

**Word Association Responses, Lexical Development
and the Relationship Within
the
Mental Lexicon of Second Language Learners**

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Follow task 123 outlined on page 152 of McCarthy (1990 Vocabulary OUP), which is reproduced below. You do not have to use students: anyone who has an L2 but has not been brought up as a bilingual will do. Use at least four subjects and test them on their L2 (or L3/L4, etc.). Report your findings, giving the level(s) of subjects' L2 (L3, etc) and including the prompt words and responses. Follow McCarthy's list of evaluation points, adding other points to this if you wish.

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1. Introduction

Learning a language entails complex processes of learning, storing and accessing words within the mind. The mental space where this phenomena occurs has been called the mental lexicon. The mental lexicon is a metaphor for the complex organizational system of the mind that allows learners to access information in a variety of ways. Understanding the organizational system of the mental lexicon has yet to be explained, nonetheless there are available methods for exploring the organizational patterns involved. One of these methods is word association. Because learning a language may take place at different stages of an individual's physical and mental growth there are still unanswered questions that have arisen in regards to how a native language learner and a second language learner develop the mental links within their mental lexicon for the organization of native language and second language acquisition.

Through use of word association as detailed in McCarthy (1990: task 123, pg 152) this paper will explore the following three points in relation to the lexical development of Japanese learners of English: 1) the ability of word association tests to examine the mental links between words in learners' developing mental lexicon, 2) the importance of phonological similarities for lower level students and 3) the correlation between the results from a word association test with the characteristic types of word association patterns discussed in McCarthy 3.2 (1990: 34-45). It will be argued that while lexical development within the mental lexicon is difficult to delineate due to overlap of organizational categories, the patterns of syntactic, semantic and conceptual relations between learned words is apparent within the retrieval process for word association and

that additionally, context may play a vital role in how words are construed along the links within the mental lexicon.

The first section of this paper will discuss the literature associated with word association and the organizational categories within the mental lexicon including paradigmatic and syntagmatic principles and the patterns of coordination, collocation, hyponymy and synonymy. I will also briefly discuss orthographic and phonological links, encyclopaedic knowledge and fixed expressions. The second section of the paper will discuss the results of a word association test and focus on the three evaluation points, listed previously, as well as suggest practical uses of word association for teachers in the classroom.

2. Organizational Patterns Within The Mental Lexicon

2.1 Word Association

While native (L1) and second (L2) language learners are both able to organize the mental lexicon along similar principles of form and meaning research suggests that the degree to which the L2 can organize the mental lexicon is limited by the processes of comprehension and production (Channell 1988 cited in McCarthy, 1990: 34). Word association evidence seems to demonstrate that regardless of the various words chosen as responses to stimulus words on word association tests, the ways in which individuals choose words follows consistent patterns (McCarthy, 1990: 39). This consistency is evident for both L1 and L2. While it appears clear that word association tests are able to indicate that words are organized into semantically related families within the mind such tests should not be concluded to mirror the retrieval process (McCarthy, 1990: 39).

Studies on the semantic organization of the L2 mental lexicon have produced

inconclusive results as to which patterns of organization are the most predominant. Maera (1984, cited in Swan, 1997: 174) states that while L2 lexicons involve networks of associations, the second-language associative links may be less firmly constructed than that of the L1 links. However, other research studies (Wolter, 2001) have argued that the lexical development within the mental lexicon of the L1 and L2 is more structurally similar.

2.1.1 Structural Semantics

For speakers of both L1 and L2 languages the development and acquisition of words involves accessing organization within the mental lexicon that clearly encompasses processes of association shaped predominantly by structural semantic principles and to a lesser degree by orthographic and phonological patterns and encyclopaedic knowledge. A structural semantic approach to word meaning follows the basic principle that words do not exist in isolation (Carter, 1998: 19). Words are clearly organized structurally through the sense relations with other words. Hunston, Francis and Manning (1997, 209, cited in Carter, 1998: 63) point out that words can be described in terms of patterns and words that share patterns share meaning. Words can be classified through: coordination, collocation, hyponymy and synonymy. It is apparently through these features that the mind is able to organize the words within the mental lexicon for input, storage, and retrieval. Aichison states that, “human mental dictionaries cannot be organized solely on the basis of sounds or spelling. Meaning must be taken into consideration...” (2003: 11).

2.1.2 Syntagmatic and Paradigmatic Principles

The interrelation of words within language can be analyzed by beginning with two basic principles or classes of word association: syntagmatic (chain) and paradigmatic (choice) (Coulthard et al, 2006: 27). The syntagmatic and paradigmatic principles operate as part of grammatical and lexical choice. Syntagmatic is a horizontal textual relationship that can be analyzed by what comes before or after a chosen word. For instance, the syntactic word associations with the stimulus word *TV* could involve such responses as *program*, *station* and *listing*. The syntagmatic responses to the left or right of the word would allow for a sequential relationship and the construction of a grammatical sequence (Carter, 1998:198). Paradigmatic refers to words that might have been chosen instead on a vertical axis and are of the same grammatical class. For example, the stimulus word *coffee* could produce responses that include *tea*, *milk* and *sake*. Syntactic patterns include collocation, while paradigmatic patterns include coordination, hyponymy and synonymy. In addition, through various studies, such as the Birkbeck Vocabulary Project, research has indicated that L1's have greater paradigmatic responses with L2's having stronger syntagmatic responses. Research studies, (Miron and Wolfe, 1964; Lambert, 1972; Meara, 1978 cited in Zareva, 2007: 124) have suggested that L1's tend to demonstrate steady patterns of associative organization in regards to paradigmatic-syntagmatic patterns, while L2 research has found that learners fail to develop the same level of stability in their lexical connections.

2.1.3 Coordination

Coordination involves words, also known as coordinates, or co-hyponyms, which have a tendency to cluster together on a similar level of detail called a coordinate. Examples of

coordinates could include *cashew* and *walnut*. Coordination also includes opposites or antonymy. Antonymy can be further divided into four categories: complementarity, gradable antonyms, converses and mutual incompatibles. Complementarity involves antonyms that cannot be graded. The presence of one excludes the other. An example of complementarity would be *lost-found*. Gradable antonyms refer to words that can be graded in reference to one another. Examples include, *obese, fat, overweight, muscular, toned, average, thin, and skinny*. Converses involve lexical relations that contain an interdependence of meaning via logical reciprocity. Examples include *physical/mental*. In addition, converses contrast with complementarity (Carter, 1998: 20). Incompatibility involves words that co-occur in relation to the same topic. For instance, *morning* excludes the possibility of it being afternoon or evening. Markedness is also a characteristic of antonyms and is often seen within pairs of words, with one word acting as a neutral or unmarked element (Coulthard et al, 2000: 26). An example of this would be *old*, in the sentence, ‘How *old* are you?’ Speakers would not say, ‘How *young* are you?’

2.1.4 Collocation

Collocation refers to groups of words that frequently appear together within a language. “Knowledge of collocation is knowledge of what words are most likely to occur together (McCarthy, 1990: 14).” These patterns can be divided into two categories: grammatical, also known as colligation, and lexical, also known as content words.

Grammatical collocation is the result of syntactic dependencies. Significantly less information about context is provided by grammatical collocation than by lexical collocation (Coulthard et al., 2000: 80). Additionally, Ellis states that "...word sequences have characteristic structures all of their own, and the abstraction of these regularities is the acquisition of grammar (1997: 130)." Examples of grammatical collocation could include following clauses, preceding modals and prepositional choice as in the following samples of: *I thought about, you should* and *go to*.

Lexical collocation is the consequence of certain lexical items co-occurring due to linguistic context (Carter, 1998: 51). These patterns are predictable with particular words (Coulthard et al., 2000: 77). Carter states that:

...it is commonly assumed that using words entails a creative deployment of the resources of the language, particularly in the selection of items from our lexical store; but many lexical items are either themselves patterns or form part of patterns which are quite fixed and stable and which are used routinely in relatively predictable situations (1998: 76).

For example, according to the Bank of English the word *computer* has a high frequency to collocate with: *technology, science* and *screen*.

Collocation also illustrates the open choice principle and the idiom principle as proposed by Sinclair (1987b, 1991, cited in Carter, 1998: 64). The open choice principle states that there is natural variation within language (Carter, 1998: 65). The idiom principle states that there are constraints upon the ways in which words can combine with one another (Coulthard et al., 2000: 81). Carter (1998: 65) says that:

“the main characteristics of language lie between these two principles along clines of varying degrees of fixity and patterns because not all ‘open choices’ are open and not all ‘idioms’ are...immutably fixed.”

From these principles it seems clear that one of the main features of collocation is the demonstration of patterns within language. Rather than language being produced word-by-word it is produced and comprehended in chunks or patterned strings consisting of several words. Grammatical and lexical collocation clearly creates patterned language that allows for the processing of language at greater comprehension because of the predictability of chunks and the accessibility of units of language, rather than pieces of language (Coulthard et al., 2000: 81).

2.1.5 Hyponymy

Hyponymy, or superordination, is a hierarchical relationship of inclusion through the construction and organization of taxonomies. Lexical relations of inclusion within hyponymy include superordinate terms and subordinate terms. For example, using *media* as the superordinate the following items would be subordinate: *TV*, *newspaper*, and *magazines*. Further, *TV* would be the hyponymy of *media*, while *newspaper* and *magazines* would be co-hyponyms. *TV* could also serve as superordinate to other hyponyms such as *news* and *entertainment*.

2.1.6 Synonymy

Synonymy is the relation of sameness between lexical items. While no two words may be exactly the same as one another, words can have a meaning relationship, called loose synonymy, and appear synonymous within contexts (Coulthard et al, 2000: 24). For

instance, *watch/see*, *begin/start*, and *eat/chew* could be synonymous for one another within given contexts.

2.1.7 Orthographic and Phonological Patterns

Orthographic and phonological organizational patterns involve the written structure and the sound structure of words, rather than the semantic associations. Aitchison (2003: 138) describes a pattern called the ‘bathtub effect’ in which individuals remember the beginnings and endings of words better than the middle of words. This demonstrates the importance of the general shape of a word. An example of this could pattern could include *c_____ate* as in *calculate*, *communicate*, and *confiscate*. In addition, just as words that are spelled similarly are close to one another within a dictionary, words of similar sounds may be close together within the mental lexicon, even if not spatially. Aitchison states that, “a natural clumping principle in the mental lexicon therefore replaces the arbitrary alphabetical system of a printed lexicon (Aitchison, 2006: 145).” McCarthy also points out that L2 learners may perceive words equally in terms of their orthographic and phonological shapes (1990: 35). For example, silent k words may have orthographic patterns for organization, such as *knife*, *knock*, and *knew*.

2.1.8 Encyclopaedic Knowledge

Language use involves not only the grammatical and lexical knowledge within language systems, but also practical knowledge of the world. McCarthy (1990: 40-41) states that native speakers can understand beyond the co-ordinates, collocates, and superordinates, and any synonyms because words are “related by an intricate series of links to an

encyclopaedia of world knowledge” that accumulates within an individual’s life. Fromkin and Rodman state, “a word or phrase not only has a linguistic denotative meaning but also has a connotative meaning, reflecting attitudes, values, judgements and so on (1988: 305 cited in Coulthard et al, 2000: 41)” It seems apparent that such connotative associations with words develop in part through encyclopaedic knowledge of the world and any given word’s role, or contextual usage, in the world. For example, with the word *exercise*, encyclopaedic knowledge would allow an individual to understand that this word relates to physical exertion, health and possibly diet. Further, encyclopaedic knowledge would enable an individual to make a decision based on information outside the grammatical structures of the word as to whether this activity would be of a positive or negative nature.

2.1.9 Fixed Expressions

Fixed expressions, or multi-word items, are “any combination of orthographic words which function as a single item (Coulthard et al., 2000: 63).” Carter defines fixed expressions as being fixed collocations, being of generally more than a single word and being semantically opaque (1998: 66). Types of fixed expressions can include: idioms, proverbs, stock phrases, catchphrases, allusions/quotations, idiomatic similes and discursals expressions. Examples of idioms, idiomatic simile and discursals expressions could include *date night*, *solid as a rock* and *it’s about time*. In addition, fixed expressions suggest that the production of language is a process of piecing together prefabricated units appropriate to given contexts and that “lexical acquisition may involve the learning of complete collocational chunks of language (Becker, 1975 cited in

Carter, 1998: 66).” The function of such fixed expressions would appear to be for the maintenance and stabilization within communication and the allowance for construction of larger grammatical units from their base for speech that is more dynamic, both externally and internally (Carter, 1998:66).

3. Discussion and Results

3.1 Word Association Test

3.1.1 Methodology and Participants

Following the task of 123 from McCarthy’s Vocabulary (1990:152) eight stimulus words were chosen for L2 learners of English as specified by the following guide-lines:

- One grammatical/function word
- One or two items from the everyday environment
- Uncommon or low frequency word
- A mix of word-classes

The following words were selected as prompt words: *In, Play, Study, City, Train, To, Funny* and *Big*. See table 1 below for list of prompt words and reasons. The word association test was given verbally to low-level Japanese learners of English. The study included 50 female Japanese 3rd year junior high school students, with participants in the age range of 14-15 years old. Students were instructed to listen to the word and then write their first response as part of a class activity. The word activity was used instead of test as a means of focusing students on the task, rather than focusing on their answers being

right or wrong, as suggested by Wright (2001), who used quiz. After the test, a follow-up questionnaire was administered. Due to the low levels of the participants reasons for their grammatical and lexical choices were very limited. I had hoped that the follow-up questionnaire would have been more beneficial. However, students were restricted to explaining how they memorized words best by writing: speaking, writing, reading or listening.

Prompt Word	Reason
In	Common preposition. Students should have connections to it in daily life. May have contextual associations to school environment: in class, in school.
Play	Common verb. Students should have mental links to play in their daily life. May have contextual associations to school life: play sports, play games.
Study	Common verb, less common for EFL as a noun. Students should have mental links to study in their daily life. May have contextual associations to school environment: study English, study Japanese.
City	A little less common noun in EFL classrooms, than country. Students should have encyclopaedic connections. May have contextual associations to life: Kobe, hometown.
Train	Common noun, but also a verb. Students should have connections to it their daily life. May have contextual associations through encyclopaedic knowledge: JR, station.
To	Common preposition and part of infinitive structures. Students should have connections to its usage. May have contextual associations to school life: to school, to study.
Funny	Less common adjective for EFL students. Based on my own practical experience

	working with L2 funny has often been used to mean fun, not humorous. Connections are not expected to be as strong as other prompt words. Students should still have contextual associations to its use: funny man, funny picture. May use it incorrectly.
Big	Common adjective. Students should have associations with items in daily life. May have contextual associations to school life or possibly encyclopaedic knowledge: big mountain, big school.

Table 1: Prompt Words and Reasons

Participant responses were first classified into areas of coordination, collocation, hyponymy, synonymy, phonological patterns, encyclopaedic knowledge, fixed expressions and incompatibles. Responses consisting of more than one word were categorized as fixed expressions and responses that lacked sufficient compatibility with prompt words were listed as incompatible. Next, responses were classified as being either paradigmatic, syntagmatic or other. Responses that were phonological, encyclopaedic or consisting of fixed expressions were categorized as other for this percentage. Finally, participant responses were classified as being of either a similar or different word class as the prompt word.

3.2 McCarthy's Evaluation Points

3.2.1 Word Association Tests and the Learners Lexical Development

Does such a word-association test tell you anything about how your learners are making mental links between words they have learnt?

The process of organizing new vocabulary within the mental lexicon clearly requires efforts of mental contextualization. The mental lexicon is in constant motion as it

integrates new input with previous knowledge and associations (McCarthy, 1990: 42). Undoubtedly, lexical development within the mental lexicon is influenced by “the increasing perception of syntactic, semantic and conceptual relations between words (Carter, 1998: 190).” Based upon the research of previous L2 word association it would be expected that syntagmatic responses would appear as the predominant response pattern within the collected data (Coulthard et al, 2000: 23). Students clearly showed predominant syntagmatic patterns of response to 90% of the prompt words, reflecting the findings of previous studies. Further patterns of response included a 57% response pattern of collocation followed by 20% response pattern of coordination. Additionally, encyclopaedic knowledge accounted for 10%, fixed expression for 9%, incompatibles for 9% and hyponymy at .25%, synonymy at .05% and synonymy at .05%. See table 2 and 3 below.

Pattern	Total % of Responses
Collocation	58%
Coordination	20%
Hyponymy	.25%
Synonymy	.05%
Phonological	.5%
Encyclopaedic Knowledge	10%
Fixed Expression	9%
Incompatible	9%

Table 2: Overall Percentages

of Patterns

Prompt Word	Paradigmatic	Syntagmatic	Other
In	36%	10%	54%
Play	20%	60%	22%
Study	6%	94%	0%
City	20%	40%	40%
Train	28%	44%	28%
To	28%	54%	18%
Funny	14%	82%	4%
Big	18%	78%	4%

Table 3: Paradigmatic and Syntagmatic Responses by Percentage. Highest percentage response in bold. Other=Encyclopaedic Knowledge, Fixed Expressions And Incompatibles.

The results of this study appear to indicate that context does play an important role within the mental links of the organizational patterns within the mental lexicon. Melka states:

it is... clear that context greatly aids comprehension. Linguistic context... facilitates understanding of a word...extra-linguistic context, including use of situations...also helps better understanding,...(1997: 95).

The highest collocation within the prompt responses was for *study* with *English* at 64%. Clearly, the context of being in English class for the word association is a factor in this response. However, while semantic associative patterns can be recognizable among the types of responses, context is likely to be less apparent in most situations or responses.

Fixed expressions were also demonstrated within the response patterns of the participants to a greater degree than would be expected. For example, while participants were instructed to respond with only a one-word response, 50% of the prompt words elicited some form of fixed expression. The prompt word *in* triggered the highest rate of fixed expressions at 38% with such responses as: *my house, my room* and *the park*. *Play* elicited the second highest rate for fixed expressions at 20% with such responses of: *the piano* and *the guitar*. *To* triggered 12% of the fixed expression responses with answers such as: *go to school, study English* and *the station*. *City* received 2% of fixed expression responses with: *of Tokyo*. See table 4 below.

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expressions	Incompatible
In	Class, Park	Out, On				Kobe, The world	Kobe, The world	The Japan
Play	Tennis, Soccer	Work, Read	Do				The piano, The guitar	
Study	English, Japanese	Write, Run						
City	Is, Beautiful	Town,				Kobe, Umeda		
Train	Fast, Station	Bus, Car			Chu chu train	Hankyu, JR		
To	You, School	From		For			Reading, The station	
Funny	TV, Girl	Interesting, Happy						Bad-minton, Shopping
Big	Dog, Mountain	Small			Pig			

Table 4: Sample of Typical Responses For Japanese Students

Responses of fixed expression seem to support the evidence on second language acquisition that suggests:

“learners acquire language in set phrases or routines. Work on second language acquisition suggests that learners acquire fluency sooner and more effectively when they learn to produce and process language in chunks, as formulae or routines (Coulthard et al, 2000: 82).”

In addition, this evidence would also seem to suggest that words are stored in relation to their syntagmatic and paradigmatic associations. It is likely that the collocational bonds were strong enough between words within the fixed expression that the participants treated the response words as a single item within the organization mental lexicon. Sinclair points out that “...a language user has available to him or her a large number of semi-preconstructed phrases that constitute single choices, even though they might appear to be analysable into segments (cited in Ellis, 1997: 128).”

3.2.2 Phonological Similarities for Lower Level Students

At lower levels, are phonological similarities playing an important role?

Phonological responses did not appear to play a significant role in this group of L2 as would be expected from previous research studies (McCarthy, 1990: 40). Only two phonological responses occurred within the response patterns of these Japanese learners: *big/pig* and *train/chu chu train*. Research in this area has stated that for both L1 and L2 the general shape of a word is important “in terms of matching input to stored patterns and in retrieving specific items from stored templates (McCarthy, 1990: 36).” However,

due to the prevalent nature of English words used throughout Japanese culture, and the Japanese language, phonological patterns of English use may have been absorbed at earlier ages of the participants overall lexical development within their native language.

McCarthy states that:

...informal inputs...[of] vocabulary may be acquired almost unconsciously. In the case of English, this may be in the form of radio and television, films, pop music, internationally marketed commercial products, and the international use of languages like English...Little is known about precisely how much vocabulary is absorbed and acquired in this way, but all language teachers are familiar with groups of 'beginners' who already seem to have some vocabulary...(1990: 37).

In addition, context, again, may play an important role upon phonological word association patterns and the overall types of patterns involved for vocabulary storage and retrieval. Nagy (1997: 69) states that, "...people pick up much of their vocabulary knowledge from context, apart from explicit instruction." In this case, context could be construed as the English words and phrases that are accessible within Japanese culture through the various forms of marketing that utilize English.

3.2.3 Word Association Results and Characteristic Types of McCarthy 3.2

Do the results bear out the characteristics types of response discussed in 3.2?

Research within the literature posits that L1 speakers respond predominantly with paradigmatic responses, while L2 learners respond predominantly with syntagmatic responses to word association tests. In addition, studies have found that word association generally elicits response words that are the same word class as the prompt word for adults(Aichison, 1997: 85). Based on the word association evidence of this paper's study

the results for the L2 word association correlate with the findings in McCarthy 3.2. Table 5 below shows the overall percentage for each type of classification. McCarthy states that although the mind must organize words in some way, it does not necessarily organize the mental lexicon of a second language in the same way as a first language (Channell, 1988 cited in McCarthy 1990: 34). The predominant pattern of response to prompt words elicited words of a different word class than that of the prompt word. See table 6 below for a list of percentages for each prompt word and response word. As stated earlier, collocation accounted for the highest word association in overall responses as would be expected for L2, indicating that children and L2 may have similar associative links. This would seem to account for the high frequency of differing word class responses. For example, additional collocation responses included *city* with *is* at 26% and *play* with *tennis* at 22%. Additionally, responses of coordination correlated with the findings in McCarthy 3.2. Coordination, as also stated previously, was the second highest word response pattern. For example, the strongest coordination was for prompt words *to*, which elicited *from* at 24% and *in* which elicited *out* at 24%. Fixed expressions ranked as the highest for the prompt word one word, *in*, with responses such as: *the park*, *the world*, and *my room*. Additionally, encyclopaedic knowledge ranked as the second highest for one prompt word, *city*, with responses such as: *Kobe*, *Amagasaki*, and *Sanda*. Hyponymy and synonymy were the least frequent response patterns, also correlating with the finding's in McCarthy 3.2. For a complete list of word association responses see Appendix 3.

Prompt Word	In	Play	Study	City	Train	To	Funny	Big
Collocation	10%	60%	94%	40%	42%	54%	82%	78%
Coordination	36%	16%	6%	20%	28%	24%	14%	18%
Hyponymy		2%						
Synonymy						4%		
Phonological					2%			2%
Encyclopaedic Knowledge	16%			38%	26%	4%		2%
Fixed Expression	38%	22%		2%		12%		
Incompatible					2%	2%	4%	

Table 5: Japanese Speakers Word Association Response by Percentage.
Highest response in bold.

Prompt Word	Word Class	Same word as Prompt	Different word class from Prompt					
			Noun	Verb	Adj.	Adverb	Prep.	Grammatical Collocation/ Fixed Expression
In	Preposition	NO	26%	14%			38%	36%
Play	Verb/ Noun	NO	64%	14%	4%			22%
Study	Verb/ Noun	NO	90%	6%	4%			
City	Noun	YES	70%	26%	2%			2%
Train	Noun/ Verb	YES	60%	24%	14%			2%
To	Preposition	NO	24%	34%			28%	12%
Funny	Adjective	NO	78%	6%	16%			
Big	Adjective	NO	82%	18%				

TOTAL			61%	16%	6%		8%	9%

Table 6: Similarities and Differences in Word Class by Percentage

3.3 Limitations of Word Association

Word Association may be limited by the interpretation of the answers. Aichison (2003: 85) lists three areas that are problematic in detailing the mental lexicon from word association, regardless of the vast information available from word association research. First, immediately thinking up only one word may not reflect typical speech processes of everyday life. Second, results can be modified by presenting words in isolation, rather than as part of group. Third, word association tests cannot detail the probable structure within the human mind, as links between words are numerous and participants are limited to only one-word answers. Additionally, in evaluating the data it is not often clear which meaning of a word a participant is implying. Some words could be evaluated in regards to collocation or they could be evaluated in regards to encyclopaedic knowledge, phonological patterns or fixed expression. For instance, students replied to the word *city* with *Kobe*. *Kobe* is a subordinate of *city*. However, *Kobe* is also the name of the city they live in and therefore shows encyclopaedic knowledge of the world that they are a part of. Additionally, students also responded to *big* with *bag*, this could be analyzed as collocation or a phonological response.

4. Furthering Lexical Development through Teaching

As teachers our goal is to aid learners in discovering new patterns within language, as well as discovering new patterns within their own minds in preparation for discourse outside the classroom. In this regards word association is clearly an invaluable classroom aid in organizing levels of detail for classroom instruction, evaluating the mental links being made within students written and spoken responses and in enabling teachers to discover new ways to present lexis as exciting and challenging. Laufer states that, "...lexis is now recognized as central to any language acquisition process, native or non-native (1997: 140). Additionally, Carter points out that applied investigation needs to be taken further involving "vocabulary in language teaching and the description of contextual associations of vocabulary (1998: 31)." In agreement with both of these points I would suggest that word association be employed as a means of developing a holistic approach to language learning and language teaching.

A holistic approach to language teaching should incorporate a balance of lexis and grammar. Melka states that, "The idea of familiarity or degrees of knowledge could be considered as a measurement concept (1997: 85). Giving students opportunities within a classroom environment to make connections between words through activities that elicit, and strengthen, other topic-related words teachers can provide students with the contexts they will most likely encounter outside the classroom. A maturation process of word association through degrees of knowledge should be utilized by the use of graded patterns in conjunction with grammar as a means of moving students from the exposure and input of words to the production and comprehension of words. Through this students would be introduced to words in a given contextual environment and then allowed to choose from

words in their own mind during discussion and conversation, preparing them for life outside the classroom. To illustrate, teachers could first provide students with grammatical patterns on the whiteboard to answer a series of topic-related questions, but have the students choose the necessary vocabulary for questions and answers. Afterwards, a second activity could be presented on the same topic as the first, but the teacher now provides additional vocabulary not demonstrated by the students who are now responsible for supplying the grammatical structures for their answers. Cycling through topics that gradually increase in difficulty via a repetition of vocabulary-centred to grammar-centred activities, teachers can provide students with an approach to lexis and word association that offers a holistic approach through degrees of knowledge.

5. Conclusion

The aim of this paper was to illustrate the ability of word association tests to examine the mental links between words in second language learners' developing mental lexicon. It is clear that McCarthy's findings (1990: 39) of words being organized into semantically related fields within the mental lexicon of the human mind was supported by the word association evidence of this paper's study, yet the responses for phonological links failed to correlate with the expected responses as stated in McCarthy 3.2. The overall results of this paper's word association have clearly demonstrated that the mental lexicon is highly organized in levels of detail that have overlapping features, to varying degrees, for both the L1 and L2 and that context seems to have an influence upon word association. However, what is less clear is just how detailed a map of the mental lexicon has actually been produced or can ever be produced. Aichison (2003: 85) points out that, "...if a

word's association can be changed so easily by... context, then it is possibly wrong to assume that we can ever lay down fixed and detailed pathways linking words in the mental lexicon." Regardless of whether an individual produces predominantly more syntagmatic responses or more paradigmatic responses to a stimulus word they are clearly approaching that word from contextual details that seem impossible to fully account for and individual levels of detail within their lives that also appear impossible to account for in the scope of a word association test. However, the patterns that emerge from word association can clearly be categorized by the semantic principles the mind employs to organize words for storage, access and retrieval within the mental lexicon. The mental lexicon remains a complex organizational space within the human mind where the phenomena of language occurs and has yet to be fully explained or understood.

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Appendix 1

Word Association Activity

Look at the word and then write the first word that you think of next to it.

In	
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Play	
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Study	
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City	
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Train	
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To	
----	--

Funny	
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Big	
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Appendix 2

Word Association Activity Follow-up

Name:

Nationality:

Age:

English Level:

How do you usually memorize new words:

Please rewrite your word and your reason.

In	Word: Reason:
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Play	Word: Reason:
------	--------------------------------

Study	Word: Reason:
-------	--------------------------------

City	Word: Reason:
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Train	Word: Reason:
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To	Word: Reason:
----	--------------------------------

Funny	Word: Reason:
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Big	Word: Reason:
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Appendix 3A

Word Association Responses: In

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
In	Class (1) Park (1) Box (2) Room (1)	Out (12) On (4) At (2)				Kobe (5) Japan (2) Osaka (1)	The world (1) The first (1) The park (8) The room (1) My room (3) My house (2) My home (1) The garden (1)	The Japan (1)

()=total number of responses out of 50 total.

Appendix 3B

Word Association Responses: Play

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclo-paedic Knowledge	Fixed Expression	Incompatible
Play	Tennis (11) Soccer (8) Game (3) Live (1) Basketball (1) Piano (1) Guitar (1) Sport (1) Baseball (3)	Work (1) Read (1) Run (1) Study (1) Listen (1) Stop (1) Swim (1) Look (1)	Do (1)				The piano (8) The guitar (2)	

()=total number of responses out of 50 total.

Appendix 3C

Word Association Responses: Study

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
Study	English (32) Japanese (4) Math (7) Hard (2) Music (1)	Write (1) Run (1) Sleep (1) School (1)						

()=total number of responses out of 50 total.

Appendix 3D

Word Association Responses: City

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
City	Is (13) Beautiful (1) Hall (3) Mall (1) Building (2) Buildings (2)	Town (8) House (1)				Kobe (12) Umeda (1) Amagasaki (2) Sanda (2) Takarazuka (1) Sanda (2) Toyonaka (1)	Of Tokyo (1)	

()=total number of responses out of 50 total.

Appendix 3E

Word Association Responses: Train

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
Train	Fast (7) Station (2) Goes (3) Is (5) Runs (4)	Bus (8) Car (4) Subway (2)			Chu chu train (1)		Hankyu (9) JR (3) Sanyo (1)	House (1)

()=total number of responses out of 50 total.

Appendix 3F

Word Association Responses: To

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
To	You (4) School (3) Station (1) Play (1) Go (5) Study (5) Read (1) Run (1) Talk (1) Eat (1) Inside (1) Me (1) Place (1)	From (12)		For (2)		Yukiko (1) Osaka (1)	The station (3) Study English (1) Go to School (2)	Reading (1)

()=total number of responses out of 50 total.

Appendix 3G

Word Association Responses: Funny

Prompt Word	Collocation	Co-ordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
Funny	TV (9) Girl (8) Panda (1) Snake (1) Monkey (1) Musical (1) Music (1) Boys (1) Man (2) Movie (1) Book (1) Person (1) Story (1) Is (1) Boy (1) Person (1) Party (1) Mother (1) Game (1) Things (1) Comedy (1) Cry (1)	Interesting (2) Happy (1) Bad (2) Tired (1)						Badminton (1) Shopping (1)

()=total number of responses out of 50 total.

Appendix 3H

Word Association Responses: Big

Prompt Word	Collocation	Coordinates	Hyponymy	Synonymy	Phonological	Encyclopaedic Knowledge	Fixed Expression	Incompatible
Big	Dog (6) Mountain (2) Heart (1) Elephant (6) Tree (1) Whale (1) School (1) Bird (1) Bag (2) Country (1) House (1) Town (1) Bear (2) People (1) Mirror (1) City (2) Cat (1) Home (1) Family (1) Fish (1) Animal (1)	Small (8) Tall (1)			Pig (1)			Japan (1)

()=total number of responses out of 50 total.

Appendix 4

Method of Memorization	Reading	Writing	Speaking	Listening
	22%	34%	25%	17%

Student's Preference of Method for Memorization of New Vocabulary from feedback questionaire.
Highest percentage response in bold.