from this study. Responses on the vocabulary tests will be collated and statistically analysed and presented. Together with the statistical data, selected extracts of the transcribed think-aloud data will be published as results in the researcher's thesis and subsequent research articles. We seek your assurance that the participation or non-participation of your students will not affect their grades or relationship with the University.

Summary of Results

If you are interested to read about the findings of this research study, please contact the researcher and he will email the results to you.

Contact Details and Approval Wording

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APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN
PARTICIPANTS ETHICS COMMITTEE ON ...22 July 2013... for (3) years,
Reference Number9074.....

APPENDIX A3

PARTICIPANT INFORMATION SHEET (Chair, School of Humanities and Social Sciences)

Project title: EFL Vocabulary Learning Through Codeswitched Reading Tasks
Name of Researcher: Kenneth Keng Wee Ong

Researcher introduction

Kenneth Keng Wee Ong is a lecturer at the Language and Communication Centre, School of Humanities and Social Sciences, Nanyang Technological University and a post graduate student studying for the degree of Philosophy in Applied Linguistics at the School of Curriculum and Pedagogy, Faculty of Education, University of Auckland.

Project description and invitation

Kenneth Keng Wee Ong would like to seek your permission to invite Senior Middle High Year 2 (SM2) students enrolled in the bridging programme to participate in a research study which investigates the suitability of reading tasks for English as a Second Language (ESL) students undergoing the SM2 Bridging programme at Nanyang Technological University. The purpose of the series of reading and vocabulary exercises is to measure students' vocabulary competence and gather meaningful feedback for the refinement and customisation of second language vocabulary tasks for ESL students. Student participants will be asked to guess certain target word meanings used in the reading passages. A few of the students will be invited to think aloud as they read and guess the target word meanings. Their voices will be digitally recorded as you think aloud your thought processes while reading a reading passage. Parts of the digital recordings will be transcribed and analyzed for the knowledge sources used to guess target word meanings. The digital voice recording will be digitally stored for six years before deletion. Should students choose to decline to participate in this research study, they can read the reading passages quietly without attempting the questions. Non-participants do not need to write down their personal particulars or any responses on the reading task sheets.

Project Procedures

The research study will take about 18 hours over a 9-week period, divided as two-hour sessions weekly. During each weekly session, you will be given a reading passage in the form of a test paper. Following the reading passage, student participants will be asked to guess the meanings of five target words as used in the reading passage. Participants are to indicate their best responses for the test items using pens or pencils. Selected and self-volunteered participants for the think-aloud session will be asked to read a reading passage, and think aloud or state your thoughts as you read and guess the target word meanings.

Responses are to be verbalised and not written for student participants selected for the think-aloud session.

Data storage/retention/destruction/future use

The reading tasks consisting of the reading passages and vocabulary tests are paper copies which will be stored securely in a locked office room for a period of 6 years before they are shredded, mixed and discarded. The voices of student participants selected for the think-aloud session will be digitally recorded as they think aloud their thought processes while reading a reading passage. The digital recordings will only be saved by the researcher onto a thumb drive. Parts of the digital recording will be transcribed and analyzed for the knowledge sources used to guess target word meanings. The digital voice recordings will be digitally stored for 6 years before they are deleted.

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Participating in this project is strictly voluntary, and student performance in the test will not in any way influence their SM2 Bridging programme grades. The students are free to withdraw from the research project at any time even after they agreed to participate in the research project, up to the end of the research data collection.

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For any queries regarding ethical concerns you may contact the Chair, The
University of Auckland Human Participants Ethics Committee, The University
of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone
09 373-7599 extn. 87830/83761. Email: humanethics@auckland.ac.nz.

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN
PARTICIPANTS ETHICS COMMITTEE ON ...22 July 2013... for (3) years,
Reference Number ...9074...

APPENDIX A4

CONSENT FORM

(Student)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project title: EFL Vocabulary Learning Through Codeswitched Reading Tasks

Name of Researcher: Kenneth Keng Wee Ong

I have read the Participant Information Sheet, have understood the nature of the research and why I have been selected. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I agree to take part in this research.
- I understand that I am free to withdraw participation at any time, and to withdraw any data traceable to me.
- I agree / do not agree to be audio recorded.
- I wish / do not wish to have my digital audio recordings returned to me.
- I wish / do not wish to receive the summary of findings.
- I understand that data will be kept for 6 years, after which they will be destroyed.

Note that a summary of results will be emailed to you upon an emailed request to the researcher.

Name _____

Signature _____ Date _____

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON ...22 July 2013....FOR (3) YEARS REFERENCE NUMBER ...9074...

APPENDIX A5

CONSENT FORM

(Director, Language and Communication Centre)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project title: EFL Vocabulary Learning Through Codeswitched Reading Tasks
Name of Researcher: Kenneth Keng Wee Ong

I have read the Participant Information Sheet and have understood the nature of the research. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I give my approval for students to be invited to take part in this research.
- I understand that students are free to withdraw participation at any time, and to withdraw any data traceable to me.
- I understand that data will be kept for 6 years, after which they will be destroyed.
- I give my assurance that the participation or non-participation of students will not affect their grades or relationship with Nanyang Technological University.

Note that a summary of results will be emailed to you upon an emailed request to the researcher.

Name _____

Signature _____ Date _____

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON ...22 July 2013...FOR (3) YEARS REFERENCE NUMBER ...9074...

APPENDIX A6

CONSENT FORM

(Chair, School of Humanities and Social Sciences)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project title: EFL Vocabulary Learning Through Codeswitched Reading Tasks

Name of Researcher: Kenneth Keng Wee Ong

I have read the Participant Information Sheet and have understood the nature of the research. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I give my approval for students to be invited to take part in this research.
- I understand that students are free to withdraw participation at any time, and to withdraw any data traceable to me.
- I understand that data will be kept for 6 years, after which they will be destroyed.
- I give my assurance that the participation or non-participation of students will not affect their grades or relationship with Nanyang Technological University.

Note that a summary of results will be emailed to you upon an emailed request to the researcher.

Name _____

Signature _____ Date _____

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON ...22 July 2013....FOR (3) YEARS REFERENCE NUMBER ...9074...

APPENDIX B

Sample Graded Reading Text

1. In this age of diversity, it is widely believed that all cultures are equal. Western culture, claim the intellectuals, is in no way superior to that of African tribalists or Eskimo seal hunters. There are no objective standards, they say, that can be used to evaluate the moral standing of different groups. They assert that to deny the equality of all cultures is to be guilty of the most heinous of intellectual sins:"ethnocentrism", which is a belief in the superiority of one's ethnic background. This is to flout the sacred principle of cultural relativism. I disagree with the relativists - absolutely. 5
2. There are three fundamental respects in which the Western culture is objectively the best. These are the core values or core achievements of Western civilisation. The Greeks were the first to identify philosophically that knowledge is gained through reason and logic as opposed to mysticism, often associated with faith and revelation. The rule of reason reached its zenith in the West in the 18th century - the Age of Enlightenment. "For the first time in modern history," writes one philosopher, "an authentic respect for reason became the mark of an entire culture." 10
3. An indispensable achievement leading to the Enlightenment was the recognition of the concept of individual rights. Individuals do not exist to serve governments, but rather governments exist to protect individuals. The individual has the right to life, liberty, and the pursuit of his own happiness. 15
4. In addition, the triumph of reason and rights made possible the full development and application of science and technology and ultimately modern industrial society. Reason and rights freed man's mind from the tyranny of religious dogma and freed man's productive capacity from the tyranny of state control. Scientific and technological progress followed and Man began to understand the laws of nature. They invented an endless succession of new products and they engaged in large-scale production, that is, the creation of wealth, which in turn financed and motivated further invention and production. As a result, horse-and-buggies were replaced by automobiles, wagon trucks by steel rails, candles by electricity. At last, after a millennia of struggle, man became the master of his environment. 20
5. These core achievements of Western civilisation have resulted in an increase in freedom, wealth, health, comfort, and life expectancy unprecedented in the history of the world. The achievements were greatest in the country where principles of reasons and rights were implemented most consistently - the United States of America. In contrast, it was precisely in those Eastern and African countries which did not embrace reason, rights, and technology where people suffered, and still suffer most from both natural and man-made disasters such as famine, poverty, illness, dictatorship and where life-expectancy was, and is lowest. It is said that primitives live "in harmony with nature," but in reality they are simple victims of nature if some dictator does not kill them first. 25
6. The greatness of the West is not merely prejudice; it is an objective fact. This assessment is based on the only proper standard for judging a government or a society, which advocates reason, rights, freedom, and technological progress. The core values and achievements of the West must be asserted proudly and defended to the death. 30

Adapted from Edqin A. Locke, "The Greatness of Western Civilisation".

APPENDIX C

Sample Codeswitched Reading Text

1. 在这个多元的时代，人们普遍认为一切文化都是平等的。学者们声称，西方文化同非洲部落文化或爱斯基摩人的狩猎文化相比，毫无优势可言。他们认为，没有客观的标准可以用来衡量不同民族的道德立场。他们还断言，否认一切文化平等就相当于触犯了最 **heinous** 的思想大忌：“种族中心论”，持这种观点的人总认为自己民族的文化具有优越性。这种思想同文化相对论的原则相违背，但我绝不认同相对主义者的观点，这毫无疑问。 5
2. 西方文化在三个基本方面无疑是最优秀的。这些是西方文明的的核心价值或核心成就。古希腊人最先从哲理上发现知识来源于理性思维和逻辑而不是迷信。迷信常常伴随的是宗教信仰和神谕。在西方，理性主义在十八世纪的时候发展到了 **zenith**，这段时期也称作启蒙时代。一位哲学家写道，“对理性主义的崇拜第一次在现代历史上成为了整个文化的标志”。 10
3. 引发启蒙运动的一个重要成就就是对个人权利的的认可。个人的存在不是为政府服务，相反，政府的出现是为了保护个人。每个人都有生存、自由以及追求个人幸福的权力。 15
4. 此外，理性主义和个人权利的胜利使科学技术得到了充分的发展和應用，最终产生了现代工业社会。理性和人权将人的思想从宗教 **dogma** 的统治下解放出来，同时也解放了受到政权束缚的生产力。由此科技得以进步，人类也开始了解自然规律。人们不断发明新产品并从事大规模生产，创造了财富，又用财富支持和鼓励进一步的发明与创造。于是汽车替代了马车，铁轨取代小路，电灯代替了烛光。经过数千年的奋斗，人类终于成为了环境的主宰。 20
5. 这些西方文明的核心成就使得人类在自由、财富、健康、舒适、预期寿命方面出现了世界历史上 **unprecedented** 的发展。美国是最贯彻理性和人权原则的国家，因而取得的成就也最大。与此相反，正是在一些东方国家和非洲国家，由于不尊重理性、人权及科技，人们过去和现在都遭受了并依然承受着自然和人为的灾难，比如饥荒、贫困、疾病、暴政。这些地方人们的预期寿命也是最短的。有人说原始人和自然是“和谐共存”，实际上，他们即便没有死在某个统治者手中，也只不过是大自然 25 30

的牺牲品。

6. 西方文明的伟大绝不是偏见，而是客观事实。这样的评价取决于一个用来评判政府或社会的唯一正确的标准，它 *advocates* 理性、人权、自由和技术进步。我们必须坚持并誓死捍卫这些西方核心价值及成就。

APPENDIX D

Sample Vocabulary Test Items

For each of the five words taken from the reading text, choose one numbered option which best describes your understanding of the word. Take note that if you choose Option 5, you should answer Option 4 too. There are extra boxes for you to write your answers if you choose Options 3, 4 or 5. You are free to write your answers in Chinese or English.

(i) heinous (line 3)

| | | |
|---|--|----|
| 1 | I don't remember having seen this word before and I don't know what it means | |
| 2 | I have seen this word before, but I don't know what it means | |
| 3 | I may or may not have seen this word before, and I think it means _____. (Write a synonym, definition or a translation) | >> |
| 4 | I know this word. It means _____. (Write a synonym, definition or a translation) | >> |
| 5 | I can use this word in a sentence. Write a sentence with the word in it. (IMPORTANT: If you can do option 5, please do option 4 as well) | >> |

Answer the following question ONLY if you chose Option 3.

What strategy did you use to guess the meaning of “heinous”?

.....

.....

(ii) zenith (line 8)

| | | |
|---|--|----|
| 1 | I don't remember having seen this word before and I don't know what it means | |
| 2 | I have seen this word before, but I don't know what it means | |
| 3 | I may or may not have seen this word before, and I think it means _____. (Write a synonym, definition or a translation) | >> |
| 4 | I know this word. It means _____. (Write a synonym, definition or a translation) | >> |
| 5 | I can use this word in a sentence. Write a sentence with the word in it. (IMPORTANT: If you can do option 5, please do option 4 as well) | >> |

Answer the following question ONLY if you chose Option 3.

What strategy did you use to guess the meaning of zenith”?

.....

.....

(iii) dogma (line 13)

| | | |
|---|--|----|
| 1 | I don't remember having seen this word before and I don't know what it means | |
| 2 | I have seen this word before, but I don't know what it means | |
| 3 | I may or may not have seen this word before, and I think it means _____. (Write a synonym, definition or a translation) | >> |
| 4 | I know this word. It means _____. (Write a synonym, definition or a translation) | >> |
| 5 | I can use this word in a sentence. Write a sentence with the word in it. (IMPORTANT: If you can do option 5, please do option 4 as well) | >> |

Answer the following question ONLY if you chose Option 3.

What strategy did you use to guess the meaning of “dogma”?

.....

.....

(iv) unprecedented (line 18)

| | | |
|---|--|----|
| 1 | I don't remember having seen this word before and I don't know what it means | |
| 2 | I have seen this word before, but I don't know what it means | |
| 3 | I may or may not have seen this word before, and I think it means _____. (Write a synonym, definition or a translation) | >> |
| 4 | I know this word. It means _____. (Write a synonym, definition or a translation) | >> |
| 5 | I can use this word in a sentence. Write a sentence with the word in it. (IMPORTANT: If you can do option 5, please do option 4 as well) | >> |

Answer the following question ONLY if you chose Option 3.

What strategy did you use to guess the meaning of “manifest”?

.....

.....

(v) advocates (line 24)

| | | |
|---|--|----|
| 1 | I don't remember having seen this word before and I don't know what it means | |
| 2 | I have seen this word before, but I don't know what it means | |
| 3 | I may or may not have seen this word before, and I think it means _____. (Write a synonym, definition or a translation) | >> |
| 4 | I know this word. It means _____. (Write a synonym, definition or a translation) | >> |
| 5 | I can use this word in a sentence. Write a sentence with the word in it. (IMPORTANT: If you can do option 5, please do option 4 as well) | >> |

Answer the following question ONLY if you chose Option 3.

What strategy did you use to guess the meaning of “advocates”?

.....

.....

APPENDIX E

List of Target Words and Meanings in English

| Words | Contextual Meanings | Lexicalised Statuses | Context Type |
|------------|---|----------------------|--------------|
| Advocates | To recommend or promote publicly something | Yes | Directive |
| Ameliorate | To make a bad situation better or less harmful | Yes | Directive |
| Anomaly | Something that is noticeable because it is different from what is usual | Yes | Directive |
| Crusaders | Campaigners | Yes | Directive |
| Diminution | A reduction in the size, number, or amount of something | Yes | Directive |
| Dogma | A set of firm beliefs held by a group of people who expect other people to accept these beliefs without thinking about them | Yes | Directive |
| Furore | Conflation of conflicting and differing views expressing offence, indignation and dismay | Yes | Directive |
| Heinous | Reprehensible | Yes | Directive |
| Heretical | A belief or statement etc. that disagrees with what a group of people believe to be right | Yes | Directive |
| Indignant | Angry and surprised because you feel insulted or unfairly treated | Yes | Directive |

| | | | |
|---------------|---|-----|-----------|
| Inexorable | Unstoppable | Yes | Directive |
| Inundate | to overwhelm | Yes | Directive |
| Irreverence | Lack of respect for organisations, customs, beliefs etc. that most other people respect – used to show approval | Yes | Directive |
| Lacerating | Damaging (in a metaphorical sense) | Yes | Directive |
| Manifest | Plain and easy to see | Yes | Directive |
| Peculiar | belonging characteristically; belonging exclusively to some person, group or thing | Yes | Directive |
| Prevalence | of common and widespread extent or occurrence | Yes | Directive |
| Promethean | Boldly innovative and creative without regard for consequences | Yes | Directive |
| Solidarity | union of fellowship arising from common responsibilities and interests, as between members of a group or between classes, peoples, etc. | Yes | Directive |
| Transcend | To go beyond the usual limits of something | Yes | Directive |
| Transgression | Something that is against the rules of social behavior or against a moral principle | Yes | Directive |
| Trite | Boring, not new and insincere | Yes | Directive |
| Underpinned | To give strength or support to something | Yes | Directive |

| | | | |
|---------------|--|-----|-----------|
| | and to help it succeed | | |
| Unprecedented | Never having happened before, or never having happened so much | Yes | Directive |
| Zenith | The most successful point in the development of something | Yes | Directive |

APPENDIX H

Instructions for Think-Aloud Procedure in English & Chinese

Please wear the earpiece/microphone provided to facilitate audio recording of your utterances. The researcher will activate the software Acustudio which will record your utterances digitally.

You are given two reading passage written in both Chinese and English. 10 Key vocabulary items are in English while the rest of the text is in Chinese. Read the text silently and stop at the end of every sentence to speak aloud your thoughts on each sentence you read.

Please feel free to say whatever that comes to mind after reading each sentence in the text. At the end of each sentence, you say aloud any thoughts you have about the sentence.

You should also try to guess the word meanings of 5 key vocabulary items in English.

You can choose to speak in Chinese or English, whichever language you are more comfortable in expression.

Some suggested oral prompts are as follows:

- I just thought of.../我刚想到。。。。
- I guess this word/phrase _____ means.../我猜想这个字或片语的意思是。。。。
- So far, I've learned.../到目前为止，我学到。。。。
- This made me think of.../这____令我想到。。。。
- This word/phrase/sentence _____ didn't make sense.../这个字或片语或句子 _____不合逻辑。。。。
- I think _____ will happen next.../我想_____会发生。。。。
- I reread this sentence because.../我又读这个句子因为。。。。
- I was confused by.../这个_____令我感到矛盾因为。。。。
- I think the most important part was.../我想最重要的部份是。。。。
- I wonder why.../我在想为什么。。。。
- I think _____ is interesting because.../我想_____是有趣的因为。。。。

If you have any questions or problems midway through the reading and think-aloud, please raise your hand and the researcher will approach you to offer assistance.

Thank you very much.

Think-Aloud 程序的指令

请配好耳机/麦克风，以便收录你的发音。研究员会启动 Acustudio 软件并进行数码录音。

你将会收到两篇文章。除了包含十个英文主要词汇外，均以中文书写。请默读文章。请在每句之后大声发表你对此句的看法。

请于默念完每句时大声并随意发表你的看法。

请揣摩那五个英文词汇的意思。

你可以随意用中文或英文发言。

关于发言，我们提供一系列的提示，如下：

- I just thought of.../我刚想到。。。
- I guess this word/phrase _____ means.../我猜想这个字或片语的意思是。。。
- So far, I've learned.../到目前为止，我学到。。。
- This made me think of.../这_____令我想到。。。
- This word/phrase/sentence _____ didn't make sense.../这个字或片语或句子_____不合逻辑。。。
- I think _____ will happen next.../我想_____会发生。。。
- I reread this sentence because.../我又读这个句子因为。。。
- I was confused by.../这个_____令我感到矛盾因为。。。
- I think the most important part was.../我想最重要的部份是。。。
- I wonder why.../我在想为什么。。。
- I think _____ is interesting because.../我想_____是有趣的因为。。。

如果你有任何问题或在中途遇到任何状况，请举手。研究员会及时提供援助。

谢谢。

APPENDIX I

Topic Familiarity Questionnaire (adapted from Pulido, 2007a, Appendix C, p. 2)

Instructions: Below you will see a list of 7 themes/topics. Please rate your familiarity with them. Base your decision on the following scale:

VERY UNFAMILIAR 1 2 3 4 5 VERY FAMILIAR

Very unfamiliar (1): I have no idea or clue about any aspect of the topic or theme.

Very familiar (5): I am very familiar with all the aspects of the topic or theme.

| Topic | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Current state of Asian intellectual thinking | | | | | |
| 2. Biological differences between men and women and gender stereotypes | | | | | |
| 3. Moral issues of genetic engineering | | | | | |
| 4. The right to free speech versus the respect for others | | | | | |
| 5. Human expansion at the expense of environmental destruction | | | | | |
| 6. Biotechnology applications in improving human life | | | | | |
| 7. The strengths of Western civilisation | | | | | |
| 8. Competition among capitalist states and its detrimental effect on global warming | | | | | |

APPENDIX J

Self-Reported Interest Level of Reading Passage

Rate your level of interest towards the reading passage on a 5-point Likert scale, bearing in mind that 1 indicates that you find the reading passage most uninteresting, and 5 indicates that you find the reading passage most interesting.

| | | | | |
|---|---|---|---|---|
| 1. I find the reading text most uninteresting | 2. I find the reading text moderately uninteresting | 3. I do not have any strong opinions of the reading text in terms of my self-interest | 4. I find the reading text moderately interesting | 5. I find the reading text most interesting |
|---|---|---|---|---|

Please explain your indicated level of interest towards the reading passage on the lines provided below.
