CHANGING ASSOCIATIONS: THE EFFECT OF DIRECT VOCABULARY INSTRUCTION ON THE WORD ASSOCIATIONS OF JAPANESE COLLEGE STUDENTS

by

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ABSTRACT

Word association tests (WATs) are generally used in second language (L2) vocabulary acquisition research studies to investigate the connections L2 learners hold in their developing mental lexicons. The problem with many of the studies to date is that the associations produced are often "extremely boring and predicable"(Meara, 1983, p. 29), because learners are usually only tested once with high frequency prompt words (PWs). This study examines the evolving mental connections of twenty Japanese college students through the multiple administration of a thirty-item WAT over a three-month period. Students were tested at the beginning of the term, after five weeks of direct vocabulary instruction, and then again after a five-week period of no direct instruction, to observe the changing associations students produced to thirty low frequency PWs taken from the Academic Word List (Coxhead, 2000). Twenty of the PWs were taught during regular class time, while ten received no attention. Half of the twenty PWs were taught using meaning-based techniques, while the other half were taught through position-based activities. Results indicate that instruction increases the number of responses elicited, and the type of response corresponds with the type of instruction (i.e. meaning-based PWs primarily elicited meaning-based responses). The findings support the general consensus that vocabulary acquisition is a gradual process and learners' connections change due to time and instruction, as words become better known.

DEDICATION

To Yumiko, my loving wife, for having faith in me from the beginning, for encouraging me to do my best until the end, and for consistently putting my studies ahead of her own interests.

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LIST OF ABBREVIATIONS

AWL	Academic Word List
EFL	English as a Foreign Language
ELT	English Language Teaching
ER	Erratic Association
ESL	English as a Second Language
FB	Form-Based Association
GSL	General Service List
L1	First Language
L2	Second Language
MB	Meaning-Based
NNS	Nonnative Speaker
NS	Native Speaker
PB	Position-Based
PW	Prompt Word
SLA	Second Language Acquisition
S-P	Syntagmatic-Paradigmatic
WAT	Word Association Test
WAT1	First Word Association Test
WAT2	Second Word Association Test
WAT3	Third Word Association Test

CHAPTER 1

INTRODUCTION AND BACKGROUND

Second language (L2) vocabulary acquisition, although still not fully understood, is no longer an overlooked part of English language teaching (ELT). Teachers who advocate a strong focus on vocabulary acquisition in the classroom should no longer need to convince others of the virtues of vocabulary instruction, like they had to thirty years ago (Richards, 1976; Meara, 1980). However, it is important to remember the views of past researchers like Hockett (1958; cited in Meara, 2009), who only fifty years ago admonished the explicit teaching of vocabulary as a trivial matter which provided no benefit to the learner until after the formal aspects of the language had been mastered. Although vocabulary acquisition now seems to have received the recognition and respect it deserves as an integral part of L2 acquisition, there are contemporary researchers who still caution against the use of direct vocabulary teaching in ELT (Nagy, 1997; Huckin & Coady, 1999). The purpose of this study was to observe how L2 learners' mental connections grew and changed over time, and to assess the effect of direct vocabulary instruction on the developing L2 mental lexicon.

The direct vocabulary teaching techniques used in this study incorporated activities that were influenced by both the *meaning* and *use* features of word knowledge (Nation, 2001, p. 27). Word associations from a group of Japanese EFL learners in a college setting were collected on three separate occasions over a three-month period, in order to glean the changes that were occurring in the learners' developing lexicons and observe the effect of direct instruction.

It is not easy to identify success in vocabulary acquisition as it is a gradual process (Meara, 1983), and learning often manifests itself quite differently depending on the individual and their preferred learning style. However, responses from word association tests (WATs) can provide valuable information about how well L2 learners know certain words and how those words are organized in the L2 mental lexicon. The associations L2 learners provide on WATs are a logical place to start in the investigation into the actual connections

learners hold in their minds. Knowing how L2 learners store and organize words during acquisition can be helpful in the development of more focused vocabulary teaching techniques, which exploit and nurture these connections.

The relevant background related to the mental lexicon, vocabulary acquisition, and word associations, is provided in Chapter 2. Chapter 3 reviews the literature concerning incidental vocabulary learning and direct vocabulary instruction with specific regard to the link between instruction and proficiency. Chapter 4 addresses the importance of building meaningful connections between words in the minds of learners, and how word associations can be used to help inform vocabulary instruction. Chapter 5 follows with a description of the methodology employed and a detailed look at the research study. The results and discussion are then presented in Chapter 6, including a look at the implications and limitations of the study. Chapter 7 concludes with a summary of the study's findings and a brief look at the future of WATs in the realm of L2 vocabulary acquisition.

CHAPTER 2

THE MENTAL LEXICON, VOCABULARY ACQUISITION, AND WORD ASSOCIATIONS

Before considering the changing associations of L2 learners and the resulting implications for vocabulary teaching, it is important to examine the interrelatedness of the mental lexicon, L2 vocabulary acquisition, and word associations.

2.1 The mental lexicon

The English language, boasting perhaps the most abundant stock of words among all the world's languages (McCrum, MacNeil, & Cran, 2002), contains anywhere from 400,000 to over 2,000,000 words (Schmitt, 2000). These estimates vary greatly, and clearly depend on how the term *word* is actually defined. Even if we accept the most conservative estimates, however, English speakers are still faced with the formidable task of organizing these words from initial acquisition and storage to retrieval and eventual production.

The mechanism responsible for handling this collection of words is traditionally known in the literature as the mental lexicon, or more plainly as the "human word-store" (Aitchison, 2003, p. ix). The mental lexicon contains information on a vast body of words, each known to varying degrees by the language user. Miller and Fellbaum (1991) suggest that the lexicon should be regarded more as a thesaurus than a dictionary as they consider synonymy to be the most important link. However, the word knowledge contained in the mental lexicon includes not only semantic information, but syntactic, phonological, and orthographic elements as well, including complex relationships with other words. Organizing these connections is no small enterprise, especially for L2 speakers and learners of English.

How newly acquired words are stored in the mental lexicon is an area that has long been of interest to linguists. Useful insights about the organization of the mental lexicon have come from studies involving specific kinds of dysfunctions,

such as those seen in aphasic individuals (Bandera, Della Sala, Laiacona, Luzzatti, & Spinnler, 1991), malapropism errors (Fay & Cutler, 1977), like those scattered throughout Shakespeare's *Much Ado About Nothing*: "Our watch, sir, have indeed *comprehended* two *auspicious* persons" (act 3, scene 5), and blends made by normal subjects (e.g. Nashville + Knoxville = Noshville; Aitchison, 2003, p. 198). The mistaken utterances observed in the previous examples give clues as to the relative location or proximity of two words, or groups of words, within the lexicon. However, since such techniques require unique test subjects or very opportune timing, in the case of catching a slip of the tongue, a simpler, more accessible technique for language researchers is the WAT. Word association data can help researchers understand how a learner's existing vocabulary is stored and offer insights into the acquisition of new words.

How one acquires new vocabulary, thereby adding to the mental lexicon, is not fully understood, yet there are numerous theories, substantial claims, and a myriad of teaching practices attempting to display their superiority (see Stahl & Fairbanks, 1986). Not long ago, vocabulary acquisition was considered the destitute stepsister of the second language acquisition (SLA) family, and was overlooked in most teaching methodologies. Richards (1976) and Meara (1980) are traditionally credited with bringing vocabulary back to the forefront and paving the way for the deluge of studies and handbooks on vocabulary acquisition today (Schmitt & McCarthy, 1997).

2.2 Vocabulary acquisition in English language teaching

Most English language teachers and materials developers would now agree that vocabulary is an essential part of every language program; learners themselves often acknowledge its importance and indicate that vocabulary acquisition is the most troublesome aspect of learning English (Meara, 1980). In many EFL settings, junior high and senior high school English classes traditionally focus on teaching grammatical structures at the expense of dedicated vocabulary instruction. As a result, the effect of grammar's primacy lingers long after the university admissions forms have been filed away. It is not until students attempt to communicate, perhaps in a university English class, a trip abroad, or a

private English school, that they realize "their vocabulary is painfully inadequate" (Feeny, 1976, p. 485). Unfortunately, there is no panacea available for acquiring L2 vocabulary, however Richards (1976, p. 84) suggests that "a major feature of a second language program should be a component of massive vocabulary expansion".

2.2.1 Incidental and direct vocabulary learning

Although researchers are not in complete agreement, it is widely acknowledged that incidental learning is responsible for the majority of L2 vocabulary acquisition after the first two or three thousand most frequent words are learned (Huckin & Coady, 1999). The term *incidental* refers to the fact that vocabulary acquisition is not the primary pedagogical concern and the vocabulary that is learned is done so as a byproduct of the main activity.

The other type of learning, often credited for the acquisition of the most common words for L2 learners, is usually referred to as *direct* or *intentional* learning. Schmitt (2000, p. 137) rightly acknowledges that "the learning of basic words cannot be left to chance, but should be taught as quickly as possible, because they open the door to further learning". Nation (2008) agrees that the first 2,000 most frequent words should be taught to learners as an important initial step in instruction. According to Nation (2001), this also includes vocabulary from the Academic Word List (AWL) (Coxhead, 1998, 2000), for those learners planning on continuing with further academic study.

Nation (2001, p. 156) notes that many researchers investigating first language (L1) vocabulary acquisition, like Nagy (1997), consider direct teaching "a waste of time". However, leaving something as important as vocabulary acquisition entirely for learners to pick up incidentally through reading or listening activities may be somewhat unsettling for EFL teachers. Clearly the meager exposure L2 learners receive to authentic text pales in comparison to the plentiful opportunities available to L1 learners (Meara, 1997; Nation, 2001). Nagy (1997) concedes that incidental learning in an L2 is more challenging than in the L1, though he maintains that incidental learning is the only way for L2 learners to develop sufficiently large vocabularies.

In promoting the use of incidental vocabulary learning, one must be careful not to discard direct methods entirely. Sökmen (1997) highlights past research (Haynes, 1993; Coady, 1993) that questions the effectiveness of vocabulary instruction that relies solely on incidental learning and recommends the need for more direct teaching methods to accompany it. Schmitt (2000) also sees the need for both types of learning and advises that they not be considered independently of one another. Direct teaching is an invaluable addition to incidental learning as it, in effect, primes learners by focusing on the same words that they will encounter while reading text, thereby leading to increased opportunities for acquisition (Nation, 2001).

The following section provides a brief history of WATs in linguistics, from the early studies to the more contemporary findings, highlighting the importance of word association data in the field of vocabulary acquisition research.

2.3 Word association tests

WATs originated in the realm of psychology, but since the 1960s have also enjoyed favor in SLA research. The WAT is popular because of its simplicity and ease of administration. It is also intriguing to laypeople because of the uncanny similarity with which individuals respond to the same stimuli. However, WATs are not simply games or "academic curiosities", they provide valuable information as to the structure of the mental lexicon and how words are stored (Meara, 2009, p. 16). The lexicon is after all, not so much the sum of its parts, but the sum of its connections (Wolter, 2001). Once the connections are identified, revealing the lexicon's underlying structure, they can ideally be exploited in vocabulary teaching and learning (Sökmen, 1993; Carter, 1998).

Word associations are usually obtained through a simple stimulus-response procedure, whereby the researcher provides a prompt word (PW) and the participant utters the first word that comes to mind. There are different incarnations involving oral-oral, oral-written, and written-written stimulus-response methods. Some WATs ask subjects to reply with the first word they think of, while others require participants to provide as many words as they can within a given time period.

In linguistics, early WATs were primarily used to gather responses from large numbers of native English speakers (NSs) to large numbers of PWs, in an effort to establish associative norms (Palmero & Jenkins, 1964; Deese, 1965; Postman & Keppel, 1970). These norms indicated that NSs responded rather homogeneously to the same stimuli, and as such were thought to share similarly structured lexicons. Researchers found that NSs tended to give responses from the same word class as the stimuli, often synonyms, antonyms, or coordinates (i.e. paradigmatic associations) (Meara, 1983).

2.3.1 Categorizing word association responses

Early WAT studies institutionalized a trinity of response classifications: syntagmatic, paradigmatic, and clang associations. Syntagmatic associations were identified if the response formed a syntactical string with the PW, meaning both words were from different grammatical form classes (e.g. *ball* → *catch*; *run* → *fast*; *paper* → *edit*). Paradigmatic associations were recognized if the response and PW were from the same form class (e.g. *bus* → *train*; *black* → *white*; *house* → *apartment*). Clang associations were considered to be void of any clear meaningful link, and were based on similarities in phonology or orthography (e.g. *phone* → *foam*; *knife* → *knight*; *acquire* → *choir*).

Early studies into the responses of NS children on WATs (Ervin, 1961; Palmero, 1971; Emerson & Gekoski, 1976) found that as children aged, they produced more paradigmatic responses, and less syntagmatic and clang associations. This belief was most commonly referred to as the *syntagmatic-paradigmatic* (S-P) *shift*, and it effectively placed higher value on paradigmatic associations, holding them up as evidence of increasing proficiency. When these findings were imported to SLA, it led some researchers (e.g. Politzer, 1978) to believe that as L2 learners' proficiency levels increased they typically provided more paradigmatic responses, whereas weaker learners tended to produce more clang or syntagmatic associations. The extension of the S-P shift to nonnative speakers (NNSs) was quite logical as both NNSs and NS children are in the process of learning the language. However, it was rather hasty to combine these two disparate groups and suggest that as NNSs gain proficiency, they move toward

more native-like responses (Zareva, 2007). What is native-like after all? This commonly used term will be examined further in Chapter 4.

Although the S-P shift failed to take account of NSs who preferred giving syntagmatic responses on WATs (Nissen & Henriksen, 2006), there was wide support for the hypothesis, and so it lasted, unchallenged, for decades (Wolter, 2001). Wolter (2001, p. 63) feels the S-P shift would be better described as a "shift from semantically meaningless responses to semantically meaningful responses". Recent studies have also questioned whether a division between L1 and L2 lexicons is actually so prominent, based on the discovery that NSs are not so homogeneous after all (Nissen & Henriksen, 2006; Fitzpatrick, 2007). In addition, the use of lesser-known PWs revealed that NS and NNS associations were similar in the proportions of paradigmatic, syntagmatic, and clang responses produced (Wolter, 2001; Fitzpatrick, 2006; Zareva, 2007). This seems to indicate that the actual organization of the mental lexicons for NSs and NNSs may not in fact be that different. It appears that various factors, like the "depth of word knowledge" (Wolter, 2001) and "word familiarity" (Zareva, 2007), greatly influence both NS and NNS associations. Wolter (2006) contends that the most important difference between NSs and NNSs lies in the syntagmatic connections (e.g. collocations) rather than paradigmatic, as the former requires significant lexical restructuring.

Some researchers were not satisfied with the rigid distinction between syntagmatic and paradigmatic associations, as many responses which share the same word class as the PW, can be related sequentially as well (e.g. *cats* → *dogs*; *mountain* → *bike*; *school* → *graduation*). This led Emerson and Gekoski (1976) to divide paradigmatic responses into either "Interactive" (i.e. same word class but related sequentially) or "Categorical" (i.e. same word class with no sequential link). Bandera et al. (1991) reclassified paradigmatic associations as "hierarchical categorical relations", and syntagmatic associations as "propositional relations", which included responses that shared the same word class as the PW yet were related sequentially. To date, however, Fitzpatrick's (2006) more detailed word association response categories, based on Nation's

(2001, p. 27) word knowledge criteria, are the most comprehensive. In place of paradigmatic and syntagmatic, Fitzpatrick (2006) proposes *meaning-based*, containing six subcategories, and *position-based* associations, with five subcategories, respectively. Clang responses fall under *form-based* associations, divided into four subcategories, and unclassifiable responses are placed into one of two subcategories under *erratic* associations. The complete description of the categories and subcategories are listed in Appendix I.

Word associations, embodying the connections that learners hold in their minds, are an important part of word knowledge (Richards, 1976; Nation, 1990), and as such, play an important role in vocabulary acquisition. In addition to the valuable input they provide, word associations can also constitute output useful for the investigation into how well learners know specific words and how learners' word knowledge changes over time. As this research study used direct vocabulary instruction to introduce twenty unfamiliar words to a group of Japanese L2 learners, Chapter 3 examines the two most prominent methods of vocabulary instruction: direct instruction and incidental learning.

CHAPTER 3

INCIDENTAL LEARNING AND DIRECT INSTRUCTION

Chapter 2 discussed the idea that vocabulary can be acquired intentionally, through direct instruction, or incidentally as a byproduct of another activity, such as reading, writing, listening, or speaking. Research into L2 vocabulary acquisition often focuses on the disparity between these two types of learning and, continuing the tradition, this chapter will present a brief overview of each method, highlighting their respective advantages and disadvantages.

3.1 Incidental vocabulary learning

Incidental vocabulary learning is the process by which NSs acquire a vast amount of words in a relatively short amount of time. Some specialized vocabulary (e.g. scientific nomenclature, business terminology, etc.) may need to be taught directly, but the majority of words are acquired incidentally during exposure to comprehensible input through reading (Krashen, 1989). Many researchers (e.g. Jenkins, Matlock, & Slocum, 1989; Nagy, 1997) feel that incidental learning is much more practical than teaching a large number of words directly through instruction. Huckin & Coady (1999, p. 182) list three benefits incidental learning has over direct instruction: 1) it is contextualized; 2) it is pedagogically efficient; 3) it is individualized and learner-based. This means that incidental learning tasks can be developed which incorporate authentic texts that are relevant to learners and help them acquire new vocabulary, while also developing reading skills.

In reviewing the effect of task on incidental vocabulary learning, Laufer and Hulstijn (2001) found that the most successful tasks were those that required learners to process new vocabulary items on a deeper level than other tasks. Based on their findings, they advocate 'task quality' over 'quantity of exposure', for incidental learning situations. Their results seem to promote well-designed incidental learning tasks over direct learning methods, as the former involve deeper processing.

Although incidental learning may be ideal in certain educational contexts, it is not always possible for vocabulary acquisition in other venues. In an EFL environment, for example, where time is often limited to perhaps one ninety-minute class a week and opportunities for L2 use outside the classroom are rare, the reliance on incidental learning must be reexamined as direct learning may provide the best chance for L2 vocabulary acquisition (Schmitt, 2000). Huckin and Coady (1999, p. 189) identify seven problems associated with incidental learning, which they sum up in one sentence: "Guessing from context has serious limitations." They maintain that guessing is imperfect and slow, as it is unable to handle tricky lexical items (including multi-word items), the context needs to be clear, students need to employ effective reading strategies, and it often does not lead to acquisition. These problems seem to support a more direct focus on vocabulary instruction.

3.2 Direct vocabulary instruction

Direct vocabulary instruction is concerned with the deliberate teaching of vocabulary. The term 'instruction' implies that the teacher directs the vocabulary learning, which is often the case, but there are other individualized techniques for direct learning. A popular vocabulary learning strategy for many L2 learners is the memorization of bilingual word lists (Schmitt, 2000). This strategy is considered quite shallow, as it "assumes that vocabulary items are discrete, and ignores the networks of semantic relations that exist between words" (Meara, 2009, p. 18). Despite this limitation, however, rote memorization has been shown to be effective for some learners (O'Malley & Chamot, 1990). Other decontextualized learning methods have also proven to be popular with students (Qian, 1996; Paribakht & Wesche, 1997), including the preference for studying translation equivalents over deciphering meaning from context (Prince, 1996).

A popular, and much-researched, direct vocabulary retention technique is the Keyword Method (Atkinson, 1975), which requires deeper processing than rote memorization or repeated note taking (Schmitt, 2000). This simple mnemonic technique requires an intermediary L1 word (i.e. the keyword) which sounds like the new L2 word. The learner must then conjure up an image of the keyword

and the new L2 word together. For example, if an English speaker wants to learn the Japanese word for water, 'mizu' (*mee-zoo*), they may choose the keyword 'zoo' and the image of a watering hole at a zoo.

The keyword method has been proven to increase learning speed and retention of second language vocabulary (Wang, Thomas, & Ouellette, 1992) and numerous experiments have shown the technique to be superior to other vocabulary learning techniques (Nation, 2001). However, Meara (1980) cautions against the blind acceptance of the keyword technique, claiming that it is insufficient to explain L2 vocabulary acquisition, the research studies do not actually use L2 learners, and the keyword may have a negative effect on L2 pronunciation.

Considering the variety of techniques included under the umbrella of direct teaching and learning, for the purposes of this study, the term *direct vocabulary instruction* is defined as the intentional teaching of a target word using techniques focusing on either the word's *meaning* or *use* (Nation, 2001), in hopes of leading to the eventual acquisition of the target word. The effects of the activities on the learners' connections were gathered from the responses they provided across three WATs.

3.3 Analyzing the effects of instruction

Past studies have shown the effectiveness of various vocabulary acquisition techniques, both direct and incidental, yet the evaluation methods used are precarious as vocabulary acquisition is not an instantaneous process and taking a snapshot of a user's lexicon is incomplete (Wilks & Meara, 2002). Since words are absorbed into the mental lexicon at varying rates depending on the individual and the context, experiments investigating vocabulary acquisition need to be longitudinal in nature.

Laufer and Hulstijn (2001) claim that incidental learning is the only method that holds up to empirical investigation, as the other techniques (e.g. key word, list memorization, etc.) are not guaranteed to be drawn upon for recall during vocabulary tests. However, like incidental learning, direct learning methods appear to stand up well to experimental scrutiny. Both incidental and intentional

learning studies primarily use multiple-choice tests to assess if the learner has acquired the word (Stahl & Fairbanks, 1986). Meara (1997) points out that such recognition tests are very advantageous for the learner, as they simply have to choose a definition from a handful of alternatives. In addition, these tests often consider only a single meaning of a word and therefore do not provide satisfactory details about how well the word is known (Schmitt & Meara, 1997). Another problem with multiple-choice tests is that they are "not sensitive enough to pick up vocabulary growth even if it really exists" (Meara, 2009, p. 91). A different, more robust, measure is needed to detect vocabulary growth, beyond the simple binary of 'right or wrong'. Nation (2001, p. 155) adds that vocabulary tests cannot detect "small amounts of learning". Therefore, analyzing word association data offers valuable insights into the actual incremental process inherent in L2 vocabulary acquisition.

The next chapter will delve deeper into the importance of the associations that learners provide on WATs. Associations as output, or more precisely as the manifestations of the connections learners hold in their minds, will be considered first. The comparisons of learners' associations to those of NSs are then discussed, along with the misleading term 'native-like'. The chapter concludes with a look at using word association data to design the kind of classroom activities students encounter on a regular basis, helping to shape the connections they hold between words.

CHAPTER 4

THE IMPORTANCE OF DEVELOPING MEANINGFUL CONNECTIONS

Responses to WATs, hereinafter referred to simply as word associations, are thought to be the outward manifestations of the inter-word connections individuals hold in their mental lexicons. The connections held by NSs are undoubtedly more developed than those of most L2 learners, and thus allow them to function more adeptly in the language. If L2 learners can be encouraged to develop similar meaningful connections during vocabulary acquisition, it would help immensely in the overall task of L2 acquisition. The first section of this chapter looks at how the changing word associations produced by L2 learners can help identify the evolving connections they hold. Next, a brief foray into the ubiquitous term 'native-like' is made, and its implications to SLA are discussed. Finally, the task of shaping L2 learners' mental connections through the use of associations as pedagogical input is considered.

4.1 Mental connections as observed through word associations

Past vocabulary studies have tested vocabulary acquisition through production (e.g. translation tasks) or recognition (e.g. multiple-choice tests), but Meara (1983, p. 36) posits that "perhaps it would be possible to tap this process (of forming connections in the lexicon) by recording the associations made to new words and observing how these associations change over a period of time." Observing changing associations appears to be a more sensitive method as word associations provide clues for the researchers that allow them to better understand how well the learner knows the PW. For example, if a multiple-response WAT were given on three separate occasions with equal time gaps between tests, and a learner responded to the PW *data* with *date* on the first test, *personal* and *secret* on the second test, and *information*, *computer*, and *personal* on the third test, some basic conclusions could be drawn beyond whether this learner knows the word *data*. Examining the associations would allow the researcher to infer that the learner initially confused two phonetically similar

words, then subsequently acquired (or at least produced) two common collocations, and finally progressed to a better-rounded knowledge of the PW.

Observing the changing associations permits researchers to actually witness what is happening as learners make new connections and develop existing links in their mental lexicons, and is extremely valuable for L2 vocabulary acquisition research. The next section will present five longitudinal studies (Randall, 1980; Beck, 1981; Schmitt & Meara, 1997; Schmitt, 1998a; Crossley, Salsbury, & McNamara, 2009), which have investigated the changing associations of L2 learners.

4.2 Past studies investigating changing associations

Randall (1980) proposed that EFL learners' associations changed as their proficiency levels increased. His findings were met with some skepticism (Meara, 1983), as it was difficult to determine which changes in associations were permanent and a result of an increase in proficiency, and which were temporary and due to the instability of the entire lexicon. White (1988, p. 10) offered Randall's results as evidence of a lexicon in the process of "reorganiz(ing) itself on semantic grounds, mirroring more closely native-speaker structures." However, Wolter (2002) notes some serious flaws in both the methodology and theory underpinning Randall's study, namely the selection of PWs, the scoring system employed, and the type of baseline data used. According to Wolter's critique, it would be wise to view studies linking proficiency to WAT results with caution, although he remains optimistic of the inherent value WATs have in assessing proficiency.

A related study, carried out by Beck (1981; as described in Meara, 1983), presented a group of English-speaking French language students with forty unfamiliar French words and asked them to respond to each word with chains of associations. Unsurprisingly, of the few responses produced, most were clang in nature. Beck then introduced twenty of the words into normal class work in a "non-obtrusive fashion" (Meara, 1983, p. 36). Two retests were administered over a twelve-week period. The first retest showed that the untaught words did not change, but the taught words "changed markedly, producing a greater

number of total responses, fewer clang associates, and a greater proportion of native-like responses" (Meara, 1983, p. 36) (What constitutes a 'native-like' response will be discussed in greater detail in the following section). The second retest revealed no changes in the associations to the untaught words. However, even though the number of responses to the taught words actually decreased, the responses indicated that meaningful connections were forming as more native-like associations and less clang associates were produced. The results reinforced the fact that vocabulary acquisition is a gradual process and the study highlighted the incomplete integration of the new words into the mental lexicon (Meara, 1983).

In another study investigating the changing associations of L2 learners, Schmitt and Meara (1997) tested Japanese high school and university students' knowledge of word associations and suffixes for twenty verbs, twice over an academic year, once at the beginning and once at the end. Results showed that the overall vocabulary gain was quite modest and students did not demonstrate heightened knowledge of either the verbs' associations or suffixes. It is likely that the lack of improvement on the two features isolated by Schmitt and Meara (1997) was a result of impoverished vocabulary instruction in the classroom and a failure to build meaningful connections in the minds of the learners.

During a yearlong study, Schmitt (1998a) investigated the acquisition of eleven words by three adult ESL learners, focusing on four kinds of word knowledge (spelling, associations, grammar, and meaning). He measured associational knowledge by asking participants to provide three responses per PW and scored them against a NS norms list. As the year went on, the association scores were characterized as becoming more native-like as the "words were gradually becoming better integrated into the students' mental lexicons" (Schmitt, 2000, p. 118). In the study, two of the three learners did not review the eleven words between sessions, but one looked them up in a dictionary. Aside from that, input was not the focus of the study, as output (e.g. spelling, associations, grammar, etc.) was the primary concern. Schmitt (1998a) felt that traditional vocabulary tests only indicated if a word was known, so by observing association responses one could more easily find the source of the error if a word was not known.

The final research reviewed here is from Crossley, Salsbury, and McNamara's (2009) one-year longitudinal study, which investigated a specific type of word association, hypernymy. Hypernymic relations are comprised of both subordinate (e.g. *whale* → *humpback*) and superordinate (e.g. *whale* → *animal*) relationships. Over the course of the year, the spontaneous speech of six L2 learners was examined at different times and showed increased levels of hypernymic associations, lexical diversity, and higher levels of abstraction. The results reinforce the fact that lexical networks develop gradually and suggest that lexical growth is indicative of increased proficiency.

With the exception of the final example, most studies investigating the changing associations of L2 learners compare their responses to NS normative data, and often refer to learners falling on some sort of a continuum constituting "partial degrees of nativeness" (Schmitt, 1998b, p. 391). It may seem innocuous to compare L2 learners to proficient L1 speakers, but there is some discussion needed before labeling an L2 learner as either 'native-like' or 'nonnative-like'. The next section will present some important misgivings with the term native-like.

4.3 What is native-like?

The term native-like deserves some attention and further discussion here as many SLA research studies use it as a measuring stick; advanced L2 learners are often described as having overall native-like proficiency, native-like pronunciation, or native-like associations.

Firstly, using the term native-like to represent overall language competence is somewhat problematic as it sets an extraordinarily high goal for most NNSs who will never achieve full NS mastery of English. The same can be said about extolling native-like pronunciation as a goal for L2 learners (Wharton, 2010a). It is generally agreed that NNSs should not strive for native-like pronunciation, often defined as American or British English (Matsuda, 2003), but should embrace their natural speech patterns (Lee, 2005).

Using native-like to describe associations is also problematic because NSs do not actually respond to WATs uniformly. In fact, "native-speaker responses vary so

much that it is difficult to identify a response as native-speaker-like or otherwise" (Fitzpatrick, 2006, p. 126). In addition, learners often provide acceptable responses that may not appear in NS normative data. The term 'normative' is in itself suspect, as different groups of NSs will likely respond to a PW in very different ways. Broughton (1977; cited in White, 1988, p. 9) found that British NSs typically responded to the uninteresting PW *fruit* with *apple, orange, banana,* and *pear*, but speakers of romance languages responded with citrus fruits. We are really comparing apples to oranges when we contemplate speakers of two different languages, but if we consider NSs from Australia, for example, they may respond to the PW *fruit* with words like *mango, grape,* or *kiwi.* This simplistic example merely serves to illustrate the fact that NS normative data is heavily influenced by factors such as geographic location, age, and, as Sökmen (1993) found, gender, first language, and education.

Since many responses on WATs are culture-specific (Kruse, Pankhurst, & Sharwood-Smith, 1987), it is necessary to reduce the disparity between normative groups and L2 subjects. Schmitt (2000, p. 41) argues that it is "necessary to organize a group as similar as possible to the nonnative subjects in terms of education, age, and so on." Schmitt and Meara (1997) used a group of thirty NS EFL teachers to provide baseline data for their study on Japanese high school and university students. Ignoring the marked dissimilarity between the subjects and the normative group, and the apparent contradiction with Schmitt's (2000) own advice, the group of EFL teachers provided 821 native-like responses, although 281 student responses were also considered native-like by two NS judges. This is further evidence that WAT responses that are not on a normative list should not always be labeled as nonnative-like and discarded so quickly.

Native-like associations are generally perceived as being meaning-based (e.g. synonyms, antonyms, hypernyms, etc.) when available, or position-based (e.g. collocations, multiword items, etc.), but they are rarely form-based (i.e. related to the pronunciation or spelling of the PW). However, when stimulus words are relatively unknown to NSs (Wolter, 2001) or they are pressured with a time limit (Clark, 1970), NSs will produce more form-based and erratic responses. The

expression 'native-like associations' might be more accurately referred to as 'meaningful associations', 'productive associations', or even 'fruitful associations', in order to be more representative of the developing L2 lexicon. The next section looks at the usefulness of associations in the teaching of L2 vocabulary.

4.4 Pedagogical input influenced by word association data

As an alternative to simply absorbing new words incidentally through exposure or experimenting with a mnemonic technique that concentrates solely on individual features of words, a better approach might be to focus on characteristics of the entire lexicon (Meara & Wolter, 2004). The mental lexicon is, after all, not just a collection of words haphazardly stored, awaiting recall; it is organized by the complex connections between words. As such, it seems logical that one should exploit these connections for vocabulary learning. Therefore, many researchers (e.g. Richards, 1976; Schmitt, 2000; Nation, 2001; Meara, 2009) promote the explicit establishment of bonds between words to better facilitate vocabulary learning.

The associations that learners make on WATs reflect the important role these associations might play in the teaching and learning of new vocabulary (Schmitt, 2000). If teachers want their learners to eventually make these connections automatically, it would logically be a great place for instruction to start. Meara (2009, p. 19) promotes the idea of developing "learning methods that, as a side effect, produced learners with native-like association patterns" in an effort to mold more proficient L2 communicators.

Since the responses to WATs suggest that our lexicons are organized through meaningful connections, including both meaning-based and position-based, White (1988, p. 10) puts forth an interesting question: "Is it possible to influence the storage of lexical items?" Upon encountering a new word, NSs naturally connect it with other words already in the lexicon, but learners likely need some help with this process. By utilizing activities based on associations, teachers can expedite the formation of meaningful connections in the learner's mind. White (1988), Sökmen (1992, 1997), Nation (2001), and Brown (2009) detail some

valuable vocabulary building activities using associations. As with other teaching techniques, some form of evaluation is required to investigate the effectiveness of vocabulary activities that make use of word associations.

Most L2 vocabulary testing is concerned with right or wrong (i.e. either the learner knows the word, or does not). It may be more relevant however, to employ an evaluation method that is more sensitive to the gradual nature of vocabulary learning and the developing associational networks within the learner's lexicon. Therefore, the current study observed the associations produced by learners on three separate occasions in order to investigate the changes that were occurring in the process of learners acquiring new vocabulary.

CHAPTER 5
METHODS AND MATERIALS

This chapter details a study conducted to analyze the changing word associations of a group of low-level EFL Japanese college students. Different direct vocabulary teaching methods were used in hopes of later observing the effects they had on the learners' mental connections. The first section begins with a summary of the purpose and expectations of the study, followed by a description of the participants used in the study, and the process that led to the construction of the final WAT, including the selection of PWs and the pilot study. The research study timeline is then presented along with the instruction techniques used. The final section concludes with the classification scheme used for analyzing the WAT responses.

5.1 Purpose and expectations

The current study investigated the effects of direct instruction on the changing word associations of twenty Japanese college students in an attempt to observe "what is happening at the periphery of a learner's vocabulary – how new words are acquired and integrated into the existing word stock" (Meara, 2009, p. 25). Considering White's (1988) question regarding the possibility of influencing the storage of new words, and since semantic and syntactic connections are so prevalent in the mental lexicon, it was thought that the direct vocabulary activities used in this study would help build meaningful connections for learners. These connections were expected to become even more meaningful over time as a result of instruction, evidenced by the changing associations seen across multiple administrations of a WAT.

Considering the low proficiency and motivation levels of the students, expectations for gains in quantity and quality of associations were modest. It was expected that associations produced from the taught words would increase from the first WAT (WAT1) to the second WAT (WAT2), and again from WAT2 to the third WAT (WAT3). The PWs that were taught through meaning-based activities (MB words) should have logically seen the greatest increase in MB responses,

and likewise, the PWs taught by way of position-based activities (PB words) should have seen a larger increase in PB responses. Untaught words should have remained relatively stable, perhaps decreasing slightly over successive test administrations as the students focus on the taught words. If these expectations were validated, it would indicate that vocabulary acquisition is indeed a gradual process whereby learners' mental connections change over time, both in quality and quantity, and are greatly influenced by the type of instruction they receive.

5.2 Participants

An intact class of twenty Japanese college students enrolled in an international business course participated in this study. The class consisted of first-year students: nineteen females and one male. The gender imbalance was initially disconcerting, however since the focus of the study was on observing the changing associations learners produced across three WATs and not on contrasting the different associations given by males and females, it was considered to be acceptable.

The overall English proficiency level was described as 'beginner' by the director of the college's international business course; seven students passed the third grade of the STEP EIKEN[1] test, which categorized them as "junior high school graduates" on the Japan Academic Level, and only two students passed the pre-second grade, "low high school graduate" (see Appendix II for the STEP EIKEN grading scale). The other students had never taken an English proficiency test.

Results from an informal pre-course needs analysis showed that most students (75%) found English to be too difficult, so many indicated that they merely wanted to "enjoy" the class by playing games, watching movies, and having short, fun conversations. Ironically, the majority of students (75%) also said that they wanted to take an English proficiency test in the future. However, only three students indicated that English was important to get a job. There seemed to be higher levels of integrative motivation compared with instrumental motivation (Gardner & Lambert, 1972) amongst students, meaning students were more

[1] STEP EIKEN is an internationally recognized English assessment test, developed in Japan and administered in 45 countries around the world.

interested in the allure of the English-speaking world, in the form of music, movies, and culture. Overall, students seemed disenchanted with studying English and as such, were not the most diligent subjects, but perhaps representative of many young Japanese English language learners.

5.3 Prompt word selection

Early studies utilizing WATs have shown contemporary researchers that PWs need to be selected carefully, in a principled manner (Wolter, 2002; Fitzpatrick, 2006). Given that the purpose of this study was to assess the changing associations of learners to direct vocabulary instruction, unfamiliar vocabulary was desirable to isolate the effects of instruction. Nishiyama (1996) estimates the English vocabulary of an average second-year Japanese college student consists of about 1,600 words. Therefore, in this study, thirty PWs were selected from the AWL, as the list includes "lexical items beyond the first 2,000 in West's (1953) General Service List (GSL)" (Coxhead, 2000, p. 222). Selections were made with the intention of exposing students to business related words that they would surely encounter in future courses, or at least find useful in future employment (see Appendix III for the complete WAT). The other constraint placed on the selection of words was that fifteen nouns, nine adjectives, and six verbs be selected. This is similar to the word class breakdown of the actual AWL itself (Fitzpatrick, 2006).

5.4 Pilot study

Since the students were not familiar with WATs, and I was unsure as to how many PWs students could effectively handle in the fifteen minutes allotted them, a pilot study was conducted using thirty PWs (fifteen nouns, nine adjectives, and six verbs), selected from the 1,000-word level of the Vocabulary Levels Test (Version A; Nation, 2001) (see Appendix IV for the pilot WAT). Although results from the pilot WAT suggested that learners did not know, or could not provide responses to many of the PWs, it was decided to proceed with the study using PWs from the more difficult AWL, as it is quite common that "learners do not know all (or even most) of the words at the more basic higher frequency levels before they begin learning rarer words at lower frequency levels" (Schmitt &

Meara, 1997, p. 25). The decisions were carefully considered, as the selection of appropriate PWs is crucial for any word association study.

5.5 Word association test

Learners were given fifteen minutes to provide up to three responses for each PW. A multiple response WAT was used in order to "better capture the richness of a subject's association network" (Schmitt, 1998b, p. 391), and as such, it was expected that the WAT would be more sensitive to changes in the learners' lexicons. Schmitt (1998b) also points out that learners may not initially respond with the most typical response, and as such, it is a fairer measure to ask learners to provide multiple responses to each PW. Like Wolter (2002, p. 320), asking for three responses to each prompt word was a rather "arbitrary" choice, used to analyze the changing associations more deeply than seemed possible with single responses.

To address the concern that asking for multiple responses results in chaining from one response to the next (Fitzpatrick, 2006), the methodology used in Wolter (2002) was employed. Wolter reproduced the PWs three times next to each response blank, in hopes of preventing chaining, for example:

data _____ data _____ data _____

5.6 Timeline

The pilot WAT was administered before the students' summer break. The first WAT was then administered five weeks later, during the first class back after the summer break (see Table 5.1 for the complete timeline).

Table 5.1: Week-by-week research timeline

07/24: Pilot word association test
08/28: Word association test #1 (WAT1)
09/04: Direct vocabulary instruction - class # 1
09/11: Direct vocabulary instruction - class # 2
09/18: Direct vocabulary instruction - class # 3
09/25: Direct vocabulary instruction - class # 4
10/02: Direct vocabulary instruction - class # 5
10/09: Word association test #2 (WAT2)
10/16: No direct vocabulary instruction - class # 1
10/23: No direct vocabulary instruction - class # 2
10/30: No direct vocabulary instruction - class # 3
11/06: No direct vocabulary instruction - class # 4
11/13: No direct vocabulary instruction - class # 5
11/20: Word association test #3 (WAT3)

After WAT1 was conducted, the results showed that five stimulus words did not elicit a single response, seven elicited a single response, and three elicited two or three responses. The responses to WAT1 were used as a guideline in deciding which words to teach. The words that elicited no or very few responses were selected for teaching as they were thought to be fairly unfamiliar to students. After ten nouns, six adjectives, and four verbs were taken from the original list of thirty items, they were divided in half and randomly assigned to either position-based or meaning-based instruction. The breakdown of PWs can be seen in Appendix V.

5.7 Instruction techniques

The teaching techniques used various activities that explicitly presented the vocabulary items to be learned. Nation (2001) provides a useful assortment of vocabulary teaching activities, many of which are likely familiar to EFL teachers around the world. The ten activities used in this study were adapted from Nation's (2001, pp. 103-106) list and are presented in Appendix VI.

All work was done during class time. The vocabulary activities were completed alongside regular class work and took approximately thirty minutes to complete per class period (about fifteen minutes each for the meaning-based and the position-based instruction). When handouts or other materials were used, they

were collected after each activity so as not to invite between class self-study, and thus control the amount of exposure students received to the PWs. The assumptions made here were similar to those made in Schmitt and Meara's (1997, p. 24) study, in which they assumed any gains made were likely the result of classroom instruction and not extracurricular exposure, as "Japanese students receive virtually no English input outside the classroom."

The students in this study received three 90-minute English classes a week: Oral Communication, TOEIC Preparation, and Writing. I taught Oral Communication using English as the medium of instruction, while a Japanese instructor taught the other two classes primarily in Japanese. The two textbooks used by the Japanese instructor were reviewed and deemed to be quite low-level and did not contain any of the words on the WAT. Likewise, the low-level textbook I used with the students did not contain any of the PWs. The Japanese instructor commented that students should know some words on the WAT, but she suspected about half of the words would be new to them. Therefore, considering the low level of the students, few responses were expected.

5.8 Classification procedures

All responses were classified using Fitzpatrick's (2006) categories (see Appendix I). Aside from the clear descriptions provided by Fitzpatrick, some further clarifications needed to be made: 1) multi-word responses were accepted, and categorized by the headword; 2) responses that merely repeated the PW were not counted; 3) a response and any inflectional variations were treated as one response (e.g. friend, friends), but responses and their derivatives were counted separately (e.g. communicate, communication); 4) affixes were accepted and counted as position-based responses. The complete results are described in the following section.

CHAPTER 6
RESULTS AND DISCUSSION

This study attempted to capture the changing connections learners held to unfamiliar words over three successive administrations of the same thirty-item WAT. Twenty PWs were presented to the learners through two different types of instruction, meaning-based and position-based, over a five-week period. The taught words were expected to show an increase in the total number of responses elicited, while the number of responses to the untaught words was anticipated to remain constant. The type of instruction was expected to influence the type of associations produced (e.g. meaning-based instruction should elicit meaning-based responses). Overall, the total number of responses was predicted to be low, given the students' lack of proficiency and motivation.

The results are presented in three parts. First, the quantitative results detail the overall number of responses across the three WATs and the number of responses associated with each instruction grouping: PWs taught through meaning-based activities (MB words); PWs taught through position-based activities (PB words); and PWs that received no instruction (untaught words). The second part describes the qualitative analyses, carried out to investigate the influence of instruction on the types of associations produced by learners, and how these associations changed over time. The qualitative results detail the response classifications across the three WATs, divided into primary, secondary, and tertiary responses. The taught and untaught PWs are then isolated and the response classifications for each are presented in an effort to discover how much of an effect instruction had on shaping the learners' mental connections.

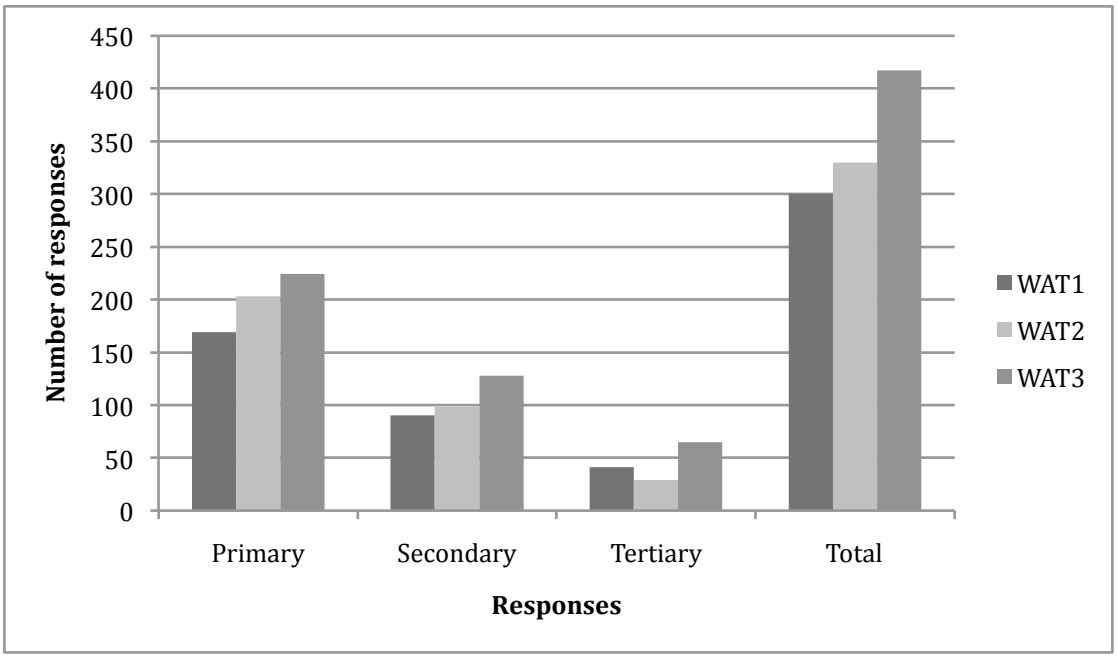
The final section presents the number of new and repeated responses given in WAT2 along with the response classifications, in an attempt to ascertain the effect of instruction on the individual learner's mental connections. The same information pertaining to the responses in WAT3 is also provided to compare how learners responded after five weeks of no direct instruction. The overall implications to L2 vocabulary instruction and the L2 mental lexicon are then

presented, followed by the limitations of the study. The complete list of responses across the three WATs is presented in Appendix VII.

6.1 Quantitative results

Overall results showed a slight (10%) increase in the total number of responses between WAT1 and WAT2 (see Figure 6.1). However, there was a more substantial (26%) increase in the total number of responses from WAT2 and WAT3. The number of primary and secondary responses increased with each successive administration of the test, in line with the overall results. However, the tertiary responses decreased slightly from WAT1 to WAT2, but more than doubled from WAT2 to WAT3. The decrease in the number of tertiary responses might be explained by the learners' apparent preference for breadth (i.e. providing more primary responses to a wider range of PWs) over depth (i.e. providing multiple responses to the same PW) in WAT2. When considering the results, it is important to bear in mind that there were 1,800 potential responses (twenty students X ninety potential responses) for each WAT. Therefore the number of responses observed across the three tests (WAT1= 300; WAT2= 330; WAT3= 417) was extremely low.

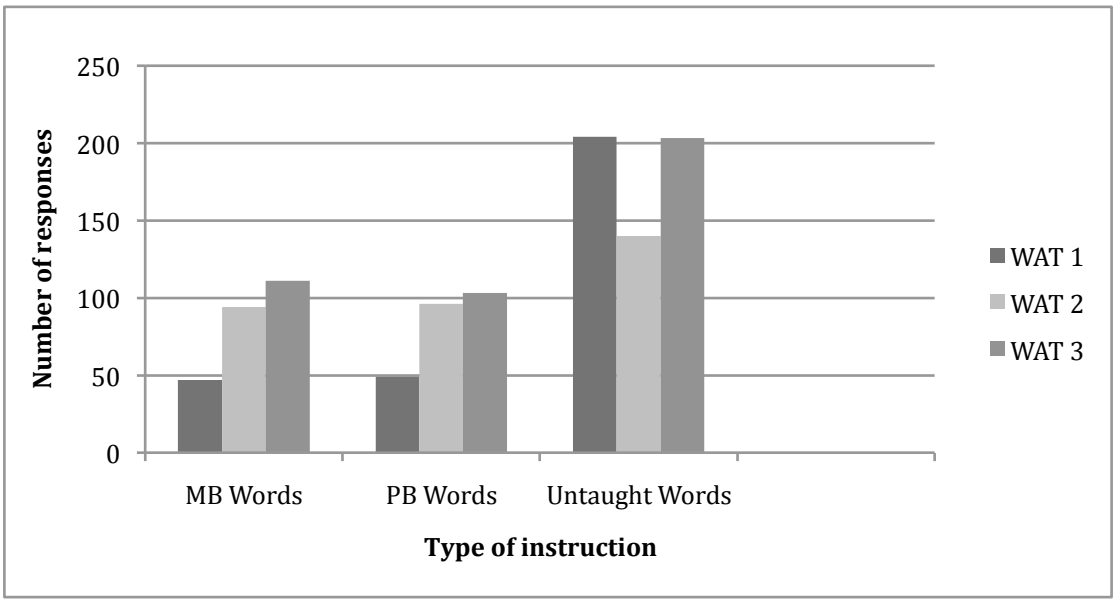
Figure 6.1: Total number of responses across the three word association tests



The ten words that did not receive any instruction between WAT1 and WAT2 elicited the most responses in WAT1, more than double the responses to the two groups of taught words combined. It was actually due to the high number of responses elicited that the untaught words were deemed to be 'well-known', or at least 'better-known' than the other PWs, and consequently not chosen for instruction, as it was expected to be more difficult to isolate the effects of instruction from the effects of prior lexical knowledge.

In WAT2, the number of responses to the taught words nearly doubled, while the responses to the untaught words decreased by about a third. The responses to the untaught words rebounded to roughly original levels in WAT3, likely due to the fading effect of instruction over the five-week period between WAT2 and WAT3. The twenty taught words, on the other hand, displayed a near identical rate of increase throughout the three tests. The results are presented in Figure 6.2.

Figure 6.2: Total number of responses per type of instruction



The substantial (123%) increase in the combined number of responses to the MB and PB words from WAT1 to WAT3 initially suggests that perhaps instruction had a positive effect on forming or helping to develop the connections learners held for these words. However, before drawing any conclusions based solely on the number of responses given, it is necessary to examine the qualitative results

(i.e. the changing proportions of meaning-based, position-based, form-based, and erratic associations) across the three WATs, detailed in the following section.

6.2 Qualitative results

Although quantitative results are important and can offer some clues as to how the mental connections form and change over time, it is only by investigating the qualitative aspects of the associations that it is possible to observe how the PWs and responses are interacting in the learners' minds. Table 6.1 presents the overall number of responses for both the taught and untaught words. The responses are classified (MB=Meaning-based; PB=Position-based; FB=Form-based; ER=Erratic) and divided into the order of response (primary, secondary, and tertiary) for all three WATs. MB and PB associations were basically equal in WAT1, but PB responses became the learners' preferred choice in WAT2 and WAT3.

Table 6.1: Total number of responses divided into response categories

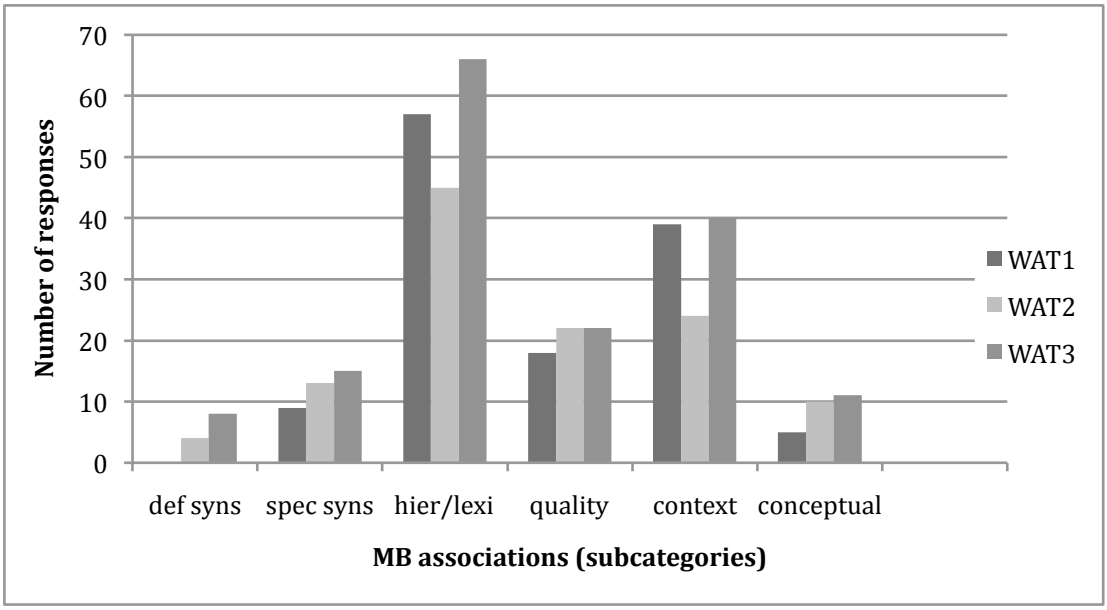
	MB	PB	FB	ER	Total	Potential responses
WAT1						
1st Response	73	72	13	11	169	600
2nd Response	40	41	5	4	90	600
3rd Response	20	18	1	2	41	600
Totals	133	131	19	17	300	1800
WAT2						
1st Response	73	109	5	16	203	600
2nd Response	33	55	3	7	98	600
3rd Response	11	17	0	1	29	600
Totals	117	181	8	24	330	1800
WAT3						
1st Response	90	110	9	15	224	600
2nd Response	49	66	4	9	128	600
3rd Response	23	34	2	6	65	600
Totals	162	210	15	30	417	1800

6.2.1 Responses divided into subcategories

A benefit of using Fitzpatrick's (2006, p. 131) WAT response categories is that associations can be further divided into subcategories. From Figure 6.3, it is evident that learners initially preferred responses that had a "hierarchical/lexical set relationship" with the PWs or a "context association".

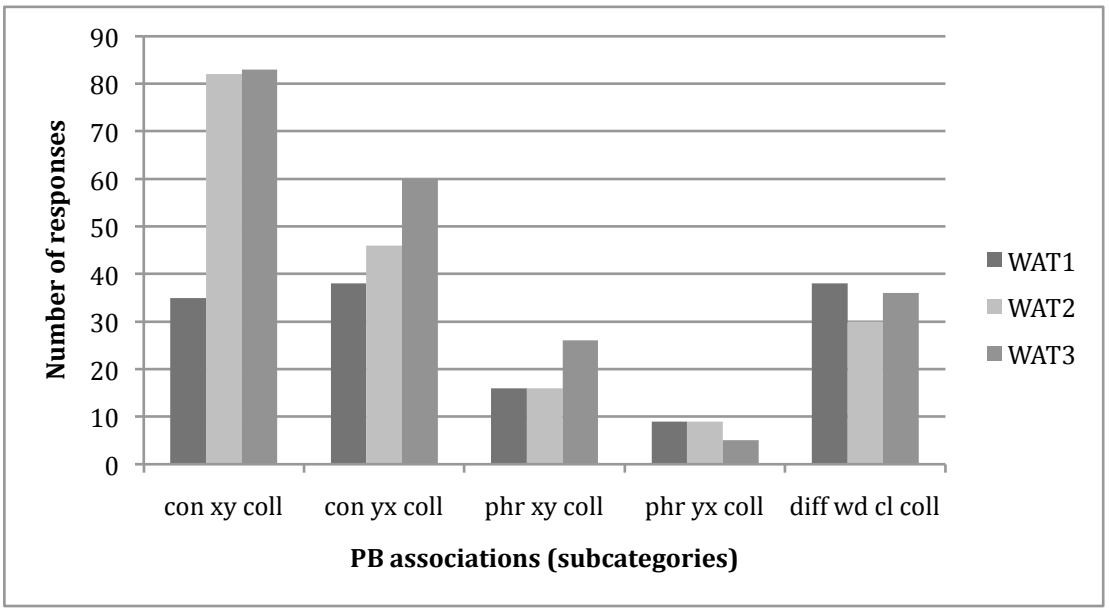
However, it appears that after instruction the two preferred types of responses dropped as all other categories grew. WAT3, on the other hand, saw the two original categories surpass WAT1 levels, suggesting perhaps that after five weeks without instruction, learners reverted back to their first responses.

Figure 6.3: Total number of responses in the meaning-based subcategories



When the position-based responses are divided into the subcategories, as seen in Figure 6.4, it is clear that learners have a strong preference for consecutive collocations, especially PW (x) - response (y) collocations. Contrary to the MB responses, the two most popular PB associations increased in responses from test to test, with the preferred 'consecutive xy collocation' subcategory increasing by 134% from WAT1 to WAT2. The sizeable increase suggests that instruction had an influence on learners' responses.

Figure 6.4: Total number of responses in the position-based subcategories



It is tempting to conclude that, considering MB and PB responses were equal in WAT1 but changed markedly in WAT2 (MB responses decreased by 12%; PB responses increased by 38%), PB instruction techniques during the five-week period between WAT1 and WAT2 had a greater influence on the learners. However, before making such a claim it is necessary to look at which PWs elicited which types of responses. For example, did the words taught through PB activities (PB words) actually elicit the most PB responses? The next two sections will examine the associations elicited by the taught words (i.e. MB words and PB words) and the untaught words.

6.2.2 Taught words

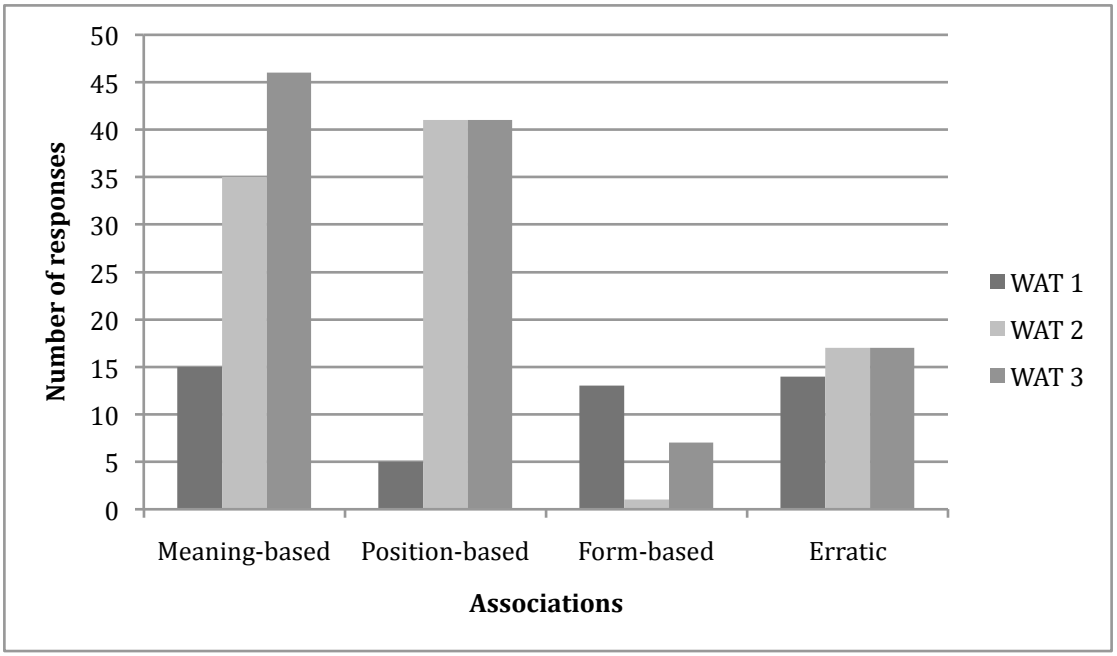
The primary focus of this paper was not on the quantity of responses, since after sitting a WAT three times it might be assumed that the number of responses would naturally increase, but it was more concerned with discovering how the responses changed over time and what effect the two different forms of instruction had on the learners' associations.

Meaning-based prompt words

The MB words initially elicited a sizeable increase in MB responses from WAT1 to WAT2, but there was a more substantial rise in PB responses (see Figure 6.5).

However, by WAT3, the MB responses to the MB words had increased further and slightly outnumbered the PB responses, as the latter did not increase from WAT2 to WAT3. FB responses dropped from WAT1 to WAT2, rebounding slightly in WAT3, and ER responses were basically constant throughout.

Figure 6.5: Total number of responses to meaning-based taught words



Without further analysis, it appears that MB instruction had an effect on the associations provided over the three-month study. The total number of associations elicited by MB words doubled from WAT1 to WAT2, however the PB associations outnumbered the MB associations in WAT2. It is important to note that PB associations elicited by MB words should not detract from the perceived effectiveness of the MB instruction. Although MB responses may have failed to materialize on the WATs, it does not mean that the learners did not have other MB connections. However, it may suggest that the PB connections were more lucid for learners, even for MB words.

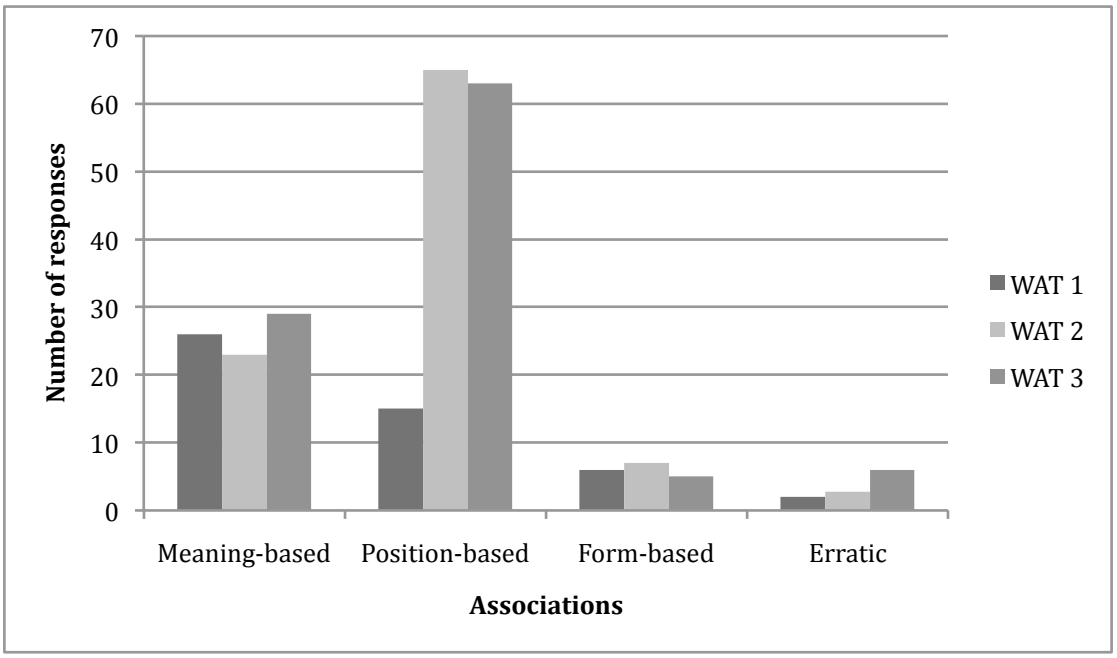
Position-based prompt words

The response distribution for the PB words differed greatly from that of the MB words, as can be seen in Figure 6.6. The MB responses were initially the highest in WAT1, but did not increase considerably across the three tests; the PB responses on the other hand, increased by fifty responses from WAT1 to WAT2.

FB and ER responses did not change significantly between WATs, with the FB responses remaining fairly stable, and ER responses increasing only slightly.

Without further analysis it is difficult to ascertain the precise effect of PB instruction on the number of responses elicited. Overall, the total number of responses to PB words nearly doubled from WAT1 to WAT2, as was seen with the MB prompt words presented earlier, however the PB responses elicited by the PB words increased more than fourfold from WAT1 to WAT2. It appears that gains made in the number of associations between WAT1 and WAT2, and WAT2 and WAT3 were almost entirely due to the increase in PB associations. This finding suggests that in responding to PB words, the learners' associations are more a product of their environment. However, as suggested earlier, more detailed analyses are needed in order to better understand what was happening to the learners' mental connections.

Figure 6.6: Total number of responses to position-based taught words

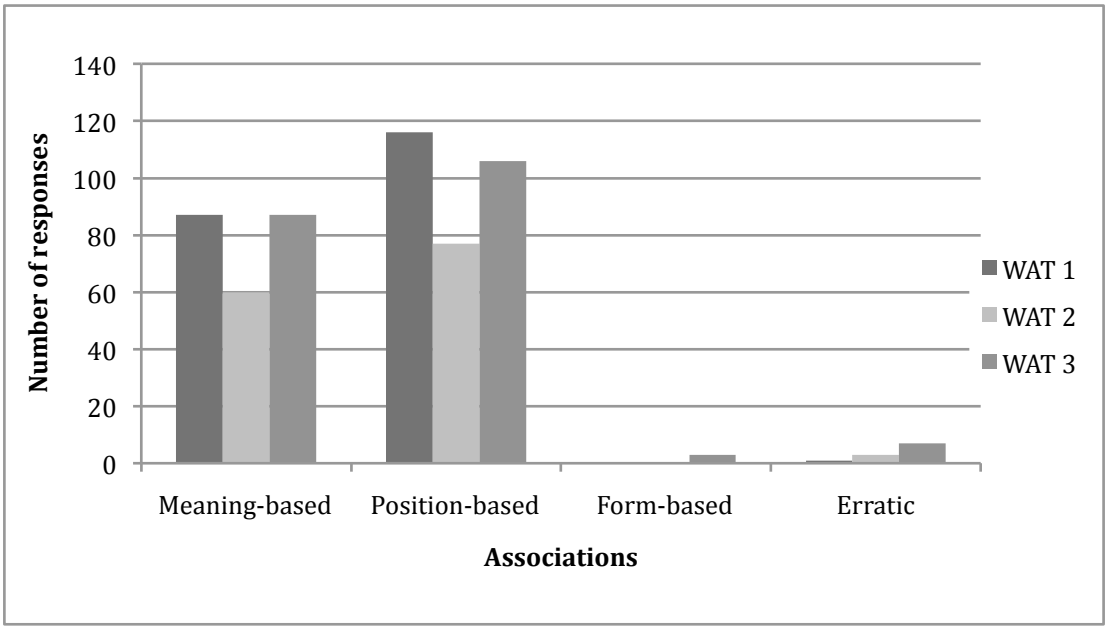


6.2.3 Untaught words

It was expected that the number of responses to the untaught words would remain fairly stable across all three WATs, as would the proportions of response types. However, from the results in Figure 6.7, it is clear that there was a noticeable drop in both MB and PB responses from WAT1 to WAT2. The 31% dip

in responses for the untaught words was presumably due to the students' focus on the recently taught MB and PB words. This seems to indicate that instruction focuses learners on the new words and helps them make meaningful connections. However, after a five-week gap, the immediate effects of instruction seemed to wear off and the untaught responses rebounded. WAT3 saw the overall number of responses return to near WAT1 levels; FB and ER responses were basically nonexistent until WAT3.

Figure 6.7: Total number of responses to untaught words



6.3 Summary of quantitative and qualitative analyses

From the previous analyses, it is evident that after five weeks of instruction there was only a slight increase in the total number of responses from WAT1 to WAT2, however the responses to the taught words increased while the responses to the untaught words decreased. The increase in responses to the taught words was predicted, yet the decrease in responses to the untaught words was not. There was also an unexpected 26% jump in the overall number of responses, both taught and untaught, from WAT2 to WAT3.

PB associations were the preferred type of response across all three WATs and among all three instruction groupings, except for the higher number of responses elicited by the MB words in WAT3. The PB associations observed in this study were consistent with past studies that found low-level L2 learners often

provided more syntagmatic (i.e. position-based) than paradigmatic (i.e. meaning-based) responses on WATs (Söderman, 1993; Wolter, 2001), and adult NSs preferred syntagmatic associations when the PWs were unfamiliar (Wolter, 2001; Zareva, 2007). Form-based responses were expected, as the PWs were quite unfamiliar to students, yet there were surprisingly few in the results, perhaps due to the low response rate and low student motivation.

Before drawing any further conclusions regarding the changes to learners' mental connections and the effects of the two different kinds of instruction, it is prudent to acknowledge the role that word class played in influencing the responses. The next section details the effects of word class on the responses given.

6.4 Influence of word class on responses

As with any word association study, it is prudent to acknowledge the influence that the PW's word class had on the types of responses it elicited. In the current study, nouns evoked nouns 82% of the time, adjectives 12%, and verbs only 4% of the time; adjectives elicited nouns 95% of the time and adjectives 3% of the time; verbs generated nouns 71% of the time, followed by verbs (13%) and adjectives (11%). These findings are also similar to earlier studies investigating L1 word associations (Deese, 1965; Fillenbaum & Jones, 1965) in which nouns produced nouns around 80% of the time, but adjectives and verbs elicited other adjectives and verbs only about 50% of the time. Although this is likely just a reflection of the nature of language, it is worth noting, as the influence of the PW's word class should not be overlooked.

For the students in this study, the adjective and verb PWs tended to elicit noun responses that formed a collocation with the PW, for example (*PW → response*): *classic → car*; *widespread → flu*; *invest → money*; *edit → movie*. NSs also produce many PW-response collocations, even more so when the PWs are unfamiliar (Zareva, 2007).

Although word class undoubtedly has an effect, it is extremely difficult to determine precisely why a response was given. In an attempt to investigate the influence instruction had on the responses, the changes in individual responses

from test to test were examined. The next section will detail the quantity and quality of new responses added to each WAT, as well as the responses that remained from test to test.

6.5 Changes to individual responses between tests

The quantitative and qualitative analyses provided some insights into the developing lexicons of the learners. However, to gain a deeper understanding of what was happening to the individuals' mental connections, the new responses produced between WAT1 and WAT2, and between WAT2 and WAT3, needed to be analyzed along with the responses that remained from test to test. New responses to PWs might indicate that, in the case of MB and PB words, instruction had an effect. Clearly the quality of these responses also had to be scrutinized to examine if they were meaningful associations.

The first WAT after the five-week period of instruction (i.e. WAT2) was expected to contain many new responses to the taught words, and undoubtedly some new responses to the untaught words. WAT3 was also expected to contain some new responses, as learners' connections were likely still forming and evolving. However, if acquisition of the taught words were starting to take place, it might be expected that more of the same responses would remain from WAT2 to WAT3. Therefore, both new and old meaningful responses on WAT3 could be considered indicative of the learners' new and developing mental connections. The changes to individual responses are summed in Table 6.2.

Table 6.2: New and repeated responses from WAT1 to WAT3

New responses to prompt words		
Prompt Words	From WAT1 to WAT2	From WAT2 to WAT3
MB Words	83	84
PB Words	86	63
Untaught Words	87	142
Total (New)	256	289
Repeated responses to prompt words		
Prompt Words	From WAT1 to WAT2	From WAT2 to WAT3
MB Words	10	27
PB Words	10	40
Untaught Words	54	61
Total (Repeated)	74	128
Total responses (New & Repeated)	**330**	**417**

6.5.1 New responses

New responses produced between WAT1 and WAT2 do not necessarily represent new learning, as the same mental connections that led to the associations given on WAT2 may have existed in the learners during WAT1, but simply never made it onto the test paper. However, without the option of actually seeing the mental connections that may have existed or not, the new responses on WAT2 are the best evidence to indicate the existence of developing connections. The new responses produced between WAT1 and WAT2, and WAT2 and WAT3 are detailed in the following two sections.

From WAT1 to WAT2

Eighty-three new responses were given to the MB words, consisting of forty-one PB associations, thirty-one MB associations, ten ER associations, and one FB association. Although MB responses were expected for MB words, the existence of PB responses does not indicate that instruction did not influence the associations; in fact it may have, just not in a way that directly dictated the types of connection. It is very likely that the instruction may have provided students with a general sense of the words, which led to the formation of syntagmatic connections between words. Of course, there were some meaningful MB responses given to MB words. For example, one learner responded with *hand* to

the PW *globe* on WAT1 (likely mistaking *globe* for *glove*). However, on WAT2, she responded to *globe* with *Earth*, suggesting a meaningful connection was made. Further examples of new responses given on WAT2, from the same student, are presented in Table 6.3.

The eighty-six new responses to the PB words included sixty PB responses, eighteen MB responses, six FB responses, and two ER responses. This distribution was more inline with expectations regarding the effect of instruction. From the earlier quantitative and qualitative analyses, it is apparent that students had a preference for PB responses. Table 6.3 illustrates the idea that "vocabulary acquisition may also include the learning of new meanings for well-known words or for combinations of well-known words" (Bogaards, 2001, p. 322). The student initially responded to *expert* with *run*, but in WAT2 responded with *ly* and *ise*, demonstrating acquired knowledge of the PW's suffixes, likely a result of the vocabulary activity involving dictionary work in the search for collocations.

The new responses to the eighty-seven untaught words were made up of forty-six PB responses, thirty-nine MB, and two ER responses. This finding was not unexpected, as familiar words surely have more connections in the mind.

Table 6.3: Examples of new responses from WAT1 to WAT2

Prompt Words	WAT1 (Association)	WAT2 (Association)
Meaning-based		
globe	hand (ER)	Earth (MB)
odd	-	people (PB)
odd	-	dog (PB)
odd	-	cat(PB)
maximize	-	pen (ER)
Position-based		
edit	book (PB)	homepage (PB)
edit	-	mail (PB)
edit	-	text (PB)
liberal	-	ism (PB)
liberal	-	arts (PB)
percent	-	of (PB)
percent	-	100 (PB)
cycle	Earth (PB)	re (PB)
cycle	-	life (PB)
expert	run (PB)	ise (PB)
expert	-	ly(PB)

From WAT2 to WAT3

Some adjustments need to be made to the results presented in Table 6.2 to provide a fairer description of what was actually happening on the WATs. New responses recorded from WAT2 to WAT3 should be reduced by thirty-five responses, as the responses were given on WAT1 (not on WAT2) and then again on WAT3, as such, these responses should not be considered 'new'. Therefore, instead of 289 new responses in WAT3, there were actually 254 new responses, representing 60.91% of the total responses in WAT3. These new responses were investigated further to see which types of associations were produced.

The seventy-nine new responses to the MB words included thirty MB associations, thirty PB associations, thirteen ER associations, and six FB associations. The high number of new responses was quite surprising, as was the equal distribution between MB and PB associations. Also unexpected was the high number of ER and FB associations. It appears that some learners disregarded the previous instruction and, in a way, started anew, while others continued to make meaningful associations. One student responded to *data* with

book on WAT1, then with *secret* and *used* on WAT2, then finally with *office*, *personal*, and *secret* on WAT3. Table 6.4 details more examples of the student's changing associations.

The fifty-six new responses to the PB words were composed of thirty-three PB associations, seventeen MB associations, four ER associations, and two FB associations. The lower number of new responses relative to those elicited by the MB words was unexpected, however the higher proportion of PB to MB associations was consistent with previous analyses that found students preferred PB responses to the PB words.

The 119 new responses to the untaught words included fifty-six PB associations, fifty-three MB associations, seven ER associations, and three FB associations. The nearly identical proportions of MB and PB associations are intriguing, as the overall preference seemed to be for PB responses.

Table 6.4: Examples of new responses from WAT2 to WAT3

Prompt Words	WAT1 (Association)	WAT2 (Association)	WAT3 (Association)
Meaning-based			
data	book (MB)	secret (PB)	office (MB)
data	-	used (PB)	personal (PB)
data	-	-	secret (PB)
globe	society (MB)	society (MB)	society (MB)
globe	-	-	world (MB)
Position-based			
widespread	-	flu (PB)	flu (PB)
widespread	-	-	cold (PB)
widespread	-	-	juice (ER)
expert	-	sport (MB)	sport (MB)
expert	-	-	culture (PB)
cycle	-	motor (PB)	mystery (PB)
cycle	-	-	friend (ER)
cycle	-	-	family (ER)

6.5.2 Repeated responses

Responses that were repeated from one WAT to another appear to suggest fairly solid and lasting connections in a learner's mind. This section discusses the repeated responses observed from WAT1 to WAT2, and from WAT2 to WAT3.

From WAT1 to WAT2

The responses that were repeated from WAT1 to WAT2, were based on connections held prior to any instruction and as such, suggest that instruction had little effect on their reoccurrence in WAT2. Of course, instruction not only builds new connections, but also maintains existing ones. There were ten responses to MB words that were repeated from WAT1 to WAT2, which included six ER associations and four MB responses. The six ER associations were all given in response to the PW *document,* which is a 'false friend' (Laufer, 1991) for *documentary* in Japanese. Many students responded with words like *TV*, *movie*, or *drama*, responses that are not found among NS normative data in the *Edinburgh Associative Thesaurus* (Kiss, Armstrong, & Milroy, 1973), suggesting that the ingrained connections learners hold are slow to change, even with direct instruction, although some students did respond with more meaningful words like *paper*, *company*, and *personal*, after instruction.

There were also ten responses given to PB words, including five MB associations, four PB associations, and one FB association. Finally, there were fifty-four responses to the untaught words that remained, consisting of thirty-three PB associations and twenty-one MB associations. The absence of FB and ER associations is noteworthy, and most likely a result of the words being familiar to students.

From WAT2 to WAT3

The number of repeated responses between WAT2 and WAT3 listed in Table 6.2 also needs to be reduced. If a response was repeated from WAT2 to WAT3, but also initially made on WAT1, then instruction did not play a role in the original response, as instruction did not take place until after WAT1. Instruction may have served to strengthen the connections or keep them in the learners' minds

longer, but they did not contribute to any 'new' learning. There were fifty-five instances of the same response being provided across all three WATs. Therefore, the 128 responses that were repeated from WAT2 to WAT3 need to be reduced by fifty-five responses to make the results more representative of the new learning that took place.

There were actually twenty responses to MB words, thirty-five responses to PB words, and eighteen responses to untaught words that were repeated in WAT3 from WAT2, but not in WAT1. The twenty responses to the MB words that were repeated consisted of nine MB responses, nine PB responses, and two ER responses. Therefore, looking back at the question of whether or not instruction can influence the type of associations learners produce, it appears that MB instruction only caused MB responses nine times out of 600 possible responses (ten MB words X three responses each X twenty students) on WAT3. These results seem to be similar to Figure 6.5, in that MB and PB responses are almost equally likely to be produced when a MB word is used as the PW.

The thirty-five responses to the PB words contained twenty-five PB associations, seven MB associations, two FB associations, and one ER association. From these data, it appears that PB instruction had a greater influence on students than MB instruction. This is consistent with Figure 6.6, which indicates a marked preference to PB responses.

The remaining eighteen responses to the untaught words consisted of ten PB associations and eight MB associations. These findings are consistent with Figure 6.7, which indicated that students showed a slight preference for producing PB responses to untaught words.

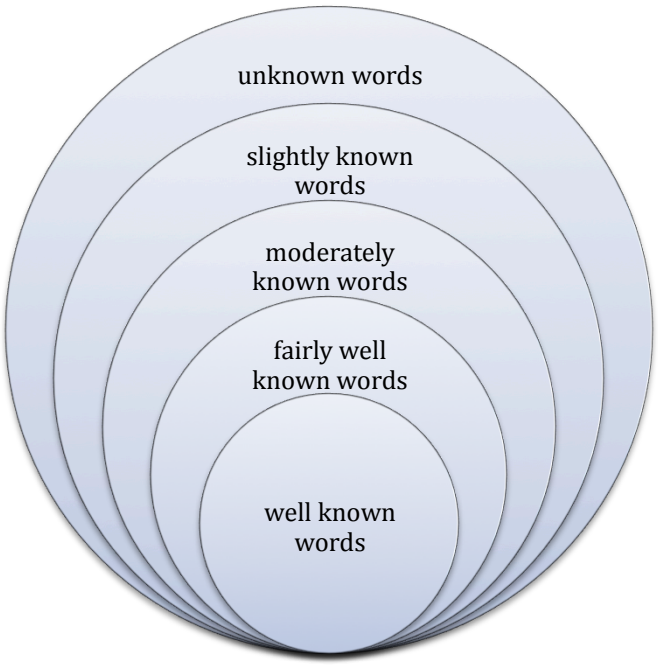
6.5.3 Summary of results for new and repeated responses

The four categories used to classify the responses (MB, PB, FB, and ER) provide clues as to the level of knowledge an individual holds for any given PW. In the current study, if a learner provided a new response where one did not exist before, regardless of the response category, we can assume that the form of the PW was, at the very least, recognized. If an ER association was given, then

perhaps the learner confused it with another PW, a false friend, or simply overextended the limited knowledge they actually had about the PW.

Since word associations produced are manifestations of the mental connections learners actually hold, providing a general idea of how well the learner 'knows' the word, it "would seem that how well a particular word is known may condition the connections made between that particular word and the other words in the mental lexicon" (Wolter, 2001, p. 47). Figure 6.8 (adapted from Wolter, 2001, p. 48) is useful in visualizing the students' progression from the outer circle (i.e. unknown words) in WAT1 towards the inner circles in WAT2 and WAT3. Considering the overall low number of responses, the relatively low number of MB responses, and the increasing proportions of PB responses and ER responses, across the three WATs, it would appear that five weeks of instruction increased the learners' knowledge of the PWs from 'unknown' in some cases to 'slightly' or 'moderately', however very few words were 'well known'.

Figure 6.8: Depth of word knowledge model



(adapted from Wolter, 2001, p. 48)

6.6 Implications for vocabulary teaching and the L2 mental lexicon

The previous sections provided focused explanations of the data and what the word associations meant in terms of the changing connections learners held between WATs. However, it is important to step back and consider the wider implications to vocabulary teaching and the overall development of the L2 mental lexicon.

It appears that direct instruction (both MB and PB) increased the quantity and quality of connections between words in the learner's mental lexicon. Some learners made meaningful connections soon after initial instruction, while other learners' connections developed more slowly, and still others did not make any meaningful connections as a result of instruction. This reinforces the fact that vocabulary acquisition is truly an incremental and individualized process. Direct instruction will undoubtedly change erratic connections into more meaningful links for some learners, however other learners' erratic connections persist despite instruction. Of course, the perceived low motivation levels of some students surely had an effect on the number of erratic responses they produced.

The results presented here also suggest that teaching practices should encompass both MB and PB aspects, as learners react differently to different forms of instruction. Likewise, direct vocabulary instruction should be seen as complementary to incidental vocabulary learning, providing learners with varied exposure and contexts to new words. This is important "because words are always used in a particular context and, therefore, in a particular sense or use, learners are confronted with them bit by bit, and they have to acquire them bit by bit as well" (Bogaards, 2001, p. 325). Learners require multiple exposures to a word before it becomes entrenched in the lexicon.

6.7 Limitations of the study

This section details the limitations of the study. Limitations were specifically identified in the research design, PW selection and WAT construction, as well as in the subjective nature of classifying WAT responses in general.

Originally, two separate college classes were sought in order to teach one class exclusively using MB activities and the other using PB activities. In the end, this was not possible and resulted in an adjustment whereby only one class was taught using both methods concurrently. Although it resulted in fewer participants and responses, it was seen as an acceptable alteration.

Data from the pilot WAT indicated that even with high frequency PWs, students had trouble providing many responses. Maintaining the length of the test from pilot to WAT1 and using the more difficult AWL vocabulary was done to allow room for the associations to grow. However, looking back, perhaps a thirty-item WAT was too ambitious. After taking a cursory look at the responses from WAT1, it was clear that students started working on the first few words and then lost motivation as they proceeded down the list. In testing, a split-half procedure is often used to check internal consistency (Meara, 2009). However since the three WATs here were not scored, a simple count was performed to compare the variation in the number of responses between the first fifteen PWs and the last fifteen PWs. From the results seen in Table 6.5, it is clear that the words in the bottom half of the test received far fewer responses. The thirty PWs were randomly ordered on the WAT resulting in seven untaught words, five PB words, and three MB words in the first half. The second half had three untaught words, five PB words, and seven MB words. It appears as though a combination of two factors may have contributed to the lopsidedness in responses: first, the three highest grossing PWs (*classic*, *media*, and *network*), all untaught, occurred in the first ten words of the WAT; second, students likely lost interest as they continued down the list of PWs. This situation could have been avoided if the two halves of the test were more balanced.

Table 6.5: First half responses compared with second half responses

	WAT1	WAT2	WAT3	Total
First Half	233	218	279	730
Second Half	67	112	138	317

A final limitation, common to every study utilizing WATs but worthy of mention, was the subjective nature of response classification. Responses can often fit into

multiple categories and ultimately settle into one category based on the researcher's subjective judgment. It has been suggested that, to reduce researcher subjectivity, participants be asked retrospectively why they responded the way they did on a WAT (Fitzpatrick, 2006). However, aside from the obvious problem of consciously trying to explain an unconscious reflex, L2 learners have also been shown to change their reasons from initial response to retrospective interview (Wharton, 2010b), and so it was decided to rely on my judgment alone.

CHAPTER 7

CONCLUSION

In an EFL venue like Japan, students are often preoccupied with the formal aspects of the language. Instructors teaching a university English communication class, or a private conversation class, may bemoan the meticulous questions they receive related to grammatical correctness, but when answering the questions, teachers would be wise to remind students: “while without grammar little can be conveyed, without vocabulary nothing can be conveyed” (Wilkins, 1972, p. 111).

Although “teaching is still an uncertain activity with very uncertain outcomes” (Nation, 2001, p. 96), this study found that direct instruction did increase the number of meaningful associations provided by L2 learners over a series of WATs. The twenty PWs taught using different types of direct instruction elicited very similar numbers of responses across all three tests. However, it was evident that learners had a preference for providing PB responses to both MB words and PB words. It also appeared that the learners’ mental connections were unstable, begging the questions: “How long does this stabilizing period last? Is it the same for all words and for all learners? What environmental factors reduce or extend it?” (Meara, 2009, p. 27). These questions are central to the future of word association research and although they were not fully answered here, it appears that the learners in this study were positively affected by direct instruction and the PWs were becoming better known. However, more time and more exposure, both incidental and direct, are needed to fully integrate the PWs into the learners’ developing lexicons.

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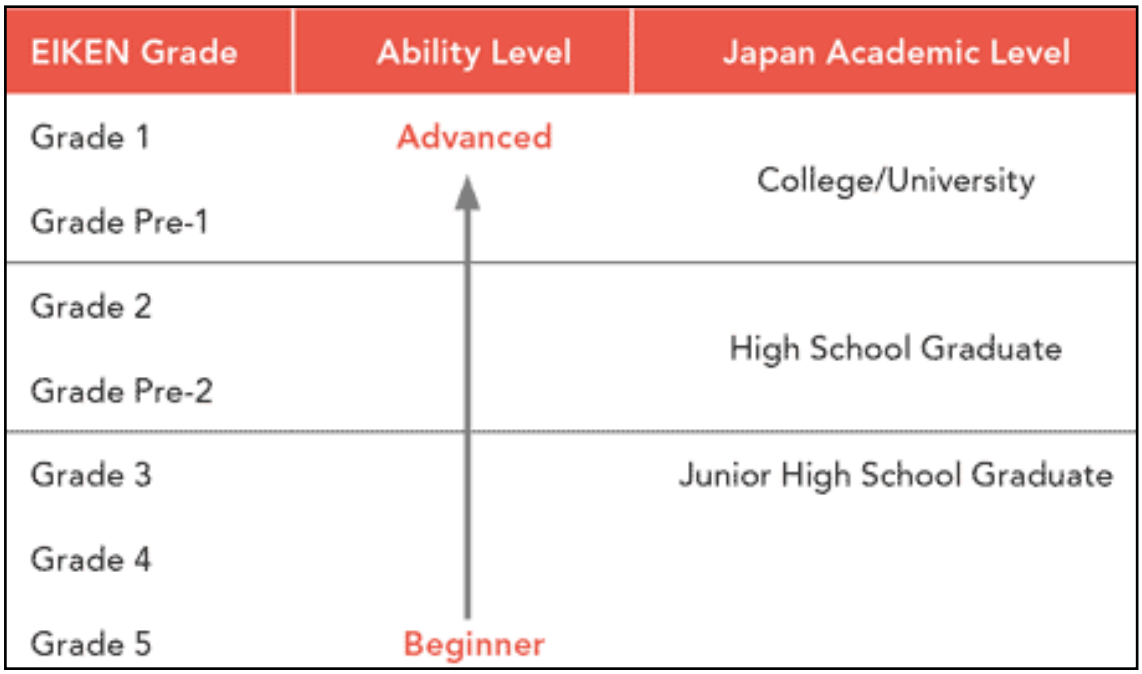
Appendix I: Word association test response categories

(x=stimulus; y=response)

Category	Subcategory	Definition
Meaning-based association (MB)	Defining synonym	x means the same as y
	Specific synonym	x can mean y in some specific contexts
	Hierarchical/lexical set relationship	x and y are in the same lexical set or are coordinates or have a meronymous or superordinate relationship
	Quality association	y is a quality of x or x is a quality of y
	Context association	y gives a conceptual context for x
	Conceptual association	x and y have some other conceptual link
Position-based association (PB)	Consecutive xy collocation	y follows x directly, or with only an article between them (includes compounds)
	Consecutive yx collocation	y precedes x directly, or with only an article between them (includes compounds)
	Phrasal xy collocation	y follows x in a phrase but with a word (other than an article) or words between them
	Phrasal yx collocation	y precedes x in a phrase but with a word (other than an article) or words between them
	Different word class collocation	y collocates with x + affix
Form-based association (FB)	Derivational affix difference	y is x plus or minus derivational affix
	Inflectional affix difference	y is x plus or minus inflectional affix
	Similar form only	y looks or sounds similar to x but has no clear meaning link
	Similar form association	y is an associate of a word with a similar form to x
Erratic association (ER)	False cognate	y is related to a false cognate of x in the L1
	No link	y has no decipherable link to x

(Fitzpatrick, 2006, p. 131)

Appendix II: STEP EIKEN grading scale



(From http://stepeiken.org/about/eiken-grades.shtml)

Appendix III: Word association test

Instructions:

The following activity is a word association test. You will see a list of words with three blank spaces. You should fill in each blank with the first English word that you think of when you read the word. There are no right or wrong answers. Try to fill in as many blanks as you can. You have 15 minutes.

1	environment _____	environment _____	environment _____
2	classic _____	classic _____	classic _____
3	edit _____	edit _____	edit _____
4	media _____	media _____	media _____
5	intelligence _____	intelligence _____	intelligence _____
6	flexible _____	flexible _____	flexible _____
7	assist _____	assist _____	assist _____
8	cycle _____	cycle _____	cycle _____
9	network _____	network _____	network _____
10	mature _____	mature _____	mature _____
11	technology_____	technology_____	technology_____
12	invest _____	invest _____	invest _____
13	symbol _____	symbol _____	symbol _____
14	document_____	document_____	document_____
15	purchase _____	purchase _____	purchase _____
16	data _____	data _____	data _____
17	liberal _____	liberal _____	liberal _____
18	odd _____	odd _____	odd _____
19	expert _____	expert _____	expert _____
20	communicate _____	communicate _____	communicate _____
21	percent _____	percent _____	percent _____
22	globe _____	globe _____	globe _____
23	revenue _____	revenue _____	revenue _____
24	significant _____	significant _____	significant _____
25	maximize _____	maximize _____	maximize _____
26	annual _____	annual _____	annual _____
27	strategy _____	strategy _____	strategy _____
28	enormous _____	enormous _____	enormous _____
29	currency _____	currency _____	currency _____
30	widespread _____	widespread _____	widespread _____

Appendix IV: Pilot word association test

Instructions:

The following activity is a word association test. You will see a list of words with three blank spaces. You should fill in each blank with the first English word that you think of when you read the word. There are no right or wrong answers. Try to fill in as many blanks as you can. You have 15 minutes.

1	mother _____	mother _____	mother _____
2	blue _____	blue _____	blue _____
3	fall _____	fall _____	fall _____
4	world _____	world _____	world _____
5	impossible _____	impossible _____	impossible _____
6	picture _____	picture _____	picture _____
7	road _____	road _____	road _____
8	stay _____	stay _____	stay _____
9	square _____	square _____	square _____
10	night _____	night _____	night _____
11	different _____	different _____	different _____
12	month _____	month _____	month _____
13	pretty _____	pretty _____	pretty _____
14	dream _____	dream _____	dream _____
15	cut _____	cut _____	cut _____
16	society _____	society _____	society _____
17	little _____	little _____	little _____
18	die _____	die _____	die _____
19	car _____	car _____	car _____
20	city _____	city _____	city _____
21	family _____	family _____	family _____
22	short _____	short _____	short _____
23	drink _____	drink _____	drink _____
24	building _____	building _____	building _____
25	money _____	money _____	money _____
26	young _____	young _____	young _____
27	attack _____	attack _____	attack _____
28	ancient _____	ancient _____	ancient _____
29	mountain _____	mountain _____	mountain _____
30	dirty _____	dirty _____	dirty _____

Appendix V: Prompt words by type of instruction and word class

Type of instruction	Words	Word class
Meaning-based instruction	document	noun
	globe	noun
	revenue	noun
	currency	noun
	data	noun
	mature	adjective
	odd	adjective
	enormous	adjective
	purchase	verb
	maximize	verb
Position-based instruction	strategy	noun
	expert	noun
	percent	noun
	intelligence	noun
	cycle	noun
	widespread	adjective
	flexible	adjective
	liberal	adjective
	edit	verb
	invest	verb
Untaught Words		
No instruction	environment	noun
	network	noun
	technology	noun
	symbol	noun
	media	noun
	annual	adjective
	classic	adjective
	significant	adjective
	assist	verb
	communicate	verb

Appendix VI: Description of direct vocabulary activities

Class # (Date)	Meaning-based Activities	Position-based Activities
Class 1 (09/04)	*Finding Substitutes*: students worked together to replace underlined words in sentences with synonymous substitutes provided on a separate list. *Group Work*	*Ordering Words*: students had to arrange scrambled words to make complete sentences. *Group Work*
Class 2 (09/11)	*Answering Questions*: students asked each other questions from a prepared list with the target words in bold (e.g. What's the most important **document** you need when you travel?). *Pair Work*	*Matching Sentence Halves*: students matched ten sentence *heads* with ten *tails* to make ten coherent sentences. Pairs checked their answers with other pairs and corrected their own mistakes. *Pair Work*
Class 3 (09/18)	*Matching Definitions*: students matched target words with their dictionary definitions. Students checked their answers with other pairs in a quiz show format. *Pair Work*	*Matching Collocates*: students matched target words to common collocates. Students then wrote three sentences using three of the collocations. *Pair Work*
Class 4 (09/25)	*Finding opposites*: students were given words printed on slips of paper and walked around the room looking for the person with the opposite word. Once the matches were made, students wrote two example sentences. *Group/ Pair Work*	*Cloze Matching*: students were given slips of paper with either single words or cloze sentences (i.e. sentences with one word replaced by a blank) and asked to find the match. Students then wrote their complete sentences on the board. *Group/ Pair Work*
Class 5 (10/02)	*Picture Matching*: same as "Matching Definitions" from class three, only with pictures in place of the written definitions. *Pair Work*	*Finding Collocates*: Students were each given dictionaries and asked to find three collocates for each target word. Students then wrote them on the board and made example sentences. *Pair Work*

Appendix VII: Complete listing of responses across the three word association tests

Key	
	No instruction (untaught words)
	Position-based instruction (PB words)
	Meaning-based instruction (MB words)

WAT1	WAT2	WAT3
environment	**environment**	**environment**
problem:3 air:1 technology:1 bad:1 earth:1 assessment:1 ecology:1 school:1 protect:1 crane:1 average:1 car:1 destroy:1 important:1 nature:1	problem:2 air:1 technology:1 save:1 poison:1 project:1	problem:2 technology:2 ecology:1 save:1 poison:1 car:1 air:1 clean:1 water:1 eco:1 tree:1
classic	**classic**	**classic**
music:19 ballet:5 car:4 piano:2 guitar:2 violin:1 CD:1 movie:1 building:1 musical:1 house:1 song:1 opera:1 Bethoven:1 record:1 dance:1 castle:1 beautiful:1 place:1	music:19 car:3 piano:3 guitar:2 ballet:1 violin:1 CD:1 movie:1 building:1 history:1 club:1 style:1 game:1 table:1	music:19 car:7 guitar:3 dance:3 piano:3 room:2 ballet:2 movie:1 concert:1 CD:1 fashion:1 building:1 museum:1 style:1 fun:1

trombone:1 TV:1 concert:1 hall:1		
edit	**edit**	**edit**
homepage:1 book:1 photograph:1	homepage:2 newspaper:2 paper:2 movie:2 books:1 out:1 data:1 essay:1 in:1 text:1 TV:1 editor:1 mail:1 an:1	paper:5 newspaper:2 make:1 exit:1 mail:1 photo:1 school:1 magazine:1 house:1 page:1 movie:1 company:1
media	**media**	**media**
TV:7 player:3 radio:3 magazine:3 newspaper:3 people(person):3 ManabuOshio:2 NorikoSakai:2 news:2 work:2 book:2 camera:1 problem:1 report:1 PC:1 job:1 information:1 audio:1	TV:5 news:4 player:2 radio:2 magazine:2 information:2 camera:1 factory:1 newspaper:1 reporter:1 report:1 little:1 comic:1 Internet:1	TV:9 newspaper:4 radio:3 news:2 report:1 network:1 player:1 camera:1 program:1 Internet:1 book:1 magazine:1 guide:1 reporter:1 audio:1 writer:1
intelligence	**intelligence**	**intelligence**
school:2 people:2 dog:2 IQ:2 women:1 college:1 teacher:1	school:2 boy:2 monkey:2 test:1 women:1 college:1 read:1	man (men):3 women (woman):3 boy:3 school:2 study:2 college:2 cool:1

glasses:1 today:1 animal:1 study:1 robot:1	international:1 people:1 book:1 brain:1 girl:1	girl:1 people:1 dog:1 animal:1 color:1 student:1
flexible	**flexible**	**flexible**
knife:1	flu:1 policy:1 mind:1 store:1 human:1	store:1 policy:1
assist	**assist**	**assist**
soccer:3 goal:2 play:1 you:1 comic:1 support:1 volleyball:1	soccer:4 goal:2 play:1 people:1 him:1 homework:1 her:1 me:1 staff:1	goal:4 job:2 assistant:2 pass:1 sports:1 soccer:1 men:1 help:1 hair:1 partner:1 women:1 kick:1 nice:1 talk:1 point:1 punch:1
cycle	**cycle**	**cycle**
Earth:1 recycle:1 motor:1 bicycle:1 bike:1 cycling:1 Yamanoteline:1 week:1 CanjoLine:1 life:1 watch:1 time:1	life:10 recycle:2 motor:2 bicycle:2 bike:1 week:1 travel:1 bi:1 re:1	life:10 recycle:3 bike:2 mystery:1 re-:1 bicycle:1 friend:1 new:1 family:1
network	**network**	**network**
Internet:8 computer:5 telephone	Internet:4 system:2 world:2	world:5 computer:5 Internet:4

(phone):2 mobile:2 access:1 car:1 world:1 folder:1 city:1 house:1 friends:1 street:1 service:1 PC:1 cellphone:1 technology:1 news:1 data:1 food:1 communication:1	local:1 PC:1 job:1 shark:1 worldwide:1 media:1 music:1 cycle:1 friend:1 -ing:1 communicate:1 Japan:1 life:1 game:1 communication:1 support:1	system:3 PC:2 news:2 office:2 communication:2 my:1 worldwide:1 media:1 international:1 line:1 phone:1 online:1 technology:1 business:1 book:1
mature	**mature**	**mature**
	boy :1 men :1 women :1	house :1 girl :1 women :1 men :1 boy :1 fruits :1 tree :1
technology	**technology**	**technology**
computer:3 high (hi):2 bio:1 school:1 information:1 company:1 new:1 industrial:1 Shonai College:1 science:1 great:1 difficult:1 robot:1 system:1 I don't know:1	bio:2 school:1 information:1 company:1 new:1 eco:1 machine:1 nano:1 hyper:1 super:1	Vaio:3 information:2 inspider:1 green:1 computer:1 school:1 company:1 mechanic:1 hi:1 engineer:1 subject:1 team:1 fire:1 book:1 new:1
invest	**invest**	**invest**
CD:1	money:1	money:1
symbol	**symbol**	**symbol**
mark:3	mark:5	mark:5

Japan:2 Tokyo Tower:2 tower:1 world:1 trademark:1 totempoll:1 pyramid:1 music:1 team:1 leaf:1 star:1	Japan:1 Tokyo Tower:1 tower:1 Japanese Flag:1 built:1 Hitoshi Matsumoto:1 peace:1	Japan:2 tower:2 Tokyo Tower:1 my:1 big:1 design:1 only one:1 beautiful:1 America:1 Canada:1 flag:1 important:1
document	**document**	**document**
TV:6 movie:4 drama:2 news:2 good:1 newspaper:1 book:1	TV (television):7 movie:4 story:3 paper:2 personal:1 news:1 picture:1 anime:1	movie:3 TV:3 book:3 story:2 program:2 news:2 my:1 company:1 picture:1 real:1 cameraman:1 drama:1 personal:1 paper:1
purchase	**purchase**	**purchase**
	money:1 bank:1 food:1 drink:1 cycle:1 anything:1	money:1 food:1 drink:1
data	**data**	**data**
folder:2 base:1 time:1 book:1 computer:1 birthday:1 box:1 diary:1 365days:1 edit:1 note:1	base:4 folder:3 file:3 disk:1 table:1 my:1 secret:1 PC:1 program:1 computer:1 box:1	box:3 base:2 computer:2 paper:2 folder:2 book:2 date:1 percent:1 program:1 office:1 secret:1

program:1	source:1 active:1 day:1 used:1	card:1 personal:1
liberal	**liberal**	**liberal**
book:1	arts:2 -ism:2 party:1 liberalist:1	party:1 people:1
odd	**odd**	**odd**
number:1	human:2 boy:2 man (men):2 people:1 eye:1 animal:1 woman:1 dog:1 cat:1 girl:1 natural:1	human:2 comics:1 people:1 boy:1 dog:1 eye:1 laugh:1 bird:1 girl:1 comedian:1 cat:1
expert	**expert**	**expert**
professor:1 Ichiro:1 Mac:1 run:1 doctor:1	teacher:3 car:1 programmer:1 job:1 -ise:1 people:1 sport:1 -ly:1	job:2 teacher:2 human:1 professional:1 sport:1 culture:1
communicate	**communicate**	**communicate**
talk :3 important :2 friend(s) :2 email :2 room :1 international :1 conversation :1 people :1 sports :1 pet :1 telephone :1 fun :1	talk :3 study :1 friend :1 world :1 event :1 bad :1 email :1	talk :2 friend(s) :2 family :2 place :2 people :1 communication :1 friendly :1 study :1 way :1 group :1 Internet :1
percent	**percent**	**percent**
100:3 math:2	100:4 math:1	100:6 -age:2

one:1 two:1 dice:1 win:1	one:1 two:1 three:1 twenty:1 thirty:1 fifty:1 juice:1 of:1 percentage:1 -age:1	one (1):2 10:2 juice:1 %:1 full:1 two:1 20:1 three:1 30:1
globe	**globe**	**globe**
baseball:5 softball:2 society:1 Komuro Tetsuya:1 hand:1 dig:1 Keiko:1 blue:1 catch:1	Earth:3 society:1 ball:1 cosmos:1 ping-pong:1	Earth:3 world:3 baseball:2 ball:2 right:1 ment:1 blue:1 society:1 hand:1 wide:1 left:1 language:1 big:1 Jupiter:1
revenue	**revenue**	**revenue**
dig:1	money:1 book:1 America:1 Australia:1 Japan:1	country:1 money:1
significant	**significant**	**significant**
me:1 you:1		program: 1
maximize	**maximize**	**maximize**
big:1	big:2 biggest:1 small:1 high:1 long:1 homework:1 pen:1 water:1 ball:1 music:1 people:1	elephant:1 water:1 many:1 size:1 problem:1 big:1 MegaMac:1 paper:1 candy:1 symbol:1 large:1

	fashion:1 garbage:1	long:1 cake:1
annual	**annual**	**annual**
fireworks:1 summerfestival:1	party:1	cute:1 pretty:1
strategy	**strategy**	**strategy**
bad:1		
enormous	**enormous**	**enormous**
	money:1	men:1 women:1 people:1
currency	**currency**	**currency**
	coin:1 money:1	Japanese:1 dollar:1 chocolate:1 men:1 women:1 America:1 Australia:1 people:1
widespread	**widespread**	**widespread**
	flu :4 Africa :1 base :1	flu :5 world :2 cold :2 America :1 Africa :1 supermarket :1 juice :1