

Words in the Mind: Exploring the relationship between word association and lexical development

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Abstract

Vocabulary acquisition in both L1 and L2 has long relied on the principle of associative language learning to help understand and explain the process of lexical acquisition in the mind of the language learner. To date, L2 studies in this area have however delivered somewhat contentious findings. This study seeks to revisit some of the relevant issues and gain some insight into how words are held in the mind – or, more precisely, to understand the relationship between lexical development and the process of word association (WA). To better understand the relationship between lexical semantics and the mental lexicon, this investigation explores and compares the word associations of a group of Japanese English speakers and a group of English native speakers. It attempts to understand how mental links are made between lexical items in the mental lexicon, a process commonly believed to partially support vocabulary acquisition. Initial findings support general trends in this research area, namely that the word-associations of native and foreign speakers differ in some respects. These however, do not occur to the extent that they may constitute a pattern that may distinguish native from foreign speakers. Findings further highlight the importance of lexical semantics and phonological aspects during word learning, while the importance of developing a robust methodology for the analysis of word association are briefly addressed. To conclude, implications for WA research, the mental lexicon and L2 language learning and teaching are discussed.

Key words: mental lexicon, word association, psycholinguistics, vocabulary acquisition, L2 teaching, L2 learning

1. Introduction

It is the human ability to communicate that makes social life and the formation and sustenance of a community possible. Central to the communicative process stands the use of language: it is our ability to ‘speak our minds’, and the words that carry thought to another mind, that is the core of communication. Words therefore, act as tokens or vehicles to make language between people possible, and they are the main focus of this study. Words become language when they are combined in a particular way, implying that words keep relationships. However, words fulfill and perform any number of complex functions in language, arguably at it’s most complex and least understood in the mind of the language user. This study sought to gain some insight into how words are held in the mind – or, more precisely, to understand the relationship between lexical development and the process of word association. The importance of this process for language acquisition should be clear: ‘knowing words’ is at the core of communicative competence in any language. This inquiry is therefore concerned with the relationship between *lexical semantics*, which is the systemization of the lexical structure of a language; and the *mental lexicon*, or how words are processed by the human mind (Aitchison & Lewis, 1995).

Linguistic research has traditionally made use of word association tests in order to gain some insight as to how the mental lexicon expands during language development. However, studies in L1 and L2 word association research using a certain typology – the ‘syntagmatic-paradigmatic shift’ (see paragraph 3.3 for a full discussion of this terminology) - have over the years reported a number of inconsistent and contradictory results, most recently addressed by Fitzpatrick (2007). In the light of this new evidence, and in order to further inform the given research questions, this study also attempts a brief contrastive analysis of the conventional classification methodology in the area of WA research, and the more recently proposed model by Fitzpatrick (2007), using data from both native and Japanese L2 speakers of English. In addition, this study further specifically addresses the process of making mental links during vocabulary acquisition and the role of phonological similarities. Implications for WA research in general, and L2 language learning and teaching are then drawn from the findings and further discussed.

2. Background

Linguistic research using WA tests has traditionally explored the relationship between two interacting entities - the cue word and the respondent - in order to gain an insight into the mental process of associative language learning. Fitzpatrick (2007, p. 320) provides a useful, but simultaneously challenging insight into this area, observing that although associative patterns may tell us something about the development and organization of the mental lexicon, it remains unclear as to how such patterns should be classified and interpreted. This issue encapsulates some of the difficulty that exists at interface of the relationship between lexical semantics and the development of the mental lexicon. Based on research with native English speakers, Fitzpatrick (2007, p. 320) observes that WA studies in L2 research have correspondingly employed a conventional classification system that measures the so-called 'syntagmatic-paradigmatic shift' to describe the development of a language learner's proficiency. The underlying assumptions here are that: (1) adult native speakers respond to association tasks in a homogenous manner; (2) patterns of association in L2 differ in a systemic way from those in L1; and, (3) that L2 learners will follow a course of lexical development similar to those of native speakers and young children, i.e. giving increasingly more paradigmatic responses with increasing language proficiency. This increasing perception of syntactic, semantic and conceptual relations between words is one important aspect of the lexical development that occurs during vocabulary acquisition (Carter, 1998, p. 190).

Although several studies using this conventional classification (Sökmen, 1993; Schmitt, 1998; Orita, 1999; Yoneoka, 2001; Wolter, 2002) report tentative evidence supporting such a progression in the L2 lexicon, findings remain contentious and inconsistent. Recent research by Fitzpatrick (2007), as well as Nissen and Henriksen (2006) however, challenge the conventional classification: native speaker response patterns are not homogenous, arguing against the establishment of 'native speaker norms'. In addition, she further questions the assumption that L2 patterns of association differ systemically from L1 profiles. In view of these findings, Fitzpatrick (2007) concludes that the notion of a 'syntagmatic-paradigmatic shift' is inadequate for an understanding of response behavior in L1 speakers, and calls for a reassessment of the underlying assumptions. It is from this observation that the present enquiry took its cue to extend the conventional analysis by further exploring the complex relationship between WA and lexical development in both native and L2 (Japanese) speakers of English. Using both the mentioned classification models this study employed a short word association test (WAT) to understand what happens 'in the mind' during word association. (*Note: although the classification systems or models used in the analysis of WA are not formally referred to as such in other literature, for further purposes here, they will be referred to as the 'conventional model/system' and 'Fitzpatrick's (2007) model/system').

3. Terminology

3.1 Words

Words are much more than a set of dictionary items: words exhibit complex features that have obvious relevance for both the organization of the mental lexicon and the use of WATs. Acquiring words involves combining, according to Aitchison & Lewis (1995, p.8), a number of intertwined pieces of information, among which are the following: (1) phonological structure, (2) word class, (3) inflectional forms, (4) rule-governed (i.e. productive) derivatives, and, (5) meaning. In addition, Carter (1998, p. 23) observes that words are also characterized through the *relations* they have with other words. This implies that the meaning of words are often best understood when explained in terms of the network that exist between the different senses and sub-senses of words.

Expanding further, Carter (1998, pp. 29-30) adds that words only become comprehensively known in the mental lexicon when other encyclopedic information is added: associative, stylistic, cultural and idiomatic meanings all combine to form the multidimensional nature of a word. In the mental lexicon, words also retain form (morphological structure), they take part in an arrangement (syntax), and have sound when spoken (phonological structure). This fundamental multidimensionality of words introduces the concept that words, and multi-word items, are *polysemic*, i.e. that several meanings may be represented in the same word, and could be expressed in different forms. 'Knowing' a word thus involves having the fullest range of form and meaning possible, related to a lexical item, in one's mind. For the L2 learner it requires an acquisition of a full understanding of the vast set

of relationships that the words of a language keep with each other to make the language what it is. The relationships between words can be summarized briefly as follows:

Table 1: Relations between words (based on Carter, 1998, pp. 20-22)

Synonymy	The notion that more than one linguistic form can be said to have the same conceptual or propositional meaning.
Antonymy	The notion of semantic oppositeness. The sense relations of antonyms can further be classified into: (1) complementarity: where the presence of one sense component excludes the other, e.g. <i>male-female</i> ; (2) converseness: a contrastive lexical relation where there is a measure of logical reciprocity, e.g. <i>husband-wife</i> ; (3) incompatibility: the relational contrasts between items in a semantic field, e.g. days of the week, etc. (4) antonymy: an inclusive term for the abovementioned, including gradable opposites, e.g. <i>hot-cold</i> .
Hyponymy	Refers to a relationship existing between specific and general lexical items: the meaning of the specific item is included in, and by, the meaning of the more general item. Also referred to as asymmetrical synonymy, e.g. <i>tulips</i> and <i>roses</i> are co-hyponyms.
Meronymy	Refers to a part-whole relation, such as in the case of <i>tree, branch</i> and <i>root, branch</i> and <i>root</i> being co-meronyms.

3.2 The mental lexicon

Central to this study is the concept of the mental lexicon, which psycholinguists define as the full collection of the representation of words in our minds. It is used to explain how words are stored, organized, accessed and retrieved in the brain (Aitchison, 2003; Zhang, 2009), and is generally taken to mean the mental faculty that underpins our ‘consummate linguistic agility’ (Altman, 2001). For the purpose of this inquiry however, a definition by Aitchison (2003, p. 248) seems suitable: ‘the mental lexicon is... concerned above all with links, not locations. It pays attention to cores of words, rather than peripheries, since it is impossible to say where knowledge about a word ends... frameworks are more important than details, which are filled in creatively as speech proceeds... the lexical connections in the mind are far from what we normally imagine a dictionary or lexicon to be’.

The mental lexicon then, is the collective representation of words in the mind, which draws together contextual, personal and interpersonal dimensions of meaning, and assists most fundamentally in the acquisition, retention and expression of language. Lexical development for the L2 language learner would therefore centrally involve the mental lexicon, since it is this capacity that supports and makes continued language learning possible.

3.3 Word-association and word association tests

To state it briefly, the rationale for using word association tests (WATs) in linguistics is to access the mental lexicon on the assumption that one may be able to, as Aitchison (2003, p. 85) observes: ‘...draw up a reasonably reliable *map* of the average person’s *word-web*’ (my italics). Aitchison (2003, pp. 85-6) cites a number of shortcomings with this assumption, the most serious being that WATs cannot provide a reliable model for the structure of the human lexicon. This is partly due to the fact that links between words are multifarious, and that only one word is required as a response to a cue or stimulus word. This criticism is echoed in Fitzpatrick’s (2007) observation regarding the interpretative problems in WAT research. Nevertheless, WATs have relevance for language acquisition studies, since they can provide accounts of the formal (grammatical and lexical) relations between words, the individual’s internal (psycholinguistic) knowledge, as well as sociolinguistic domains. Another criticism, raised by Meara (1984, as cited in Carter, 1998, p. 202), becomes apparent in this analysis: a WAT delivers a static and decontextualized version of a mental lexicon, whereas words and language, and by implication, the mental lexicon, are in a state of constant flux and reconstruction. Thus, WATs may need to be supplemented by information outside the psycholinguistic domain. Despite these formidable criticisms, WATs continue to be utilized as means to investigate lexical development.

Word associations have conventionally – from a functional or grammatical point of view - been divided into two main classes: *paradigmatic* and *syntagmatic* associations, supplemented by a third class, *clang* associations. This classification highlights one relevant aspect of lexical development: the increasing perception of syntactic, semantic and conceptual relations between words. A summary of the conventional classification used in the analysis of word associations is presented in Table 2 below.

Table 2: Conventional classification of word associations (adapted from Carter, 1998) * Abbreviations added.

Paradigmatic (*P)	Words from the same grammatical class as the stimulus item, thus given the word <i>dog</i> , to be followed by examples such as <i>cat, wolf, animal</i> and <i>pet</i> ; essentially means words which regularly belong to the same conceptual category, and thus includes antonyms and hyponyms.
Syntagmatic (*S)	Those words that form some sequential relationship to the stimulus word, i.e. given the word <i>dog</i> , would result in the formation of a grammatical sequence to the left or right of the word, such as: <i>bark, furry and bite</i> .
Clang (*C)	Word responses that are motivated more by their <i>phonological</i> than their semantic resemblance, e.g. <i>dog, frog, log, smog</i> .

The Fitzpatrick (2007) study provided evidence that native speakers actually do not necessarily respond to cue words in a predictable, homogeneous way, supporting the critique that the traditional analysis may fall short of adequately interpreting association patterns. It further introduced the possibility that L2 learners of English may actually present a response pattern that reflects a movement towards their own individual L1 response type preferences. The assumption that L2 responses move steadily towards native speaker ‘norms’ as proficiency increases, is thus challenged, and remains an area for further investigation. Fitzpatrick’s (2007) classification is presented in Table 3 below.

Table 3: Fitzpatrick’s model: a description (Fitzpatrick, 2007, p. 330)

Meaning-based responses (MBR)	Those determined by semantic characteristics.
Position-based responses (PBR)	Determined by syntactic and collocational characteristics.
Form-based responses (FBR)	Determined by phonological, orthographical and collocational characteristics.
Erratic responses	No apparent link between cue and response, or no response.

A full description of each category is given in Table 4. A brief observation from a comparison between the two systems: Fitzpatrick (2007) expands and defines all three classes in the conventional system and adds a fourth, while the classification of responses are clearer, increasing the chances of a more sophisticated analysis.

Table 4: Fitzpatrick’s classification of association responses (Fitzpatrick, 2007, pg. 331) (*My abbreviations)

Descriptor	Definition	Specification
Meaning based association (*MBR)	Defining synonym	x means the same as y
	Specific synonym	x can mean y in some specific contexts
	Lexical set/context related	x and y same lexical set: coordinates/meronyms/superordinates provide context
	Conceptual association	x and y have some other conceptual link
Position-based association (*PBR)	Consecutive xy collocation	y follows x directly (includes compounds)
	Consecutive yx collocation	y precedes x directly (includes compounds)

	Other collocational	y follows/precedes x in phrase with word(s) between them
Form-based association (*FBR)	Change of affix	y is x plus or minus affix
	Similar form not meaning	y looks similar to x but has not clear meaning link or is an associate of a word with a similar form to x
Erratic association (*ER)	No link/blank y has no decipherable	link to x or no response given

4. The study

4.1 Research participants

Nine native English speakers, 3 females and 6 males with an age range between 22 and 29. Nine Japanese English second language speakers, 5 females and 4 males with an age range between 25 and 51. All participants volunteered for the project and were individually tested by the examiner.

4.2 Procedures

4.2.1 The Word Association Test (WAT)

A list of eight cue words was compiled, with the aim to include a list of relatively common words that could be delivered orally by the researcher. The word list, word classification, and rationale for the choice of words are set out in Table 5, and the WAT sample sheet in Table 6.

Table 5: The WAT: Word class and word choice rationale

Cue	Word class	Rationale for choice
wash	verb / noun	A common word in everyday use; polysemic.
computer	noun	A word in everyday use by all the participants.
green	adjective / noun / verb	A polysemic word that could tap socio-cultural and linguistic meanings.
believe	verb	Perhaps a less frequently used word, slightly more difficult in conceptualization, but nevertheless postulated to be fairly well known amongst both respondent groups.
train	verb / noun	A common word in everyday use; polysemic use less common.
exciting	adjective	A fairly common word, yet postulated to be used less in spoken than in written language.
in	preposition/adjective/adverb/ prefix/noun	A polysemic, function word occurring regularly and with a variety of uses.
drive	verb / noun	A common word in everyday use; polysemic.

Table 6: The WAT sample sheet used in this study

CUE	RESPONSE	EXPLORING THE ASSOCIATION
wash		
computer		
green		
believe		
train		

exciting		
in		
drive		

4.2.2 Administration of the WAT

Due to time and schedule constraints, the Japanese speakers were interviewed individually, with the researcher writing down the responses, whereas the native speakers responded in a group, and wrote down their own responses. The procedure was orally explained as follows:

"I am conducting research to understand how people remember words and their meanings. I would like to understand your associations with certain words, or how and why you remember a particular word. For example: when someone says the word 'cup', I often immediately think of the word 'tea'. Of course every person may think, feel or imagine something different – so any word that comes to you is fine. I am now going to read you a list of words that I think you may know. Once I have said the word, please say the first word that comes to your mind. Are you ready?"

On completion of the test, and in order to explore the respondents' associations, the procedure continued with a second instruction:

"I would now like to know what was in your mind when I said each word. Please tell me what you thought, felt or imagined when I said "(cue word)".

The test was thus delivered in two phases: recording the immediate associated link, followed by a phase of enquiry. This approach sought to first *complete* the task of 'pure' lexical association in order to quickly establish which words were linked in the mind of the participant, and, once completed, that momentary link was revisited and additional information obtained to complete the associative response.

4.2.3 Method

Tables 7, 8 and 9 represent a sample analysis of two sets of responses for the cue word **"green"**. These examples illustrate the method of analysis.

Table 7: Sample responses - Japanese speakers

green	tree	In Japan we always learn the kanji for green and tree together – it is a symbol of nature.
green	relax	The mountains are green – it helps me to relax when there is beautiful scenery.

Table 8: Sample responses - Native speakers

green	life	"Green" reminds me of spring, which makes me think of new plants and life.
green	grass	Summer time, my parents' lawn.

An illustrative analysis using the two different classification systems are presented below. Scoring and analysis of the associative responses were conducted using the classification criteria presented earlier in Tables 1-4, with emphasis on the extended associative responses.

Table 9: Classification – Sample contrastive analysis of Japanese and native speakers

Responses: data sample			Conventional Classification			Fitzpatrick's classification			
	Cue	Response	Paradigmatic	Syntagmatic	Clang	Meaning Based Response	Position Based Response	Form Based Response	Erratic Response
Japanese	green	tree		*			*		
		relax	*			*			
Native	green	life	*			*			
		grass		*			*		

5. Results and discussion

5.1 Introduction

The full analysis is here preceded by a few general remarks and caveats. Although Fitzpatrick's (2007) classification system was incorporated in this study, it is beyond the scope of the investigation to compare the validity of the two classification systems. In view the similarities between them, a few observations will be included to elucidate and highlight relevant aspects. Secondly, the critique of WATs, notably their inability to provide information about the structure of the mental lexicon, and controversy surrounding their appropriate interpretation, imply that this study maintains the same limitations. A third proviso is that this investigation utilized a combination of quantitative and qualitative methods for the collection and analysis of data. Due to some practical constraints, the recording of responses for the Japanese group was done individually, whereas the English L1 speakers completed their response sheets as a group, during a singular meeting. Although this difference in the approach to the collection of responses may not be taken as a direct form of interference, one may speculate that responses may be marginally influenced by contextual variables such as these. The fourth potential criticism may be leveled against the potential bias created by the subjective judgment of the researcher during the scoring and analysis. A final limitation is that quantitative analysis did not extend beyond the summation and comparison (in percentages) of analyzed responses, mainly for two reasons: the first being the very small sample group (N=18), which makes statistical analysis less robust, and the second being the limited scope of this investigation.

5.2 Presentation, discussion and evaluation of results

The results of this study are consequently summarized below. Please refer to Tables 2, 3 and 4 for definitions of the technical terms used. Table 10 below represents the total analysis, given in rounded percentages. Paragraphs 5.2.3 and 5.2.4 present a discussion of the results.

Table 10: Contrasting analysis of results for the total group

Classification:	Total Responses	Japanese group total	Native group total	% of total (Japanese)	% of total (Native)	Responses as % of total
Meaning based	74	39	35	27.1	24	51.4
Form-based	3	1	2	0.7	1.3	2.1
Position based	66	32	34	22.2	24	45.8
Erratic response	1	0	1	0	0.7	0.7
Subtotal	144	72	72	50	50	100

Paradigmatic	34	19	15	13.2	10.4	23.6
Syntagmatic	106	52	54	36.1	37.5	73.6
Clang/phonological	4	1	3	0.7	2.1	2.8
Subtotal	144	72	72	50	50	100
TOTALS	288	144	144	100	100	100

5.2.1 WATs and making mental links

Based purely on the abovementioned quantitative classification, it is difficult to draw any definitive conclusions about how respondents made mental links during WATs. Reference to the qualitative data, however, reveals significantly more. Consider the following examples, from the Japanese respondents, for the cue word ‘green’:

Table 11: Japanese group: Example analysis for cue word ‘green’

Response	Exploring the association	Syntagmatic	Paradigmatic	Clang	Meaning Based	Position Based	Form Based	Erratic
tree	The mountains in my area are covered in green.	*				*		
relax	The mountains are green – it helps me to relax when there is beautiful scenery.		*		*			
forest	The image is common these days: green means ‘eco’, ‘clean energy’. You can hear these words every day.	*				*		

Two related issues immediately become apparent in this analysis: (1) accurate classification of a response, and, (2) the importance of exploring the association. Following the conventional analysis, both the referential responses, ‘tree’ and ‘forest’, would be classified as *syntagmatic*, i.e. as forming a sequential relationship, or collocation, with the cue word (as in ‘green tree’ and ‘green forest’). Less clear-cut, is the response ‘relax’: without exploring the association, the researcher is forced to classify it as *paradigmatic*, thus assuming that there is some conceptual class or superimposed mental category operating in the mind of the respondent that makes syntactic substitution possible, since no immediate clue presents itself. However, this can only be confirmed by exploring the association with the respondent *at that time*. Using Fitzpatrick’s (2007) model, the classification changes significantly; however, the same dilemma (of classification without further exploration) is present. In this classification, ‘tree’ and ‘forest’ can ostensibly be classified as *position-based*, i.e. making a consecutive xy collocation, whereas ‘relax’ becomes an *erratic response*, or having no decipherable link to the cue word.

When the relevant associations are explored however, the classification becomes clearer: in the case of the position-based responses, the original scoring is supported by the associative exploration, however, the erratic response becomes a meaning-based one, due to the introduction of the respondent’s conceptual clarification. Here we can see how the exploration of the associative link is crucial to the classification procedure. This could mean that even though different respondents may give a similar, or even exactly the same response, the eventual classification may change when the individual association is considered. This has serious implications for classification models, and may go some way in explaining the inconsistent and controversial findings that

have been reported.

The issue of how to interpret the data in terms of links made in the mental lexicon seems even more complex, as it should be clear from the analysis that (1) these links are highly individual or idiosyncratic (e.g. the ‘green-relax’ response); (2) are contextual (e.g. the ‘green-tree’ response), and, (3) sometimes sociolinguistic (e.g. the ‘green forest’ response). Thus, although responses can be multifariously classified, the *source* of the response that the cue word elicited may still remain elusive. This data-analysis supports Fitzpatrick’s (2007, p.328) assertion that ‘individual profiling’ (i.e., looking at individual response profiles separately, as opposed to an analysis of group responses to cue words) might prove a valuable approach to WAT research. For example, at least one respondent in the present study organized his responses thematically (in terms of music) and commented afterwards that one of the cue words triggered this approach. This kind of qualitative information, as the Fitzpatrick (2007) concludes, would certainly allow for individual differences to be explored in terms of their L1-L2 associative profiles, as well as investigations to determine individual storage and retrieval preferences, and the identification of non-linguistic variables affecting associative processes.

Although WAT’s can therefore demonstrate some of the associative processes in making links between words, it should be clear that they might be based on any number of connections (or combinations thereof) in the psycholinguistic and sociolinguistic domains of the individual mental lexicon. A WAT, supported by classifications systems such as the ones employed here, can therefore reveal information from a functional or grammatical point of view, at the semantic, syntactic and lexical level. The associative response analysis employed here, which included a supplementary interview stage, provided an additional means for obtaining data in a meaningful and accurate way. This procedure raised the stakes for analysis in view of the fact that the conventional classification system do not allow for such a step to be recorded, as data in this field was often only quantitatively treated. The data collected during the interview stage following the collection of responses made additional demands on the respondent in terms of other mental faculties such as memory, attention span, focus and so forth, which implicates the involvement of other mental functions in the associative process. These functions can equally, and simultaneously exert a determining force on *how* the linkage takes place. In support of this, Carter (1998, p. 202) mentions the effects of memory (retention, processing, retrieval), implicit versus explicit learning, and learning (and/or cognitive) strategies, while Aitchison (2003, pp. 247-8) draws attention to processing, layout and the effects of novelty. These influences are quite beyond the investigative power of a simple WAT, although the very simplicity of the test and the amount of information (qualitative and quantitative) that it yields may have very useful application in linguistic and pedagogical theory and practice.

5.2.2 The role of phonological similarities

Although none of the participants in this study can be characterized as ‘lower-level’ speakers, a few responses (only 2.8% of the total responses) were recorded as based on phonological similarities. Consider the example below:

Table 12: Native speaker group: Example analysis for cue word ‘sex’

Response	Exploring the association	Syntagmatic	Paradigmatic	Clang	Meaning Based	Position Based	Form Based	Erratic
sex	The word ‘excitement’ didn’t trigger anything specifically but the ‘x’ triggered ‘sex’.			1			1	

The assumption (Carter, 1998, p. 99) in the conventional classification is that such responses, referred to as *clang*, are usually more frequent in young children (up to age 7) and non-native speakers. Yet the occurrence of such responses (form-based, in Fitzpatrick’s

classification) in adult native and non-native speakers, have been reported, albeit in small frequencies, and with idiosyncratic patterning (Fitzpatrick, 2007; Nissen & Henriksen, 2006). Two other contrasting examples, given below, may provide further thought for discussion:

Table 13: Native speaker group: Example analysis for cue words ‘wow’ and ‘yay’

Response	Exploring the association	Syntagmatic	Paradigmatic	Clang	Meaning Based	Position Based	Form Based	Erratic
wow	The sound you make when you are excited		1		1			
yay	I say ‘yay’ when I’m excited		1		1			

Although these are strictly speaking not *clang/form-based* responses, the associative responses are revealing. For instance, using the *meaning-based* analysis, these respondents made an associative link to an expression of sound (a word). If one considers that all spoken language *is* in fact sound, one could imagine that the *sounds* of other words may easily also elicit a linked association, but it should also be conceded that (as in the two latter examples) the source from which the sound originated, may be triggered literally from anywhere in the respondent’s psycholinguistic domain. Fitzpatrick’s (2007) classification system does not specifically allow for a phonologically triggered associative response to be classified, whereas the *clang* classification in the traditional model for response analysis does not require an exploration of responses given. This means that phonologically related association responses may sometimes escape detection and/or adequate analysis, which is a shortcoming that will have to be addressed in future research.

5.2.3 Patterns in the results

With reference to Table 10, results across the conventional classification are spread as follows: syntagmatic: 73.6%; paradigmatic: 23.6%; clang: 2.8%. These results contradict general patterns reflected in some of the research (Sökmen, 1993), but supports Fitzpatrick’s (2007) findings. Participants in this sample thus predominantly favored words that formed some sequential relationship with the cue word – in contrast to the mainstream belief that advanced language users more frequently give paradigmatic responses. An analysis using Fitzpatrick’s model yields results that are spread slightly differently: meaning-based responses: 51.4%; position-based responses: 45.8%; form-based responses: 2.1%, and erratic responses: 0.7%. These results follow the same trend as Fitzpatrick’s, although comparisons should be cautiously made due to significant differences in the two enquiries, for e.g. this study used both L1 and L2 speakers of English.

One aspect deserves mention however: in both groups (native and non-native speakers), the *meaning-* and *position-based responses* are in close proximity of the 50% mark, with other categories receiving significantly less. One reason for this result might be the small size of the sample group, i.e. the relatively low response rate resulted in an impoverished statistical significance. Another explanation drawn from this could be that Fitzpatrick’s (2007) subcategories might need to be further enhanced in order to improve their discriminatory power, which would improve the classification and analysis of WA responses. In this regard, Fitzpatrick (2007, p. 145) remarks that the processing and analysis of WA data demands certain levels of accuracy and verification that need be emphasized in future applications of these classification models. An additional, and rather striking observation from the data is the variety and breadth of responses given by individuals that were mainly revealed through the enquiry and classification phase of the research. These responses gave an indication of the idiosyncratic links that occur in the mind of an individual, and may be taken as the spoken pathways to the development of the mental lexicon. Although this study and the literature reported earlier provided evidence that certain patterns exist in the WA behavior of 1L and 2L speakers, it is also evident that significant variety exists in the response patterns of both groups. While it appears that WA classification systems could, to

some extent, reveal common response patterns, some issues regarding their construct validity remain.

5.2.4. Comparing Japanese and native speakers

In the conventional classification, the following results (Table 10) were obtained for Japanese participants: syntagmatic: 36.1%; paradigmatic: 13.2%; clang: 0.7%. For native speakers: syntagmatic: 37.5%; paradigmatic: 10.4%; clang: 2.1%. Fitzpatrick's categories revealed the following for Japanese participants: meaning-based: 27.1%; position-based: 22.2%; form-based: 0.7% and erratic: 0%. Native categorizations were as follows: meaning-based: 24%; position-based: 24%; form-based: 1.3%, and erratic: 0.7%. These results show negligible differences between the two groups, thus on the whole corresponding with results and subsequent trends reported in paragraph 5.2.3. Fitzpatrick's (2007) conclusions that native speakers do not respond in homogenous ways, nor respond necessarily in predictable patterns can therefore be tentatively supported. Furthermore, preliminary indications here are that the same may be true for advanced L2 speakers of English, which is confirmed by other literature in this field (Mattheoudakis, 2003; Wolter, 2001).

5.2.5 Summary and implications for L2 teaching

Firstly, it should be clear that words are by definition relational and multidimensional in terms of meaning and use. Learners need to know that very few word meanings remain static: knowing a word also means acquiring an understanding of what is happening in the vicinity of that word, as the associative process clearly demonstrates. Pedagogical implications from this insight point to the importance of language instruction and activities that draw learners' attention to the frequency of certain words, their common use in expression, collocations, idioms, fixed expressions, different uses of the same word, and so forth. In addition, activities focusing on the facilitation of comprehension, retention and production of lexical items (such as reading for comprehension, cloze procedures and word generation tools and games, crosswords, word puzzles, and so forth) would thus benefit the development and expansion of the mental lexicon.

Secondly, the variety of responses given by this sample group attests to the idiosyncratic nature of the mental lexicon, and the infinite diversity of contextual stimuli that the lexicon draws upon in the acquisition and production of language. Learners (and teachers) of an L2 might benefit from a reminder that the mental lexicon could utilize any and all types of materials and stimuli – indeed, anything in the surrounding environment – to encourage language acquisition, and not to feel restricted to only 'traditional' learning and classroom methods and tools. The immediacy and availability of these contextual resources behooves the L2 teacher to consider that the mental lexicon will thrive on techniques and learning strategies that could engender curiosity and maintain interest, thereby assisting the memorization of words and the expansion of its word-networks.

6. Conclusion

The mental lexicon is uniquely personal, yet also a human universal. This study investigated the word associations of a group of Japanese speakers of English and a group of English native speakers to further explore the notion that WA can assist in understanding how the mental lexicon connects words in the mind of individuals. WA research operates at the complex interface of language in the mind, and although several controversies remain in this area, findings of the present study broadly supported the idea that individuals exhibit preferred or unique ways of making word associations. Thus although further investigations in this area are clearly needed, initial indications for this study are in accordance with other findings (Zhang, 2009; Fitzpatrick, 2006, 2007; Wolter, 2001) that research grounds exist to support a uniquely individual WA response pattern. This finding however, does not exclude other findings that certain trends or patterns (such as the syntagmatic-paradigmatic shift in L1-L2 comparisons) also deserve further exploration. Another finding drew attention to the importance of addressing word associations that were produced as a result of phonological stimuli. Indications are that both WA classification systems utilized in the present study may not adequately

account for these stimuli, which may need to be addressed in future research. Finally, a superficial observation drawn from the utilization of the mentioned classification systems appear to indicate that a more robust methodology and model may be needed to enhance construct validity, and by implication, the analysis of responses.

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