

Word Association and Second Language Learners' Responses

by

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1 Introduction

To date there has been relatively little research done in the area of word association and the second language learner¹, most studies in this psycholinguistic field involve native speakers. In addition, with corpus linguistic studies challenging traditional grammar-based views of language patterning (see Sinclair, 1991, Willis, 1990), understanding of the L2 mental lexicon is of increasing importance. For these reasons it is of interest to explore word association and lexical development in second language learners. The following study investigates the nature of learner word association responses with the aim of determining possible mental links between learned words, in particular, the following characteristic features cited in McCarthy (1990, 39-42) will be considered:

- co-ordination
- collocation
- synonymy
- superordination
- phonological links
- word class links

The possibility of lower level learners association choices being influenced by phonological similarities of words will also be looked into, and the presence of other influences in response patterns will be considered. The study combines both quantitative and qualitative elements, using a word association test and a brief subject interview to discuss why certain words were chosen, followed by post-experiment analysis of learner responses.

It will be argued that although the learner's mental lexicon is difficult to map due to flexibility in association categories and changeable associations, the above-mentioned patterns of storage and linking are evident. Further, the appropriateness of the word association test as a research tool and points for further study will be briefly considered.

¹ Respondents of this study spoke English as a second, third, fourth and even fifth language, but for simplicity will be referred to as second language learners.

2 Lexical links in the Mind

2.1 From Cobwebs to Computers: Metaphors of Lexical Storage and Association

Word association is not a simple matter of observable behaviour, but a complex process of what occurs in the mind from hearing a word to producing another and involves intricate processes of comprehension, storage and retrieval and production (see Aichison 1994 and McCarthy, 1990). However, various models for mapping the mental lexicon have been put forward, using such metaphors as the “cobweb” or “human word web”, in which words are organised in “semantic fields”, or groups according to meaning (Aichison, 1994: 97). These semantic fields include “collocates”, or words that are likely to appear together e.g. *salt* and *water*; “co-ordinates” or words of the same level of detail, including opposites, e.g. *salt*, *pepper* and *mustard*; synonyms, or words with similar meanings e.g. *hungry* and *starved*; and “super-ordinates”, or words whose meanings subsume the meanings of other words e.g. *colour* for *red*, *blue* and *green* (ibid.:84, see appendix 1). The semantic link model, drawn from typical native English speakers’ responses, may or may not correspond to patterns of association for learners of English as a second language. McCarthy argues that learners “may for a long time lack the ability to make instantaneous collocational associations, and may be more inclined to associate L2 words by sound similarities”. He makes a valid point that the semantic link model, limited to collocation, co-ordination, superordinates and synonyms, may be an “oversimplification” (1990: 40) and emphasises:

encyclopaedic information ... may often provide links between words... (and) produce a web-like set of associations ... Encyclopaedic knowledge relates words to the world, and brings in origins, causes, effects, histories, and contexts.

(McCarthy, 1990: 41)

He concludes that a complete model for how words feature in the lexicon is “three dimensional, with phonological nets crossing orthographic ones and criss-crossing semantic and encyclopaedic nets” (ibid., see appendix 2 for a portion of the model). This means for example, that the word *peace* may generate not only semantically related associations such as *war* and *freedom*, but also encyclopaedic links such as *Gandhi* or *the*

*Treaty of Waitangi*², as well as phonological and orthographic links, which relate to sound and spelling e.g. *piece* or *peas*, and, by extension, more personal links e.g. *relaxing at Pauanui beach*. Nattinger also looks beyond semantic links and, in line with this study, finds that words are linked “not only by meaning, and sound, but also by sight – we link similar shapes in our mind’s eye – and by other contexts in which we have learned or experienced them” (1988: 64-50). In a recent study, Meara (1997: 121) even claims that words may be randomly associated.

2.2 Word Association Trends

2.2.2 Semantic Links

According to Aichison (1994: 86), collocations are also powerful and long lasting connections. Recent studies point to the importance of how lexis maps onto meaning both according to “syntagmatic” (chain) as well as “paradigmatic” (choice) relations (Sinclair, 1991: 121). Thus, in a phrase such as ‘the *fat* cat’ the word *fat* relates syntagmatically with *the* and *cat* and paradigmatically with a synonym, ‘the *tubby* cat’, or an antonym, ‘the *skinny* cat’, words which could replace it. Sinclair, illustrates the “idiom principal”, whereby language is organized according to “semi-preconstructed phrases that constitute single choices”(1991: 110) e.g. the meaning of the phrasal verb *lay off*...is not found by dividing and analysing its respective parts *lay* and *off*, but rather in its total meaning as a phrase or “chunk” (see also Widdowson, 1989). One question to be considered by this study is whether or not learners store and produce these chunks. Willis, in rationalizing an argument for a lexical syllabus, states that “learners do accumulate language forms, often phrases”(1990: 72) and (Coulthard et. al., (1997) also maintain that these syntagmatic collocation links may be more likely to occur in non-native speakers than paradigmatic co-ordination links.

Co-ordinates, including opposites, are also said to be powerful links (Aichison, 1994). Word association test errors and the ‘tip-of -the-tongue’ phenomena (ibid: 86) show how co-ordinates are closely associated e.g. one might often mistakenly say, “turn right” instead of “turn left” when giving directions. According to Jackson, antonymy operates

² A New Zealand “peace” agreement.

most widely in the word class of adjective (1988: 74). This may point to a preponderance of co-ordinate associations for adjective associations.

Contrary to the trends of co-ordinates and collocates, links of synonymy and superordination are found to be less frequent in native speakers (Aichison, 1994). It is worthy of note that in his definition of synonym, Jackson argues against the “strict” synonym, one that is “interchangeable in all contexts” and includes some multi word units in his examples of synonymy e.g. *make glad* as a synonym of *please* (1988: 70). As pointed out by Aichison, synonym choice is determined by surrounding context, so *wide* may link strongly with *road*, and *broad* with *mind* rather than *broad* and *wide* with each other (1994: 97), so, collocational links for some words may be stronger and more likely to occur than synonym links. In hierarchical associations, or super-ordination, clumping of words into bundles may however, become problematic when we try to determine the correct super-ordinate for words such as *cough* and *sneeze* (ibid.: 92)– not all sneezes are *cold symptoms*.

2.2.3 Phonological Links

Patterns of association may also depend on the phonological component of words. Learners may store words according to their “phonological shapes” and, to some extent their orthographic (spelling) patterns (McCarthy, 1990: 35) e.g. *boat* and *coat* may be linked. Similarly, Maera found that learners produce “clang associations” i.e. responses having phonological rather than semantic resemblance e.g. *frog* for *dog* (Meara 1982: 30-31, quoted in Carter, 1982: 199). The general rhythmic pattern of words may also help to determine how lexis is stored (Aichison, 1994). This implies that words of the same syllabic structure may commonly be associated.

2.2.4 Word Class and L1 Influences

Meaning and word class seem to be very closely related and, according to Aichison, “can be regarded as integrated into a single whole, the lemma” (1994: 109). For word association this suggests that words of one part of speech may be tightly grouped together, in particular “nouns, verbs and adjectives ... are closely bonded” (ibid). One

word association experiment found that “nouns elicit nouns around 80 percent of the time, whereas verbs and adjectives do so ...just over 50 percent [of the time]” (Deese 1965, quoted in Aichison 1994: 102). Also, as suggested by Sinclair and Renoulf, more common words may have less independent meaning (1988:152) and therefore, pronouns, such as *it*, and prepositions, such as *in*, could be expected to collocate with a wider range of words.

A final point to be considered is that of L1 influence. Overlap and misalignment in taxonomic links due to L1 influence (see McCarthy, 1990: 20) may be relevant also for and phonological links e.g. many Japanese learners use the word *notebook* to refer to that which native English speakers would commonly call an *exercise book* due to the overlap in meaning and sound of the Japanese word ‘*noto*’.

3. Reflection and Hypothesis

3.1 Challenges in Mapping the Learners Lexicon

Psycholinguistic studies have yet to provide firm evidence as to how language learners store words. The L2 mental lexicon is not likely to be static and therefore associations also may not be of a fixed nature. As McCarthy points out, “(t)he webs of meanings and associations constantly shift and re-adjust; new connections are woven, and old ones strengthened” (McCarthy, 1990: 42), as illustrated by Meara, who found that phonological instabilities of second language learners changed with weekly testing (quoted in Carter, 1998: 200). Carter and McCarthy also point out the “shifting nature of many collocational partnerships” (1988: 95) and the “fuzzy edges” of lexical sets e.g. although most types of food are prepared by *slicing*, *chopping* or *grating*, meat also uses the special term *mince* (ibid.: 210).

Collocation, a very broad category, makes strict classification difficult. Current studies point to a flexible definition:

the occurrence of two or more words within a short space of each other ...
The usual measure of proximity is a maximum of four words intervening (with)
... no theoretical restrictions to the number of words involved.
(Sinclair 1991: 170)

Besides length, or span (ibid) variation, collocates are also subject to a “cline” or sliding scale of fixity e.g. *take* with *a look/a holiday a rest/time/a walk* being less fixed – one could take a lovely *long* walk, whereas *stark naked*, or binominals such as *ups and downs* are more fixed, or less likely to vary in form (Carter, 1988: 70-71). This cline may also relate to stylistic variation e.g. *tall* and *seeks* are found to be significant collocates according to the Bank of English reflecting language of a ‘personal’ advertisement. (Coulthard et. al., 1997: 69, see Sinclair, 1991 for further examples). By extension, collocational acceptability could broaden with the consideration of spoken discourse associations.

Synonymy may also be difficult to define in absolute terms and may be seen more clearly as having varying degrees of ‘sameness’. Aichison sights the incompatibility of some co-ordinates (where one of a pair cannot be the other) as an example of overlap with synonymy (1994: 97). So, for example, *trustworthy* and *sincere*, or *dangerous* and *frightening* are, to some degree both co-ordinates and synonyms.

3.2 Hypotheses

It is proposed that the characteristic responses of semantic association will be found, and that collocates may be more in evidence than co-ordinates. Variation according to the word class of the prompt word, and level variation could also be expected to occur. Beginners may make more phonological associations and could be more likely to choose collocations than co-ordinates, whereas advanced students may select more co-ordinates, as do native speakers.

McCarthy’s ‘encyclopaedic’ links will be renamed as “experiential” in order to cover links that may specifically result from a learner’s personal experience. These experiential influences may influence and at times override the general semantic associations. They could be due to the learner’s physical environment (including influences of the word association test and tester), the learner’s present, recent or past experiences, or could result from influences of the learner’s first language.

4 The Study

4.1 The Word Association Test

4.1.1 Procedure and Participants

Eight words were chosen according to the specifications of including one or two grammar words, items from the physical environment, a low frequency word and a mix of word classes. They were: *ocean, fork, in, expensive, slowly, it, understand, and better*. A word association test requiring learners to write down the first word they thought of for these words was given in the form of a written handout (see appendix 3). At the time of the study, the author's university students were on holiday, so the main body of participants were second language learners travelling or residing in Thailand and Cambodia (see table 1). A proportion of the respondents were general English students and business students in Japan. All learners were in the 20 to 50 year old age bracket. Subjects' first languages and levels were as follows:

Table 1: Word Quiz Respondents

Beginner	10 Japanese, 4 Thai, 2 Khmer (Cambodian), 2 Korean, 1 German, 1 Polish
Intermediate	4 Japanese, 3 Norwegian, 2 German, 2 Korean, 1 French, 1 French Quebecois, 1 Dutch, 1 Hebrew, 1 Khmer, 1 Danish
Advanced	4 German, 2 Austrian German, 1 Swiss German, 1 French, 1 Korean, 2 Dutch, 1 Spanish, 1 Portuguese

4.1.2 Pilot Study Alterations.

An initial pilot study led to the 'test' being renamed as a 'quiz' – a small point but one that was felt to emphasise that respondents should not search for a 'correct' answer, but write down any word that they first thought of. An interview element was added in order to find out more about 'unusual' answers and to ensure accurate interpretation of results. A French respondent gave the answer *blind* for the prompt word *it* during the pilot study, and a short interview pointed to first language influence – there is no equivalent for *it* in

French, either *le* or *la* would be used so the woman said she felt *blind*, or “a *blind* spot” was the only association she was able to make.

4.2 Analysis

A broad definition for the meaning of the commonly used term ‘word’ is an underlying premise of this study. Chunks, or multi word units were not discounted in learners’ responses. Data analyses of learners’ responses were made according to overall responses and levels. Firstly, overall responses were categorised according to the semantic and phonological links described above, with experiential and L1 influences being counted as other responses. Possible overlap in response type was indicated by multiple category symbols on response tables (see appendix 4). Word class patterns were also investigated over total learner responses. Secondly, an analysis of response patterns according to learners’ levels was carried out. Data calculations for levels were made as percentages, in order to balance learner number variation in levels (both number and percentage to totals were shown in most tables). General phonological responses measured occurrence of words with the same sounds at the beginning or end as the prompt, and clang responses. Syllabic analysis measured responses with the same number of syllables and stress pattern as the prompt (with the exception of longer words *expensive* and *understand* for which same number of syllables only was the criterion). Subjects were asked to determine their own level of proficiency as beginner, intermediate or advanced. After completing the interview this was occasionally amended if it was felt that the self-assessment was inaccurate.

5 Results

5.1 Overall Responses

As hypothesised, characteristic semantic responses were found, and as reflected in the total mean response figures of table 2 below, significantly more co-ordinates (40.75%) and collocates (39.00%) were found than super-ordinates (1.50%) and synonyms (5.75%). The number of collocates and co-ordinates were similar overall. This was due to the balancing out of opposing trends within levels i.e. collocate prolificacy and less co-ordination in beginners, countered by co-ordinate prolificacy and fewer collocations in advanced learners (see 5.2.3). It should also be noted that words such as *fork*, *better*, *in*,

and *expensive* may be strongly disposed to co-ordination and antonymy in particular, thus a study biased towards an over-inclusion of these words may be seen.

Table 2: Word Association Responses: Semantic, Phonological and Other Responses

Prompt Word	Ocean	Fork	Better	Expensive	Understand	Slowly	In	It	TMV
Collocates	56	42	16	32	60	52	18	36	39
Co-Ordinates	14	50	70	38	18	40	70	26	41
Super-ordinates	12	-	-	-	-	-	-	-	2
Synonyms	12	-	2	4	16	-	4	8	6
Phonologic	-	6	4	2	4	4	2	4	3
Other	6	2	8	24	4	4	6	26	10

Key: Phonologic=phonological/orthographic
Other=L1/experiential influences
TMV=total mean value to the nearest whole No.

5.1.2 Collocates

Compared with co-ordinates, collocates showed less strong links i.e. there were fewer multiple responses, the most common being *English* associated with *understand* 7 times (see table 3 below for typical responses).

Table 3: Typical Word Association Responses

Prompt Words	Collocates	Co-ordinates	Super-Ordinates	Synonyms	Phonological Responses	Other Responses
ocean	blue, beach	river, lake	water	sea	-	Thailand*
fork	food, meat	knife, spoon	-	-	dance (error: folk)*	French dinner (experiential)
better	feel/ings	worse, good	-	positive*	bread (error: butter)	intelligent* (experiential)
expensive	money, diamond	cheap	-	high price*	-	money
understand	study, good	don't understand	-	know, take in*	underground *	look*
slowly	turtle, bicycle	fast	-	-	lately* lowly*	my English (experiential)
in	house	out	-	inside	Holiday Inn*	negative* (L1 influence)
it	is	that-	-	thing	eat,* at*	Information Technology

Key: *= single response representative of a trend

However, a large range of responses occurred, making the category strong as a whole, especially as looser and weaker collocates were included e.g. a variety of animals and vehicles were associated with *slowly*, such as *turtle*, *donkey*, *bus* and *boat*. These concrete noun collocates were common, indicating in line with Nattinger (2.1), that learners associate by ‘seeing a picture’, as with the relatively frequent link of *ocean* with *blue*. Some links were also related specifically to personal experience e.g. *expensive* with *Japan* for a Polish beginner, who had just finished a conversation with the author about Japan, or the above example of *understand* and *English* which may indicate influence of the test situation. The lack of collocation for prompt words such as *better* and *in*, indicate that stronger links e.g. of opposition were present. Examples of collocation across sentences was seen, as in *understand* associating with *good* and *yes*, (spoken collocates). An interesting single response, *mind*, may indicate the trend of rare but strong links for fixed phrases – the learner came up with the phrase “keep it in mind” in an interview. Learners linked *it* and *is* relatively frequently, indicating the presence of grammatical as well as lexical collocation.

5.1.3 Co-ordinates

Co-ordinate links were very strong ones, high in frequency over a small range of responses. The majority of these were due to antonymy, which can be classified into three classes (Jackson, 1988: 75-6):

- gradable e.g. *big* and *small* (which may have intermediaries *bigger* or *quite small*)
- complementary e.g. *alive* and *dead* (one excludes the other)
- converses e.g. *over* and *under*, or *buy* and *sell*. Complementary opposites e.g. *in* and *out* and gradable opposites e.g. *expensive* and *cheap*, *slowly* and *fast* and *better* and *worse* drew from 10 to 35 responses each. Interestingly, when there was no clear single word opposite, as in the case of *understand*, learners came up with a variety of responses (often multi word units) suggesting oppositeness or negation, such as *don't understand*, *not understand*, or *misunderstand*, Co-hyponyms of *fork* and *knife* showed stronger links than *river* and *lake*, perhaps due to less clear “prototye” boundaries (Aichison 1994), in

support of Carter and McCarthy's 'fuzzy edges'. Some responses for the word *understand* seemed to defy categorisation: *think* or *learning* were particularly questionable co-ordinates and could be examples of incompatibility, or the overlap of co-ordinates and synonyms (see 3.1).

5.1.4 Super-ordinates and Synonyms

With the exception of *ocean* eliciting *water*, super-ordinates were not at all common. This could have been due to the nature of the prompt words e.g. *cutlery* could have been chosen for *knife*, but probably was not as it is a more formal term. As predicted synonyms were less frequent. *Ocean* could technically be termed as the super-ordinate of *sea*, but in common use would be considered a synonym. *Feelings*, classed as a collocate, may also be seen as "quasi-super-ordinate" for *better*, in the same way that a super-ordinate of another word class, *shape*, was used for *round*, *square* and *oblong* (Aichison, 1994:27). This study did not discount multi word units, and, in line with Jackson, *high price* associating with *expensive* demonstrates multi word synonymy, along with *too much* being less formal, "connotational", or attitudinal, and probably spoken (1988:73). *Thing* was linked with *it*, as an informal cover-all term, or more formally with *item*.

5.1.5 Phonological/Orthographic Links

Sound and spelling links were not generalizable over all prompt words, but supported the claims of predominance in beginners (see 5.2 for further details). Orthographic and/or phonographic confusion led to *bread* and *cookies* as answers for *better* (learners read 'butter'). *It* prompted several responses connected with the acronym for Information Technology e.g. *computer*, also supporting McCarthy's orthographic link theory.

5.1.6 Other Responses

The interview stage of the test was useful in revealing personal and experiential types of association (see 'comments' in appendixes 4A-H) e.g. *it* was linked to a horror story by the novelist Stephen King. Associations for *fork* may have contained some cultural influences, for instance Europeans were more likely to choose *knife*, whereas Cambodians and Thais, who use spoons and chopsticks, chose *spoon*. L1 influence (see

5.2.1) was also evident. Polysemy, or multiple meaning of a word was seen in links of *better* with *sick* and *badly*. Other interesting links were compounds e.g. *ocean* and *going*, derivations e.g. *understand* and *misunderstand*, binominals e.g. *better* and *or worse* and the superlative *best* for *better*.

5.1.7 Word Class

Trends in word class correlated roughly with those mentioned in previous studies. Most word associated with words of the same word class, as seen in table 4. Exactly in line with Deese, noun-noun links were the strongest at around 80%, and verb-verb links were produced 50% of the time. Adjectives associations in this study did not correlate completely with Deese's findings (a 50% figure for adjective-adjective links) but were closer to Jackson's suggestions of antonym predominance in adjectives. The particular adjectives *better* and *expensive* may not be 'typical' with other links prevailing e.g. links for the irregular comparative and superlative chain of *good/ better/best* were very strong. Concrete noun collocates were common in this study, perhaps indicating that learners associate by 'seeing a picture' in line with Nattinger (see 2.1), as with the relatively frequent link of *ocean* with *blue*. The strength of preposition-preposition links, reflecting the 'closed' nature of this class, is seen in the figure of 76%, however, as noted by Aichison, prepositions may also exhibit both dependent and independent meaning, (1994: 107) as was shown by polysemic responses of *in silence* and *in (the) house*. Associations for *it* were many and varied, reflecting its varied usage.

Table 4: Word Association Responses: Word Class

Prompt Word	Same Word Class as Prompt	Different Word Class to Prompt						
		Noun	Verb	Adjective	Adverb	Preposition	Pronoun	Other*
ocean	72%		6%	22%				
fork	88%		10%					2%
better	76%	16%	2%		4%			2%
expensive	44%	50%			2%			4%
understand	50%	38%		6%			2%	4%
slowly	42%	32%	14%	8%				4%

in	76%	22%		2%				
it	26%	32%	22%	4%		4%		12%

Key: * = word class distinction difficult e.g. *worth*, *blank*, *some* multi word units e.g. *'I don't know'*

5.2 Responses According to Level

5.2.1 Phonological Similarities in Responses

As seen in table 5, general phonological links relating to words with similar beginnings and or endings, and clang responses e.g. *at* and *eat* for *it* were not very frequent. However, beginners were twice as likely as intermediates and 3 times more likely than advanced students to chose these responses e.g. 12 out of 20 beginners chose associations beginning with 'b' for *better*, compared with 2 out of 17 intermediate, and 1 out of 13 advanced learners. Also, beginners were far more likely to select *quickly* for *slowly* than intermediate or advanced learners, who tended to opt for *fast*. The sole homophone response of the study *inn* for *in* was a beginner's association. The low number of phonologically similar links could have been due to the fact that a large proportion of the prompt words began with vowels. Most examples of the "bathtub effect", where linked words have common beginnings and ends, (Aichison, 1994: 134-43) e.g. *connection* and *correction*, have consonant or consonant cluster beginnings. Overlapping phonological and L1 influences were also present e.g. *dance* and *song* were chosen for *fork* (mistaken for folk) by Japanese learners. In the author's experience /l/ and /r/ are easily confused by Japanese learners. One advanced Korean learner associated (pork) *cutlet* with *fork*, indicating a fossilised speech pattern (where interlanguage is influenced by native language – see Selinker 1984). Korean does not distinguish between the sounds /p/ and /f/ (Sang-Oak, 1995).

Table 5: General Phonological Links: Responses by Level

	Ocean		Fork		Better		Expensive		Understand		Slowly		In		It		TMV	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Beginner	3	15	3	15	3	15	1	5	6	30	6	30	1	5	1	15	3	16
Intermediate	-	-	4	24	2	12	1	6	2	12	-	-	-	-	1	6	1	8
Advanced	-	-	3	23	1	8	-	-	-	-	1	8	-	-	-	-	0.6	5

Key: No=number of responses within level
 %= % of responses within level
 TMV= total mean value

Note: phonological responses previously not included due to category overlap added

5.2.2 Similar Syllabic Patterning

Beginner learner tended to choose associations with similar syllabic patterns to the prompt words more often than other learners, the distinction being clearer with level increase (see table 6). Total mean values may be more relevant, covering a larger number of words, but typical of the trend was *ocean*, with 45% of all beginners' responses being of 2 syllables, with the first syllable stressed, e.g. *river* or *swimming*. A majority of single syllable answers was also given by beginners for *fork*, such as *knife* and *spoon*.

Table 6: Responses by Level: Similar Syllabic Trends

	Ocean		Fork		Better		Expensive		Understand		Slowly		In		It		TMV	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Beginner	9	45	15	75	4	20	3	15	1	5	8	40	15	75	15	75	9	44
Intermediate	4	24	14	82	1	16	2	12	2	12	6	35	14	82	11	65	7	40
Advanced	6	46	9	69	-	-	-	-	1	0	2	15	11	84	11	85	5	37

Key: No=number of responses within level
%= % of responses within level

TMV= total mean value

5.2.3 Collocate Predominance in Beginners' Responses

In line with the hypothesis of this study, collocates and co-ordinates were the most common associations at all levels. Collocates were the most evident for the majority of words (5 out of 8) in both beginner and intermediate learners, whereas co-ordinates were more common for 5 out of 8 prompt words in advanced learners (see table 7 below). This supports the argument that syntagmatic relations are common in lower level learners, whereas advanced learners, more like native speakers, organise words paradigmatically.

Table 7: Responses by Level: Collocate/ Co-ordinate Predominance

	Predominance of Collocates (%)								Predominance of Co-ordinates (%)							
	Oc	Fork	Better	Exp	U	Slow	In	It	Oc	Fork	Better	Exp	U	Slow	In	It
Beginner	50			40	50	60		40		50	70				65	
Intermediate	53	53			65	47					65	53			70	29
Advanced	69				54			47		54	77	30		46	77	

Key: Oc= ocean, Exp= expensive, U= understand,
% = percentage of learner responses per level

It is also relevant that multi word unit answers were more than twice as common for beginners as for other levels e.g. discorsal expressions such as “*It’s my pleasure*” and “*I don’t know*” indicate that learners are capable of storing and producing multi word units. Experiential links were consistently present across levels, and although not large in number, synonym responses increased with level, again in line with the theory of paradigmatic organisation increasing with level.

6 Conclusion: Discussion of Findings and Suggestions for Further Study

The efficiency of a word association test in accurately determining the lexical links may be of question. Associating single words out of context may neither reflect natural links, nor the variety of associations a learner would make (Aichison, 1994: 83). Deese, quoted in Katzer (1976: 15), argues for the totality of free associates in a study of intra-verbal meanings” (verbal reactions to words):

... any particular linguistic form, at various times, elicits a variety of responses in the same person. Therefore the meaning of any form is not given by single response, or, indeed, by a collection of responses at some particular time, but by the potential distribution of responses to that form.

Specifically, single word answer limitations may not accurately reflect the learner’s ability to form multi word unit, or ‘chunk’ connections. The weighting of more rare collocates is also not taken into account by the word association test, which looks for common trends.

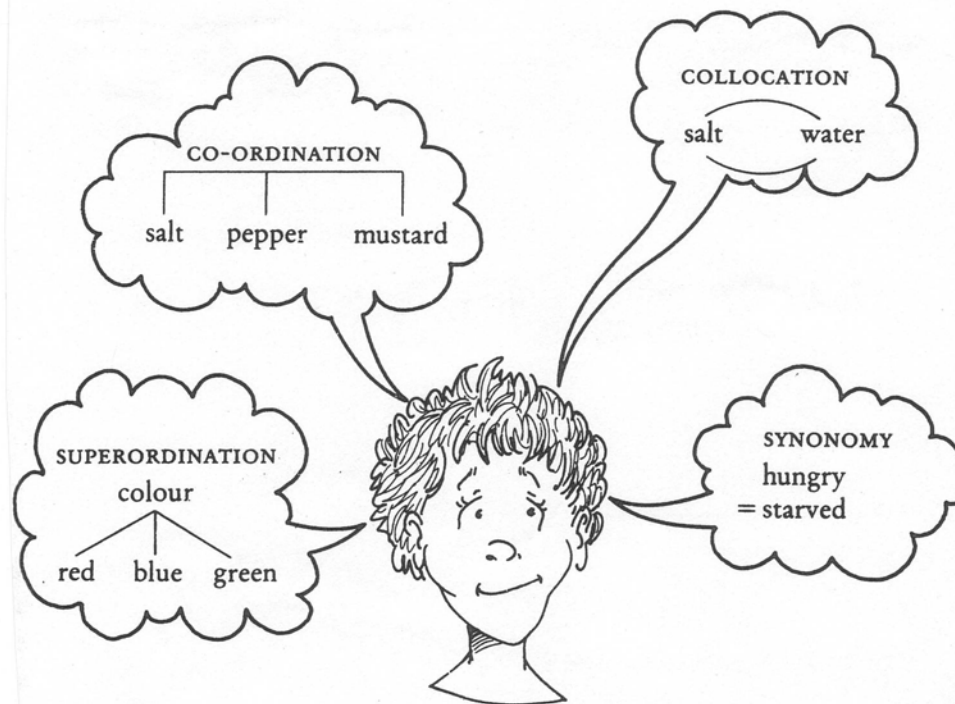
The current study notes that choice of prompt word can potentially influence results: whereas the words such as *better*, *expensive*, *understand* and *slowly* were antonym biased, words such as *butterfly*, *hungry*, *red* and *salt* (Aichison, 1994: 84) would not be. For further study, a careful balance of prompt words should be stressed.

Due to overlapping categories and flexibility within categories, responses were difficult to categorize. Some collocates especially seemed to defy objective classification,

particularly when they resulted from personal or experiential influences. McCarthy's definition of collocational relationship as a "marriage contract between words" (1990: 12), may be better to be modernized to a "partnership"—one that is flexible, subject to interpretation, and more likely to change!

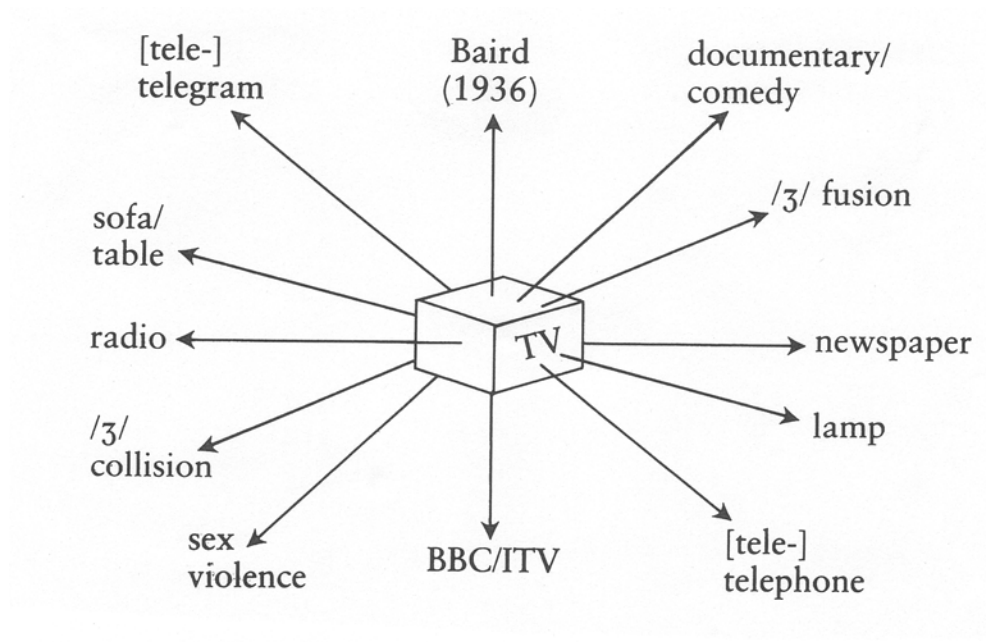
Learners' ability to store and produce multi word unit associations, as seen in this experiment, supports implications for the teaching of both syntagmatic and paradigmatic relations of lexis. The results of this study show that word associations for a small number of words can not accurately reflect the L2 mental lexicon, but can suggest some possible trends of how learners associate words, such as strong collocate and co-ordinate links, the presence of some super-ordinate links and synonymy, and the stronger likelihood of phonological links for beginners. These links are not permanent and are likely to be influenced by experiential influences individual to each learner.

**Appendix 1: Types of Links in the Word Web: Aichison's
Semantic Model of Word Association**



Types of link in the word-web

Appendix 2: A Portion of McCarthy's 3D Model of Word Association



Appendix 3: Word Association Quiz

Hello,

My name is . I am currently doing a study in English vocabulary learning. If English is your second (or third, or fourth...) language and you have a spare minute, could you please do the following word association quiz:

Quiz

A. Read the following words one by one and write down the first word that you think of:

1. OCEAN >
2. FORK >
3. BETTER >
4. EXPENSIVE >
5. UNDERSTAND >
6. SLOWLY >
7. IN >
8. IT >

B. What is your first language?

C. What is the level of your English? (Circle one)

Beginner
Intermediate
Advanced

D. Do you have any comments about why you chose the words in A?

Appendix 4A Word Association Responses: Ocean

OCEAN	Response Total	Link	Beginner	Intermediate	Advanced	Comments
sea	6	syn	2	3	1	
water	6	sup	2	1	3	
blue	5	coll	2	1	2	
lake	4	co-ord	2	2		
river	3	co-ord	3			
island	2	coll		1	1	
sun	2	coll(L)		2		
beach	2	coll		2		
wide	2	coll		1	1	
turquoise	1	coll			1	
going	1	coll			1	
Pacific Ocean	1	coll/hyp			1	
great	1	coll(L)			1	
swim	1	coll(L)	1			
swimming	1	coll(L)	1			
fishing	1	coll(L)	1			
fish	1	coll(L)	1			
boat	1	coll(L)			1	
ship	1	coll(L)/p?	1			
sunset	1	coll(L)	1			
sky	1	coll(L)	1			
seafood	1	coll		1		
globe	1	coll(L)?		1		
wave	1	coll(L)	1			
picnic	1	oth	1			
Bordeaux	1	oth		1		French person
Thailand	1	oth		1		

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link
 L= loose/weak collocate

co-ord= co-ordinate
 syn= synonym
 oth= other link

Appendix 4B Word Association Responses: Fork

FORK	Response Total	Link	Beginner	Intermediate	Advanced	Comments
knife	14	co-ord	5	5	4	
spoon	9	co-ord	5	2	2	
food	5	coll(L)/p		3	2	<i>Food on a fork</i>
eating	3	coll(L)	2		1	
eat	2	coll(L)			2	
spaghetti	2	coll(L)	2			
meat	2	coll(L)	1	1		
steak	2	coll(L)	1	1		
beef	1	coll(L)		1		
fruit	1	coll/p		1		
rice	1	coll(L)	1			
French dinner	1	oth/p	1			pers. exp.
dinner	1	coll		1		
chopsticks	1	co-ord			1	
scissors	1	co-ord?		1		kitchen utensil
cutlet	1	phono			1	
dance	1	phono/ort	1			
song	1	phono/ort	1			
weapon	1	coll(L)		1		

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link
 L= loose/weak collocate
 ort= orthographic link

co-ord= co-ordinate
 syn= synonym
 oth= other link

Appendix 4C Word Association Responses: Better

BETTER	Response Total	Link	Beginner	Intermediate	Advanced	Comments
worse	10	co-ord	1	4	5	
good	10	co-ord	3	3	4	
best	7	co-ord/p	4	2	1	
bad	5	co-ord/p	5			
sick	1	co-ord		1		
worst	1	co-ord		1		
badly	1	co-ord/p	1			
positive	1	syn?			1	more positive?
money	1	oth	1			
beautiful	1	oth/p	1			
intelligent	1	oth		1		
good sleep	1	oth		1		
feel	1	coll		1		
feelings	1	coll		1		
English	1	coll	1			
or worse	1	coll			1	
much better	1	coll			1	
result	1	coll		1		
life	1	coll		1		
taste	1	coll	1			
bread	1	Phono (butter)	1			"butter"
cookies	1	Phono	1			"butter cookies"

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link
 L= loose/weak collocate
 ort= orthographic link

co-ord= co-ordinate
 syn= synonym
 oth= other link

Appendix 4D Word Association Responses: Expensive

EXPENSIVE	Response Total	Link	Beginner	Intermediate	Advanced	Comments
cheap	18	co-ord	6	8	4	
money	7	other	2	2	3	
diamond	2	coll	1	1		
car	2	coll	2			
inexpensive	1	co-ord/p		1		
house	1	coll	1			
jewellery	1	coll	1			
shop	1	coll			1	
cigarettes	1	coll		1		
diving	1	coll(L)		1		
cufflinks	1	coll(L)		1		
everything	1	coll	1			
Norway	1	coll(L)?		1		
Tokyo	1	coll(L)?	1			previous conversation
Japan	1	coll(L)?	1			
good	1	coll(L)?			1	
good quality	1	coll(L)?			1	incopatable
high price	1	syn?	1			
too much	1	Syn?			1	
'Venture'	1	oth		1		travel Co.
worth	1	oth			1	worth a lot
sales	1	oth	1			
blank	1	oth			1	
mind	1	Oth-previous test word	1			depends on your mind
cloth	1	phono	1			clothes

Key: coll= collocate

sup= superordinate

phono/p= phonological link

L= loose/weak collocate

ort= orthographic link

co-ord= co-ordinate

syn= synonym

oth= other link

Appendix 4E Word Association Responses: Understand

UNDERSTAND	Response Total	Link	Beginner	Intermediate	Advanced	Comments
English	7	Coll/ex	4	3		WA test inf.
know	5	syn	1	3	1	
study	4	coll?	2	2		<i>Study to understand</i>
good	3	good	1	1	1	<i>Understand? Good!</i>
don't understand	2	coord opp(L)/p	2			
no understand	1	co-or(L)p	1			
not understand	1	co-or(L)?	1			
no understanding	1	co-or/p?	1			
misunderstand	1	co-or/p		1		derivative
think	1	co-or?	1			polysemy
thinking	1	co-or			1	
learning	1	co-or?			1	
meaning	1	coll	1			
theory	1	coll		1		
that	1	coll	1			<i>"Understand that?"</i>
problem	1	coll			1	
friend	1	coll			1	
knowledge	1	coll(L)		1		
don't	1	coll			1	
I don't know	1	coll	1			Reply to <i>Understand?</i>
not so good English	1	coll?/ex	1			"
nothing	1	coll		1		
language	1	coll			1	
languages	1	coll			1	
culture	1	coll/ex		1		Internat. job
universe	1	coll		1		dreamer
yes	1	coll			1	
believe	1	syn			1	polysemy
take in	1	syn			1	"
I see	1	syn?		1		
stood	1	phono	1			Past tense
underground	1	phono		1		prefix
look	1	oth	1			Phono-see?
blank	1	oth			1	

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link

co-ord= co-ordinate
 syn= synonym
 oth= other link

L= loose/weak collocate
 ort= orthographic link

opp= opposite
 ep= experiential

Appendix 4F Word Association Responses: Slowly

SLOWLY	Response Total	Link	Beginner	Intermediate	Advanced	Comments
fast	13	co-or	2	6	5	Gradable antonym
quickly	5	co-or/p	5			Gradable antonym
quick	2	co-ord		1	1	
turtle	4	coll	1	2	1	
donkey	1	coll(L)		1		
koala	1	coll(L)		1		
my dog Kyan	1	coll(L)/exp	1			
bicycle	1	coll(L)/exp		1		
bus	1	coll(L)/exp	1			
boat	1	coll/exp	1			
this ship	1	coll/exp	1			
Yurikamome train	1	coll?/exp/L1	1			
time	1	coll	1			
working time	1	coll(L)	1			
driver	1	coll		1		
drive	1	coll		1		
study	1	coll?/exp	1			slowly learn?
relax	1	coll			1	
relaxed	1	coll			1	
improve English	1	coll			1	
speak	1	coll	1			
keep	1	coll(L)	1			keep going slowly
surely	1	coll		1		binominal
down	1	coll?	1			slow down
calm	1	coll?			1	word class
smooth	1	coll?			1	word class
my English	1	oth		1		
love	1	oth		1		?
lately	1	phono/coll	1			If you're slow you'll be late
lowly	1	phono			1	

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link
 L= loose/weak collocate
 ort= orthographic link

co-ord= co-ordinate
 syn= synonym
 oth= other link
 exp= experiential

Appendix 4G Word Association Responses: In

IN	Response Total	Link	Beginner	Intermediate	Advanced	Comments
out	35	co-ord	13	12	10	
inside	2	syn/p	1		1	
house	2	coll	1	1		
home	1	coll			1	
in my home	1	coll/p	1			
room	1	coll	1			
classroom	1	coll		1		
pocket	1	coll		1		
mind	1	coll		1		
inside mind	1	other/p	1			copy of other
silence	1	coll			1	polysemy
negative	1	oth		1		L1 infl
parking	1	oth	1			
Holiday Inn	1	phono	1			hotel name

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link
 L= loose/weak collocate
 ort= orthographic link

co-ord= co-ordinate
 syn= synonym
 oth= other link

Appendix 4G Word Association Responses: It

IT	Response Total	Link	Beginner	Intermediate	Advanced	Comment
that	9	co-or	5	2	2	pronoun
is	6	coll/p	2	2	2	
thing	3	syn?/co-ord			3	
the	2	oth		1	1	
-	2	oth	1		1	
this	1	co-ord	1			
he	1	co-or		1		s/he/it
they	1	co-or	1			plural
you	1	co-or		1		s/he/it/you/ (grammar)
interesting	1	coll/p	1			
my pleasure	1	coll	1			discoursal expression
was	1	coll		1		gram. coll
on	1	coll(L)			1	it is on
that's it!	1	coll			1	spoken
it's	1	coll/p	1			
be	1	coll?			1	it will be
has	1	coll		1		
a car	1	coll(L)	1			it's a car
dog	1	coll	1			“, not polite word, (Thai)
sea	1	coll?	1			ocean infl?
marble	1	coll?		1		small thing
item	1	syn?		1		
King	1	oth	1			thriller novel + film: Stephen King
film	1	oth		1		
horror story	1	oth		1		
computer	1	oth/ortho		1		acronym + Japanese PM's blunder I.T.> “it”
Info. Tech.	1	oth/ortho phono		1		
Mr. Mori	1	oth/ortho	1			
English	1	oth		1		English word, no “it” in French
blind	1	oth			1	no French “it” I have a blind spot
no idea	1	oth	1			no Japanese “it”
eat	1	phono		1		sound
at	1	phono	1			short word

Key: coll= collocate
 sup= superordinate
 phono/p= phonological link
 L= loose/weak collocate
 ort= orthographic link

co-ord= co-ordinate
 syn= synonym
 oth= other link

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