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AUTHOR O'Gorman, Elizabeth
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ABSTRACT

A study investigated the organization and development of second language lexicons among Hong Kong learners of English as a Second Language (ESL). Specifically, it compared the associations promoted by a single list of 20 frequent, common words in the learners' native language (L1, Chinese) and second language (L2, English). Subjects were 22 teacher trainees with mid-level English proficiency. They heard the list of English words and then in Chinese, and were asked to write the first word that entered their minds. The responses were analyzed for the frequencies of different response words, and the results compared to determine which similar semantic prompts inspired different responses in the two languages, and which inspired different responses. Results suggest that the L1 and L2 lexicons of this group are very different in structure. The L1 and L2 prompt words evoked neither similar frequencies of responses nor similar semantic associations in the two lexicons, and individual word responses did not elicit similar frequencies of word types in L1 and L2. It is concluded that different languages produce different storage and retrieval systems, refuting the notion of a common underlying principle of bilingual proficiency. Contains 16 references. (MSE)

An Investigation of the Mental Lexicon of Second Language Learners[1]

Elizabeth O'Gorman

1. Introduction

Without grammar very little can be conveyed;
without vocabulary nothing can be conveyed

Wilkins 1972

In Hong Kong, the current emphasis on teaching grammar may cause some teachers to overlook the crucial importance of teaching vocabulary. From a cursory examination of popular textbooks it might seem that vocabulary is unimportant. However, there seems to be a resurgence of interest in lexis. This may be linked to the impact of technology on research and the ease with which data can now be inputted into a corpus or analysed by a concordancer. As a result, it is likely that vocabulary will once again assume a stronger presence than it has been accorded in the past.

1.1 The mental lexicon

Knowing how vocabulary is stored in the mental lexicon is important. If an approximate model can be made of the storage and retrieval systems of the lexicon then the teaching and learning of vocabulary can be enhanced. Several metaphors for such a model have been suggested -

- a dictionary
- a thesaurus
- an encyclopedia
- a library
- a computer

Of these, the computer analogy seems the most appropriate. It conveys the notion of simultaneous access to a variety of sources of information about an individual word. A word's orthographic, phonological, grammatical and semantic properties can be stowed for instant retrieval.

Also, links can be created between various words which pertain to any and every of these features.

As there is no way of accessing the mental lexicon itself, these approximations of its structure are mainly hypothetical. The difficulty therefore, is ascertaining exactly what these links are and how they work. Slips of the tongue, error analysis, word association, malapropisms and introspection are a few of the research tools that have been used to reach it. Word association is the easiest and quickest way of collecting data and it has a long history of use in psychology with established norms. Therefore, it is often the method of choice in language research.

1.1.1 The native speaker's lexicon

Based on word association research, the consensus on the native speaker's lexicon is that it changes in structure from childhood to adulthood. At first the links between words are mainly phonological. Later strong semantic links become the norm. In adulthood, the native speaker's associative links between words are relatively stable with high correlation on repeated testing. Moreover, the responses on word association tests are strongly convergent with high frequencies of relatively few words accounting for all subjects' responses (Aitchison 1987). The question is, are these findings mirrored in the lexicons of non- native speakers?

1.1.2 The L2 learner's mental lexicon

How do second language learners store the vocabulary of their target language? Does the storage system of vocabulary differ in their L1 and L2 lexicons? If we can discover how the L2 lexicon is structured, insights may be revealed which help to understand how best it can be expanded. This is important not only for vocabulary learning but also for vocabulary teaching. As there has been comparatively little research in vocabulary, the methods of teaching vocabulary are not always founded on psycholinguistic principles but may rely on untested assumptions.

1.1.3 The relationship between the L1 and L2 mental lexicons

Several possible models exist for the structure of the language learner's mental lexicon.

- an undifferentiated mass of both L1 and L2 lexical items
- separate lexicons which develop individually, one for each language
- a combination of these two

This is not to imply that there is a single universal, unchanging model for all language learners. As a learner progresses through different levels of

proficiency, a gradual change in the mental lexicon may occur. Another factor contributing to change in the lexicon is age[2]. Cummins and Swain (1986), in their work on linguistic interdependence, have proposed a concept of a universal language proficiency underlying L1 and L2. This has been labeled CUP (common underlying proficiency) and serves as a model for general language learning. They suggest that:

common cross-lingual proficiencies underlie the obviously different surface manifestations of each language and bilingual proficiency is represented by a dual ice-berg model
Bilingualism in Education (p. 82)

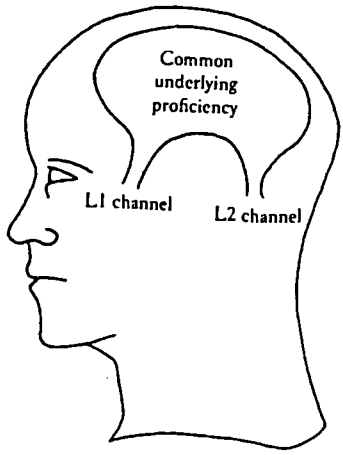


Figure 5.2 The common underlying proficiency model (CUP) of bilingual proficiency.

An extrapolation of this model suggests that while the surface features (the words in this instance) of two languages are obviously different, a common semantic space and similar links will underlie the vocabulary items of the L1 and L2. Evidence for this thesis would be finding similar links for the same semantic entries in the individual lexicons. That is, the word *table* would prompt the same association, e.g. *chair* in both the L1 and the L2.

1.2 Research questions

1. Do the responses on a word association test converge similarly in L1 and L2?
2. Are the associative links between words semantically similar in L1 and L2?
3. Are the prompt words which elicit high frequency responses similar in L1 and L2?

1.3 The nature of this investigation

The purpose of this investigation is to attempt to broaden the understanding of how the mental lexicon of the Hong Kong L2 learner is constructed. In particular, it seeks to compare the associations prompted by a single list of twenty frequent, basic, common words in the L1 (Chinese) and L2 (English). If the words give rise to similar associations, perhaps the notion of a single lexicon for both languages is appropriate. Knowing a word means being aware of the semantic space it occupies and

does not occupy. The term word association can refer to either a psycholinguistical or sociolinguistical aspect of a word. In language research, it is usual to focus on the psycholinguistical interpretation: referring to the store of words and the interrelations between them (Carter 1987) rather than the more sociolinguistical interpretation which acknowledges the meanings that may be accrued from the social, cultural or pragmatic contexts. However, can these two aspects be separated?

In language research, the type of word associations a person makes can be classified into two main categories: phonological or semantic. Meara (1984) found that beginners and young language learners tended to make phonological links between words (*clang associations*). The type of semantic associations made can be subdivided into paradigmatic and syntagmatic responses. Here, paradigmatic usually refers to words from the same grammatical class and a similar semantic area. They may be coordinates, superordinates, synonyms or antonyms e.g. dog, cat, animal. By contrast syntagmatic refers to linked words which can be part of a syntactic (grammatical sequence) and therefore are collocates of the word, e.g. *dog, bark, furry.*

Traditionally, in the early research on word association, this differentiation within semantic associations was perceived as being important. It was found to distinguish between the responses of language learners at varying levels of proficiency. However, this distinction has been eschewed in this short study for the following reasons.

1. There are difficulties in classifying words into either category. There are fuzzy boundaries between them. (Is *chair* a syntagmatic or paradigmatic response to *table*? What about *queen* in relation to *king*?)

2. In this study, some of the responses were ambivalent in their relationship to the prompt word and possibly were errors (e.g. *length* as a response to *short*, *height* as a response to *long*). This necessitated the use of another category- 'misrepresentations' which distorted traditional analysis.

3. Moreover, the purpose in syntagmatic\paradigmatic research is usually to distinguish between learners of different proficiency levels. In this investigation, the subjects are at roughly the same level, all having achieved similar results on the college entrance criteria. Thus, the value of the distinction is not relevant.

4. Most importantly, while syntagmatic\paradigmatic research is usually INTRA-language, this study is concerned with INTER-language comparisons. As pointed out by Mitchell (1975) different collocations exist in different languages. Indeed, they exist in different varieties of the same language.[2] For example the word 'soft' collocates with 'day' in Irish English but not in the English spoken in England. Consequently, a comparison of syntagyms and paradigms in the word associations of any two languages will necessarily differ and be a feature of each language rather than a source of comparative proficiency data.

2 Method and problems

2.1 The investigation

The choice of method in investigations of the mental lexicon is limited to error analysis slips of the tongue introspection and word association. As a primary focus of the study is the variable associative links of L1 and L2, word association seemed the obvious choice of method. What follows is a comparison of a small number of language learners' L1 and L2 mental lexicons. It is primarily descriptive in nature and does not seek to generalize to any population. It focuses on the **written** word associations generated by oral prompts as this was the simplest way of collecting data. A similar study focusing on oral responses may produce somewhat different results.

2.1.1 Subjects

The subjects were a group of 22 students in their first year of a tertiary teacher training course. All were English electives and although all had similar results in the Hong Kong Certificate of Education Examination, the apparent range of their ability (as gleaned from classroom interaction) was quite diverse. However their scores, (excluding the two extremes), on the Goulden et al., (1990) vocabulary checklist were from a fairly narrow range - 4,300 - 6,500 and the mean score determining vocabulary size was 5,230. Other research on L2 vocabulary size indicated that Hong Kong secondary form two and form three students have vocabulary levels of approximately 1,263 and 1,565 (Cheung, 1992) and that Japanese proficient language learners have vocabulary levels of between 4,900 - 12,100 with a mean of 7,700 (Izawa, 1993). This suggests that the subjects come from a mid-proficiency range.

2.1.2 Method

A list of twenty English words from McNeill (1995), taken from the Kent-Rosanoff (1910) list was used as prompt words. This list was also

translated into Chinese. On separate occasions each list was read out to the subjects. They were instructed to write down the first word that entered their mind on the provided worksheet. Due to outside factors beyond control, only 15 sets of responses were included in the Chinese survey and 16 in the English survey. Of these, the responses for 20 words were included in the English survey. In the Chinese survey one word *smooth* was translated ambiguously and elicited a different response from each of the subjects. Consequently, it was dropped from the analysis and only 19 words of the 20 were used.

2.1.3 Method of Comparing Chinese (L1) with English (L2)

Students heard the list of 20 prompt words in English and then in Chinese. The total possible number of responses for English was 320 [20 prompt words X 16 subjects] and the possible total number of responses for Chinese was 285 [19 prompt words X 15 students]. However, the actual total number of responses was distorted in both cases as one student gave two responses to three words and a few subjects did not write responses to every prompt words. This latter phenomenon occurred a little more frequently in English than in Chinese -10 times in English and 7 times in Chinese.

2.1.4 Analyses used

The responses produced by the word association test were analysed and the frequencies of different response words (types) were tallied for each language. This elicited the overall convergence and divergence of responses in L1 and L2 -the types token ratio. Following this, the responses for each word and for its translation were compared to determine which similar semantic prompts inspired different responses in L1 and L2 and which semantic prompts inspired similar responses in L1 and L2. Next, the high frequency responses in L1 and L2 were compared to see if any obvious relationship existed.

2.2 Problems with method

As Carter (1987) pointed out, word association research is limited. One to one translations of the stimulus word is difficult beyond a very basic level and even then the connotations of a word in any two languages is unlikely to be similar. Homographs and homophones cause problems, some peculiar to studies involving Chinese characters. The Chinese characters for light and bright are the same and take their meaning from the context without a context, as in simple word association, it is impossible to tell.

2.2.1 Problems with method

In translating words into Chinese, there is the additional problem of Cantonese being the oral version and Putonghua being the written version. Equally, retranslating the words back into English for the purposes of analysing them, leads to further distortion of the boundaries of the semantic space they occupy.

Additionally, assessing the links in the mental lexicon through the use of discrete vocabulary items is far removed from their normal contextualised usage. Thus, it may not be an accurate representation of the mental links. Equally, knowing a word includes knowledge not only of its semantic sense but also of the way it is used (its inflections, its derivations, its usage). Similar criticisms of this type of research have been put forward by Cowie (1984) among others who states there is a need to move away from purely psycholinguistic research strategies.

While a single word response is very limiting, in some respects, test retest correlations have proved high in past research (Postman and Keppel, 1970). A spew test would not necessarily have been more revealing and the additional information mainly repetitive, though perhaps having more validity.

3. Analyses

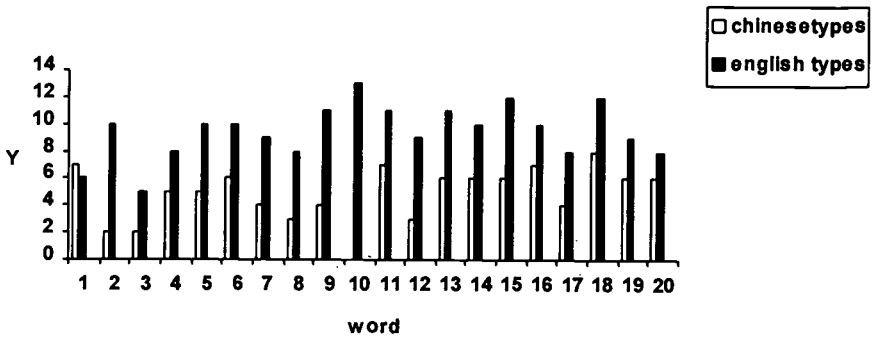
3.1 ***Research question 1:*** *Do the responses on a word association test converge similarly in L1 and L2? [Type token ratio.]*

3.1.1 Types per prompt word.

When the associations were analysed the overall trend noted was that the responses in Chinese tended to converge, whereas the responses in English tended to diverge. There was a marked similarity within the L1 responses and a contrasting disparity among the L2 responses.

The number of different words (the types) given in response to each prompt word in Chinese contrasted strongly with the number of words given in English.

Figure 1 Responses classified into number of types per prompt word.



3.1.2 Total number of types

The total number of types required to account for all the tokens (words given in response to a prompt word) offered by the subjects in Chinese contrasted strongly with the total number of types required to account for all the tokens given in English. This, in part, is accounted for by the fact that only 19 words and their associated responses are considered in Chinese whereas 20 words form the basis for analysis in English. This has the effect of distorting the data but the overall difference is so great that it seems to have only a slight impact.

Table 1: Type\Token ratio
Word types required to account for all tokens

	number of types	*total number of tokens*	*expressed as a ratio*
Chinese	96	316	.35
English	191	277	.60

Here only 96 types were needed to account for all responses in Chinese; in contrast, 191 words were needed to account for all the responses in English.

Prompt, responses and frequencies in L1 and L2

Table 1a: Analysis of Chinese prompts and responses

prompt	1st most common response		2nd most common response		3rd most common response	
1 table	chair	6	furniture	2	water	2
2 dark	light	14	night	1		
3 man	woman	13	strong	2		
4 deep	shallow	8	sea	3	light	2
5 soft	hard	6	near	6	cotton	1
6 mountain	water	5	trousers	5	dead	2
7 black	white	12	blackbird	1	dark	1
8 hand	foot	13	useful	1	skillful	1
9 short	long	12	inconvenient	1	length	1
10 smooth	X					
11 command	obey	4	order	3	army	1
12 woman	man	11	water	2	soft	1
13 cold	hot	6	snow	1	pure	1
14 slow	fast	7	quick	5	blind	1
15 white	black	8	pure	3	clean	1
16 needle	sharp	5	thread	3	cloth	2
17 girl	boy	9	lovely	3	mother	1
18 health	sick	5	wealth	1	happy	2
19 moon	sun	7	stars	2	romance	2
20 king	queen	8	rich	2	eunuch	2
		159				

Table 1b: Analysis of English prompts and responses

prompt	1st most common response		2nd most common response		3rd most common response	
1 table	chair	4	furniture	7	desk	2
2 dark	light	2	night	4	black	4
3 man	woman	5	strong	3	human	3
4 deep	dark	4	sea	3	shallow	3
5 soft	hard	5	light	1	sofa	2
6 mountain	hill	4	high	4	valley	1
7 black	colour	5	white	4	dark	2
8 hand	finger	5	body	4	foot	1
9 short	long	4	tall	2	length	1
10 smooth	rough	3	soft	2	river	1
11 command	order	6	request	2	sentence	1
12 woman	man	4	lady	4	water	1
13 cold	hot	3	winter	3	snow	1
14 slow	fast	5	relax	2	walk	1
15 white	snow	4	black	2	clean	1
16 needle	thread	4	sharper	3	clothes	1
17 girl	boy	5	young	4	lady	1
18 health	wealth	3	body	3	strong	1
19 moon	sun	3	night	3	romantic	2
20 king	queen	5	crown	2	emperor	3

As there was a high number of types arising from single instances (i.e. only one subject gave that word in response to the prompt word [see Tables 1a and 1b]), a more representative picture can be gleaned by examining the high frequency responses of the L1 and L2 word associations.

3.1.3 The most frequent associations

Table 2: Comparison of the most common response in L1 and L2

	The most common response		
	number of types	number of tokens	expressed as a ratio
Chinese	19	159	.12
English	20	85	.23

From examining the the high frequency responses of Tables 1a and 1b, (the first column) it can be seen that the difference between the number of tokens accounted for by the most frequent responses in Chinese is virtually double that of those in English.

3.1.4 The first three most frequent associations.

A quick examination of the 1st three most common responses (Table 3) reveals that this trend is continued, though is not as strong.

Table 3: Comparison of the 3 most common responses in L1 and L2

	number of words	*number of tokens accounted for*	*expressed as a ratio*
Chinese	55	200	.27
English	60	179	.34

Here the three most common responses of each of the prompt words still accounted for a greater proportion of the total number of responses in Chinese than in English.

3.2 Discussion

These findings mirrored that of Meara (1982). In a study of the word associations of L1 and L2 speakers, Meara found that the responses differed greatly. Although the L2 speakers probably had smaller and more limited vocabularies than the native L1 speakers, they tended to produce a wide range of dissimilar responses to the prompt words. In comparison, the L1 speakers tended to reproduce a narrower range of similar responses. This would seem contrary to anticipated results - a smaller vocabulary should produce a smaller range of responses.

In this Hong Kong study of word associations there also was a difference between the responses generated by the mother tongue (Chinese) and the responses generated by the second language (English). The responses in L1 tended to converge so that the number of words accounting for the total range of responses was far less than the number of words accounting for the total range of responses in L2.

Meara postulates that this difference in the L1 and L2 mental lexicon is due to the L2 learners' lack of clearly established links between words. In L1 not only are these links strong, but they are also shared by many speakers. It is interesting to speculate why this is so. Perhaps the size of vocabulary is at issue here and the consequent necessity for an individual word in the L2 learner's lexicon to represent a larger area of semantic space [meaning] than it has to represent in the L1 (native speaker) lexicon.

3.3 *Research question 2: Are the associative links between words semantically similar in L1 and L2?*

Table 4: **Chinese/English word association responses**
English equivalents given for Chinese prompt words and responses
Underlined words are translations from Chinese.

word	1st most common response	number of occur-rences	2nd most common response		3rd most common response	
table	*chair*	*6*	*furniture*	*2*	*water*	*2*
	chair	4	furniture	7	desk	2
man	*woman*	*13*	*strong*	*2*		
	woman	5	strong	3	human	3
soft	*hard*	*6*	*near*	*6*	*cotton*	*1*
	hard	5	light	1	sofa	2
short	*long*	*12*	*inconvenient*	*1*	*length*	*1*
	long	4	tall	2	length	1
woman	*man*	*11*	*water*	*2*	*soft*	*1*
	man	4	lady	4	water	1
girl	*boy*	*9*	*lovely*	*3*	*mother*	*1*
7	boy	5	young	4	lady	1
moon	*sun*	*7*	*stars*	*2*	*romance*	*2*
	sun	3	night	3	romantic	2
king	*queen*	*8*	*rich*	*2*	*eunuch*	*2*
	queen	5	emperor	3	crown	2

A comparison of the responses for each individual word prompt was conducted to see if the responses were linked in any way. A CUP (common underlying proficiency) model of language skills would predict that a word in the L1 lexicon would have word associations similar to its counterpart word in the L2 lexicon. Similar sets of responses would also be anticipated if the lexicons of the L1 and L2 were an undifferentiated mass.

Here the focus was on whether the prompts would give rise to similar responses in both L1 and L2. As can be seen from Table 4 the responses in L1 and L2 are similar for less than half of the prompts. When the second and third most common responses are considered the similarity decreases to four out of a possible sixteen. It is interesting to speculate on the reasons for these few similarities that do exist in the data. Possibly some may be translations from the mother-tongue. Others may only exist from a foreign source, for example *king, emperor* is more common in Chinese. More may be explained by obvious contrast i.e. *man\woman, short\long.*

3.4 *Research question 3: Are the prompt words which elicit high frequency responses similar in L1 and L2?*

It was assumed that the words in a language which evoked a high frequency of similar responses were those that were well anchored in the mental lexicon and therefore had strong links shared by all speakers of the language. One tenet of L2 lexicon researchers is that as the L2 learner approached native speaker competency, word associations would mirror those of the L1. The analysis chosen to investigate this aspect was a comparison of the Chinese words which gave rise to the greatest convergence with the English words which gave rise to the most convergence.

Table 5: **Chinese word convergence**
English equivalent given for prompt word and response

word	1st most common response	number of occur-rences	2nd most common response		3rd most common response	
dark	light	14	night	1		
man	woman	13	strong	2		
hand	foot	13	useful	1	skillful	1
black	white	12	blackbird	1	dark	1
short	long	12	inconvenient	1	length	1
woman	man	11	water	2	soft	1

Table 6: **English word convergence**

word	1st most common response		2nd most common response		3rd most common response	
table	furniture	7	chair	4	desk	2
command	order	6	request	2	sentence	1
man	woman	5	strong	3	human	3
soft	hard	5	sofa	2	light	1
black	colour	5	white	4	dark	2
hand	finger	5	body	4	foot	1
slow	fast	5	relax	2	walk	1
girl	boy	5	young	4	lady	1
king	queen	5	emperor	3	crown	2

As can be seen only one of those words which elicited high frequency responses had common semantic responses. Reasons to account for these two might include: the word's high position on a general service word list (though it is not markedly higher than other words in the list of prompt words). It must follow then that convergence is not a factor in establishing a common semantic space for words in the L1 and L2 mental lexicon.

3.5 Discussion

A possible extrapolation of these findings is that a well anchored word (as established by the high frequency of similar associations from different subjects) may have completely different links in the L1 and L2 lexicons. Therefore, the concept of a single underlying proficiency for both L1 and L2 seems invalid with regard to the semantic space occupied by the Chinese and English lexicons of Hong Kong learners. The CUP model of language must be treated with great caution and the concept applied only to those areas where more evidence exists for its plausibility- for example, the various reading skills may transfer readily from L1 to L2.

This finding of prompt words with high frequency responses giving dissimilar semantic responses in L1 and L2 leads to questioning the notion and implications of response stability in L1 and L2. Traditionally it is thought that in L1 responses are stable and in L2 they are not. This is thought to be due to the underdevelopment of strong links between words in L2 and to the necessity for an individual word in the L2 learner's lexicon to represent a larger area of semantic space [meaning] than it has to represent in the L1 (native speaker) lexicon. However, in this study, the word associations for many L2 learners were shared but they were not similar to native speakers' word associations. This then, questions the idea

that, as proficiency increases, the L2 learner's lexicon will mirror that of the L1 native speaker. Indeed, a further question is whether the L2 learner's lexicon will ever give rise to similar patterns of response.

From this study, an intermediate stage would appear to exist where well-anchored words share links peculiar to the L2 lexicon. Perhaps these links are formed during the learning process and are specific to each learning situation and possibly culture of the L2 learner.

3.5.1 Miscue analysis of responses

Several responses were unusual and seem to point to two sources of inaccuracy -mishearing and misrepresentation.

In common with the findings in Meara's Birbeck vocabulary project, a source of bizarre responses was a misunderstanding of the prompt word e.g. *dog* for *dark*; *help* for *health*; *comment* for *command*. These findings should be given due weight as they indicate a problem area for language learners - the identification of words in the target language. Although the words were simple and well within the competency of the learners, they misunderstood the stimulus word most frequently mistaking them for words which had a somewhat similar phonological resemblance. In many cases, the errors were based on the final syllable. Perhaps mother tongue interference can account for this - in Cantonese, most words end with a vowel sound and learners may have difficulty with English consonant endings both in oral production and aural comprehension. A similar finding was reported by McNeill (1990) in his analysis of Hong Kong students' English errors.

The other source of errors pointed to production difficulties. Here the problem may be that faulty links between underlying semantic space and the surface features of the L2 learners productive vocabulary caused them to write words, which did not accurately represent what they had intended. Such an explanation may account for such anomalies as *high* when *height* might have been a more appropriate response. Did the subject intend a different lexical item or did the possible derivations of a lemma get confused?

4. Conclusion

The results of this study suggest that the L1 and L2 lexicons of mid-proficiency Hong Kong language learners are very different in structure. The L1 and L2 prompt words neither provoke similar frequencies of responses nor do they evoke similar semantic associations in the L1 and

L2 lexicons and finally, individual word responses do not elicit similar frequencies of types in L1 and L2.

It seems reasonable to assume from these findings that different languages produce different storage and retrieval systems and the notion of a CUP iceberg model is not supported in this case. While it is highly likely that technical vocabulary evokes similar word associations other words have culturally-loaded associations. These cannot be ignored in discussions of word associations. The originators of the CUP model were mainly concerned with primary school classroom research rather than society and this may explain the narrowness of the applicability of their model.

4.1 Possible implications

Some tentative suggestions may arise from these findings. As the same prompt words in the two languages evoke quite different responses in L1 and L2, than using translation methods of teaching vocabulary may not be in the learners' best interests. Translation may be successful, giving instant access to an individuals words meaning. However, this is a shortsighted approach, as it prohibits the possibility of developing associations in the L2. Perhaps an alternative approach which focused on providing synonyms and antonyms in the L2 would help promote word links and would anchor the word more firmly in the L2. Also, as a native speaker's vocabulary is approximately 17,200 words (Goulden et al., 1990) and that of these mid-proficiency L2 subjects 5,230, it seems every opportunity ought be made to increase vocabulary size. By expanding vocabulary size, the semantic space allotted to each word in the L2 learner's lexicon may be decreased. This may strengthen the links between words as they may be more focused.

Given the problem of misrepresentation encountered in this study, the uncontextualised learning of vocabulary, as in the use of wordlists, may be indicated. The use of the newly combined dictionary and thesaurus, the 'language activator' may also be of use in this area.

4.1.1 Future research

Despite the limitations of word research cited, further investigation in this area should prove worthwhile in adding to the information on the L2 lexicon.

A similar study using Irish as the L2 is envisaged. In addition to a simple comparison of the English and Irish mental lexicons as in this study additional criteria will be considered such as the differences between the

bilingual native Irish speaker and non native Irish speakers of varying proficiency such as Gaelscoil and ordinary primary school.

A statistical comparison with a sufficiently large group of high frequency responses in L1 and L2 would be of interest, as would a study determining whether or not vocabulary size is a factor in the production of high frequency responses.

If Irish word association norms based on the Kent- Rosenoff list are not currently available, an investigation yielding such norms would provide a useful comparative base for further interlanguage comparison.

Other research might involve the stability of L1 and L2 word association responses on a test retest survey. A comparison of aural prompts and oral responses with written prompts and written responses might be of particular interest in Ireland given the emphasis on audio-visual teaching in primary schools.

All told there remains a large area of unexplored vocabulary research which might add to the understanding of the L2 lexicon.

Footnotes

[1] This article is based on a study of English language learners in Hong Kong.

[2] Further issues to consider are whether the learner is a composite or compound bilingual and whether the second language contributes to additive or subtractive bilingualism but these are peripheral to this study.

[3] A soft day means a pleasant, not cold, day.

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