First and second language word association. A study of how native English speakers and ESL learners make mental links between English words they have learnt.

By
Sarah Barrow

Student Number: 1047483

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Supervisor: Ali Shehadeh

Centre for English Language Studies
Department of English
University of Birmingham
Edgbaston
Birmingham
B15 2TT

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Abstract

This dissertation is a study into first and second word association. It compares the mental lexicon of those who have English as a first language (L1) with those who speak English as a second language (L2). The mental lexicon has been described as a human word-store (Aitchison 2003: 10-14), a network which has a multidimensional complexity consisting of many levels of interconnection between each item (Wilks and Meara 2002: 303). Using qualitative and quantitative data collection methods, this study attempts to show how low, middle and high ability L2 learners make associations between words they have learned, providing information about how words are sorted in the lexicon and how mental links between these words are made. The overall findings of the study show that L1 low, middle and high ability students use syntagmatic links most often. In comparison, syntagmatic links were most commonly used by L2 low and middle ability students and phonology was a popular link used by L2 middle ability children. The results of this study show the L2 mental lexicon is not structurally different or inferior to the L1 lexicon. It is in a developmental stage and is not a fully developed process as the L1 mental lexicon.

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Dedication:

For Ian, thank you for your continual positive outlook, support and faith.

Table of Contents

1.	Introduction	8
2.	The Mental Lexicon	10
2.1	The Structure of the L1 Mental lexicon	11
2.1.1	Young Learners' Lexical Development in their L1	11
2.2	The L2 Mental Lexicon	12
2.2.1	Young Learner's Lexical Development in a Second Language	13
2.3	Structural similarities / differences in the L1 and L2 Mental Lexicon	14
2.4	How can the similarities or differences be investigated?	15
2.5	Paradigmatic Links	17
2.5.1	Coordination	17
2.5.2	Hyponymy	18
2.5.3	Synonymy	18
2.6	Syntagmatic Links	18
2.6.1	Collocation	18
2.6.2	Phonological and Orthographical Links	19
2.6.3	Experiential Links	19
2.7	The Current Study	19
3.	Methodology	20
3.1	Context of the Study	20
3.2	The Participants	20
3.3	Preliminary Testing	21
3.3.1	Preliminary Data Collection	22
3.3.2	Discussion of Preliminary Testing	22
3.3.3	Changes Made Following Preliminary Testing	23
3.4	Final Data Collection Methods	24
3.4.1	Participants	24
3.4.2	Data Collection Instruments	24
3.5	Data Collection Procedures	25
3.5.1	The WAT	25
3.5.2	The DIWK Test	25
3.5.3	Associate Task	25
3.5.3	Associate Task	25
3.5.4	Picture Activity	26
3.5.5	Variables	26
3.6	Data Analysis and Coding of Data	26
3.6.1	WAT	26
3.6.2	DWIK	27
3.6.3	Response Test	28
3.6.4	Picture Activity Coding	28
4.	Results	29
4.1	Results from the Word Association Test (WAT)	29
4.2	Depth of Individual Word Knowledge Test Results Compared with Depth of Response Test Results	37
4.3	Picture Activity Results	43

5.	Discussion of Results	48
5.1	Expected and Unexpected Results	48
5.1.1	Word Association Test Results	48
5.2	Discussion of Results	51
5.2.1	Overall Findings	51
5.2.2	Depth of Individual Word Knowledge Test Results	51
5.2.3	Picture Activity Results	51
5.3	Depth of Individual Word Knowledge Test Results Compared with Depth of Response Test Results	52
6.	Conclusion	54
6.1	Summary of main findings	54
6.2	Implications of the findings of the study	54
6.3	Limitations of the study and recommendations for further research	55
7.	Appendices	57
7.1	Appendix One Preliminary Word Association Test Format	57
7.2	Appendix Two Word Association Test Format	58
7.3	Appendix Three DIWK Test Depth of Individual Word Knowledge Test	58
7.4	Appendix Four Depth of Associate Test	59
7.5	Appendix Five Picture Activity Questions	59
7.6	Appendix Six Responses for Word Association Tests	60
7.7	Appendix Seven Picture Activity Responses	70
8.	Bibliography	76

List of Tables

Table 1	Strategies a native language learner can apply (from Aitchison 1998: 2)	10
Table 2	From Deese (1965 in Carter 1998: 19 showing typical WAT responses)	15
Table 3	From Slobin (1971 in Carter 1998: 19) Showing examples of main networks and word associations.	17
Table 4	Background of the L1 Participants	21
Table 5	Background of the L2 participants	21
Table 6	Changes made in the WAT	23
Table 7	Changes made after the DIWK test	23
Table 8	Additional Changes Made	24
Table 9	Showing Lexical links and abbreviations used during testing and coding.	26

Table 10	Showing VKS and Scores	27
Table 11	Showing the criterion and scores given in the Depth of Response Test	28
Table 12	Influenced by Wolter (2001: 43) Showing links and sub links during the picture activity)	28
Table 13	Categorised and Uncategorised Responses in the Word Association Test	29
Table 14	Classified and Unclassified L1 WAT Responses	30
Table 15	L2 Responses	31
Table 16	L1 and L2 Participants (Word Associations)	32
Table 17	L1 Classified Table showing Phonetic, Paradigmatic, Syntagmatic and Experiential Links	32
Table 18	L2 Classified Table showing Phonetic, Paradigmatic, Syntagmatic and Experiential Links	32
Table 19	L1 Classified Table showing Lexical Links and Ability	34
Table 20	L2 Classified Table showing Lexical Links and Ability (Table 20)	36
Table 21	Table showing Depth of Individual Word Knowledge Test Results Compared with Depth of Response Test Results (L1)	37
Table 22	Showing percentages of L1 Depth of Individual Word Knowledge Test Results	38
Table 23a	Showing L1 associate test scores	38
Table 23b	Showing percentages of L1 associate test scores	38
Table 24	Table showing Depth of Individual Word Knowledge Test Results Compared with Depth of Response Test Results (L2)	40
Table 25	Showing percentages of L2 Depth of Individual Word Knowledge Test Results	41
Table 26a	Showing L1 associate test scores	41
Table 26b	Showing percentages of L2 associate test scores	41
Table 27	Showing picture activity results (RED) (L1 and L2)	44
Table 28	Showing picture activity results (SHINY) (L1 and L2)	45
Table 29	Showing picture activity results (WALK) (L1 and L2)	45
Table 30	Total picture activity results	46

List of Figures

Figure 1	An illustrated picture of the mental lexicon (from Foder 1985 in Fitzpatrick 2011: 2)	11
Figure 2	Depth of Word Knowledge Model of the Mental Lexicon (from Wolter 2001: 48)	16
Figure 3	Categorised and Uncategorised lexical responses (L1 and L2)	30
Figure 4	Categorised and uncategorised word association responses (L1)	30
Figure 5	Categorised and uncategorised word association responses (L2)	31
Figure 6	Categorised word associations (L1 and L2)	32
Figure 7	A comparison of L1 and L2 lexical links	33
Figure 8	A Comparison of L1 lexical links by ability	34
Figure 9	Proportion of lexical links by ability (L1)	35
Figure 10	A comparison of L2 lexical links by ability	36
Figure 11	Proportion of lexical links by ability (L2)	36
Figure 12	A comparison of low ability DWIK test results and Associate Test Results (L1)	39
Figure 13	A comparison of middle ability DWIK test results and Associate Test Results (L1)	39
Figure 14	A comparison of high ability DWIK test results and Associate Test Results (L1)	40
Figure 15	A comparison of low ability DWIK test results and Associate Test Results (L2)	41
Figure 16	A comparison of middle ability DWIK test results and Associate Test Results (L2)	42
Figure 17	A comparison of high ability DWIK test results and Associate Test Results (L2)	43

Chapter One

1. Introduction

Throughout this course, I have become increasingly interested in the mental lexicon and how people, in particular children, find words they want to use. As Aitchison (2003: 3 - 4) says, words are fascinating and we depend on them as part of our everyday lives. We use them constantly without thinking. It is because of this dependency that the mental lexicon is a focus area of research. Many studies have been conducted into learning more about the power of words and vocabulary. Such research is often driven by the desire to investigate the development and organisation of the mental lexicon (Fizpatrick 2007: 1).

Debot, Lowie and Verspoor (2005: 39) state that language processing is a complex interaction that involves a wide range of factors, which affect the efficiency of the lexicon particularly the size of the student's vocabulary. Having a larger vocabulary can give a greater connectivity, allowing language users to associate words they know with a larger number of different words, and having a larger vocabulary allows richer connections in size, commonality and heterogeneity to be made (Zareva 2007: 138). Having an insight into the mental lexicon can help guide teachers, educational practitioners and academics in supporting pupils with their language development and building a developmental model of the lexicon. Through studying the MA course, combined with my own experiences of teaching, I have become increasingly interested in the mental lexicon, particularly the lexicon of those who speak English as a second language (ESL). Due to these experiences and my studies into lexis, I have come to realise that children who speak English as a second language may need different strategies and support to guide their language development than those who speak English as a first language.

This study was conducted at an infant school in Basingstoke, Hampshire, England. Basingstoke has been also described as a 'London overspill', where many large companies have relocated to commercial land, which resulted in families moving from London to Basingstoke where they often received publicly provided housing. Due to this migration, Basingstoke has rapidly grown in size, and many schools are oversubscribed and are growing in size, which is the case with the school site of this study. Due to the increasing number of families relocating to the area, there has been an increase of children who speak English as a second language attending the school. There has been an increasing amount of global migration to Basingstoke, as some

families are seeking asylum, and are given an opportunity to live in the new housing development.

Therefore, the focus of this study is investigating how words are selected by ESL learners, and the processes involved in selecting the chosen word and the central role of lexicon in language processing. This process will be compared with speakers who have English as a native language (from now referred to as L1 students), in comparison with speakers who have English as a second language (from now referred to as L2 students).

When teachers in School were questioned about the sudden growth of L2 students attending the school, many commented on feeling inadequately trained with teaching children who have English as a second language. They felt that they were not meeting the needs of these pupils, as they felt they had insufficient lexical knowledge about L2 language development. Cameron (2002: 146) states that teachers can be placed in teaching situations with limited understanding of additional language development and of the teaching practices that can meet the needs of pupils. Therefore, an action research methodology has been adopted in this study (following Hadley et al 1997: 4 and Cohen and Manion 1994: 194) as a diagnostic approach is needed to target and investigate specific areas of need raised by classroom teachers. Then strategies can be put in place to meet the needs of pupils (Hadley et al 1997: 4). Therefore, the main motivations behind this study are to increase knowledge of the L1 and L2 lexicon through word association strategies, due to a professional need and personal interest, investigating how L1 and L2 students find words they want to use.

According to Fitzpatrick (2007: 1), findings from word association experiments have failed to produce consistent findings of the mental lexicon, therefore the purpose of this dissertation is to investigate words and their associations. This study differs from previous research in two ways: firstly a qualitative and quantitative methodology has been adopted to produce a varied set of data, which will allow conclusions and comparisons to be formed and to produce consistent findings which can explain the similarities or differences between the L1 and L2 mental lexicon. Second, several testing measures have been introduced to test word association and depth of word knowledge in order to give a more holistic view of the lexicon.

This study begins with a review of existing research of the mental lexicon, focusing on a first language lexicon, and then a multilingual lexicon. The methodology behind this study is then introduced and explained. This section is followed by the results

section, where the results from the data and results are presented and explained. After a discussion of results section, the hypothesis that constitutes the basis of this study is discussed with respect to whether the L1 and L2 lexicons are structurally similar or different, and if L1 and L2 students go through the same processes when finding words they want to use.

Chapter Two

2. The Mental Lexicon

Examining links between a person's language knowledge and language usage are vital when investigating the mental lexicon (Aitchison 1998); however acquiring word meaning is a complex process (Henriksen 1999: 307). According to Aitchison (1998: 2) decoding and encoding are strategies used when acquiring or learning a language. These processes are illustrated in the table below:

1 Understand sentences or 'decode' 2 Produce sentences or 'encode'	LANGUAGE USAGE
3 Store linguistic knowledge	LANGUAGE KNOWLEDGE

Table 1. Strategies a native language learner can apply (from Aitchison 1998: 2)

The mental lexicon specifies how a word is spelled, pronounced, its part of speech and what a word means (Garnham 1985: 43). It has been described as a 'web of words' and a network which has a multidimensional complexity (Wilks and Meara 2002: 303). A mental map, similar to the plan of the London Underground System, a network which, in reality, is much more complex (Aitchison 2003: 37). According to Fodor (1985 in Fitzpatrick 2011: 2) the lexicon is like a connective graph, with lexical items and nodes with paths from item to item (see figure 1). There is no guarantee that human minds work in a neat and economical fashion, as some words are not easy to retrieve, however, the lexicon is an intricate system and words can be found and selected quickly (Aitchison 2003: 26, 4+5).

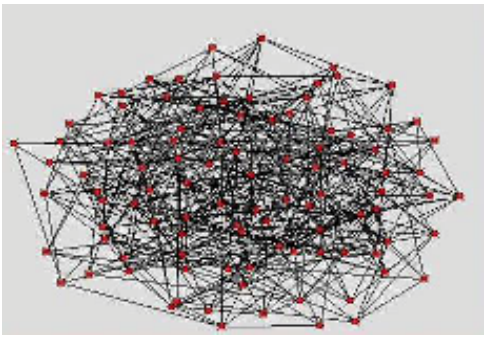


Figure 1 An illustrated picture of the mental lexicon (from Foder 1985 in Fitzpatrick 2011: 2)

2.1 The Structure of the L1 Mental lexicon

According to Wolter (2001: 46) language proficiency can reveal how words are stored in the lexicon. It has also been suggested that words are not placed alphabetically in the mental lexicon, as incorrectly spelt words can still be found. The structure of sound and meaning must also be considered as it is a possible for words to be confused with similar meanings and phonetics to also be located (Aitchison 2003: 11). The lexicon is constantly changing with new words and meanings are continually added. The lexicon is not fixed; it is spontaneous, fluid and in a constant state of flux (Wolter 2001: 47, Aitchison 2003: 13). However, psycholinguistic experiments have shown that the lexicon is highly organised as speakers are able to conduct an orderly search through their mental-word store in a short length of time, showing that the retrieval system of the lexicon is an organised and structured system (Aitchison 2003: 8+9). According to Wolter (2001: 46) word frequency, vocabulary breadth and depth can also give the linguist explanations of the structure of the lexicon (Qian and Schedl 2004: 29). Henriksen (1999: 304) suggests that lexical competence consists of three dimensions: partial-precise knowledge, depth of knowledge and receptive and productive knowledge, which are dependent on vocabulary breadth and depth.

2.1.1 Young Learners' Lexical Development in their L1

A Child's language development is hugely influenced by their environment, as the quality of a child's spoken language is largely determined by the language they are exposed to and young learners demonstrate a huge ability to absorb language of all its complexity (Macdonell 2002: 20). Chomsky (in Aitchison 1998: 134) states that children learn a language efficiently due to a predetermined knowledge of the

structure of language. Children have an ability to apply language structures in various social settings and do not merely acquire language structures; however, the social context is also valuable, as children in their early stages of speech are heavily dependent on their surroundings (Aitchison 1998: 5). Language development is systematic and often goes beyond what has been heard to create new forms and structures, children's minds are not empty vessels awaiting to be filled, they are born with a specific innate ability to discover for themselves the underlying rules of a language system, through exposure to samples of natural language (Lightbrown and Spada 2006 : 15). However, Vygotsky (1978 in Aitchison 1998: 111) suggests children can make overgeneralisations about their L1 language which can lead to confusion which is referred to as the 'chain complex' due to the chain of items formed which are linked by the same name, this leads to the content vs. process approach and ultimately Universal Grammar (Aitchison 1998: 111). A child's first exposure to schooling is a hugely powerful stage in a young child's development, as it is where the concept of communication is learned through language (Macdowell 2001: 20).

2.2 The L2 Mental Lexicon

Previous research into the bilingual lexicon has generally fallen into two paradigms: some past studies stated that bilingualism had a negative impact on cognitive development. For example, Runnqvist and Costa (2011: 1) suggest that speaking two languages can be a disadvantage to an L2 speaker, as lexical processing maybe slower and less reliable, due to the need to resolve competition between the target word and its translation. However, some research studies have shown that speaking at least two languages can have a positive effect on lexical development, as bilingualism demands higher level of lexical skill, influencing cognitive control and language representation (Kormi – Nouri, Moradi, Moradi, Akbari – Zardkhaneh and Zahedian (2010: 10). Finding words in an L2 speaker's second language, rather than their first language, is a challenging process particularly for a less experienced bilingual speaker, as it involves skills such as listening, understanding what is being said, translating and then switching back to an L2 and producing coherent speech (Debot 2005: 258-259). Marinova-Todd (2011: 1) suggests that L2 learners become efficient language learners, particularly in terms of vocabulary acquisition, as they can switch between two or more languages; this can develop metalingusitic awareness and the ability to analyse and control language structures. It has also been suggested that L2 speakers

are more flexible learners, due to their exposure to L1 and L2 languages structures. When comparing L1 and L2 language development, it has been suggested that the average L2 child will reach language development milestones at the same age as monolingual children, but the process of learning language can vary (Marinova-Todd 2011: 2). Many have suggested that L2 children progress in their lexical development through maturation, social experience and language experience building richer semantic networks (Marinova-Todd 2011: 3). It must also be recognised that intrinsic link between language and culture is vital when attempting to understand word choices from an L2 lexicon; this affects the acquisition and organisation of new vocabulary (Zahera 2007: 6).

2.2.1 Young Learner's Lexical Development in a Second Language

Second language acquisition is affected by many factors, particularly the learners individual stage of development and challenges presented when learning a second language (Lightbrown 1985: 177). Also, the type and amount of contact with the language, age, attitude, motivation, intelligence, and earlier learning experiences are contributing factors to learning an L2 (Debot 2005: 3). Learning an L2 is a challenging and slow process, which includes a mixture of affective, cognitive and social factors (Brown 2007: 290, Willis and Littlemore 2001: 3).

The L2 lexicon is a dynamic system which is unpredictable and chaotic, that constantly self organises and changes. The concepts of 'association' and 'activation' are central to the dynamic model, particularly 'activation' as the language node helps to control language processing by activating a particular language subset and inhibiting others, which are not like an on or off switch. Debot et al (2005: 48) describes a metaphor of holding down ping pong balls in a bucket full of water, whilst trying to hold down all the balls, one or two will inevitably jump to the surface. This illustrates that interference of the stronger language into the weaker language is more likely than interference from the weaker language into the stronger, as words that are heard, seen or used most often are most easily accessed again. Words that are heard, seen or used the least will be the more difficult to retrieve. This suggests acquiring new words in the lexicon depends on the level of proficiency of the speaker, as children may produce mainly 'clang' associates, as they see a phonological link between words where more experienced L2 speakers may use syntagmatic links (Meara 1983: 1-2). Moon and Jiang (2011: 1) suggest two possible L2 lexical

procedures when attempting to select target words. Firstly the selective access view when L2 speakers are engaged in a monolingual task they are able to select the chosen language whilst keeping the other language dormant, however, non-selective access view states that both languages of a bilingual speaker are activated on some level even when one language is in use. However, recent research has shown that bilingual speakers cannot completely turn off or shut down the language that is not required by a task, as both languages are active even in a monolingual task. According to Moon and Jiang (2011: 2), the bilingual lexicon is more integrated than separate, as words share a high degree of semantic or phonological overlap. It has also been suggested that when completing a lexical decision task, L2 speakers may quickly make decisions due to lexical activation, particularly performing tasks in their dominant language before representations in the non-dominant language can influence first language processing (Friesen and Jared 2011: 9). However, it must be remembered that the process of first and second language acquisition varies from learner to learner and that it is a complex system, dependent on cultural variables (Brown 2007: 290).

2.3 Structural similarities / differences in the L1 and L2 Mental Lexicon

According to Aitchison (2003: 84) the mental lexicon is an interconnected system, however the investigation of these structural similarities or differences has been a debatable issue in Lexical research. It has been suggested that an L1 lexicon is structurally different from the L2 lexicon (see Channell 1990). Meara (1983: 7) argues that there are significant differences between the structure of the L1 and L2 mental lexicon, as connections made by L2 speakers are less stable than native speakers, plus phonetic links are often more frequent in L2 than L1 associates. However, according to Wolter (2001: 61) structural similarities exist between the L1 and L2 lexicon, although the L2 lexicon may be less developed as syntagmatic links are dominant. However, this may not mean that the L2 lexicon is less structurally superior, as paradigmatic connections may not play as vital a role in the L2 lexicon than in the L1 lexicon (Wolter 2001: 63). It has also been suggested that a larger proportion of L2 responses are phonetic, therefore requiring less lexical sophistication than paradigmatic or syntagmatic associates (Wolter 2001: 63).

2.4 How can the similarities or differences be investigated?

Word association tests (will now be referred to as WATs) have been a popular tool to investigate word association. Due to the complex nature of the mental lexicon, WATs have given the researcher a quantifiable measure of information about lexical storage and retrieval behaviour (Fitzpatrick 2011: 2). WATs allow the linguist to create a 'word-web' (Aitchison 2003: 85) testing the link between word knowledge and integration (Wolter 2001: 42). Word association has been described as a complex process which involves comprehension, storage, retrieval and production skills (Aitchison (1998: 89). Even widely used words can have a complex relationship that exists in a structural semantic network (Carter 1998: 22). Deese (1965 in Carter 1998: 19) suggests typical WAT responses are:

Stimulus	Typical Response
accident	car
alive	dead
baby	mother
born	die
cabbage	vegetable
table	chair
careless	careful

(Table 2 From Deese (1965 in Carter 1998: 19 showing typical WAT responses)

Meara (1983: 1) suggests that results from WAT generally fall into two main word classes: paradigmatic associations and syntagmatic associations. Wolter (2001: 43) defines paradigmatic responses are words from the same word class as the prompt word and perform the same grammatical function within a given sentence. In contrast, syntagmatic responses have a sequential relationship with the stimulus word, but usually fall into a different word class as the prompt word. Children tend to use syntagmatic responses, usually at the age of seven, and clang associates, due to responses related to the phonological features of the stimulus word, but which has no obvious semantic relationship to it (Meara 1983: 1). Rhyming responses, assonance, responses with the same initial sounds as the stimulus, or similar prominent consonant cluster are common types of clang associate (Meara 1983: 1+2). Wolter (2001: 43)

defines ‘clang’ associates as responses with no semantic connection to the stimulus word, but they are linked phonologically. According to Fitzpatrick (2001: 3) an L1 language function matures around the age of six years, more paradigmatic responses are made, less syntagmatic responses are made and almost no phonological responses are made. Often, the original semantic ‘fields’ of the original word are stored together and the partner word is often chosen (for example husband and wife) (Aitchison 2003: 85). However, according to Wolter (2001: 4) words are acquired individually and go through developmental shifts, which can be performed separately from other words in the mental lexicon. Wolter states that the mental lexicon can consist of core vocabulary, which contains well-known words, and layers of peripheral vocabulary which consists of words that are known to varying degrees. Figure two shows Wolters Depth of word knowledge model of the mental lexicon.

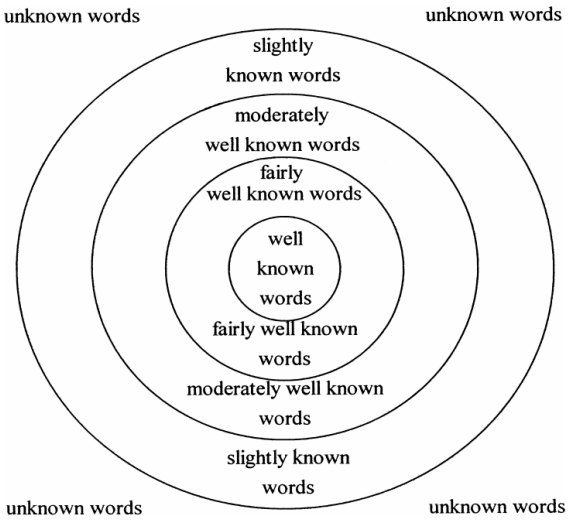


Figure 2. Depth of Word Knowledge Model of the Mental Lexicon
(from Wolter 2001: 48)

Figure 2 displays a circular diagram, which shows different levels of word knowledge, ‘well known words’ are placed centrally leading to slightly known words in the outer circles. Wolter (2001: 48) suggests that paradigmatic links are present in the central circles, then syntagmatic links between words slightly further out and phonological associations between words located in the outer circles. Wolter suggests that this model can account for a syntagmatic - paradigmatic shift for L1 and L2 speakers, as all responses made by L1 and L2 speakers can be displayed in this diagram, therefore

allowing the researcher to analyse subconscious connections and the integration of words in the lexicon.

Carter (1998: 19) supports a structural semantic approach in the belief that words do not exist in isolation and their meanings are defined through the sense relations they have with other words. Such associations are organized structurally in a less coherent way than they may initially appear. Some main networks are listed in the table below (from Slobin 1971 in Carter 1998: 19).

Contrast or antonymy	Wet - dry
Similarity or synonym	Blossom - flower
Subordinate classification	Animal - dog
Coordinate classification	Apple - peach
Superordinate classification	Spinach - vegetable

(Table 3 From Slobin (1971 in Carter 1998: 19) Showing examples of main networks and word associations.

The relationship between these words is classified through synonymy, antonymy, and hyponymy relations (Carter 1998: 20). Aitchison (2003: 86) considers four common links between stimulus words and responses. These are coordination, collocation, superordination and synonmy. I shall discuss the common links below.

2.5 Paradigmatic Links

Debot et al (2005: 51) presents a dynamic model of the multilingual lexicon in which the degree of activation and numbers of associations between entries determine the state of the lexicon at any moment in time. The lexicon consists of lemmas with all kinds of conceptual, semantic, syntactic and paradigmatic information with their corresponding lexemes. However, this is one aspect of the information the speaker has, as emotion and memories the participant has, maybe linked to certain concepts.

2.5.1 Coordination

Aitchison (2003: 86) defines coordination as words that cluster together on the same level of detail, including opposite words associates. This includes antonym and co-hyponymy. Data from previous word association experiments suggests that this is the

most common link in native word association responses, as words are stored in semantic fields and coordinates are closely associated, such as semantic tongue-slips yesterday – *today*, blue – *green,* dog - *cat* (Aitchison 2003: 87, Wolter 2001: 43). When looking for an unfamiliar word it is possible to look in the same semantic area and within a group of coordinates (Aitchison 2003: 88).

2.5.2 Hyponymy

According to (Aitchison 2003: 86) hyponymy is a type of asymmetrical synonymy as its organization is hierarchical. Carter (1998: 21) states that hyponymy is 'inclusive' in sense relations, due to the relationship that exists between specific and general lexical items, as the semantic field is included within another word, for example: red, *scarlet, crimson.* (Wolter 2001: 43).

2.5.3 Synonymy

Aitchison describes synonymy as a word with the same meaning as the original word (Aitchison 2003: 86). Synonymy has symmetrical sense relation in which more than one linguistic form can be said to have the same conceptual or propositional meaning, for example: dog - *canine* (Carter 1998: 20, Wolter 2001: 43).

2.6 Syntagmatic Links

2.6.1 Collocation

Collocation refers to a group of words which occur repeatedly together in a language. These predictable patterns of co-occurrence can be grammatical as they result primarily from syntactic dependencies or they can be lexical as patterns can result from the linguistic environment in which certain lexical items will co-occur, for example: Dog- *bite* or *bark* (Carter 1998:51, Wolter 2001: 43). Collocation is a common response in WAT, as certain words are likely to be found together and produce powerful and long lasting connections (Aitchison 2003: 86). Previous word association experiment data has shown that humans seem to be fairly sensitive to collocational links and often word meaning is learned through noting words which collocate alongside each other (Aitchison 2003: 91). However, McCarthy (1990: 40) argues that L2 learners may use phonological strategies rather than collocation links when associating words, as they lack the ability to make instant collocation decisions.

2.6.2 Phonological and Orthographical Links

According to McCarthy (1990: 35) phonological responses may be chosen by the respondent as they have a similar sound structure to the target word (McCarthy 1990: 35). Mattheoudakis (2003: 2) suggests L2 learners often make orthographic links in response to a target word similar to young children learning their mother tongue, for example: dog – *bog* (Wolter 2001: 43). The phonological link often overrides semantic links as these lexical links are stronger in the initial stages of learning a second language. However, a native speaker may rely less on 'clang' associations due to more developed semantic links in the mental lexicon (Mattheoudakis 2003: 10).

2.6.3 Experiential Links

Experiential links include any link associated with a child's previous experience, including encyclopaedic links. This link is particularly relevant to young children as many of their responses may be linked to their experiences and speakers may have emotions that correspond with certain concepts (Debot et al. 2005: 51).

2.7 The Current Study

Previous research available testing these mental links is sparse, as a large proportion of research has been focused on native speaker associations, rather than a comparison between the L1 and L2 lexicon (Wright 2001: 1). Historically, previous research in the lexicon has shown that the L1 and L2 lexicon are different, but more recent research suggests otherwise (Mattoudakais 2003). Recently there has been a growth of investigation into the L2 lexicon (see Fitzpatrick and Izura (2011), Zahedian (2010) and Marinova – Todd (2010) that suggests word association can support ESL pupils with lexical development and vocabulary growth. It was decided that this area would benefit from further investigation to gain a deeper understanding of the lexicon. A holistic view of the lexicon was needed to gain theoretical and pedagogical benefits. Therefore the hypothesis was created that both L1 and L2 students go through the same process when trying to find the words they want to use and the rationale behind this hypothesis is that the L1 and L2 lexicon are structurally similar. It is also predicted that low ability L1 and L2 students will prefer phonological links, but L2 students may generally rely on phonetic links more than L1 students.

Chapter Three

3. Methodology

3.1 Context of the Study

This study was carried out in a state infant school located in a large housing estate on the outskirts of Basingstoke, Hampshire, England (now referred to as school X). One hundred and sixty pupils aged five to seven years attend the school and attendance is increasing due to a large housing project creating many new homes in the area. According to Ofsted (2007) the majority of all children begin School with attainment that is below the national average. There is a high level of social need in the school's surrounding area and basic levels of reading and writing are low.

3.2 The Participants

All the participants were five years old and in their first year of formal English schooling, at the time of research collection. The sample consisted of ten children who have English as a first language and ten children who have English as a second language; a sample of this number allowed lexical links to be investigated. It is school policy for all children to be placed in ability groups, ranging from high ability to low ability. The researcher formed a sample which consisted of L1 and L2 participants, of all abilities (see Tables 4 and 5 below). Due to the young ages of the students, a letter asking for parental consent was sent home to their parents. All parents agreed to their children taking part in the testing.

Several issues were addressed to ensure that the sample was representative and valid. A gender balance was created, so an equal number of girls and boys was represented. The sample also consisted of a range of abilities to allow the researcher a wide set of data to then draw conclusions. Due to the limited number of children who had English as a second language in the school, the sample consisted of three high ability children, five middle ability and two children of low ability. In order to keep the procedure consistent, this sample was mirrored with children who had English as a native language. The research took place in a room in the school the children know as 'The Cove', a place where the children often take part in intervention programmes and group tutorials. This location was selected by the researcher as it is familiar to the children, therefore limiting feelings of anxiety and a feeling of 'being tested'.

Table 4 Background of the L1 Participants

L1 Participants		
Child	Ability	Native Language
1	High Ability	All participants have English as their first language.
2		
3		
4	Middle Ability	
5		
6		
7		
8		
9	Low Ability	
10		

Table 5 Background of the L2 participants

L2 Participants			
Child	Ability	Native Language	Languages Spoken
A	High Ability	Hindi	2
B		Chinese	2
C		Urdu	2
D	Middle Ability	Urdu	2
E		Hindi	3
F		African	2
G		Urdu	2
H		Nepalese	2
I	Low Ability	African	2
J		Nepalese	2

3.3 Preliminary Testing

The researcher conducted preliminary testing to explore any potential flaws with the data collection tools and to highlight any areas that may need further investigation. To ensure issues of validity and reliability with the continuity of L1 and L2 participants, the same children were tested in the preliminary investigation and the final investigation. Each participant completed a WAT and a Depth of individual word knowledge test (DIWK), inspired by studies conducted by Mattoudakis (2003), Wolter (2001) and Meara (1983), giving the researcher primary research (Brown 1988 in Dornyei 2007: I).

3.3.1 Preliminary Data Collection

The researcher conducted a WAT with each of the participants individually (following Carter 1998: 20, 311) (see appendix one). The preliminary WAT consisted of seven stimulus words taken from various word groups. The researcher decided to use a WAT as the process can allow students to activate and recall particular associate words (Cameron 2002: 151). The data collection took place in 'the cove'. The researcher introduced the WAT to each child, following a script to ensure that each child had the same input. Then, the researcher verbally said each stimulus word to the participant, once. The child was given an opportunity to respond, and the researcher recorded the response on a template. The researcher then categorized the responses using a systematic approach, as suggested by Mattoudakis (2003). Then the researcher conducted a DIWK test with each participant for the first stimulus word on the WAT. The questions were presented verbally to each participant and the researcher recorded the answers. Each participant was given an opportunity to complete a DIWK test, despite their responses given in the WAT. The researcher then recorded the results onto a table, where the responses were compared.

3.3.2 Discussion of Preliminary Testing

The preliminary testing raised some interesting points, which were addressed in the final data collection procedure. The first issue highlighted was the order of saying the stimulus words. It was decided that starting the WAT with a pronoun or a low frequency word confused the children. Also, the number of stimulus words used was increased from seven to ten stimulus words to give a broader range of responses for the researcher to compare and analyse. The researcher chose different stimulus words for the preliminary Word Association Test (WAT) than the final WAT, to ensure that the participants were not 'primed' to give particular responses. The preliminary testing revealed a leaning to quantitative methodology, so the researcher introduced a balance of quantitative and qualitative methodology, to ensure triangulation and to maximise the strengths of each approach (influenced by Marshall and Rossman (1989: 42 in Mcdonough and Mcdonough 1997: 94). It was also assumed that the results from the WAT and DIWK tests would reveal a basic understanding of the lexical links with each participant, but a deeper understanding into the mental lexicon was needed (as supported by Wolter (2001:46 in Mattoudakis 2003: 3). WATs have been criticised for presenting words in isolation, without a supporting linguistic or

schematic context (Cameron 2002: 150), therefore, an Associate task and a picture activity was introduced to explore word recognition and depth of word knowledge.

3.3.3 Changes Made Following Preliminary Testing

The preliminary testing revealed some problems, suggesting that the initial testing was too simplistic. Several changes were introduced to improve the data collection methods. The preliminary testing revealed that a shaper, more focussed approach needed to be taken, addressing two main key questions:

1. Which data instruments / approaches can give a more in-depth view of the mental lexicon of the participant?
2. How can these approaches be analysed to show these links?

The changes below were introduced in an attempt to address these questions.

Table 6 Changes made in the WAT

Number	Change
1	Number of stimuli words in the WAT
2	The order of stimuli words said to each participant
3	A practice stimulus word asked to each participant
4	A more rigorous evaluation was used to categorise the WAT responses.

Table 7 Changes made after the DIWK test

Number	Change
1	A DIWK test was put in place for each stimulus word from the WAT, not just the first stimulus word
2	A Vocabulary Knowledge Scale was introduced to evaluate and categorise the responses given in the DIWK test, to allow the researcher to analyse the responses given. (following Mattoudakis, 2003)

Table 8 Additional Changes Made

Number	Change
1	A mixture of quantitative and qualitative data collection methods introduced (Associative task)
2	Associative Task introduced
3	Picture Activity Introduced

3.4 Final Data Collection Methods

The final data collection methods chosen were considerably more complex than the preliminary testing; this allowed the researcher to collect a greater amount and gain more depth of data to analyse and draw conclusions.

3.4.1 Participants

Due to a lack of students who had English as a second language at the desired age, the same sample was used for the preliminary test. The preliminary test took place just after the Easter holidays of 2011 and the final test in June 2011.

3.4.2 Data Collection Instruments

According to Henriksen (1999: 306) in order to assess a learner's lexical competence, researchers must use a combination of test formats that tap into different aspects of knowledge. This methodological approach was applied in this study.

Therefore, each child completed a:

- WAT test
- DIWK Test

The DIWK test scores were assessed using a Vocabulary Knowledge Scale (created by Mattoudakis (2003) and if the participant did not achieve a score of five on the DIWK, then it was decided that it would be a struggle for the participant to complete additional tests. If participants scored five on the DIWK test, then they completed:

- An Associate Task
- A Picture Task

3.5 Data Collection Procedures

3.5.1 The WAT

The word association test (see appendix two) consisted of ten stimulus words that were said to each child individually. Each word was spoken verbally and students were encouraged to respond with the first word that they could think of. The word was repeated again to allow the children to fully understand and hear the stimulus word. This procedure was scripted and repeated in exactly the same way with each of the twenty participants, to ensure reliability. The WAT was not timed. This was considered by the researcher, but it was decided that timing responses could create feelings of anxiety, and would contradict ethical considerations. The researcher recorded the first response each child made and then moved through each of the stimulus words.

3.5.2 The DIWK Test

When the respondent had finished the WAT, each child then completed a DIWK test (see appendix three), to give the participants an opportunity to show depth of word knowledge, rather than just breadth (Cameron 2002). This gave the researcher a deeper knowledge into the connections between words and an insight into the depth of word knowledge, allowing the original hypothesis to be tested (Wolter 2001: 46). The responses were scored using a Vocabulary Knowledge Scale and if the student achieved a score of five or above, the researcher conducted an Associative Task and a picture activity with each student.

3.5.3 Associate Task

The Associative task consisted of a set of questions, linked to the response the student had given in relation to the stimulus word (see appendix four). These questions were asked verbally to each of the participants and the results recorded by the researcher. One vital part of the Associate Task is the investigation into the depth of lexical knowledge the student has about a word. The last question in both tests asks the student to place the chosen word into a sentence, using the process of ‘grammatical encoding’ (Debot et al. 2005: 41). This is then given a score by the researcher.

3.5.4 Picture Activity

The picture activity consisted of several pictures linked to the stimulus word, such as words with similar meaning, group words, grammatical features, phonic elements and related experiences (see appendix five). Pictures related to these links were displayed to the participant who in turn considered possible links they could see. This was observed by the researcher, who asked questions and made observations. The purpose of this activity was to explore lexical links through a qualitative method, mixed with quantitative methods, such as the WAT, DIWK and Depth of Response Test, in order to create a triangulation of the data collected.

3.5.5 Variables

Throughout the testing of the participants the researcher was vigilant to ensure that particular variables were kept consistent, to achieve validity and reliability therefore presenting meaningful data. All participants were tested in the same location to ensure particular students were not given an unfair advantage. When administering the tests the researcher followed a script to ensure all students received the same instructions. The same process was administered to each respondent and conducted on a one to one basis, to make sure that the respondents were not influenced by each other.

One main criterion was considered in order to select a sample of children who had English as a second language: the child's mother tongue was not English. Then the sample was formed with children from the various reception classes who met the criterion.

3.6 Data Analysis and Coding of Data

3.6.1 WAT

The results for the WAT were inputted into a table (see appendix six) where the stimulus word was compared with various factors, such as the ability of the student, L1 or L2 participant, and the lexical link present. The researcher had a check list of links and the most probable link was then chosen, these are displayed in the key below:

Key	
Lexical Link	Abbreviation:
Collocate	Coll
Superordinate	Super
Phonological	Phon
Orthographic	Orth
Co-ordinate	Co-ord
Synonym	Syn
Syntagmatic	Syntag
Paradigmatic	Para
Experiential	Exp
Homophone	Hom

Table 9 Showing Lexical links and abbreviations used during testing and coding.

3.6.2 DWIK

The DIWK test results were categorized against the criterion part of the Vocabulary Knowledge Scale (used by Wesche and Paribakht, 1996 and Mattoudakis 2003), see the table 10 below:

Criterion	Score
A score of 1 is assigned if the word is not familiar at all	1
A score of 2 when the word is familiar but the meaning is not known	2
A score of 3 when a correct synonym or translation is given	3
A score of 4 is given to a word when it is used with semantic appropriateness in a sentence	4
A score of 5 is assigned when the word is used with semantic appropriateness and grammatical accuracy in a sentence	5

Table 10 Showing VKS and Scores

Each response given by each participant was assessed against the criterion and then given a score from 1 – 5.

3.6.3 Response Test

The responses collected from the Response Test were collocated in a table and then assessed against a set of criteria, created by the researcher, inspired by Wesche and Paribakht, (1996) and Mattoudakis (2003).

Criterion	Score
A score of 1 is given if the respondent gives some kind of response as to why they chose the response word, this maybe unclear.	1
A score of 2 is given if the participant can articulate clearly why they chose the response word.	2
A score of 3 is given if …The above and… A score of 3 is given if the participant can suggest other possible response words.	3
A score of 4 is given if the above and the participant can use the response word in a sentence with semantic appropriateness.	4
A score of 5 if the above criterion is achieved and if the response word is used in a sentence with semantic appropriateness and grammatical accuracy in a sentence.	5

Table 11 Showing the criterion and scores given in the Depth of Response Test

3.6.4 Picture Activity Coding

The results from the picture activity were recorded in a table and analysed against a coded system, shown in the table 12 below (see appendix seven):

Link	Sub Link
Paradigmatic	Coordinate
	Super ordinate
	Subordinate
	Synonym
Orthographic	Orthographic Link
Syntagmatic	Collocation
Phonetic	Phonological Link
Experiential	Encyclopaedic or a response influenced by the students own experience and / or surroundings.

(Table 12 Influenced by Wolter (2001: 43) Showing links and sub links during the picture activity)

Chapter Four

4. Results

In order to test the hypothesis guiding this study, the results below present the findings of the WAT, DIWK test, Depth of Response Test and the Picture Activity. The results from each data collection method will be presented and then discussed. The results will be explained further in the 'Discussion of Results' section and the hypothesis will be considered, that both L1 and L2 students go through the same process when trying to find the words they want to use.

4.1 Results from the Word Association Test (WAT)

The data below shows the total number of responses collated during the word association test (WAT). The results have initially been sorted into 'Categorised' and 'Uncategorised' responses to show the frequency of L1 and L2 students who gave a response during the WAT. The criterion considered for an uncategorised response was either repetition of the stimulus word, repeatedly saying the initial sound of the stimulus word or no response given. In total there were 210 word associations; 100 L1 associations and 110 L2 associations. The numbers of associations differ because one word can attribute many associates.

Categorised and Uncategorised Responses in the Word Association Test (Table 13)

Lexical Links	L1 and L2 Participants (Total - 210 word associations)	
	Categorised	Uncategorised
Frequency	133	77

Table 13 shows a combined total of L1 and L2 responses, 133 responses were considered as categorised and 77 uncategorised. This demonstrates that a larger proportion of results were considered categorised rather than uncategorised. Figure 3 presents the proportion of results that were categorised or uncategorised for the total number of L1 and L2 students.

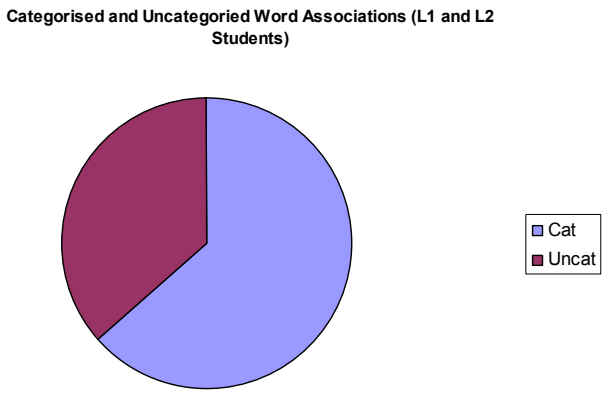


Figure 3

This pie chart reveals that a larger proportion of both L1 and L2 students achieved a categorised response, where a smaller proportion achieved an uncategorised response. To investigate particular variables potentially impacting the mental lexicon, the L1 and L2 results were investigated separately to examine if a larger proportion of L1 or L2 students achieved a categorised and uncategorised response in order to reveal the lexical strategies that were used.

Classified and Unclassified L1 WAT Responses

(Table 14)

Table 14 shows a total of 100 L1 responses, showing 69 categorised responses, compared with 31 responses that were considered uncategorised.

Lexical Links	L1 (Total - 100 Word Associations)	
	Categorised	Uncategorised
Frequency	69	31

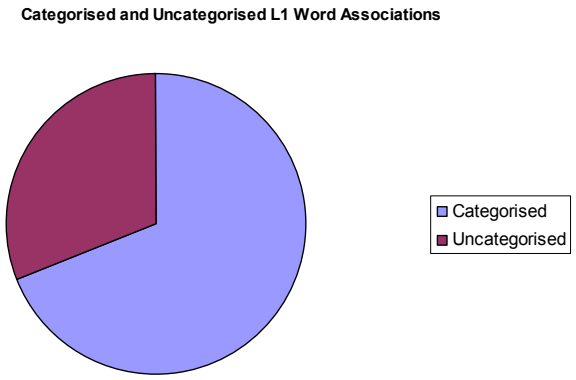


Figure 4

Figure 4 shows a larger proportion L1 students' responses were categorised, compared with a smaller proportion of responses that were not categorised.

L2 Responses

According to table 15, out of a total of 110 L2 responses, 62 were considered categorised compared to 48 uncategorised responses.

(Table 15)

Lexical Links	L2 (Total - 110 Word Associations)	
	Categorised	Uncategorised
Frequency	62	48

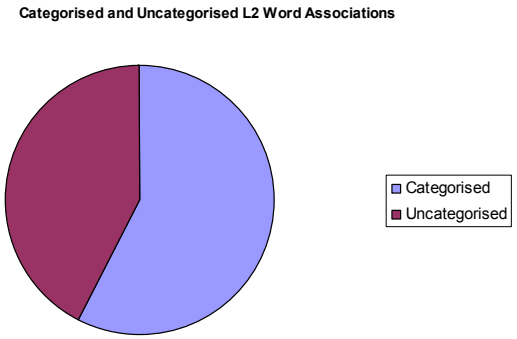


Figure 5

Figure 5 and table 15 reveal that a larger proportion of L2 students gave an uncategorised response, compared to L1 students. Figure 5 displays a more even balance of categorised and uncategorised responses, compared to figure 4.

Presentation of Classified Responses

Lexical Links in L1 and L2 Classified Responses

(Paradigmatic, Syntagmatic, Experiential, Phonetic and Other)

Table 16 presents classified responses of both L1 and L2 participants, collated into lexical links: phonetic, paradigmatic, syntagmatic and experiential categories. The bar chart shows that the most common lexical link was syntagmatic, followed by phonetic, then paradigmatic and finally experiential. In order to test the hypothesis further, the lexical links must be investigated within L1 results and L2 results; this will reveal the most common lexical link and if there was a shift between lexical strategies during the WAT. This will allow any variables related to the participants to be tested against the hypothesis and identify relationships within the data.

(Table 16)

Lexical Links	L1 and L2 Participants (Total - Word Associations)			
	Phonetic	Paradigmatic	Syntagmatic	Experiential
Frequency	21	21	74	17

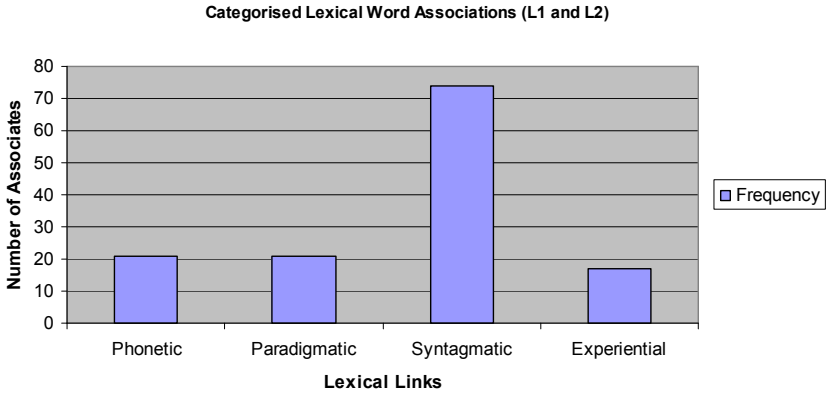


Figure 6

L1 and L2 Classified Table showing Phonetic, Paradigmatic, Syntagmatic and Experiential Links

(Table 17 and Table 18)

Table 17 and Table 18 present data collated into different phonetic, paradigmatic, syntagmatic and experiential links with L1 and L2 students. The bar chart below summarises the data into a comparable form, to show the frequency of students who used various lexical links during the WAT.

Table 17 (L1)

Lexical Links	L1 Participants (Total - 69 Word Associations)			
	Phonetic	Paradigmatic	Syntagmatic	Experiential
Frequency	9	5	48	9

Table 18 (L2)

Lexical Links	L2 Participants (Total 62 Word Associations)			
	Phonetic	Paradigmatic	Syntagmatic	Experiential
Frequency	12	16	26	8

Figure 6 presents the relationship between lexical links and the number of responses, alongside a comparison of L1 and L2 students. Figure 6 clearly identifies the syntagmatic link as the most popular lexical strategy used by L1 students. Syntagmatic responses represent 70% of all L1 responses. The remaining 30% of L1 responses were spread across the other three classifications with paradigmatic being the least significant. This finding contradicts the main hypothesis stated throughout

this study, as it was initially thought that a paradigmatic approach would be most favoured by L1 students.

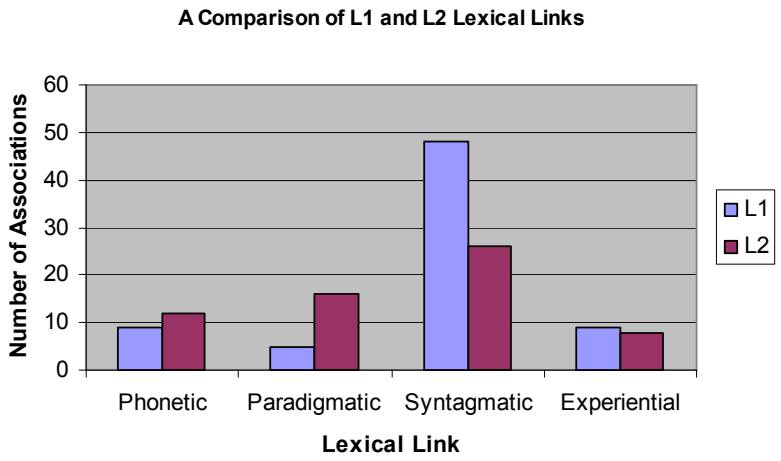


Figure 7

Whilst syntagmatic was also the most popular approach in the L2 responses, this was not as significant as with L1 students. Figure 7 shows L2 students using a more evenly spread mix of phonetic, paradigmatic, synatagmatic and experiential links when compared with L1. The data does reveal an equivalent number of experimental links by both L1 and L2 students, although it was expected that experiential links would be a popular choice by L1 and L2 students. The data shows lower proportion responses classified as phonetic approaches originating from L1 students. This supports the original hypothesis as it has been suggested that a higher number of L2 students would use phonetic approaches than L1 students. However, it was predicted that a phonetic approach would have been more significant with both L1 and L2 students.

To analyse these results further it is essential to compare the lexical links chosen by the participant when compared to their ability, to allow further relationships within the data to be made.

L1 Classified Table showing Lexical Links and Ability

Table 19 shows the amount of responses that were made by low, middle or high ability children that were either phonetic, paradigmatic, syntagmatic or experiential lexical links.

(Table 19)

Ability	L1 Participants (Total - 69 Word Associations)			
	Phonetic	Paradigmatic	Syntagmatic	Experiential
Low	0	0	3	1
Middle	1	2	22	5
High	8	3	23	3
Total	9	5	48	9

Figure 8 presents the data displayed in the table in graphic form. The percentage of response and lexical link are displayed in a graph below.

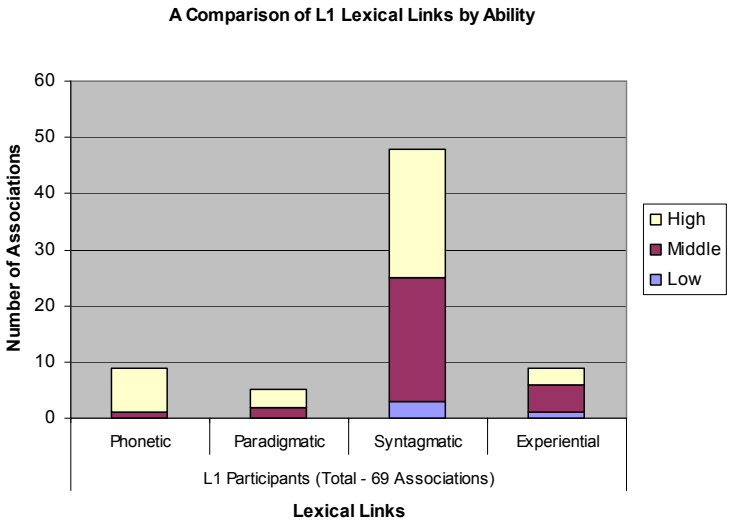


Figure 8

Figure 8 shows the frequency of associated response for L1 students. This shows that a syntagmatic link was the most common associate for L1 students, as 48 responses were syntagmatic, compared with 9 phonetic, 5 paradigmatic and 9 experiential associates. This bar chart shows a clear preference of L1 students using syntagmatic associates, possibly because of the obvious sequential link to other words (Meara 1983: 1).

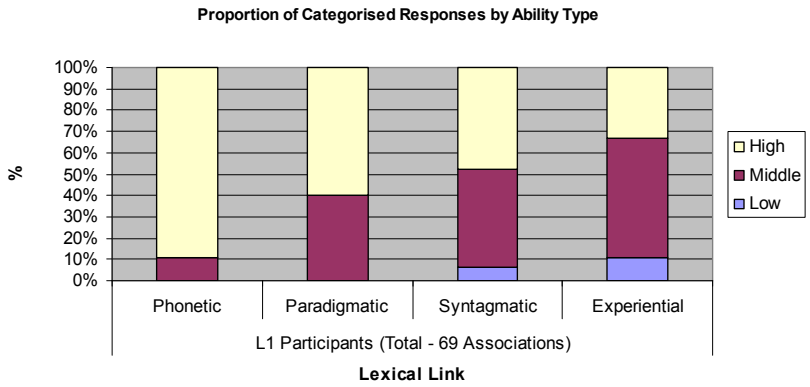


Figure 9

Figure 9 shows that 89% of the phonetic associates were from high ability students. High ability students also contributed to 60% of the paradigmatic approach responses and 46% of the syntagmatic associates. It was originally thought that children of a higher ability would use more paradigmatic and syntagmatic associates rather than phonetic associates due to a potential ability to make more sophisticated lexical choices. However, figure 9 shows that phonic associates were clearly the most common lexical link; proving further support for Meara's study (1983: 1) that children tend to produce large numbers of 'clang' associates as they are phonetically linked to the stimulus word, but have no semantic relationship to the word. This is the case with higher ability students in this instance, but not overall in the study, as phonic associates were less popular than synatgmatic generally in the study, for L1 students. The original hypothesis states that the percentage of higher ability children that used a phonetical associate would be lower than the percentage lower ability children. This was also contradicted as the graph shows the percentage of lower ability phonetic associates was 0%.

Figure 9 shows that 53% of experiential associates were from middle ability students. It was not expected that such a high percentage of L1 students would use an experiential associate. A further 10% of phonetic associates, 40% of paradigmatic approaches and 45% of syntagmatic associates were produced by middle ability L1 students. This partially supports the hypothesis as it was originally thought that students who were considered middle ability would use more syntagmatic associates, but experiential was not initially considered to be the most popular associate for this ability band. When comparing these results to children considered lower ability L1

students, it was found that these students did not use phonetic associates or paradigmatic associates, contradicting the original hypothesis. 7% of syntagmatic associates and 10% of experiential associates were used by L1 students.

L2 Classified Table showing Lexical Links and Ability
(Table 20)

Ability	L2 Participants (Total - 62 Word Associations)			
	Phonetic	Paradigmatic	Syntagmatic	Experiential
Low	0	4	7	3
Middle	11	3	7	2
High	1	9	12	3
Total	12	16	26	8

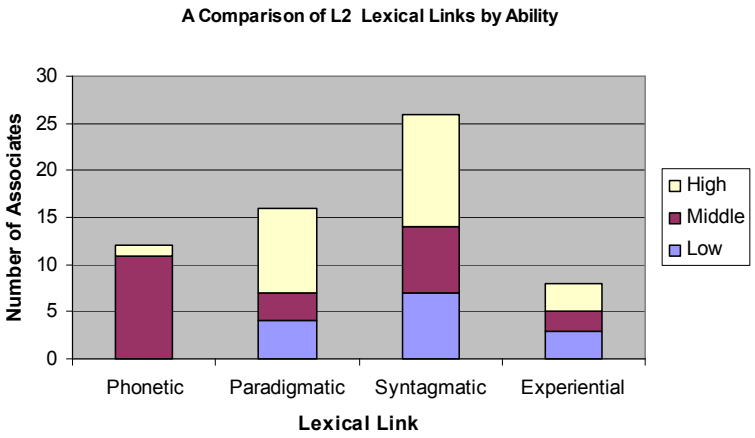


Figure 10

Figure 10 shows that a syntagmatic link is the most frequently chosen by L2 participants. However, overall the L2 responses are more varied than L1 responses, as 16 responses are categorised as paradigmatic, 12 phonetic responses and 8 experiential responses.

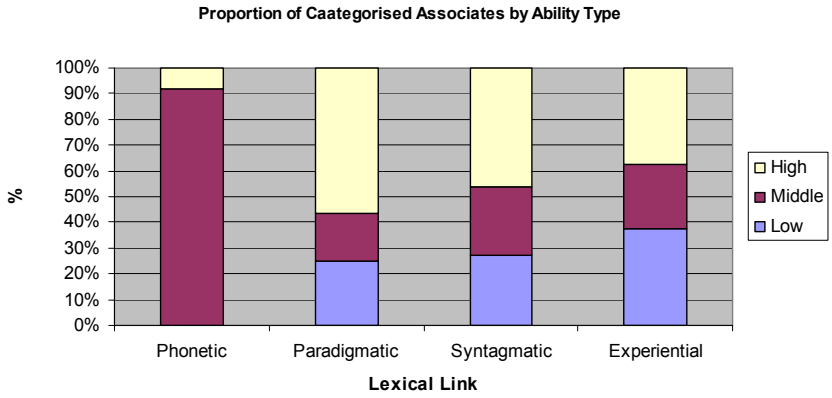


Figure 11

One main comparison between L1 and L2 of associate responses is the percentage of high ability phonetic responses, as 10% of the phonetic associations were L1 high ability compared with 90% of phonetic responses being from L2 associations. Also, figure 11 shows that 46% of the syntagmatic links were achieved by L1 and L2 high ability groups. Additionally, 56% of the paradigmatic associations were reached by high ability L2 students, compared with 60% of paradigmatic associations achieved by high ability L1 students. One main comparison between L1 and L2 middle ability results is the percentage of phonetic associations, as 91% of phonetic associations were reached by L2 middle ability participants compared with 10% of the phonetic responses achieved by L1 middle ability students. Another main comparison between phonetic lexical links is that they were not used by L1 and L2 students. However, 22% of paradigmatic responses were used by low ability L2 students compared with 0% of paradigmatic responses that were used by L1 students, contradicting the hypothesis, as it was predicted that both low ability L1 and L2 students would use phonetic strategies during the WAT.

4.2 Depth of Individual Word Knowledge Test Results Compared with Depth of Response Test Results

Table 21 presents the data collated from the DIWK test and the VKS scores given, compared with the abilities of the students.

L1 Participants
(Table 21)

	L1 Participants (100 Responses- Total)				
	VKS Score (Frequency)				
Ability	1	2	3	4	5
Low	25	4	2	0	0
Middle	7	3	5	16	8
High	0	4	3	16	7
Total	32	11	10	32	15

Table 22 shows that the majority of L1 participants scored either a Score of one and four in the DIWK test, the least common score was three.

(Table 22)

	L1 Participants (100 Responses- Total)				
	VKS Score (%)				
Ability	1	2	3	4	5
Low	78.13%	36.36%	20.00%	0.00%	0.00%
Middle	21.88%	27.27%	50.00%	50.00%	53.33%
High	0.00%	36.36%	30.00%	50.00%	46.67%

Associate Test Results (L1)

Table 23 presents the scores from the Associate Test Results compared to the abilities of the students.

(Table 23a)

	L1 Participants (50 Responses - Total)				
	Associate Task Score (Frequency)				
Ability	1	2	3	4	5
Middle	1	8	0	4	7
High	2	7	1	5	15
Total	3	15	1	9	22

(Table 23b)

	L1 Participants (100 Responses- Total)				
	ATA Score (%)				
Ability	1	2	3	4	5
Low	78.13%	36.36%	20.00%	0.00%	0.00%
Middle	21.88%	27.27%	50.00%	50.00%	53.33%
High	0.00%	36.36%	30.00%	50.00%	46.67%

Low Ability (L1 DWIK Scores)

LA L1 students did not complete the depth of associate response test as the children did not reach a high score in the DIWK test and it was felt that forcing the students to complete the depth of associate response test would cause feelings of anxiety, therefore compromising ethical considerations.

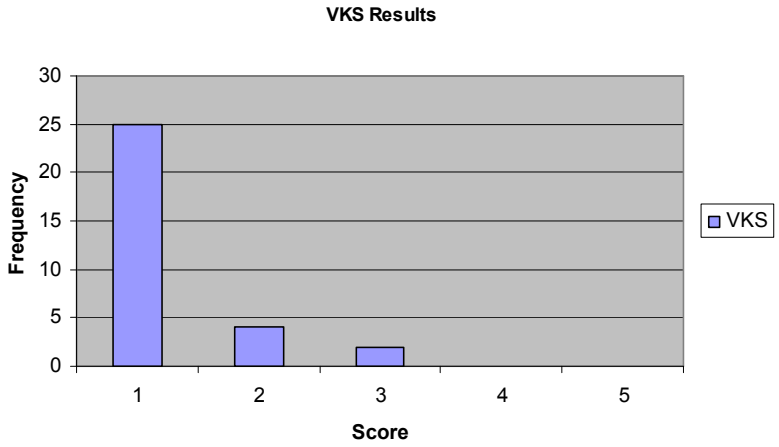


Figure 12

Figure 12 shows that the most common score low ability L1 students achieved was 1, a small proportion of students scored 2 and 3. No children scored 4 or 5.

Middle Ability (L1 DWIK Scores)

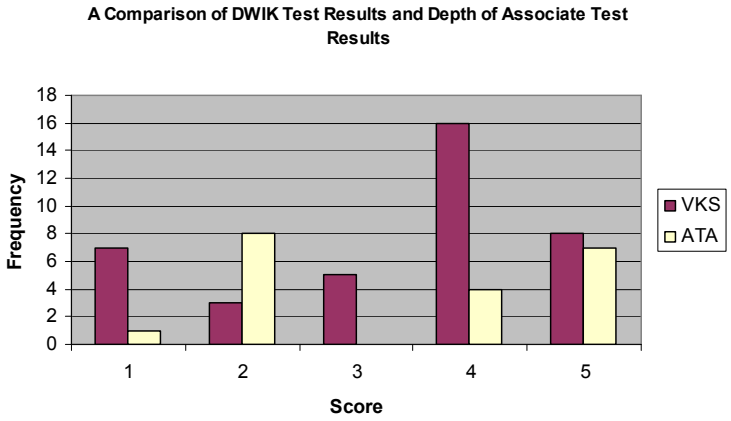


Figure 13

Figure 13 shows that the highest proportion of 16 middle ability L1 students scored 4 in the DIWK test, compared with 8 students who scored 5, 7 students reached a score of 7. Only 3 students reached a VKS score of 2 and 5 children scored 5. A similar score of 5 was reached by middle ability students for both the DIWK test and ATA (associate test associates). However, the bar chart shows that far less students scored 4 for the DAT and no children reached a score of 3 in the ATA. A reasonably moderate proportion of 7 students achieved a score of 1 during the DIWK test compared with one student comparing a score of 1 in the ATA.

High Ability (L1 DIWK Scores)

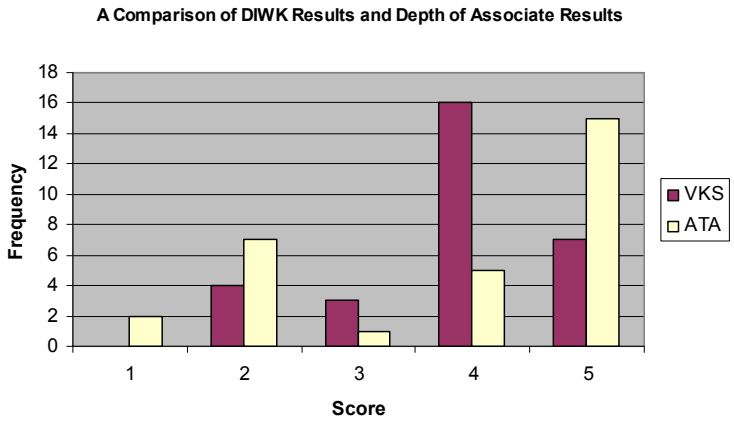


Figure 14

Figure 14 illustrates a common score of 4 reached by 16 high ability L1 students, clearly showing a preference to syntagmatic associates. A smaller proportion of 7 students scored 5, compared with 0 students were given a score of 1. This shows that a higher proportion of high ability students used syntagmatic and paradigmatic links compared with phonetic links. It also shows that all students knew the stimulus words and 23 students knew them well. In comparison a higher proportion of 15 students achieved a score of 5 in the ATA test in contrast with 7 students who achieved a score of 5 in the DIWK test. It was also possible to see a much lower proportion of students scored 4 in the ATA test compared to the DIWK test. One surprising result was that 7 students scored 2 in the ATA test compared to 4 students in the DIWK test.

L2 Participants

Table 24 presents the data from the DIWK test compared to the different abilities of the students.

(Table 24)

	L2 Participants (100 Responses - Total)				
	VKS Score (Frequency)				
Ability	1	2	3	4	5
Low	21	8	1	0	0
Middle	15	6	6	7	6
High	1	2	2	14	11
Total	37	16	9	21	17

(Table 25)

	L2 Participants				
	VKS Score (%)				
Ability	1	2	3	4	5
Low	56.76%	50.00%	11.11%	0.00%	0.00%
Middle	40.54%	37.50%	66.67%	33.33%	35.29%
High	2.70%	12.50%	22.22%	66.67%	64.71%

Associate Test Results (L2)

Table 25 presents the data from the Associate Task compared with the different abilities of the students.

(Table 26a)

	L2 Participants (60 Responses - Total)				
	Associate Task Score (Frequency)				
Ability	1	2	3	4	5
Low	8	2	0	0	0
Middle	19	2	2	7	0
High	0	0	0	5	15
Total	27	4	2	12	15

(Table 26b)

	L1 Participants (60 Responses- Total)				
	ATA Score (%)				
Ability	1	2	3	4	5
Low	29.63%	50.00%	0.00%	0.00%	0.00%
Middle	70.37%	50.00%	100.00%	58.33%	0.00%
High	0.00%	0.00%	0.00%	41.67%	100.00%

Low Ability (L2 DIWK and ATA Scores)

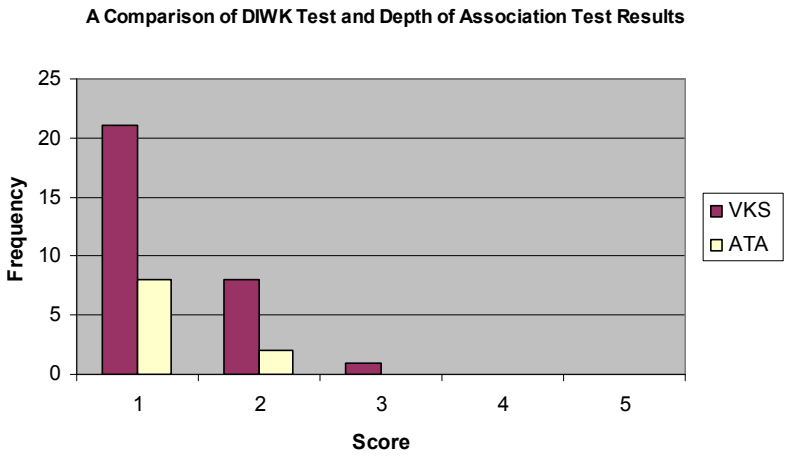


Figure 15

Figure 15 shows that a high proportion of low ability L2 students scored 1 in the DIWK test compared with 8 students in the ATA test. It is also interesting to note that no students scored 4 or 5 in the DIWK test, and no students scored 3, 4 or 5 in the ATA test. Also, a much smaller proportion of students achieved a score of 2 in the ATA test compared to the DIWK test.

Middle Ability (L2 DIWK Scores)

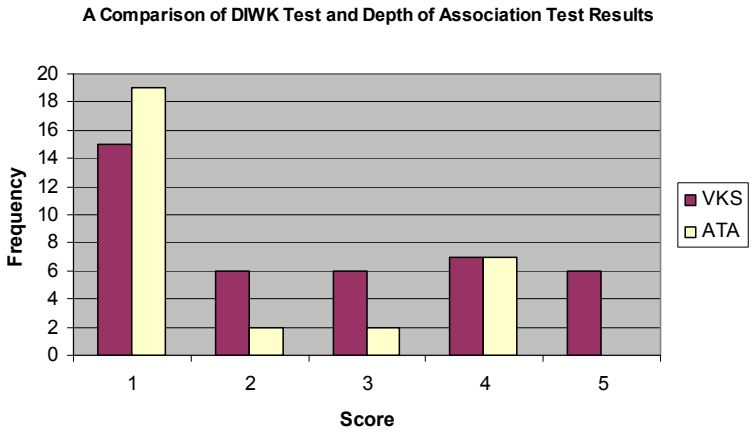


Figure 16

Interestingly, the most popular VKS score was reached by 15 middle ability L2 participants, who scored 1 in the DIWK test. Also, 19 students achieved level 1 in the ATA test. A surprising result is that 6 middle ability L2 students scored 5 in the DIWK test, as a similar score of 5 was reached by 7 high ability L1 students in the DIWK test. Also, the same number of 7 middle ability L2 students achieved a score of 4 in the DIWK test and the ATA test, which is the only instance this has happened. Another interesting observation is the same proportion of 6 L2 middle ability students achieved a score of 2, 3 and 5 in the DIWK test, and the same proportion of 1 student achieved a score of 2 and 3 in the ATA test. It is also possible to see that no middle ability L2 student scored 5 in the test.

High Ability (L2 DWIK Scores)

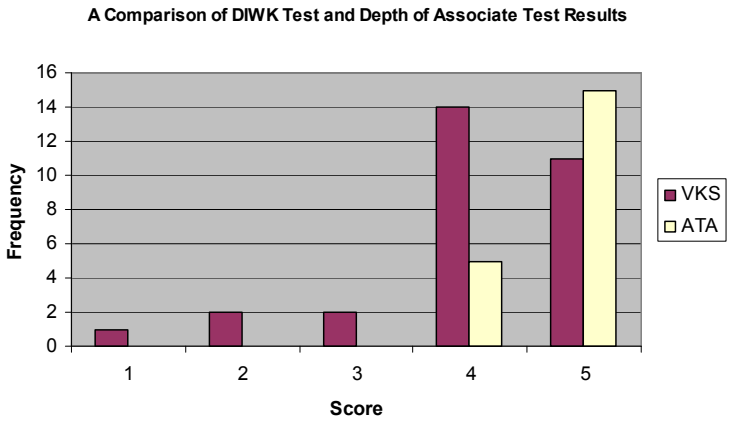


Figure 17

Figure 17 shows a small proportion of L2 high ability students reached a score of 1, 2 or 3, in the DIWK test. When comparing this to the high ability L1 results it is interesting to see that a slightly higher proportion of 16 L1 high ability students scored a 4 on the DIWK test, in comparison to 14 high ability L2 students. But a higher proportion of 11 L2 high ability middle ability students achieved a score of 5 than 7 high ability L1 students. It is also possible to see that the same proportion of 15 L1 high ability students reached the same score as L2 high ability students in the ATA test. This is also the case with L1 and L2 high ability participants scoring 4 on the ATA test, but 16 L1 students achieved a slightly higher score of 4 than 14 L2 students in the DIWK test.

4.3 Picture Activity Results

Tables 27, 28, 29 and 30 show the results from the picture activity conducted with middle and high ability L1 and L2 students. The tables present the frequency of phonetic, experiential and syntagmatic links chosen by the participants in relation to each stimulus word, RED, SHINY and WALK. These links have been investigated further to analyse the frequency of hyper ordinate (HYP), subordinate (SUB), antonym (AT), coordinate (COORD), synonym (SYN), collocation (COLLO) and orthographic (ORTH) links used.

Red (Table 27)

Ability (L1)	Link							
	Para					Syntag	Exp	Phon
	Hyp	Sub	Ant	Coord	Syn	Collo		
High	2	2	0	5	0	0	2	2
Middle	1	1	0	1	0	9	1	1

Ability (L2)	Link							
	Para					Syntag	Exp	Phon
	Hyp	Sub	Ant	Coord	Syn	Collo		
High	2	2	0	1	0	0	2	1
Middle	0	2	0	2	0	0	1	1

Table 27 shows that a paradigmatic link was the most popular choice of L1 high ability students, particularly a coordinate associate, followed by an equal number of hyper ordinate, subordinate, experimental and phonological responses. When compared to L1 middle ability students, a higher frequency of 9 students chose a syntagmatic link, but an equal amount of participants used hyper ordinate, subordinate, coordinate, experiential and phonetic links. Table 15 shows a smaller proportion of middle ability L1 students used these links than high ability L1 students. It can be seen that in comparison with L2 students, neither high nor middle ability students chose syntagmatic links during the picture activity. An equal number of high and middle ability L2 students used phonetic and subordinate associates. Table 15 also shows that L2 middle and high ability students produced a more varied choice of links, compared to L1 high ability students who clearly preferred coordinate links and L1 middle ability students chose syntagmatic (particularly collocation) links the most. Interestingly, the same number of L1 and L2 students used experiential links.

Shiny (Table 28)

Ability (L1)	Link							
	Para					Syntag	Exp	Phon
	Hyp	Sub	Ant	Syn	Coor	Collo		
High	0	0	2	2	0	1	0	1
Middle	0	0	1	2	0	1	0	1

Ability (L2)	Link							
	Para					Syntag	Exp	Phon
	Hyp	Sub	Ant	Syn	Coor	Collo		
High	0	0	0	2	0	1	0	1
Middle	0	0	0	2	0	2	0	0

According to Table 28 more varied choice of paradigmatic, syntagmatic and phonetic choices were made by L1 and L2 students. It is possible to see that L1 and L2 children did not use experiential links, which was not the case with the previous stimulus word 'RED'.

Walk (Table 29)

Ability (L1)	Link								
	Para					Syntag	Exp	Orth	Phon
	Hyp	Sub	Ant	Syn	Coor	Collo			
High	0	0	0	1	0	0	5	1	2
Middle	0	0	0	0	2	0	0	1	1

Ability (L2)	Link								
	Para					Syntag	Exp	Orth	Phon
	Hyp	Sub	Ant	Syn	Coor	Collo			
High	0	0	0	0	2	0	0	0	1
Middle	0	0	0	0	2	0	0	0	1

The results from table 29 show a preference for experiential made by L1 high ability students. It is also possible to see that both L1 high and middle ability students favoured orthographic associates when responding to the stimulus word 'WALK'. It can also be seen that the same proportion of L2 high ability students compared with L2 middle ability students used phonetic and coordinate responses.

Table 30 (Total Results)

Table 30 shows the total amount of paradigmatic, syntagmatic, phonetic links, with particular reference to hyper ordinate (HYP), subordinate (SUB), antonym (AT), coordinate (COORD), synonym (SYN), collocation (COLLO) and orthographic (ORTH) associates for all three stimulus words during the picture activity. In order to analyse the results from L1 and L2 groups the results have been placed in a table.

Ability (L1)	Link (51 ASSOCIATES L1)								
	Para					Syntag	Orth	Exp	Phon
	Hyp	Sub	Ant	Coord	Syn	Collo			
High	2	2	2	5	3	1	1	7	5
Middle	1	1	1	3	2	10	1	1	3
Total	3	3	3	8	5	11	2	8	8
Total	22 PARA					11 SYNT	2 ORTH	8 EXP	8 PHON

Ability (L2)	Link (28 ASSOCIATES L2)								
	Para					Syntag	Orth	Exp	Phon
	Hyp	Sub	Ant	Coord	Syn	Collo			
High	2	2	0	3	2	1	0	2	3
Middle	0	2	0	4	2	2	0	1	2
Total	2	4	0	7	4	3	0	3	5
Total	17 PARA					3 SYNT	0 ORTH	3 EXP	5 PHON

One initial comparison between L1 and L2 students of all abilities is the difference in response rate. Table 30 shows a total of 51 responses made by L1 students compared

with 28 responses made by L2 students, due to a greater number of L2 students who could meet the criteria in order to complete the picture activity. With the remaining responses it is possible to see that a higher proportion of 22 L1 associates fell into the paradigmatic category, compared with 17 associates which fell into the L2 paradigmatic category. This is an interesting score as during the WAT the most popular link used by high ability L1 students was syntagmatic and a more balanced choice of syntagmatic and paradigmatic links were chosen by high ability L2 students. Table 30 also shows that L1 middle and high ability students used a wider range of links than L2 students, as each link had been used by L1 students. In comparison L2 students did not use an antonym or orthographic link. When comparing the total number of responses from L1 and L2 it is possible to see that 56% of paradigmatic responses were from L1 students, compared with 44% of paradigmatic responses made by L2 students. Although it could be suggested that a larger amount of responses were made by L1 students, it must be remembered that a higher proportion of L2 students did not reach the criteria to be able to take part in the picture activity, therefore a higher proportion of paradigmatic results were made by L1 students. The results from the picture activity also show that 79% of syntagmatic results were made by L1 participants, a much higher percentage than L2 students, as 21% of syntagmatic associates were made by L2 participants. Also, 100% of orthographic responses were made by L1 students. A percentage that contradicts the hypothesis of this study is that 62% of phonetic associates were made by L1 students, compared with 38% of phonetic associates made by L2 students. It is also interesting to note that 73% of experiential links made by experiential associates were produced by L1 students compared with 27% of experiential associates made by L2 students. One interesting comparison between data from the picture activity and other data collection instruments used in this study is the preference of phonological responses used by L1 students throughout this study.

Chapter 5

5. Discussion of Results

5.1 Expected and Unexpected Results

5.1.1 Word Association Test Results

The first surprising finding is that no low ability L1 students used phonic strategies during the WAT. It was also originally expected that high ability L1 students would choose paradigmatic links. However, it was not expected that a large proportion of this group would use phonetic links.

Another surprising finding is the high percentage of syntagmatic responses used by a mixture of low, middle and high ability L1 and L2 students, although it has been recorded that syntagmatic links are favoured by young children, particularly those under the age of five years (see Meara 1983: 3). However, it was initially considered that a proportion of L1 students may use syntagmatic links, it was not expected that a high proportion of students would use this link.

It was also thought that middle and high ability L2 students would use a range of phonetic, syntagmatic and paradigmatic associates and low ability L2 students would rely on phonetic links, but the data shows this was not the case, as no low ability L2 children used phonetic links. The data also shows that L2 low ability children achieved a higher frequency of paradigmatic responses than middle ability L2 participants; it is also possible to see that middle ability L2 students achieved the same frequency of syntagmatic associates as low ability L2 students. Generally L2 students achieved a total of 16 paradigmatic responses compared with 5 L1 children, which is not in line with the hypothesis. Also, L1 students generally made more syntagmatic responses than L2 children, which were also not considered in the original hypothesis.

Findings of this study support Meara's (1983: 2) findings that most L2 associates are more varied than L1 responses. This was the case in this study as it was found that higher proportion of L2 low, middle and high ability students used phonetic, paradigmatic, syntagmatic and experiential links than L1 students did. This initially may seem a surprising finding, but Meara's study (1983: 2) suggests that L2 learners may have a dependency on phonetic responses producing varied responses related to the stimulus word. The findings from this study support this suggestion, as a higher proportion of L2 students achieved an uncategorised response.

The WAT, DWIK and associate activity tests show L2 middle and high ability students have a higher proportion of phonetic links than L1 middle and high ability students, although the results from the picture activity contradict this as 62% of phonological responses were made by L1 students, compared with 38% of phonological responses were made by L2 students. However, a higher proportion of L1 students reached the criteria to take part in the picture activity than L2 students. Also, a higher proportion of L2 WAT 48 were considered uncategorised than L1 responses meaning a higher proportion of L1 students could take part in each data collection procedure. It could therefore be suggested that the data presents inhomogeneous L2 responses due to the weaker semantic links in the mental lexicon which are easily overridden by similar phonological sounding words, which is often the case with L2 speakers rather than L1 speakers (Meara 1983: 3). These findings contradict the original rationale of this study which states that L1 and L2 mental lexicons are structurally similar and these findings challenge this approach as a larger proportion of L2 uncategorised responses were phonological than L1 students.

Meara's study shows that phonology plays a prominent role in organizing the L2 mental lexicon than L1 speakers, as semantic links between words tend to differ in a systematic way from those of native speakers. Similarly, the data from this study shows that a higher number of L2 students used phonic response when choosing their stimulus word. A possible explanation for this is that L2 children demonstrate a developmental shift in response type, parallel to the shift of response type demonstrated by native speaker children (Wolter 2001: 42). The data from this study shows a slight increase in paradigmatic and syntagmatic responses ranging from low ability to high ability L1 WAT associates and a gradual increase in syntagmatic and paradigmatic responses with L2 middle and high ability associates, a finding in line with Mattoudakis (2003: 7) who also observed a corresponding increase of both syntagmatic and paradigmatic associations as the level of proficiency increased in native and non-native groups.

Specifically, Mattoudakis's study (2003: 11) shows that phonological associations dominate both L1 and L2 metal lexicons when words are not well known. When words become more integrated, phonology loses its importance and associations become semantic, either syntagmatic or paradigmatic. It could be suggested that the results from the present data conflicts with this theory, although arguably having an

in-depth lexical knowledge about a particular word is dependent on the students' level of word knowledge, and could be regardless of their ability as a less able student may have a more in-depth understanding of the noun 'house', for instance, than a more able student. During the WAT one L1 low ability student demonstrated a clear understanding of the WAT procedure and responded with predominately syntagmatic associates; however, the student struggled when taking the DWIK test as their in-depth word knowledge was not sufficient for a higher score. In contrast an L1 high ability student consistently replied with a phonetic response, but achieved a high score in the DIWK test and the Depth of response test. The child could articulate why the associate word had been chosen "Red and bed rhyme". It has been suggested that due to the nature of WAT, low frequency words can attract nonsensical responses (Wolter 2001: 45), possibly a wider variety of stimulus words would have attracted a wider range of responses and challenging higher ability L1 and L2 students. In contrast to this view, however, Zareva's study (2007: 30) states that all students used paradigmatic and syntagmatic associates rather than phonetic associations, contrary to the findings of Meara and Wolter. This is also the case in this study as a low percentage of low ability and high ability L1 and L2 groups used phonetic responses, as syntagmatic links were preferred.

The findings from this study suggest that both lexicons are highly complex and are constantly evolving. Many factors affect the efficiency of the lexicon particularly the size of the student's vocabulary, as having a larger vocabulary, can give a greater connectivity. Allowing language users to associate words they know with a larger number of different words. Having a larger vocabulary allows richer connections in size, commonality and heterogeneity to be made (Zareva 2007: 138). These findings suggest that both the L1 and L2 mental lexicons may be similar, but subtle differences between them are apparent. The data from this study shows that the L2 mental lexicon is not less structured than the L1 lexicon but this is only in the early stages of development. Wolter (2001: 60) supports this view and states that it is important to remember that particular words may be more familiar to L1 students than L2 students. Mattoudakis (2003: 11) also agrees with this stance and disagrees with previous research that has suggested that L1 and L2 mental lexicons are structurally different. When comparing the L1 and L2 mental lexicons, the L2 lexicon is in earlier stages of development. The data also shows that L2 learners' lexicons show a lesser degree of

commonalty than the monolingual lexicon. Once L2 students reach intermediate proficiency they can develop towards a native speaker's capacity, creating more paradigmatic links, showing a definite syntagmatic to paradigmatic shift with both L1 and L2 learners.

5.2 Discussion of Results

5.2.1 Overall Findings

The overall findings from the WAT, DWIK and Depth of Response tests have shown that L1 low, middle and high ability students used syntagmatic links most often. When analysing L2 associates it can be seen that syntagmatic links were most commonly used by L2 low and middle ability students and phonology was a popular link used by L2 middle ability children. It was also found that L1 and L2 low ability students did not use phonetic links when providing response words and middle ability L1 children used a range of paradigmatic, syntagmatic and phonetic strategies, with a preference of syntagmatic associates.

5.2.2 Depth of Individual Word Knowledge Test Results

When considering the DIWK test findings it is possible to see 15 high ability L1 and 17 L2 students achieved a VKS score of 5. This finding is generally consistent with a study conducted by Wolter (2001: 58), who found that a similar proportion of native and non-native speakers have achieved a VKS score of 5. It was originally expected that a high proportion of low ability L1 (78.13%) and low ability L2 (56.76%) LA students would achieve a VKS score of 1. This supports Wolter's findings due to the number of L1 and L2 students who achieved a VKS score of 1 and 2, inferring that stimuli words were not familiar with either group. It can also be noted that L1 low ability children did not achieve a VKS score of 4 or 5, possibly because the L1 students struggled to utilize syntagmatic and paradigmatic links, and preferred phonological links.

5.2.3 Picture Activity Results

When examining the results from the picture activity it is possible to see that the results seem to contradict some of the results stated in the WAT, DIWK test and Depth of Response Test as a larger proportion of L2 students achieved a paradigmatic associate when compared with the proportion of L1 students who achieved a

paradigmatic response. The reasons for this contradiction could be the design of the picture activity, as some pictures representing particular lexical links may have seemed unclear to particular children. Also, the number of L2 students who took part in the picture activity were fewer than L1 students, as more L2 students did not qualify and achieve a high enough score in the previous tests. Therefore the results show that 56% of paradigmatic responses were achieved by L1 children compared to 44% of paradigmatic responses achieved by L2 children. Although the percentage achieved by L1 participants is higher, it must be remembered that a greater proportion of L1 participants took part in the picture activity. So although the percentage of L2 children achieving paradigmatic responses is smaller than L1 students, the proportion of L2 students is actually higher than L1 students. However, a higher proportion of L2 participants achieved an uncategorised response than L2 participants.

The picture activity also showed how a certain word class attracted particular responses. For example, the noun 'red' attracted the highest frequency of collocates from middle ability L1 students in comparison to the adjective 'shiny' or verb 'walk'.

5.3 Depth of Individual Word Knowledge Test Results Compared with Depth of Response Test Results

Firstly, a factor to take into consideration is that L1 low ability students did not reach a high enough VKS score to sit the depth of response test, unlike L2 low ability children who did take the test, possibly suggesting that the L2 sample demonstrated a better knowledge of stimulus words than the L1 sample. Although figure 5 shows that a proportion of 48 L2 participants reached an unclassified result compared with 31 L1 participants, suggesting a higher frequency of L1 students could respond to stimulus words in the WAT. When comparing results from the DIWK and ATA tests, the majority of L1 middle ability students scored 4 on the DIWK test, compared with the majority of L2 middle students who scored 1. The VKS and ATA criterion states that a score of 4 shows a syntagmatic link, a score 5 shows a paradigmatic preference and a score of 1 can indicate an attempted response. The total amount of L1 and L2 students of all abilities shows a comparison of 38 L2 compared with 47 L1 students used a syntagmatic and paradigmatic link. Suggesting the L1 mental lexicon is more developed than the L2 lexicon.

This high proportion of syngtagmatic responses is in line with Meara's hypothesis (1983: 1) that word association responses generally fall into two main categories:

syntagmatic and paradigmatic. Syntagmatic responses are preferred by children, as they form an obvious sequential link with the stimulus word. This is supported in Wolter's study (2001:61) as syntagmatic links are the most popular link used by L1 and L2 respondents. It can also be noted in Meara's findings that children usually produce a high number of phonetic responses during WATs. These findings are also consistent with Mattoudakis' study (2003) as syntagmatic and paradigmatic links were listed as the most common, more than phonology, projecting a mirror – image with native and near native groups in relation to the amount of paradigmatic and syntagmatic responses used. Research has previously suggested that syntagmatic links involve less lexical sophistication than paradigmatic links, but according to Soderman (1993) syntagmatic responses demonstrate a good use of lexical knowledge; as this involves more than merely knowing a word and should not be regarded as a lower degree of lexical knowledge. Wolter's study supports this view and argues that syntagmatic responses fall into the central circle in Wolter's depth of knowledge model of the mental lexicon rather than the peripheral edges (see figure two in chapter two).

In contrast to L1 speakers, L2 learners did not develop such stability in their lexical connections, as L1s show stable patterns of associative organisation of meaning connections along commonly shared paradigmatic-syntagmatic connections (Zareva 2007: 3). According to Zareva (2007: 6) this could be because generally L2 speakers tend to directly translate the stimuli, therefore not necessarily showing L2 students at their lexical full potential. It has been suggested that as proficiency increases, an individual's word association behaviour in their L2 becomes more like their L1 association behaviour, as there is a substantial difference in how well lexical items are mastered in relation to the use of words in comprehension and production (Henriksen 2011: 39).

Chapter Six

6. Conclusion

6.1 Summary of main findings

The aim of this study was to explore the L1 and L2 mental lexicon and how L1 and L2 speakers find words they want to use. In reference to the original hypothesis of the study, it was found that L2 speakers used similar methods of finding words as L1 speakers, but certain links maybe preferred by the speaker such as paradigmatic, syntagmatic, phonetic, and experiential links. The WAT findings in this study show that L1 speakers clearly preferred syntagmatic links, compared to L2 speakers where a higher proportion of students used a more varied range of links. Also, more ESL children used phonetic links than L1 speakers. When considering the DIWK results, it is possible to see that a similar proportion of L1 and L2 students scored a VKS score of 5, although a higher number of L2 speakers used phonetic links than L1 students, a large number of both L1 and L2 speakers had an in-depth knowledge of the stimuli words. This evidence supports the suggestion that the L2 lexicon is not structurally different from or inferior to the L1 lexicon, but rather it is less developed. Further evidence that supports this idea is the results from the associate task and picture task, as more L1 students reached the criteria to take part in these tests. Also, a higher number of L1 students achieved level 4 and 5 compared to L2 students. The links chosen were also found to depend on individual variables of the speaker such as age, ability, language proficiency and confidence.

6.2 Implications of the findings of the study

These findings can be related to Wolter's Depth of Word Knowledge Model of the Mental Lexicon (2001: 48) which states the mental lexicon consists of core vocabulary, words that are well known to the participant. This contains well-known words, and layers of peripheral vocabulary which consists of words that are known to varying degrees. The higher proportion of L2 phonetic results lie in the peripheral circles in Wolter's Depth of Word Knowledge Model of the Mental Lexicon, as Wolter states phonetic associates have no semantic connection to the stimulus word. In comparison, L1 participants' responses lie in the central circle, demonstrating strong paradigmatic links. It is possible to see from the results of the study that a higher number of L1 students achieved a score of 5 in the DIWK test and the

associate test, suggesting that L1 students used a higher proportion words selected in the core vocabulary, compared to L2 speakers who used more words located in the outer circles.

On the other hand findings of the study support the view that the L2 lexicon is flexible, due to more varied lexical links used by L2 speakers compared with L1 students. However, the lexicon is not static and is constantly changing due to the influence of a wide range of interrelated factors, external and internal forces. It is a dynamic system in its own right (Debot et al 2005: 44,47). The L2 lexicon is developmental and it is possible that it will reach full size and capacity as the L1 lexicon. Learning a second language is a complex process which involves a high degree of cognitive development, and which can ultimately aid lexical development (Kormi – Nouri et al. 2010: 10).

There are both pedagogical and theoretical implications of the findings of this study. Firstly, having an understanding of the mental lexicon can guide and inform teachers when helping students learn vocabulary. If teachers understand the similarities and differences between the L1 and L2 lexicon, then teachers can support L2 language learning and have a deeper understanding of language acquisition and development. Lexical knowledge can also give teachers a greater insight into how an L2 learner can input, store and find words in their lexicon. When considering the theoretical implications of this study it is important to consider that previous research into the mental lexicon has been sparse, particularly research of the L2 lexicon. However, recently there has been an increase of research investigating the mental lexicon and the L2 lexicon (see Marinova - Todd (2011) and Fitzpatrick (2011)). There is still a need to build a clearer theoretical model of additional language development, informed by research of the L2 lexicon, which can guide the development of teachers' practice and education policy to ensure the best possible education for all children (Cameron (2002: 149). This study is a first step in this direction.

6.3 Limitations of the study and recommendations for further research

This study could be extended to investigate and compare current lexical associates with children of different ages, as according to Palmero (1964) older children have a tendency to produce a higher proportion of paradigmatic responses than younger groups of children. It has also been suggested that phonetic responses diminish with

age. Investigating lexical links with primary children from the age of 5 to 11 would give an interesting and varied mixture of data to allow the researcher to make and draw stronger conclusions. There is still a need to support teachers in catering for the needs of ESL children in British schooling. WATs can reveal a great deal about the mental lexicons of all children, particularly if teachers have children with English as a second language in their classes. Then the teacher can explore the mental lexicon of an L2 learner, and can support these students' language learning needs.

Another area that would benefit from further research is developing qualitative research methods within word association testing. It would be beneficial to investigate a possible mixture of quantitative and qualitative methods when testing the mental lexicon. In this study, I attempted to develop a qualitative approach through using a picture activity, but it would be worthwhile to develop this approach further. According to Fitzpatrick (2011: 10), some stimulus words can create highly predictable responses; also stimuli from different word classes can prompt different word associations. If I was to conduct the study again, I would select words from a greater variety of word classes to ensure that all word classes were represented, which would have achieved a richer set of data. I would also arrange a retrospective interview to give students a greater opportunity to explain their responses, supporting a qualitative methodology. This may also have given respondents a chance to explain any omitted or uncategorised data (Fitzpatrick 2011: 10).

In spite of these limitations, findings of this study provide us with valuable information about the mental lexicon and the similarities and differences between the L1 and L2 mental lexicon, focusing on how L1 and L2 speakers find words they want to use in the mental lexicon.

7

7.1

Appendix One

Preliminary Word Association Test Format

Stimulus Word	Response	Para	Syntag	Clang
You				
Car				
Drink				
run				
sparkle				
home				
in				

7.2 Appendix Two (Word Association Test Format)

WAT		Strategy (tick)		
Stimulus Word	Response	Phonetic (using sounds)	Meaning (para) Eg. Sun-moon-star	Sentence patterns (synag) Eg. Sun-shine
Red				
Baby				
House				
Me				
Walk				
On				
Slowly				
Love				
It				
Shiny				

7.3 Appendix Three DIWK Test

Depth of Individual Word Knowledge Test

1. Have you heard the word *** before?
    - Yes
    - No
    - Don't Know
2. Do you know what **** is?
    - No
    - Yes, I think *** is …
    - Yes, I know ***. It is …
3. Can you put *** in a sentence?
    - Yes
    - No

7.4 Appendix Four (Depth of Associate Test)

Associate Activity

When I asked you to think of the first word you thought of, when I said STIMULUS WORD you said ****. Can you tell me why you choose ******?

- No
- Yes

Can you think of any words that other words that pop into your head when I say "STIMULUS WORD?"

- No
- Yes

Can you put **** into a sentence?

Does the word ****** make you think of anything?

- No
- Yes

I asked you to tell me the first word you thought of when I said RED. You said ****. What do you think is special about Red and ****

7.5 Appendix Five (Picture Activity Questions)

Picture Bingo

Can you tell me anything you notice about these pictures?

Do you think any of them match?

Is there anything special about the pictures?

7.6 Appendix Six (Responses for Word Association Tests)

Results from Word Association Test								
Stimulus Word: Red								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Bed			1		2		PHONO	
Fish		1		1		1	EXP	There was a fish display behind me whilst completing the WAT.
Apple		1					SYNT COLL	
Group			1				EXP	Student is part of 'red group' at school.
Stop	1		1				SYNT COLL	
School			1				EXP	Children are placed in ability groups, named by colour.
Car		1					SYNT COLL	
Yellow				1			PARA CO-ORD EXP	Student is in yellow group.
Head					1		PHONO	
Blue						2	CO-ORD PARA EXP	Student is in blue group.
Uncategorised Response	2			1	1			

Stimulus Word: Baby								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Rock-a-bye		1					SYNT COLL	
Play			1				SYNT COLL	
Cry			1				SYNT COLL	
Laying			1				SYNT COLL	
Cuddle		1					SYNT COLL	
Sister		1					COLL SYNT/ EXP	Participant has a baby sister.
Milk		1					SYNT COLL	
Good						1	SYNT COLL	
Children						1	SYNT COLL	
Mummy					1		SYNT COLL EXP	"I love my mummy."
Brother				1			SYNT COLL/ EXP	Participant has a baby brother.
Dad					1		SYNT COLL/ EXP	
Uncategorised Response	3			2	2	1		

Stimulus Word: House								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Live		1					COLL SYNT	
Fish			1				EXP	There was a fish display behind me whilst I conducted the WAT.
Home			1				PARA COORD	
Path			1				SUB PARA	
Bounce		1					PHON ORTH	
People		1					SYNT COLL	
Chair						1	SYNT COLL (weak)	
Building						1	SYN PARA	
Mouse					2		PHON ORTH	
Bricks				1			SUB PARA	
Uncategorised Response	3	1		2	2	1		

Stimulus Word: Me								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Bee			1		1		PHON	
Be					1		PHON ORTH	
Love		1					EXP	
Walking			1				SYNT COLL(WEAK)	
Here			1				SYNT COLL(WEAK)	
Cuddles	1						EXP	
See			1				PHON	
Mouse		1					OTHER	
Care						1	COLL SYNT	
I						1	SYN PARA	
You				1	1		COLL SYNT	
Uncategorised Response	2	1		2	1	1		

Stimulus Word: Walk								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
School		2	1			1	SYNT COLL	
Wood			1				COLL SYNT	
Mummy			1				SYNT COLL	
Way	1						SYNT COLL	
Far			1				SYNT COLL	
Park		1					SYNT COLL	
Talk					1		PHON ORTH	
Run				1		1	PARA COORD	
Don't					1		SYNT COLL	
Uncategorised Response	2			2	2	1		

Stimulus Word: On								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Fun			1				PHON	
Light	1	2	1				SYNT COLL	
Off		1			1	1	ANT PARA	
Seat			1				SYNT COLL	
Go				1			SYNT COLL	
To						1	SYNT COLL	
Uncategorised Response	2		1	2	3	1		

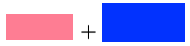
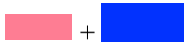
Stimulus Word: Slowly								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Fast				1	1	1	ANT PARA	
Stop				1			COLL SYNT	
Does it						1	COLL SYNT	"Slowly does it!"
Roly			1				PHON	
Fish		1					EXP	There was a fish display behind the researcher whilst conducting the WAT.
Walking			1				COLL SYNT	
Tortoise			1				COLL SYNT (WEAK)	
Bike			1				COLL SYNT (WEAK)	
Walk		1					COLL SYNT	
School		1					COLL SYNT	
Uncategorised Response	3			1	3	1		

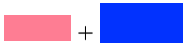
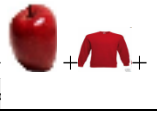
Stimulus Word: Love								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
You			1	1		1	SYNT COLL	I love you.
Bad						1	ANT PARA	
Run					1		SYNT COLL(WEAK)	
Above			1				PHON	
Kiss		1					SYNT COLL	
Sister		1					SYNT COLL	
Mummy		1	1				SYNT COLL	
Grandma			1				SYNT COLL	
Me				1			SYNT COLL	Love me…
Uncategorized Response	3			1	3	1		

Stimulus Word: It								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Bit			1		2		PHON	
Dangerous		1					SYNT COLL	It is dangerous…
Bedtime			1				SYNT COLL	It's bedtime
On			1				SYNT COLL	It's on…
Is			1			1	SYNT COLL	It is…
Me				1			SYNT COLL	It's me!
Fish					1		SYNT COLL (WEAK)	It's a fish There was a fish display behind me whilst conducting the WAT.
Get						1	PHON	
Beautiful		1					SYNT COLL	It is beautiful…
Uncategorised Response	3	1		2	1	1		

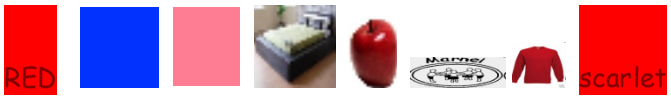
Stimulus Word: Shiny								
Response	L1 Participants			L2 Participants			Link	Comments
	Low Ability	Middle Ability	High Ability	Low Ability	Middle Ability	High Ability		
Blimey			1				PHON	
Shine		1					SYN PARA	
Gem		1					COLL SYNT	Shiny gem
Sun			1				COLL SYNT	
Car			1				COLL SYNT	Shiny car
Really			1				SUPER LATIVE PARA	Really shiny
Sparkly				1	1		SYN PARA	
Coin						1	COLL SYNT	
Tiny					1		PHON	
Beautiful						1	COLL SYNT	
Shoes		1					COLL SYNT	Shiny shoes
Uncategorised Response	3			2	2	1		

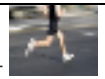
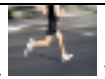
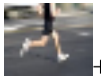
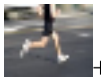
7.7 Appendix Seven (Picture Activity Responses)

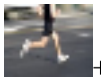
A table to show results from picture activity (based on the stimulus word: red)				
L1 or L2 Participant?	Participant	Observations (Matched Pictures)	Links Observed	Comments
L1 (High Ability)	Child 1	1. Scarlet + RED 2. RED +  3. RED +  4. 	1. HYP (PARA) 2. PHON 3. COORD (PARA) 4. EXP 4. SUB? (PARA)	Immediately placed red jumper and school logo together. "Red is similar to pink but blue is not similar to any of these, is it?"
L1 (High Ability)	Child 2	1. RED +  2. RED +  3. RED + 	1. COORD (PARA) 2. COORD (PARA) 3. PHON	
L1 (High Ability)	Child 3	1. Scarlet + RED 2.  3. RED +  4. 	1. HYP (PARA) 2. EXP 2. SUB? (PARA) 3. COORD (PARA) 4. COORD (PARA)	Did not find any phonetic similarities – just meaning. "Apples are red." Looked at colours first – "Scarlet and red are the same." "Pink and blue do not match."
L1 (Middle Ability)	Child 4	1.  Scarlet	1. EXP 1. SUB? (PARA)	 does not match anything, there are no pink things"  does not match anything, there are no blue things"
L1 (Middle Ability)	Child 6	1. Scarlet + RED 2.  3. RED + 	1. HYP (PARA) 2. COORD (PARA) 3. PHON	RED +  rhyme, but bed is not red, so they don't go together."
L2 (High Ability)	Child A	1. Scarlet + RED 2.  3. 	1. HYP (PARA) 2. EXP 2. SUB? (PARA) 3. COORD (PARA)	"Blue and pink don't go, although they are colours, no matching."
L2 (High Ability)	Child B	1. RED + 	1. PHON	"Some of them rhyme, but some don't."
L2	Child C	1. RED + Scarlet	1. HYP (PARA)	"They are both red colours."

(High Ability)		2. 	2. EXP 2. SUB? (PARA)	"They are both red." "The rest don't match."
L2 (Middle Ability)	Child E	1.  + Scarlet 2.  3. RED + 	1. SUB? (PARA) 2. COORD (PARA) 3. PHON	"Both red" RED + BED – "Both end with the same sound."
L2 (Middle Ability)	Child G	1. RED +  2. Scarlet + 	1. COORD (PARA) 2. EXP 2. SUB? (PARA)	"RED and BLUE are different." "Bed, blue, pink don't match."

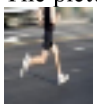
The pictures shown below were shown to the students during the picture activity:



A Table to show results from the picture activity (based on the stimulus word: Walk)				
L1 or L2 Participant?	Participant	Observations	Links Observed	Comments
L1 (High Ability)	Child 1	1.  +  +  2. WALK+WALK DON'T RUN 3.  +WALK 4.  + STROLL	1. EXP 2. ORTH 3. PHONO 4. EXP	1."This reminds me of walking to school." 2."Both have the word WALK." 3."Fork and WALK rhyme." 4."Mummy's hand and stroll."
L1 (High Ability)	Child 2	1.  + 	1. PHONO	
L1 (High Ability)	Child 3	1.  +  +  2.STROLL+WALK+WALK DON'T RUN! 3.  + 	1. EXP 2. EXP 2. SYN 3. EXP	1. "You should always hold hands." 2. "You shouldn't run, you should walk." 3. "I banged a fork on my drum."
L1 (Middle Ability)	Child 4	1. WALK+WALK DON'T RUN 2.  +WALK 3.  +  + 	1. ORTH 2. PHONO 3. COORD	1. "Both have WALK." 2. "Both sound the same." 3. "These go together. They are running and walking fast."
L1 (Middle Ability)	Child 6	1.  +  + 	1. COORD	
L2 (High Ability)	Child A	1.  + 	1. COORD	1. SPRIINT+MARCH are moving and marching.

L2 (High Ability)	Child B	1.  +WALK	1. PHONO	1. “They both rhyme.”
L2 (High Ability)	Child C	1.  +  + 	1. COORD	1. “They are all moving.”
L2 (Middle Ability)	Child E	1. WALK+  2.  + 	1. PHONO 2. COORD	1. “Both end with the same sound.” 2. Don’t end with the same sound.”
L2 (Middle Ability)	Child G	1. WALK+  + 	1. COORD	“Grand Dukes walk and march. They march slowly and hold hands slowly.”

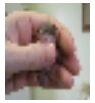
The pictures shown below were shown to the students during the picture activity:

     Walk Stroll Walk don’t run!

A Table to show results from the picture activity (based on the stimulus word: Shiny				
L1 or L2 Participant?	Participant	Observations	Links Observed	Comments
L1 (High Ability)	Child 1	1. SHINY +  2.  +  3.  + 	1.PHON 2.SYN	DULL not placed. "Some of them are shiny and some aren't."
L1 (High Ability)	Child 2	1.  + 	1.ATON	1."Some are shiny and some are not shiny."
L1 (High Ability)	Child 3	1.  +  +  +SHINE+  2.  + 	1.SYN 2.AT 3.COLL	All of them match apart from DULL and TINY. DULL and TINY don't match.
L1 (Middle Ability)	Child 4	1.  +  2. SHIMMER + 	1.SYN 2.ATON	1.STAR and RING are both grey. 2.SHIMMER + DULL are opposite.
L1 (Middle Ability)	Child 6	1.  +  2.  +  + 	1.PHON 2.SYN 3.COLL	1."SHINY and TINY rhyme." 2."SHIMMER and GLIMMER rhyme." "All shiny things go together. Not shiny things go together."
L2 (High Ability)	Child A	1. SHINE +  2.  + 	1.SYN	1."SHINE and the RING are both shiny." 2. "Both sparkle like glitter."
L2 (High Ability)	Child B	1. SHINY + 	1.PHON	1. "They both rhyme." Questioned DULL.

L2 (High Ability)	Child C	1. SHINE +  +  + 	1.SYN 2.COLL	"All are sparkly and shiny."
L2 (Middle Ability)	Child E	1.  +  2.  + 	1.COLL 2.SYN	"Both shine the same light."
L2 (Middle Ability)	Child G	1.  +SHINE+ 	1.SYN 2.COLL	

The pictures shown below were shown to the students during the picture activity:

      SHINE

Shimmer

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