ORGANIZATION OF WORDS IN THE MENTAL LEXICON: A PSYCHOLINGUISTIC STUDY

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ISLAMABAD

JUNE, 2023

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M.A English National University of Modern Languages Islamabad, 2012

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF PHILOSOPHY

In **ENGLISH (Linguistics)**

To

FACULTY OF ARTS & HUMANITIES

NATIONAL UNIVERSITY OF MODERN LANGUAGES, ISLAMABAD

Rizwana Jabeen, 2023

NATIONAL UNIVERSITY OF MODERN LANGUAGES FACULTY OF ARTS & HUMANITIES

THESIS AND DEFENCE APPROVAL FORM

The following thesis is recommended for approval by the Faculty of Arts & Humanities by the signatories, who confirm that they have read the thesis, examined the defense, and are satisfied with the overall exam result. Thesis Title: ORGANIZATION OF WORDS IN THE MENTAL LEXICON: A PSYCHOLINGUISTIC STUDY

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Candidate for the **Master of Philosophy** degree at the National University of Modern Languages, hereby certify that the thesis **ORGANIZATION OF WORDS IN THE MENTAL LEXICON: A PSYCHOLINGUISTIC STUDY** submitted by me in partial fulfillment of the M.Phil degree is my original work entirely and has not been submitted or published previously. Additionally, I solemnly state that it shall not, in the future, be submitted by me for obtaining any other degree from this or any other university or institute. I am aware that the work may be cancelled and the degree withdrawn if there is any indication of plagiarism in my thesis or dissertation at any time, even after the degree has been granted.

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ABSTRACT

Title: ORGANIZATION OF WORDS IN THE MENTAL LEXICON: A PSYCHOLINGUISTIC STUDY

Mental lexicon refers to the part of the brain where word learning, storage, and retrieval occur. Lexical relation is a method used in psycholinguistics to look at how peoples' mental model networks are set up in their brains. The current research has attempted to find out organization of words in the mental lexicon of grade 4 students. For this purpose, hundred students have been selected of grade 4 from the selected schools. This study employs quantitative method. The responses of the hundred students in word association test have been analyzed by using Fitzpatrick's (2007) model of 'classification of association response'. This model is applied to find out how the English language learners of grade 4 make position-based and meaning-based associations between the words through word association response. The research also sheds light on how the lexical networks of the English Language learners of grade 4 are characterized and influenced by the lexical class of the words. This work is important because it makes a significant advance to the understanding of the organization of words in the mental lexicon. Position-based association, which accounted for 56.95% of the total collected data dominated the distribution of the data. The outcome indicated that just 17.95% of connections are meaning-based. Collocation associations have been prevalent in position-based association. The findings of the word association test showed that the participants' mental lexicon was impacted by their comprehension and use of the target term. Hence, it is concluded that in the participants' mental lexicon, position-based association is the strongest lexical network.

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ACKNOWLEDGMENT

First and foremost, I want to express my gratitude to Allah, the Almighty, who provided me with the fortitude, wisdom, talent, and tenacity I needed throughout my years of study. My thesis supervisor, Professor Dr. Khurram Shahzad, whose direction, expertise, advice, generosity, and insights were crucial to the successful completion of my thesis, deserves a special mention.

Even if I forget someone, I won't forget my parents, whose fervent prayers were answered. I am very grateful to my parents' help. They are a source of inspiration and power. They have loved and supported me, and I am grateful to them. Without the help of my sincere friends (Kiran & Fatima), I would not have been able to complete my M.Phil program. So, I would like to thank them for their encouragement and support.

Finally, I would like to thank my siblings (Shafqat, Bablee, Nayla, Hamza and Maaz) for supporting me throughout my years of academic studies.

DEDICATION

I sincerely dedicate my dissertation to my dear parents, who consistently supported me emotionally, spiritually, and financially. A special sense of thanks goes out to my devoted parents, whose words of support and push for persistence continue to resonate in my ears.
I dedicate this work to my sisters Bablee and Nayla who are incredibly dear to me and have never left my side.
Finally, I dedicate this work and especially appreciate my brother Shafqat Shafiq for supporting me during the entire M.Phil program.

CHAPTER 1

INTRODUCTION

This chapter serves as an introduction to the selected topic. Problem statement, research objectives, and research questions have been presented after the introduction. The overall structure, including introduction of the topic, significance of the study, and delimitation, is also presented in this chapter.

1.1 Introduction

The mental area, where the process of learning, storing, and accessing words takes place, is known as the mental lexicon. Lexical relation is a technique used in psycholinguistics to examine the organization of the mental model network in the brain of individuals. By comparing the mental vocabulary to the World Wide Web, Bowern (2015) offered a more contemporary metaphor, implying that the mental lexicon is not simply formed but is organized in such a way with clear grouping and traceable network. It is dynamic and can evolve at any time like the World Wide Web. The input, storage, and retrieval processes lead to the formation of the mental lexicon, which is a continual process in cognition. When new words are received, they are first processed into the mental lexicon and then added to the relevant category depending on them or their connections to other words already stored there (Bowern, 2015).

The intricate internal arrangement of the mind is represented by the mental lexicon as a metaphor. The mental lexicon's intricate organizing structure enables the learners to retrieve the knowledge in a number of different ways. It is an intriguing and fascinating wonder how our brain processes vocabulary. The mechanism of the mind that is capable of language appears to be extremely complicated. "The area of psycholinguistics called 'mental lexicon' or 'the internal lexicon' is concerned with how words are organized in one's long-term memory" (Carroll, 2000, p. 114). There is no list or alphabetical order of the terms. The human word bank functions like a dictionary (Aitchison, 2012).

Mental lexicon is like a person's mental storage of words, meaning of the words and their association (Schmitt, 2000). Mental lexicon comprises not only that how the words are kept in one's memory, but also how they are recalled throughout the act of writing (Rothman, 2009). The new words are retained in the long term memory if there is

a sufficient relationship between them and the previously learned terms (Carroll, 2000). One's mental lexicon, or persistent memory, contains groups of words that are organized.

Learning a language involves intricate mental processes for memorizing, storing, and accessing the words (Kavitha & Kannan, 2016). Learning new words is a difficult process that takes place to varying degrees and depths for many learners. The majority of vocabulary learning is multifaceted and progressive (Schmitt, 2000). For the effective use of a word, it is necessary to master a variety of word knowledge, including spoken, written, meaning, collocation, organizational characteristics, frequency, register, and association (Kavitha & Kannan, 2016). The mental lexicon metaphor is the most effective way to comprehend how the learners of language gain words (Aitchison, 2012).

According to psycholinguistics, the words in our mental lexicon are organized into a vast network that is determined by the characteristics of each word. Through their collocation and coordinates, and the words' semantic characteristics, the words must be strongly connected (Aitchison, 2012). Using links between the words, a conceptual network is formed, with each combination of words representing a context that the person is familiar with (Schmitt, 2000). The words are further joined to create weaker networks, which can be identified by their phonological or orthographic similarity. The mental lexicon's network structure resembles a massive, multidimensional spider web (Aitchison, 2012).

Understanding the process of language acquisition and the relationship between the mental lexicon of the second language and cognitive ability depends on knowing how many words a normal language learner has stored in his or her mental lexicon at a given age (Schmitt, 2000). According to certain lists and tables describing vocabulary, many 9 to 10 year olds know at least 30,000 words (Radesky et al., 2016). Schmitt (2000) estimated that a 10-year-old has a total lexicon of 40,000 words. English language learners between the ages of 9 and 10 do not have a firm idea of the size of the mental lexicon.

Language research today makes use of the Word Association Test, which was first employed by psycholinguistics for psychoanalysis. A straightforward Word Association Test uses the approach of delivering a word or stimulus and asking the participants for the first thought that comes to mind. This response is studied for attributes that link it to the word or stimulus and this is done in result to gain a glimpse of the network structure of mental lexicon. Understanding the mental lexicon, linkages, and features that define the

link between the words will be made easier by researching the terms' close associations with the target word.

1.2 Statement of the Problem

Words must first be cognitively represented and arranged in a logical and accessible manner in order for someone to transform his or her abstract thoughts into actual words i.e., spoken or written form. The mental lexicon refers to this orderly arrangement of the words represented in our minds. The organizational patterns in the word association response give a general picture of English language learners' lexical networks and access mechanisms. English vocabulary is not taught in schools based on a proper understanding of the organization of the mental lexicon of English language learners. The lack of the mental vocabulary would make language production time-consuming and inaccurate in its representation of one's thoughts. If the words are not stored in an organized way in the mental lexicon this condition affects the vocabulary learning of English language learners. The organizational patterns in the word association response cannot provide a general picture of English language learners' lexical networks if the words are not stored in an organized way in the mental lexicon. The responses of the English language learners in word association test may be less stable and reveal low levels of associations. The weak tendencies towards responses and patterns are because of the various factors such as English language learners word knowledge related to the word or associations based on the forms of the words or simply misrepresentation/misinterpretation of the words. This study investigates the organization of words in the mental lexicon of English Language learners of grade 4.

1.3 Objectives of the Study

1. To analyze meaning-based features in the mental lexicon of the English language learners at grade 4.
2. To analyze position-based features in the mental lexicon of the English language learners at grade 4.
3. To examine the lexical networks of English language learners characterized and influenced by the lexical class of the words.

1.4 Research Questions

1. What kinds of meaning-based associations do English language learners of grade 4 make when presented with single words?
2. How do grade 4 English language learners make position-based associations between words using word association response?
3. How do lexical class words affect and characterize the lexical networks of grade 4 English language learners?

1.5 Significance of Study

This study is significant because it looks into how grade 4 English language learners organize words in their mental lexicon. This study is significant as it is helpful for English language teachers to teach English vocabulary based on a proper understanding of the organization of the mental lexicon of English language learners. This study is significant in a way that it explores the mental lexicon of English language learners of grade 4 using word association test (WAT). This study is also significant that it suggests diagnostic tests, such as word association tests that can be an important part of the curriculum because these tests would allow teachers to understand the various levels of word knowledge and the learners' reactions to lexical class disparities, and rearrange the study materials as needed.

1.6 Delimitation of the Study

The present study is delimited as it investigates the organization of words in the mental lexicon of English language learners of grade 4 by analyzing position and meaning based features. This study is delimited to English-medium schools in Rawalpindi, including Beacon House, Roots IVY, Roots International, APS, and The City School. This study is delimited to 100 participants of grade 4 at Beacon House, Roots IVY, Roots International, APS and The City School.

Chapter 1: Introduction. It presents the introduction of the present study. It deals with the aspects related to the statement of the problem, research objectives; research questions which the present study has attempted to answer the significance of the study and delimitation of the study.

Chapter 2: Literature Review. It deals with the reviewing of the related literature, operational definitions of the key concepts related to the research. It also deals with the related studies.

Chapter 3: Methodology. It deals with the research design and method, population of the study, sample of the study, method of data collection, and the techniques for data analysis procedure. It deals with the theoretical framework of the present study.

Chapter 4: Data Analysis and Findings. It deals with the thorough examination of the data. The results are presented in percentages, tables, figures, and graphs, and then they are analyzed.

Chapter 5: Conclusion, Recommendations and Implications for the Teachers. Conclusion, recommendations and implications for the teachers are covered in this chapter. The researcher has made a few recommendations for upcoming researchers. The researcher has provided teachers with a few implications of the study at the end of the chapter.

CHAPTER 2

LITERATURE REVIEW

A review of the pertinent literature is done in order to develop a theoretical framework for investigating how words are organized in the mental lexicon. The purpose of this chapter is to provide an overview of the literature on word association test, types of associations, word organization, and mental lexicon. This chapter also covers earlier studies that have been conducted in the area of mental lexicon.

2.1 Language

Language is a cognitive process by which one formulates ideas and concepts, which are then expressed through speech, written language, or oral language. According to Zucker, Piasta, and Kaderavek (2010),

> Language is widely acknowledged to be multifaceted and it is preferable to think of it as a collection of discrete domains. 1) Phonology, for example, is the study of how sounds are represented in language. 2) The domain of syntax, for example includes the representation of linguistic norms such as how phrases, clauses and sentences are ordered in language. 3) Semantics, for example, comprises the representation of words and meaning that make up a language, often known as a vocabulary system and lexicon. (pp. 67-68)

Language development is determined by oral input provided by the child's social environment, which is the primary source of vocabulary learning (Hoff & Naigles, 2002). Carey (1978) distinguishes between fast mapping and slow mapping. i) Fast mapping allows youngster to form a lexical representation (farm meaning) for a word after only a few encounters. ii) During a slow mapping process, the children then add additional lexical information (for example, deeper understanding, and connections to other words) to the already existing entries.

2.2 Words

It is the ability of humans to communicate that allows for social existence, community creation and maintenance. The ability to 'speak our minds' and the words that

communicate thinking to one another's minds are at the core of communication (Roux, 2013). As a result, words serve as symbol or vehicle that enables people to communicate with one another.

When the words are connected in a specific way, they constitute language, signifying that they maintain ties (Aitchison, 2003). Words are considerably more than dictionary entries and the complicated characteristics that are clearly relevant to the organization of the mental lexicon.

"Word acquisition entails merging a variety of linked pieces of information, including the following: (i) phonological structure, (ii) inflectional form, (iii) word class, (iv) rule governed (productive) derivatives, and (v) meaning" (Aitchison, 2012, p. 77).

Words are characterized by their relationship with other words (Roux, 2013). This means that explaining the meaning of words in terms of network that exists between the various senses and sub-senses of word is often the best way to understand them. When encyclopedic information is added to words, they become thoroughly recognized in the mental lexicon: stylistic, associative, idiomatic, and cultural meaning all join together to establish a word's multidimensional nature (Carter, 1998). Word definitions alone may not express the complete meaning and potential relationships that the word implies. Languages, on the other hand, cannot have a distinctive lexical item for every differentiation, and the same label or symbol may be used for several meanings. The multidimensionality of words presents the idea that words, especially multi-word items, are polysemic, indicating that the same word can have multiple meanings and can be expressed in various ways (Singleton, 1999). In the internal lexicon, the words also retain form (morphological structure); they participate in an arrangement (syntax), and produce sound when uttered (phonological structure) (Roux, 2013). Lexical connections in the mind differ greatly from what we often consider a dictionary or lexicon to be; a mental lexicon is more concerned with connections and word centers than word peripheries, and frames rather than specifics (Aitchison, 2012). The ability to distinguish between semantically related words and knowledge of how particular words relate to each other is emerging in the mental lexicon, which is made up of sets of words (Roux, 2013). In lexico-semantic theory, as more words are learnt, the mind must construct a system to organize them, which takes the form of a web, and that this web of interconnected linkages allows words to be remembered more easily (Sokmen, 1997). A comprehensive model of how words occur in the lexicon is three dimensional, with criss-crossing semantics; phonological nets crossing orthographic ones and

encyclopaedic nets (Wright, 2001). For example, the term ‘peace’ may elicit not just semantically linked connections like ‘freedom’ and ‘war’, but also encyclopaedic links like ‘Quaid-e-Azam’, as well as phonological and orthographical links like ‘piece’ and ‘peas’, and, by extension, more personal links like ‘relaxing at home’. Words are associated not only by meaning and tone, but also by visual; we associate comparable shapes in our minds’ eye with words, as well as with other contexts where we have learned or experienced them (Roux, 2013). It is possible that words will be linked at random (Nation & Meara, 2013). This leads to a practical proposal for language teachers: they should assist their students in making connections by allowing them to build on their own experiences and knowledge, which will reinforce the ties between words and make the learning process easier.

2.3 Words in the Mind

Human language is distinct from the communication systems employed by animal species in terms of quality (Séguin, 2017). Among the many properties that distinguish human language, it is worth noting that it has the power to symbolically represent meaning about objects or events, both near and far, and it may be utilized to generate sentences that have never been heard before but are understood by other listeners (Steuer, 1994).

Words and their meanings are acquired at a rapid rate by children. A two-year old vocabulary is roughly 500 words; a three-year old is over 1000 words, and a six-year old vocabulary is believed to be 14,000 words. According to certain lists and tables describing vocabulary, most 9 to 10 year olds know at least 30,000 words (Radesky et al., 2016). Schmitt (2000) estimated that a 10-year-old has a total lexicon of 40,000 words. In this study, the participants are grade 4 pupils aged 9 to 10. The participants were selected from grade 4 to see how their mental lexicon is developed (Rahimi & Haghighi, 2009).

Knowing the meaning of words, idioms, and phrases is important, but competency in vocabulary, which is more complex, also necessitates an open door to that information in order to use it successfully in context (Aitchison, 2012). The ability to utilize the language may be related to access, which is independent of analytic grammar (Séguin, 2017). The relationship between systematizing lexical structure of a language, i.e. lexical semantics, and the process of words being handled by the human mind, i.e., mental lexicon has to be investigated in the context of communicative competence (Aitchison, 2012).

2.4 Mental Lexicon

The term ‘mental lexicon’ refers to how words are stored in one’s mind as well as how they are recalled during speech and writing (Gui, 2000). The mental lexicon is the concept that is similar to a standard dictionary in many aspects. According to Zhang (2009),

> The mental lexicon and traditional dictionary differ in four ways. i) Unlike standard dictionary, a mental lexicon is not alphabetically structured. ii) The dictionary has a finite number of words, and is sometimes unable to keep up with constant growth of a language; in contrast, the mental lexicon can adjust to change in the meaning and pronunciation of words as they appear or disappear. iii) In dictionaries, words are enumerated one by one, however in the mental lexicon; words are organized into groups based on numerous features and relationship. iv) Lastly, the most importantly, a mental lexicon contains far more information than a dictionary. When a word is located in one’s lexicon, features related with the term are made available, such as its definition, pronunciation, spelling, and relationships to other words. As a result, the mental dictionary is more complex and dynamic than a physical dictionary. (p. 41)

The concept of the mental lexicon encompasses a broader framework that includes several facet of word (McCarthy, 1990). The internal/mental lexicon is a collection of well-known words that speakers can refer to when speaking and in comprehending what they hear kept in memory. As a result, it has records for all a person’s known term. Each lexical item includes information on the word’s meaning, morphology, pronunciation and syntax. When reading and writing skills are necessary, orthographic-knowledge about the written form is also part of the lexical entry in the lexical quality of hypothesis (Justice, 2018).

A mental dictionary, personal dictionary, and lexicon are all terms that refer to collection of words that an individual knows and uses (Schmitt, 2000). A person’s mental lexicon does not include separate ‘words’, but rather a collection of neurological connections that form a lexical network. The neural network’s activation patterns serve to convey information about the world’s lexical or meaning related aspects (for example, synonyms, antonyms and closely related words), as well as, its phonological (how a word

sounds), orthographic (how a word looks in print), and syntactic form (its grammatical class) (Zucker et al., 2010).

The mental lexicon functions similarly to a dictionary, thesaurus, encyclopedia, computer, library, and computer (McCarthy, 1990). Like a computer or library, the knowledge in the mental lexicon constantly gets updated. New words are introduced; existing words are connected in new ways, and unused terms often get forgotten. The talent that enables our supreme linguistic agility is referred to as mental lexicon (Altmann, 2001). Mental lexicon is the mind's collective representation of words which bring together contextual and interpersonal components of meaning and, most importantly, aids in language acquisition, expression and retention (Roux, 2013).

2.5 Insights on the Study of Psycholinguistics and Mental lexicon

The study of the cognitive processes that support the acquisition and use of language is known as psycholinguistics (Schmitt, 2000). The science of analyzing human language is known as psycholinguistics and the study of the interrelationship between linguistic and psychological elements is also known as psycholinguistics. People must have prospective talents and knowledge in order to learn and use language, as well as process the language inside them, which is unseen and can only be determined by observing learners' behavior (Schmitt, 2000). According to Xue (2020),

> In psycholinguistics, there are three basic experimental approaches that are regularly utilized. 1) The first is to distort the meaning of the vocabulary and design various interference possibilities, forcing the participants to make quick adjustments and judgments. 2) The second method is to observe the time of the participant's language processing in precise time measurement methods using online and real-time technologies. 3) The third step is to determine whether the participant's short-term memory still exists based on the outcomes of language processing, which is typically accomplished using a recurrence test that allows the subject to view and repeat information comprising new and old words in a short amount of time. (p. 89)

Vocabulary, according to psycholinguistics, is more complex and layered than a collection of words and their definitions **(**Kavitha & Kannan, 2016). The word mental lexicon comes from the field of psycholinguistics, which is concerned with the human brain's long-term memory for terminology (Xue, 2020). It is a complicated system with sophisticated psychological cognitive processes for learning and storing information. It cannot be measured or researched directly; researchers have developed a variety of analogous methods. In the form of psychological structural cognition, knowledge is stored in the brain. People may deduce the structure of the other half of the brain from some knowledge, improve the speed and accuracy of information processing, and successfully infuse information into the brain using this holistic psychological cognition.

2.6 Mental Lexicon and Vocabulary Learning

Vocabulary is an essential component of language, while little can be conveyed without grammar, and nothing can be conveyed without words (Zhang, 2009)**.** "The term 'vocabulary size' or 'vocabulary knowledge' is frequently used to define the number of words a person knows and depth of the semantic understanding" (Singleton, 1999, p. 210). The formation of vocabulary knowledge and the creation of one's own personal dictionary begins at a young age and lasts throughout one's life (Zucker et al., 2010).

For a high lexical quality, which is a high degree of vocabulary knowledge, it is vital to have specificity within various sections of word knowledge as well as strong linkages between them. "The size of the mental lexicon's features, is also known as vocabulary breadth and vocabulary depth" (Singleton, 1999, p. 102). The terms vocabulary size and quality of word knowledge refer to the same thing (Schmitt, 2000). The lexical entries are thought to be linked together based on commonalities in specific language domains, such as orthographic (widow-window), semantic (hungry-food), and phonological (hygrometer-hyndrometer) relationships (Aitchison, 2012). The size and organization of vocabulary should be evaluated rather than the depth and breadth. The sum of a learners' understanding of individual term in their vocabulary is referred to as vocabulary knowledge (Nation & Meara, 2013). In comparison to other aspects of vocabulary knowledge, vocabulary arrangement has only just begun to attract attention in mental lexicon research. However, it has only been in the last few decades that researchers have begun to look at how words are represented in the mental lexicon (Lu & Lim, 2019). In fact, we have seen a steady increase in studies into English language learners' mental vocabulary over the years (Singleton, 1999). The mental lexicon can be thought of as a

network that contains many types of individualized knowledge on well-known term (Aitchison, 2003).

2.7 Access to the Mental Lexicon and Its Organization

Lexical access, which involves selecting words from the mental lexicon to activate, is different from the way the mental lexicon is organized or structured. These two components are interrelated because how easily information can be retrieved depends on how humans retain it.

2.7.1 Network model

The majority of scholars believe that the mental lexicon is a network of interconnected elements, and that these interconnected elements are semantically related concepts or nodes (Zhang, 2009). As a result, the meanings of words are determined by their relationships with other words via a network of links.

1. The hierarchical network model

Hierarchical network model is a semantic network model that deals with the relationship between words and their meanings. This model proposes that words are stored in networks in a single person's memory; each word or notion represents a node, and relationships and hierarchy are formed through relationships between nodes (Zhang, 2009). Some nodes dwell on the same level as other nodes, and these nodes are dominated by superordinate nodes. These nodes can also serve as superordinate nodes for the other subordinate nodes.

Every word in the hierarchical network is connected according to its semantic properties, using animal-bird-robin being an example of a superordinate-subordinate semantic relationship. Because the amount of space available for storing semantic data is limited, it is preferable to keep data in a single network of location. This paradigm, however, has limitations because hierarchies are not always clearly ordered (Zhang, 2009).

2. Spreading activation model

The spreading activation model assumes the existence of word knowledge at three levels: conceptual, lemma, and lexeme (Zhang, 2009). Understanding the role of lexical access in comprehension and production requires distinguishing between these levels.

Furthermore, the information is stored in an isolated manner in each of these three levels, i.e. conceptual, lemma, and lexeme (Carroll, 2000). For example, the tip of the tongue phenomena occurs when a person knows a word but is temporarily unable to remember it (Zhang, 2009).

The speaker was aware of the word's meaning (the idea) and syntactic category (the lemma), but not of its phonetic properties (the lexeme), at least not in their whole (Kavitha & Kannan, 2016).

3. The prototype model

The concepts are kept in the form of a 'prototype', which is a representation of the most common member of the given conceptual categories (Zhang. 2009). For example, every member of the bird family possesses the attribute of 'bird-ness', which includes a set of characteristics that define a prototypical bird, such as a beak, wings, feathers, and two legs.

Birds such as larks, swallows, robins, and sparrows resemble the prototypical bird more closely than chickens, while penguins do not resemble the prototype at all.

2.7.2 Access to the mental lexicon (lexical access)

The process of activating meanings in the mental lexicon is known as lexical access (Zhang, 2009). This can happen when a person perceives the occurrence of a word through their senses. When a person reads the word 'elephant' on a printed page, for example, he has the ability to recognize it as a known term and, as a result, recover relevant knowledge about the word to aid the person in the understanding process (Carroll, 2000).

1. The autonomous search model

The word recognition system is split into two components in the autonomous search paradigm (Carroll, 2000). The first is concerned with the orthographic properties of words, whereas the second is concerned with their phonetic properties (Zhang, 2009). These aspects entail analyzing words in terms of relevant features, such as how common words are accessed faster than similar uncommon words, and how the model accounts for the word frequency impact. Priming and contextual effects are not taken into account by the autonomous model (Carroll, 2000).

2. The logogen model

In a lexicon, words (morphemes) are represented by 'logogens', which are units that indicate various semantic, orthographic, and phonological properties of a word (Zhang, 2009). The sensory input and contextual information both function in tandem to activate a logogen. Although this model does not account for word frequency, priming, or contextual effects, it is a good starting point (Carroll, 2000).

3. The cohort model

According to Zhang (2009) cohort model accounts for the three stages of auditory word recognition. The 'word-initial cohort' is formed by activating a collection of lexical candidates based on an acoustic-phonetic analysis of the input. Second, a member of the cohort is chosen for further investigation. The chosen lexical item is then integrated into the current semantic and syntactic context.

4. Variables that influence lexical access

The frequency of a word, its phonological/morphological structure, its syntactic category, the availability of semantically related terms, and the existence of other meanings of the word all influence lexical access (Carroll, 2000). The readiness of common words and meanings appear to be higher than that of less commonly used words and meanings when confronted with new words, humans rely on morphological structure (Zhang, 2009).

The method of how words are stored, comprehended, accessed, and created in the mental lexicon can be explained using network and connectionist models (Rothman**,** 2009). According to connectionist theories, words function as nodes or brain units that are connected by networks (Kavitha & Kannan 2016). When a stimulus, such as a picture, is presented, the nodes or words in the network associated with the picture are activated, and this activation spreads throughout the network. The entire network comes to life, with the output being the word that receives the most stimulation. Mental lexicon is the subject of numerous theories and models (Zhang, 2009).

2.8 Types of Word Associations

The growth and learning of words for second language learners entail accessing organization within the mental lexicon, which clearly includes processes of associations formed primarily by semantic principles (Post, 2007). The fundamental assumptions of a semantic approach to word meaning are that words do not exist in isolation. The sense relationships between words help to order words structurally (Carter, 1998). Patterns can

be used to define the words, and words that shape patterns have similar meanings (Post, 2007). Synonyms, collocation, hyponymy, and coordination can all be used to classify words. It appears that these characteristics allow the mind to order the words in the mental lexicon for input, storage, and retrieval. The organization of human mental dictionaries cannot be done merely on the basis of sounds or spelling; meaning must also be considered (Aitchison, 2003).

Beginning with two main principles or classes of word association: paradigmatic (choice) and syntagmatic (chain), the interrelationship of words within language can be examined (Coulthard, et al., 2001).

2.8.1 Syntagmatic associations

A syntagmatic relationship is a horizontal relationship that can be deciphered by looking at what comes before and after a given word. Syntagmatic association is a term used to refer to connections made between words that are commonly associated together, such as abandon-ship (Schmitt, 2000).

The syntagmatic replies to the left and right of the word would allow for the establishment of the grammatical sequence and a sequential relationship (Carter, 1998). Syntagmatic association focuses on how words are combined to form text (McCarthy, 1990). Syntagmatic relationships are regarded as horizontal, because the next words in the text are determined by words before them. As a result, when the students or people make syntagmatic connections they are connecting words to generate meaning.

Syntagmatic associations have diverse word class that is not the same as the stimulus (Schmitt, 2000). In most cases, the stimulus and response words usually form separate word classes. This is perhaps unsurprising, given that most texts change word classes with each new word. When we make a compound of two existing terms, such as ‘apple pie’, this is an example exception.

The group of word associations related to collocations belongs to syntagmatic associations (McCarthy, 1990). Syntagmatic associations are words that regularly collocate with the stimulus word, this is clear (as in steel-bond, sell-short and red-rose) (Singleton, 1999). This is comparable to collocations, which work in a similar manner.

i) Collocation

Collocations are a type of word associations that have a syntagmatic linkage, in which two or more words collocate (McCarthy, 1990). A collocation is a term for a link between two words that are likely to be present together in context (Atchison, 2003).

Many lexical items are either themselves patterns or form part of patterns that are quite fixed and stable and are used routinely in relatively predictable situations; however, many lexical items are either themselves patterns or form part of patterns that are quite fixed and stable and are used routinely in relatively predictable situations (Carter, 1998). In the study of vocabulary, collocation is crucial; it is a marriage contract between words, and some words are more firmly married to each other than others (McCarthy, 1990). This indicates that some words are more naturally connected to one another than others. Collocates are words that frequently appear with or near a target word (i.e. with a more frequently than by chance), while collocations are resulting sequences or groups of words (Reppen & Simpson, 2019). This makes judging difficult whether or not two words should be classified as collocations. Some words are inextricably linked and easy to spot on as collocation (McCarthy, 1990).

In theory, any word can collocate and form a new word. However, some words are more likely to appear together than others. ‘Guilt’ and ‘mathematics’ are unlikely to be linked. On the other hand, there is a good chance that’ florist’ and ‘flower’ will appear in the same sentence. Creating a list of words that are likely to appear with the stimulus is one way to solve the problem of determining which associations can be classified as collocation (Carter, 1998). This is not done with the forty stimuli in this study, but it is sometimes necessary to think about what might be collocated.

Collocation is described by the color ‘blond’. Blond is almost always used to describe hair; it is not acceptable to use it to describe a car. As a result, ‘blond’ and ‘hair’ have link for each other, which implies they collocate (McCarthy, 1990). ‘Bread’ and ‘butter’ are two terms that frequently collocate, which may lead to the notion that they are easily linked because they both begin with the letter ‘B’ and phoneme [b]. However, terms like ‘knife’ and ‘fork’ are just as associated, indicating that the objects are linked by their meaning (Post, 2007).

Some collocation pairs have become fixed; they are referred to as ‘freezes’. Frozen pair is represented by the words “knife and fork’. Collocations include idioms and numerous words integrated into phrases, which are tied to ‘freezes’ because they cannot

communicate the meaning without the full expression (Aitchison, 2003). Speakers treat phrases like ‘good morning’ as a single word because they are so firmly collocated (Nation & Meara, 2013). As a result, it is no wonder that individuals frequently identify such a section of a phrase with one another.

In languages, common collocations are frequently closely linked to cultural elements (Crystal, 2018). In English, for example, ‘green’ is associated with ‘jealousy’. This type of metaphor is unlikely to exist in all languages and cultures. Furthermore, additional collocations that are influenced by culture are real life phenomenon. For instance, ‘sour’ is synonym with ‘milk’ but not with ‘ham’ or ‘egg’.

2.8.2 Paradigmatic associations

Paradigmatic relationships are frequently found between terms of the same word class, and they are sometimes referred to as ‘vertical’ relationships since grammatically related words can be used to substitute for one another in a sentence (McCarthy, 1990). Due to paradigmatic links, the words in the phrase can be replaced in a variety of ways (Crystal, 2018). It is possible to replace a word in a phrase that is not present.

i) Coordination

Words that have a tendency to cluster together on same degree of detail, known as coordinate, are involved in coordination (Aitchison, 2003). Coordination is determined by the connection of ‘salt and pepper’, and other instances of coordinates include ‘cashew and walnut’.

Antonyms are also included in coordination. Some opposing words simply have two parts: left and right. However, some parts of opposites have multiple conceivable oppositions. In that situation, two polar opposites, such as ‘hot and cold’, can be coordinated (Aitchison, 2012). The term antonym is used, while looking at oppositions further. An antonym is a term with the opposite meaning.

Complementarity, converseness, gradable antonyms, and incompatibility are four types of antonyms (Carter, 1998). i) Complementarity refers to the fact that one term includes the presence of another because the words have no degree of complementarity or the existence of one excludes the presence of the other. ‘Dead-alive’ or ‘lost-found’ are two examples of complementarity. ii) Conversness is a phrase of words that have a correlation, such as ‘buy and sell’. The link is that if one person buys something, another person must sell something. iii) Incompatibility occurs when words from the same semantic realm are

mutually exclusive. Incompatibility can be seen in color and season; for example, 'November' cannot be 'December' at the same time. iv) Words that can be related in relation to one another known as gradable antonyms. Overweight, obese, fat, toned, muscular, skinny, average and thin are some examples gradable antonyms.

ii) Super-ordination

Super-ordination, also known as hyponymy, is a hierarchical relationship of inclusion that is established by the creation and structuring of taxonomies (Carter, 1998). Superordinate term and subordinate terms are examples of lexical relations of inclusion in hyponymy. Hyponymy is a relationship between two words, one of which is specialized and other broad or general (Rothman, 2009). A robin can be classified as a bird in general. In terms of hyponymy, super-ordination is explained. Using 'media' as an example, the following elements would be subordinate: television (TV), magazine and newspaper. Furthermore, television (TV) is a hyponymy of 'media', while magazine and newspaper are co-hyponyms. Hypernyms are sometimes referred to as superordinate, while the objects that fall under the superordinate, hypernym is usually referred to as hyponymy (Aitchison, 2003). In this study, the term 'superordinate' is employed.

It is possible that a superordinate causes words within its category to be triggered, such as 'pear' for 'fruit' (Rothman, 2009). These words are referred to as subordinate. This term can be applied to any word in a subordinate group. Different people have different viewpoints on what a word relationship must resemble in order to be considered superordinate link (McCarthy, 1990).

iii) Meronymy

Only a relationship in which one item is a kind of representation of the superordinate is accepted by semantics. A 'chair', in other terms, is a piece of 'furniture'. Semanticists do not include the term 'meronymy' in the concept of super-ordination (McCarthy, 1990). Carter (1998) categorized meronymy as part of his section on super-ordination. Schmitt (2000) offers a list of sense of relation in which he includes super-ordination under the name hyponymy but separates meronymy, which refers to whole-part linkage, such as the 'clutch' being a component of the 'car', and the 'finger' being a part of the 'hand'. Although the definition of meronymy is not always obvious, the underlying concept is that an item can be divided into smaller bits (Aitchison, 2003). Meronymy is handled as a type of super-

ordination since the whole-part relationship can be viewed as a hierarchical system (Rothman, 2009).

iv) Synonyms

Synonyms are words that signify exactly the same thing, such as 'worried' and 'anxious'. However, because it is uncommon for two terms to signify exactly the same thing, the term synonym is applied to a broader context (Aitchison, 2003). As a result, even though the latter meaning is stronger than the former, words like 'hungry' and 'starve' are considered synonyms. In reality there are no absolute synonyms; a synonym always has a small variance in meaning from its counterpart. This is not to say that synonyms cannot be interchanged; it only means that substituting a synonym changes the meaning in a context slightly (Carter, 1998).

Synonyms are offensive words, such as 'bathroom' and 'restroom', are popular in many cultures. As a result, while the meanings of the synonyms are the same, the formality may differ significantly when one is chosen over the other (Carter, 1998). Is there such a thing as true synonyms? It is debatable whether synonyms may always be used in the same context, and yield the same meaning. The words 'start' and 'begin', for example, cannot always be interchanged. i) The infant begins/starts to scream. ii) The bike did not begin. iii) Everything was black before the world started. Both terms can be used in the first statement; however, the other two sentences seem strange due to underlined word's choice (McCarthy, 1990). This demonstrates that, despite the fact that terms are considered synonyms, it is not always possible to substitute them with one another.

There are several words that are regularly referred to as synonyms in dictionary but are difficult or impossible to substitute when used in context (Murphy, 2003). Some synonyms are intimately associated with certain terms, while others are not. 'Thick forest' and 'heavy traffic' are two examples of this phenomenon, where 'thick' and 'heavy' are nonetheless considered synonyms due to the meaning they convey (Rothman, 2009).

Words with approximately the same meaning are known as synonyms (Schmitt, 2000). The use of the word 'approximately' indicates that synonym does not always imply matching meaning. It is difficult to define similarity, and selecting which words go together is a never ending process (Murphy, 2003). As a result, many terms can be considered synonyms in a suitable situation. Defining synonyms and specific context, synonyms are employed in this study.

v) Clang associations

Phonological and orthographical patterns focus on the sound structure and written structure of the words rather than semantic linkage (McCarthy, 1990). For example, 'boat' and 'coat' could be related. When it comes to the form, clang associations are tied to the stimulus, but they have no meaning, such as 'fast-past' (Schmitt, 2000). The way lexis is stored may also be determined by the basic rhythmic pattern of words (Aitchison, 2012). This means that words with the same syllabic structure are likely to be related.

If the words were a person lying in a bathtub with their head on one end and their feet on the other, the beginnings of words are, on average, better recalled than the endings, much as the head is further out of the water and more conspicuous than the feet in a bathtub (Aitchison, 2003). Individuals remember beginnings and endings of words better than the middle of words, a phenomenon known as the bathtub effect (Rothman, 2009). This highlights the significance of a word's overall shape, c_____ate, as in communication, *confiscate* is a good illustration of this pattern. Furthermore, many of words with similar spellings are close to one another in dictionary; words with similar sounds may be close to one another in the mental lexicon, even if not physically (Aitchison, 2012). Further evidence for a phonetically structured mental lexicon can be discovered in studies on 'malapropism', or speech errors produced by related pronunciation rather than meaning, such as first-fast; finally-formally, and so on (Rahimi & Haghighi 2009). In the recognition of words, sound plays an important role (McCarthy, 1990).

vi) Encyclopedic associations

Encyclopedic associations are more influenced by the respondent's global knowledge, age, interest, nationality, or other personal characteristic than by the dictionary of word's meaning or collocational features (McCarthy, 1990). A word or phrase has a connotative meaning as well as grammatical denotative meaning that reflect values, judgment, and attitude (Murphy, 2003). Connotative connections with words emerge in part as a result of encyclopedic knowledge of the world and the role, or context of every given word (Post, 2007). For example, encyclopedic knowledge would allow someone to grasp that the word 'exercise' refers to physical activity, health, and possibly food. Furthermore, encyclopedic knowledge would allow an individual to determine if an activity is favorable or non-favorable based on information outside of the grammatical structures of words. Encyclopedic responses are based on one's personal understanding of the target

word over time, resulting in a 'web-like' set of associations (McCarthy, 1990). McCarthy (1990) characterizes his understanding of the term 'war' as based on years of reading and personal memories, resulting in a 'web-like' set of associations that include names of specific wars, the impact of war, political goals linked with war, and civilian things observed during wartime.

Responses in collocational associations are dependent on the participants' individual interpretations of the target term (Rothman, 2009). Common collocations in languages are closely related to cultural concepts (Post, 2007). The term 'collocation' refers to a connection between two words that are most likely to appear together in context (Aitchison, 2003). Additional collocations that are impacted by culture also occur in real life. Encyclopedia is treated in this study as a sort of position-based association. Since typical collocations in languages are often closely linked to cultural components, real-world occurrences and collocation linkages are based on one's individual understanding of the target term.

vii) *Fixed expression*

Any combination of orthographic words that works as a single item is referred to as a fixed expression (Coulthard et al., 2001). A phrase of words that works as a single lexical item is referred to as a 'fixed expression' or 'multi words', which generally refers to phrases of words that contain more than one word and are semantically ambiguous (Carter, 1998). Proverbs, idioms, stock phrases, allusions/quotations, catchphrases, discoursal expressions, and idiomatic similes are examples of fixed expressions. 'Date night', 'solid as a rock', and 'it's about time' are a few examples of idioms, idiomatic similes, and discoursal expressions. Additionally, fixed expressions imply that the process of producing language involves assembling prefabricated parts that are appropriate for specific contexts and that 'lexical acquisitions may involve the learning of whole collocational chunks of language' (Post, 2007, p 9). It would seem that the purpose of such fixed phrases is to maintain and stabilize communication while allowing for the formation of larger grammatical units from their base for speech that is more dynamic both internally and outwardly (Rahimi & Haghighi 2009).

2.9 Word Association Test (WAT)

In recent studies, the early 20th century technique has largely been employed to examine the mental lexicon of English language learners (Fitzpatrick, 2007). One technique

for investigating the way words are organized in our minds is the word association test (Rothman, 2009). Numerous linkages of all kinds have been discovered as a result of these investigations. Even though they may refer to the same phenomenon using different terminology, researchers generally accept the identified types of linkages. Through identifying patterns and generally typical methods to associate in word association tests, it is possible to create strong mental connections. Thus, word association tests have provided the framework for word network models of individuals.

The word association tests can be used to infer information about the formal (grammatical and lexical) relationships between words, a person's internal (psycholinguistic) knowledge, and the sociolinguistic context (Roux, 2013).

The word association test is a technique for identifying respondents' automatic response to a specific word (Schmitt, 2000). It is considered that the automatically presented word has the closest mental association with the incentive term among the respondents. The participants are asked to provide associative meaning for words presented as solitary entities, and it is assumed that frequently provided answers have a strong relationship and familiarity with the triggering word. Words can also be considered well-known if they cause participants to respond in a consistent manner (Rothman, 2009). Additionally, words are deemed well-known when they cause participants to respond in a consistent manner. It is also suggested that these words have organized networks. On the other hand, responses that are unusual are seen to have tenuous links to the stimuli. The lack of familiarity and an unorganized network are the causes of these words' failure to elicit reactions. We can learn more about how the metal lexicon was structured and the conceptual associations that existed between the words (Schmitt, 2000). This means that studies aiming to map the mental lexicon may find word association tests to be useful.

The word association test is one of the most popular tools for assessing the representations of the mental lexicon. In this study, language users would be supplied with a stimulus or priming word, and then instructed to produce one word immediately after reading the particular stimulus. The fundamental premise behind this is that language users' production of a word followed by reading the specific stimulus word will indicate how the words are arranged in their mental lexicon.

2.10 Multiple and Single Response Word Association Test

The participants make an idiosyncratic association for a first response, while for the second, they may produce a more usual reaction (Schmitt, 2000). The commonality of responses in a multiple-response test was higher, resulting in a fuller picture of the respondent's mental lexicon (Precosky, 2011).

Multiple Word Association Tests (WATs) produce chain responses or second and third responses that associate to one another rather than stimulus, whereas single response Word Association Tests (WATs) are better at detecting a respondent's first (and strongest) association to a stimulus word (Cremer et al., 2011). In this study, single Word Association Test (WAT) is employed to find patterns in learners' word association.

2.11 Changing the Classification System

McCarthy's (1990) *characteristics type of response* theory includes coordination, collocation, and encyclopedic and clang associations. Word associations are traditionally used to express a functional or grammatical point of view and are separated into three categories: syntagmatic, paradigmatic and clang associations. The following illustrates how conventional classification is applied in word association analysis. Carter's (1998) model for word association classification according to convention is used.

Paradigmatic: Words belonging to the same grammatical class as the stimulus item, such as *wolf, cat, pet,* and animal -- especially indicate words that regularly belong to the same conceptual category, and thus includes hyponyms and antonyms.

Syntagmatic: Words that form a grammatical sequence to the left or right of the stimulus word, for example, given the word 'dog', would form a grammatical sequence to the left or right of the word, such as *bark, bite, hairy* and *furry*.

Clang: Words like *dog, log, fog, blog, smog, clog,* and *frog* elicit responses based on their phonetic similarity rather than their semantic similarity.

Fitzpatrick (2007) attributes the paucity of decisive knowledge about learners' mental lexicon to the clang-paradigmatic-syntagmatic classification system's inadequacy to capture the mental lexicon's specific details (Roux, 2013). As a result, Fitzpatrick (2007) suggests a categorization system that includes three categories: meaning-based association, position-based association, and form-based association, as well as erratic association. The categorization scheme of Fitzpatrick's *(*2007) model is shown below.

Meaning based association: Determined by semantic characteristics: Words that can be used to replace one another in a sentence. For example, synonyms, antonyms, super-ordinates (hyponymy), lexical sets, coordinates (meronymy), and conceptually related words.

Position based association: Determined by syntactic and collocational characteristics: Words that appear in a sentence in a specific order for example, collocations.

Form based association: Associations based on the form of words: Words having different affixes, as well as their orthographic and phonological resemblances.

Erratic association: Blank: It appears that there is no link between the cue and the reaction, or that there is no response at all.

Meaning-based association, position-based association, form-based association, and other erratic association are all included in Fitzpatrick's (2007) model of 'classification of association response'.

Fitzpatrick's (2007) model of 'classification of association response' expands and describes all three types, syntagmatic, paradigmatic, and clang association, as well as adding the fourth category, erratic association (Precosky, 2011). Fitzpatrick's (2007) model of 'classification of association response' is simple and straightforward, which increase the likelihood of a more advanced analysis (Roux, 2013). In this study, Fitzpatrick's (2007) model of 'classification of association response' is employed as a theoretical framework.

2.12 Framing Research Questions and Planning Research Objectives

In this study, for formulating the research questions and planning research objectives, the researcher finds Fitzpatrick's (2007) model of 'classification of association response' and the word association test the best techniques for investigating the way words are organized in the mental lexicon of English language learners of grade 4. Fitzpatrick's model emphasizes the important component of lexical development such as growing awareness of syntactic, semantic and conceptual relations between words (Roux, 2013). The word association test in this study is used to infer information about the formal (grammatical and lexical) relationships between words, the English language learners' internal (psycholinguistic) knowledge, and the sociolinguistic context (Rothman, 2009).

2.13 Related Studies

The L2 mental lexicon of Korean EFL students was studied by Lu and Lim (2019). The goal of the study was to look at the elements that influence Korean EFL students' mental lexicon word association type. The researchers also looked at the size of the learners' vocabulary to determine if it had any bearing on the types of word associations. A total of 40 Korean EFL students made up the study's sample. The participants in this study were 23 females and 17 males. This study was conducted using an experimental research design. The lexical decision task assumes reaction time and accuracy when responding to word association. In this study, the McCarthy's (1990) model of word association served as a theoretical framework. Learners' vocabulary size and their word association task were both used in a correlation study. The findings revealed that the amount of a Korean EFL learner's vocabulary had a strong relationship with their ability to identify paradigmatic and phonological associations. The findings also revealed that the amount of a learner's mental lexicon is influenced by their vocabulary. In this study, the sample size was insufficient.

El-Dakhs (2017) conducted a research on the effect of language exposure and word characteristics on Arab EFL learners' word association. The researcher looked into the structure of word connections among Arab EFL students and compared it to native English speakers. The researcher looked at how increased language exposure and word features affected learners' association patterns. The study's sample included 45 native English speakers and 421 Arab English learners at a Saudi university. Multiple replies were used in the word association test. As a theoretical framework, the Fitzpatrick's model (2007) was used. The study's findings revealed that language exposure and word characteristics have a strong influence on learners' associations, and they supported a developmental approach to the second language lexicon in which increased language exposures and word knowledge enhanced mental word connectivity and increased native-like similarity with most paradigmatic associations. In this study, the word association test employed multiple responses. Chain reactions that were induced by many responses were related with one another rather than the stimulus.

Kavitha and Kannan (2016) conducted research on Indian learners' mental lexicon and lexical network. The study used two-word association tests to investigate the Indian learners' mental lexicon and lexical network. The goal of the study was to derive patterns from the learners' association behavior. The syntactic features of the association that forms the networks were studied. The study included 106 students studying English as a second

language at the postsecondary level. In this study, the McCarthy's (1990) model of word association was used as a theoretical framework. In this investigation, two tests were carried out. Test 1 consisted of a single-response word association task, with the results examined for patterns of word association using a significantly modified response classification technique. The relationship was examined for its lexico-syntactic features in Test 2, which used the identical collection of terms. The result of the study showed the lexico-syntactic properties and lexical class difference. In order to investigate the Indian learners' mental lexicon and lexical network, the study used two-word association tests; however, the conventional classification, such as paradigmatic, syntagmatic, and encyclopedic used in word association analysis was insufficient to derive pattern from the learners' association behavior.

Mattheoudakis (2013) did a study on the mental lexicon's developmental model: evidence from Greek students. Mattheoudakis (2013) put Wolter's (2001) mental lexicon developmental model to the test. The study included 50 participants 40 Greek English learners of various levels and 10 native English speakers. For the purpose of the study, three instruments were created. The first instrument was a 48 word single response word association test, which was completed by native and non-native English speakers alike. The second instrument was a single answer word association test with 48 common terms that could only be completed by native English speakers. The third instrument was a word knowledge depth exam, which was performed by Greek learners for the frequent words in the first test and native English speakers for the frequent words in the second test. The study's findings demonstrated that the depth of word knowledge, as supported by Wolter's (2001) model, appears to play a crucial role in word association for both native and non-native speakers. The study's findings revealed that less integrated terms in the lexicon mostly displayed phonological linkages, whereas more integrated words elicited syntagmatic reactions. In this study, Greek and native learners did not have an equivalent number of samples to study the mental lexicon's developmental model.

In contrast to the studies described above, the current study looks into how fourth-grade English language learners organize words in their mental lexicon. The study has employed quantitative research methodology. This study has employed an exploratory-descriptive research design. The sample size of the study is 100 students. The students have been selected from grade four of private schools, i.e. Beacon House, Roots IVY, Roots International, The City School and APS. In this study, forty words have been taken for the

word association test. This study's theoretical framework is based on Fitzpatrick's (2007) model of "classification of association response". Fitzpatrick's (2007) model of 'classification of association response' includes meaning based association, position based association, form-based association and erratic association.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes data collection and analysis strategies that are pertinent to the study. This chapter explains and explores the research process and how the data and information collected are used throughout the entire investigation. This chapter covers the population of the study, sampling, and sample size in addition to describing the research's focus and responses. The method for gathering data, the method for analyzing it, and the tools utilized are all described in this chapter. The theoretical framework employed in this study is explained in this chapter along with the research kind, research method, and research site.

3.1 Research Approach and Method

Exploratory-descriptive research method has been used in this study. This exploratory-descriptive study uses quantitative research approach. Exploratory research is employed to look into a problem that is not well-defined. The process of gathering numerical data and subjecting that data to statistical analysis is known as quantitative research. This kind of data can be used to compile rough data and then further build percentages, charts, tables, and figures to obtain information.

Quantitative research is concerned with quantifying and analyzing variables in order to acquire results (AlHassan & Wood, 2015). It explains the method used to explain an issue or concept by gathering statistical data (Rashid & Sipahi, 2021). Surveys, tests, formal interviews, individual questionnaires, similarities and correlations with empirical research are all part of the quantitative method. The word association test is used in this study to collect data. In this study the word association test responses from the students are investigated using a quantitative test technique. This study's data is analyzed using a descriptive statistical method.

3.2 Population of the Study

The students are selected from grade four of private schools, i.e. Beacon House, Roots IVY, Roots International, The City School and APS.

3.3 Site of Research

The study is carried out in English-medium schools in Rawalpindi, including Beacon House, Roots IVY, and Roots International, APS, and The City School. The rationale behind this decision is that all of these schools are located in Rawalpindi. The City School, APS, Beacon House, Roots IVY, and Roots International have been chosen because they are the top English-medium schools in the city. The City School, APS, Beacon House, Roots IVY, and, Roots International are the five English-medium schools from which permission was obtained to conduct the research (Appendix B).

3.4 The Sample of the Study

The sample size of the study is 100 students. Twenty students from each school have been chosen to participate in the word association test. This study has employed a non-probability convenience sampling technique. Precosky (2011) used non-probability convenience sampling technique in his study because that study has quantitative approach. In this study, with the aid of a non-probability convenience sampling strategy, the researcher selects the sample by locating students who are conveniently available.

3.5 Sample Selection Criterion

The study is carried out in English-medium schools in Rawalpindi, including Beacon House, Roots IVY, and Roots International, APS, and The City School. All these schools are located in Rawalpindi, quite a big city, and it was feasible for the researcher to collect data from these schools. In this study, the participants are grade 4 pupils aged 8 to 10. Every participant in this study was eager to take the test. The chosen individuals of grade 4 were able to understand the test since they have studied English for at least five years in school (Rahimi & Haghighi, 2009). The participants were all fluent in English Language. As a result, the students have probably attained a proficiency in their second language that allows them to grasp and create a large number of words, which was essential for the research's success (Rothman, 2009).

3.6 Data Collection Instrument

The word association test is used to collect data, which involves selecting 40 words from grade 4 English textbooks taught at Beacon House, Roots IVY, Roots International, The City School, and APS.

3.7 Data Collection Method

Forty words have been taken for the word association test (Appendix A). The content words have been taken from the required grade 4 English textbooks i.e., Oxford reading Comprehension & Grammar, Cambridge Global English APSACS edition, Oxford Progressive English, and Oxford Discover at Beacon House, Roots IVY, Roots International, The City School, and APS. The stimulus is a set of 40 words. A list of 40 words was compiled, with the aim to include a list of relatively common and uncommon words (Rothman, 2009). The amount of words selected for the test is sufficient for a reliable result. To develop conclusions, a set of forty words is sufficient. Although this number of items would give the study additional evidence, it might also help to clarify the findings and enable the development of a trustworthy analysis (Rothman, 2009). The stimulus words have been chosen following the Task 123 of McCarthy's Vocabulary (1990, p. 152) i.e., grammatical words, items from everyday environment, common/uncommon words and mix words-class. In this study, the stimulus words have been chosen of four word classes with common/uncommon words. The words are divided into word classes, such as nouns, verbs, adjectives, and adverbs, with a list of ten for each, in order to get an equal number of each word class, that is necessary to make the findings clear and successful (Pranoto & Afrilita, 2019). The participants were chosen from grade 4 students because they are in the developmental stage as far as their mental lexicon is considered (Rahimi & Haghighi, 2009). In this study, the content words are meant to be simple enough for all of the participants to grasp because failing to do so would have a negative impact on the outcomes (Rothman, 2009). English language learners are exposed to a broad range of vocabulary through the Oxford and Cambridge English textbooks. From first three lessons of each textbook the researcher took content words. The content words were picked from the required texts because it is likely that English language learners are already familiar with them through their classroom instruction (Kavitha & Kannan, 2016). In the first three lessons of grade 4, there were used total twelve adverbs of manners, four adverbs of frequency, and four adverbs of times. For the word association test (WAT) in this study, the researcher selected six adverbs of manners, two adverbs of frequency, and two adverbs of times. Ten descriptive and ten positive adjectives were used in the first three lessons of grade 4. For the word association test (WAT), the researcher selected five positive and five descriptive adjectives. The first three lessons of grade 4 textbooks employed thirty verbs and forty common nouns. The selected stimuli represent concrete nouns. Concrete nouns

are selected so that the students can perceive the words easily (Rahimi & Haghighi, 2009). Ten concrete nouns and ten verbs were selected by the researcher for the word association test (WAT) in this study.

Instead of focusing on the word connections that a particular word elicits, this study wants to know what associations students frequently have. In Word association test (WAT), the participants are asked to respond with the first word that comes to their mind after reading a specific stimulus. Single response Word Association Test (WAT) is better at detecting a respondent's first (and strongest) association to a stimulus word (Rothman, 2009). The word association tests can be used to infer information about the formal (grammatical and lexical) relationships between words, a person's internal (psycholinguistic) knowledge, and the sociolinguistic context (Roux, 2013). Word association test (WAT) has been adopted from (Roux, 2013) in this research. The data is collected in the form of response of the students to the stimulus word.

Each participant completes the word association test on their own to avoid interfering with one another's performance. They are instructed to write down the first word that comes to mind after reading an incentive word. The benefit of having the pupils read the words rather than hear them is that tone of voice, pronunciation, and accent may not have an impact on their understanding. This justification, together with practical considerations, led to the decision to conduct the full test in writing.

The test contains written instructions on how to perform the task. The instruction for the test has been for the pupils to not provide lengthy explanations.

This study places absolutely no emphasis on spelling, and the test explicitly states as much to prevent individuals from being discouraged from submitting an association due to concerns about spelling. Spelling is not important as long as the words are easily comprehended. The respondents have a certain amount of time to finish the test. Since they are simply need to write the first word that comes to mind, they have been granted thirty minutes to do so. Since the pupils are just required to mention the first item that comes to mind, there have been thirty minutes allotted for them to write.

The researcher himself administered and gathered the tests. The distribution of the test materials in the courses is made possible by the fact that the researcher has obtained authorization from the schools to administer the test. The researcher had to gather the data on the designated day set by the schools; it took over three weeks to collect the data.

The word associations that the students provided were counted to determine the most frequent responses. Additionally, this data has been examined to determine the types of word associations that occur, such as collocations, coordination, synonyms, and superordination. When given an incentive word, the participants are required to respond with one word. This is due to the fact that the participant's first word association was used to determine the study's results. The word "stimulus" has been used several times in this study in relation to the word association test. “A stimulus is something that arouses or incites to activity” (HarperCollins, 2019, p. 1310). A word that is intended to cause participants to associate it with another word is referred to as a ‘stimulus’ in word association tests (Schmitt, 2000).

3.8 Data Analysis Procedure

The information gathered from the reactions to the stimulus words are based on a theoretical framework that divides association into four categories: meaning-based association, position-based association, form-based association, and erratic association. This study’s data is examined using a descriptive statistical method. The results of the word association test were given in terms of the percentage of responses and the actual number of responses. It is determined what percentage of nouns, adjectives, verbs, and adverbs fall into each category.

The results of the word association test were given in terms of the percentage of responses and the actual number of responses. One hundred students participated in total. To make things clearer, the proportion has not been rounded off. The responses in each category are also shown in figures, tables and graphs. The results are presented in figures and then calculated using the actual number of students to provide further clarification. Some results are presented in figures and converted to percentages in order to provide greater clarification.

3.9 Theoretical Framework

This study is based on Fitzpatrick’s (2007) model of ‘classification of association response’. Fitzpatrick’s (2007) model of ‘classification of association response’ includes meaning based association, position based association, form-based association and erratic association.

In this study, the responses of the students in word association test have been analyzed by using Fitzpatrick's (2007) model of 'classification of association response'. Four categories of Fitzpatrick's (2007) model of 'classification of association response' are made.

1. Meaning-based associations: Words that can be substituted for one another in the sentence: synonyms, antonyms, lexical sets, super-ordinates (hyponymy) (meronymy i.e. whole part relation), coordinates, and conceptually related words.
2. Position-based associations: Determined by syntactic and collocational characteristics: Words that appear one after the other in the sentence. Encyclopedic associations are more influenced by the respondent's global knowledge, age, interest, nationality, or other personal characteristic than by the dictionary of word's meaning or collocational features (McCarthy, 1990). A word or phrase has a connotative meaning as well as grammatical denotative meaning that reflect values, judgment, and attitude (Murphy, 2003). Connotative connections with words emerge in part as a result of encyclopedic knowledge of the world and the role, or context of every given word (Post, 2007). Responses in collocational associations are dependent on the participants' individual interpretations of the target term (Rothman, 2009). Common collocations in languages are closely related to cultural concepts (Post, 2007). The term 'collocation' refers to a connection between two words that are most likely to appear together in context (Aitchison, 2003). Additional collocations that are impacted by culture also occur in real life. Since typical collocations in languages are often closely linked to cultural components, real-world occurrences and collocation linkages are based on one's individual understanding of the target term.
3. Form-based associations: relationships between words based on their forms, words with changed suffixes, similarities in their orthographic (relative to the letters) and phonetic structure (related to the sound).
4. Erratic association: It appears that there is no link between the cue and the reaction, or that there is no response at all.

3.10 Analytical Framework

Thus, Fitzpatrick (2007) proposes a categorization system consisting of three main categories i.e., meaning-based, position-based, and form-based which are then subdivided into 9 subsystems, and a category for erratic associations. In the word association test the

responses of the students have been analyzed by using Fitzpatrick's (2007) model of 'classification of association response'. Table 1 shows the categorization and sub-categorization scheme of Fitzpatrick's (2007) model of 'classification of association response'.

Table 1

Fitzpatrick's (2007) model of 'classification of association response'

Category	Subcategory	Definition	Example
Meaning-based association	Defining synonym	x and y have same meaning	large-big
	Specific synonym	x can mean y (in some specific contexts)	cold-uncomfortable
	Lexical set/ context related	x and y refer to a lexical set (superordinate coordinate, antonym, meronymy)	super-ordinates (apple-fruit), coordinate (bread-butter), antonym (happy-sad), meronymy (clutch-car)
	Conceptually related	x and y are linked conceptually in some way	charity-kind
Position-based association	Consecutive xy collocation	y follows x directly (includes compounds)	fast-food
	Consecutive yx collocation	x follows/precedes y directly (includes compounds)	weight-paper
	Other collocational association	y follows/precedes x in a phrase, although there are words in between	sparrow-(gets the)-seed
Form-based Association	Change of affix	y is x minus or plus a prefix/affix	happiness-happy

	Similar form only	y looks or sounds similar to x but there is no other association	cereal-serial
Others	Erratic association Blank	No link between y and x no reaction/ response	sandwich-jump ……

Note. In Fitzpatrick's (2007) 'classification of association response' model, word association responses are categorized using categories and subcategories (x= stimulus word, y = response word).

Fitzpatrick's (2007) model of 'classification of association response' expands and describes all three types, syntagmatic, paradigmatic, and clang association, as well as adding the fourth category, erratic association (Precosky, 2011). Fitzpatrick's (2007) model of 'classification of association response' is simple and straightforward, which increases the likelihood of a more advanced analysis (Roux, 2013). In this study, Fitzpatrick's (2007) model of 'classification of association response' is employed as a theoretical framework.

Exploratory-descriptive research method has been used in this study. This exploratory-descriptive study uses quantitative research approach. Hundred students are selected from grade four of private schools, i.e. Beacon House, Roots IVY, Roots International, The City School and APS. In order to find out how words are organized in the mental lexicon, the researcher has selected forty words for the word association test. The words were taken from the English textbooks used at Beacon House, Roots IVY, Roots International, The City School, and APS in grade 4. This study uses Fitzpatrick's (2007) model of "classification of association response" as a theoretical framework.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

In this chapter, a thorough examination of the data is covered, followed by a discussion of the findings. Fitzpatrick's (2007) model of "classification of association response" is used in this study to examine the students' responses to the word association test. The results are presented in tables, figures, and graphs, after which they are analyzed and interpreted.

4.1 Meaning based Associations

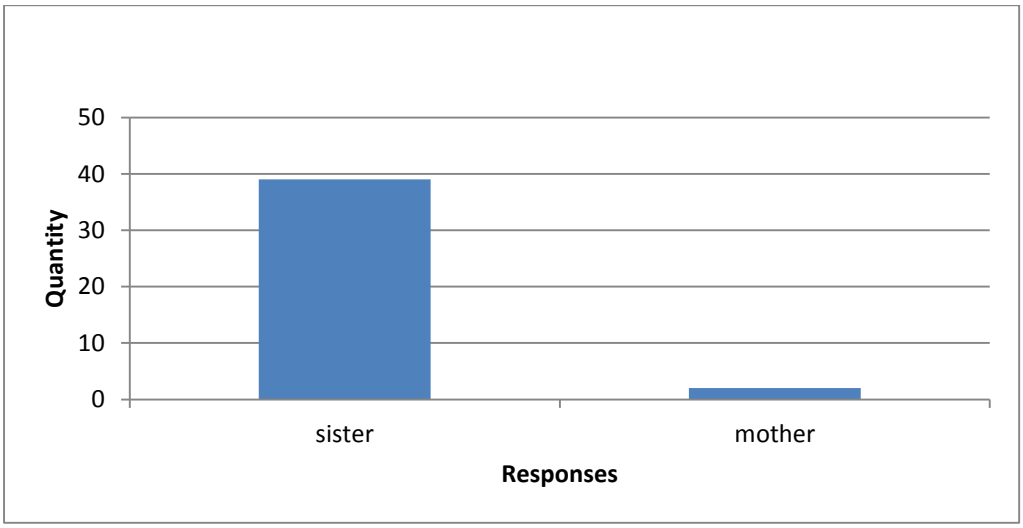
As grammatically related words can be substituted for one another in a sentence, meaning-based interactions are frequently seen between lexical items belonging to the same word class. These relationships are sometimes referred to as 'vertical' relationships.

4.1.1 Coordination

The word 'brother' was presented to the participants in this word association test. Naturally, the usual pair for this word is 'sister'. This coordination pair is an illustration of complementarity; the antonyms are obviously the opposite because they have no degree (Carter, 1998). For instance, being a sister precludes a person's ability to be a brother. Figure 1 displays coordinated responses with the stimulus 'brother'.

Figure 1

Co-ordinational Responses Given to Stimulus 'Brother'



Note. This stimulus includes all the co-ordinational responses

In this word association test, 39% of respondents responded ‘sister’ when given the stimulus ‘brother’. In response to the stimulus ‘brother’, two participants responded ‘mother’. The majority of answers that agreed with the stimulus were provided by these responses. When it comes to the stimulus ‘brother’, these participants’ mental vocabulary exhibits a comparatively high co-ordinational relationship.

‘Dead’ and ‘live’ are also examples of complementary antonyms. In other words, complimentary opposites are absolute opposites; you cannot be one while being the other (Rothman, 2009). Ten students responded ‘live’ to ‘dead as complementary antonyms’. In other words, you cannot be alive if you are dead. Although ‘alive’ must be the coordinating response to ‘death’, the pupils chose ‘live’ instead. Although there has to be ‘alive’ in response to ‘dead’ as coordination but the students responded ‘live’ as coordination. The meaning of ‘live’ “is to be alive” (HarperCollins, 2019, p. 550). “The meaning of alive is “having a life” (HarperCollins, 2019, p. 94). However, the definitions of ‘live’ and ‘alive’ are the same. The pupils who chose such response were therefore having no choice to write ‘lives’ in place of ‘alive’ as coordination.

In this word association test, the participants wrote ‘chair’ with the word ‘table’. Of course, ‘chair’ is the usual partner for this word. ‘Chair’ is the coordinator of ‘table’ in this coordination pair. Eighteen students replied ‘chair’ with the stimulus ‘table’. These replies reflected a strong agreement with the stimulus. As a result, these students’ mental lexicon has a rather high co-ordinational association with the stimulus ‘table’.

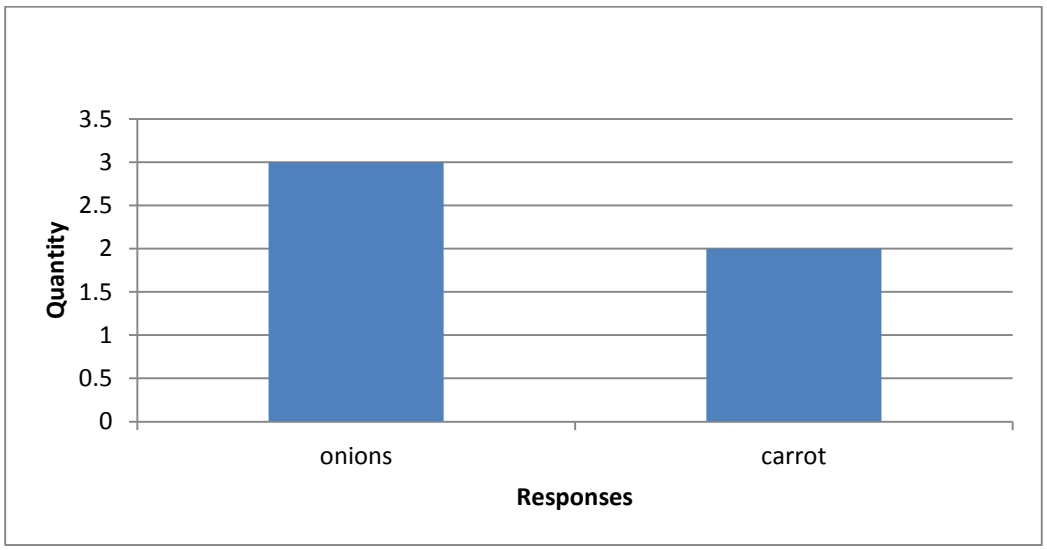
Cat and dog are another coordination couple; however, they might not be as obvious as the others.

Twenty-one students responded ‘dog’ in connection to ‘cat’. Incompatibility is demonstrated by this connection. Incompatibility is the link between two objects that are members of the same semantic field (Carter, 1998). In respect to ‘salt’, ten students wrote ‘sugar’. This relationship serves as another illustration of incompatibility. ‘Salt’ and ‘pepper’ are another example of incompatibility. Six pupils responded ‘pepper’ to ‘salt’. The most frequent recommendation to ‘salt’ was this one. Even so, it is still fewer than all of the collocations made in response to the same stimulus. It becomes clear that despite being antonyms, ‘cat-dog’ and ‘salt-pepper’ nevertheless share some similarities. There are some commonalities between opposites (Murphy, 2003). Both ‘cat’ and ‘dog’ can be grouped under the superordinate ‘animal’, indicating that their meanings are equivalent but

that they are spreading in separate ways. When we turn to ‘salt’ and ‘pepper’, it is obvious that there is no obvious option to link the two things in the form of a superordinate. Although there is no common name for the set, this does not mean that the terms ‘salt’ and ‘pepper’ are part of the same group. As a result, coordination based incompatibility is chosen for ‘salt’ and ‘pepper’ in this word association test. Going back to the ‘cat-dog’ association, it is evident that the students’ mental lexicon prioritized coordination above super-ordination. It seems doubtful that the superordinate word ‘animal’ qualifies as a magnificent uniting term. In the example of the ‘cat’ stimulus, coordination based on incompatibility is chosen even though there is a simple and accessible super-ordinate available, namely ‘animal’. Figures 2 and 3 display coordinated responses with the stimuli ‘potatoes’ and ‘apple’.

Figure 2

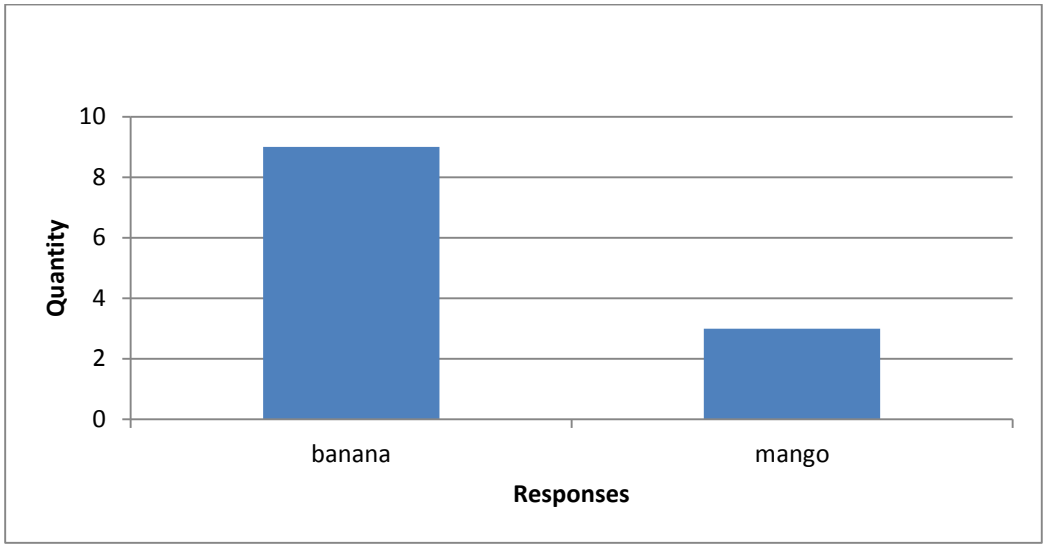
Co-ordinational Responses Given to Stimulus ‘Potatoes’



Note. This stimulus includes all the co-ordinational responses

Figure 3

Co-ordinational Responses Given to Stimulus 'Apple'



Note. The stimulus 'apple' includes all the co-ordinational responses

In reference to 'potatoes', three students responded 'onions' and two 'carrot'. Incompatibility is demonstrated by these connections. The responses 'onions' and 'potatoes', 'carrot' and 'potatoes', all are included under the term 'vegetables', which indicates that their meanings are equivalent, but that they have diverse applications. There is unequivocal evidence that the participants prioritized coordination over super-ordination in their mental lexicon. Even though there is a simple and reliable superordinate available, namely 'vegetables', coordination based on incompatibility is chosen in the instance of the 'potatoes' stimulus.

It is shown in figure 3 that nine students wrote 'banana' and two 'mango' in relation to 'apple'. These links, which serve as illustrations of incompatibility, show how the participants' mental vocabularies prioritized coordination over superordinate concepts like fruit.

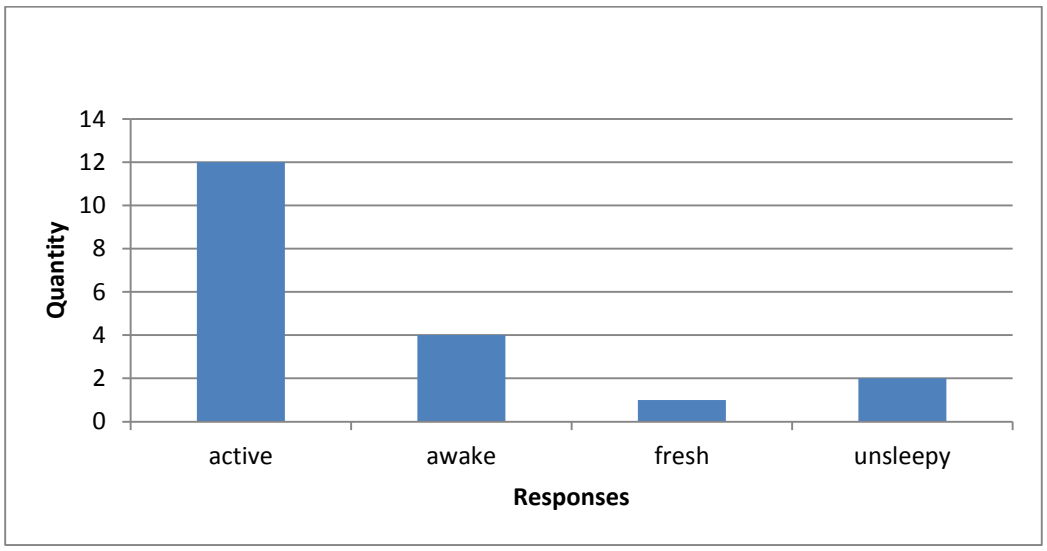
In this word association test, twenty-nine participants wrote 'big', and two 'large' with the stimulus 'small'. 'Big' and 'large' are antonyms of the stimulus 'small'. 'Big' and large' are examples of gradable antonyms. Gradable antonyms are also included in coordination. In this word association test, thirty students responded 'slow' with 'fast', thirty 'sad' and three 'unhappy' with 'happy', thirty-two 'hot' with 'cold', thirty-nine 'happy' with 'sad', seventeen 'soft' and nineteen 'easy' with 'hard', nine 'never with 'always', four 'early with 'late', five always' with 'sometimes', and one 'carelessly' with

'carefully'. These connections, which act as examples of gradable antonyms, demonstrate that the students' mental lexicon has a strong co-ordinational link with these stimuli.

It is obvious that the stimulus 'sleepy' can be interpreted as either a noun or an adjective. It appears that the majority of respondents treated the word as an adjective and then coordinated it with their associations. Twelve students responded 'active', four 'awake', one 'fresh', and two 'un-sleepy' with the stimulus 'sleepy'. The majority of the responses showed a great deal of agreement with the stimulus. Four students responded 'awake' to 'sleepy' as complementary antonyms. You cannot be awake if you are sleeping. As a result, the stimulus 'sleepy' has a rather strong co-ordinational association in these students' mental vocabulary. Figure 4 shows the coordinated responses to the stimulus 'sleepy'.

Figure 4

Co-ordinational Responses Given to Stimulus 'Sleepy'

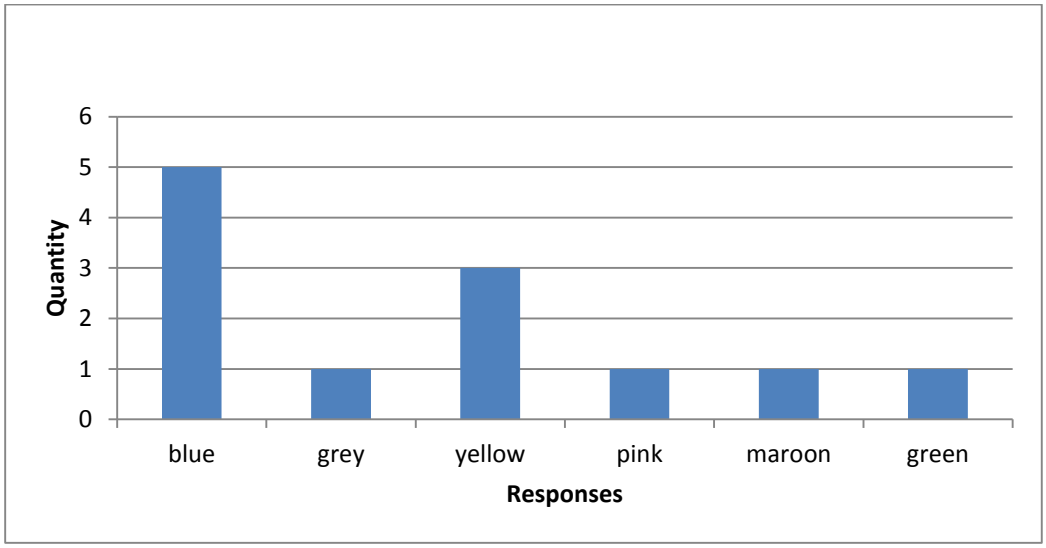


Note. This stimulus includes all the co-ordinational responses

Alternatively, in word association tests, names of some colors frequently prompted names of other colors. Particularly the color 'red' appears to be predisposed to elicit connections based on coordination in the form of labels for other colors (Aitchison, 2003). The following figures with the stimulus 'red' and 'green' display coordinated responses.

Figure 5

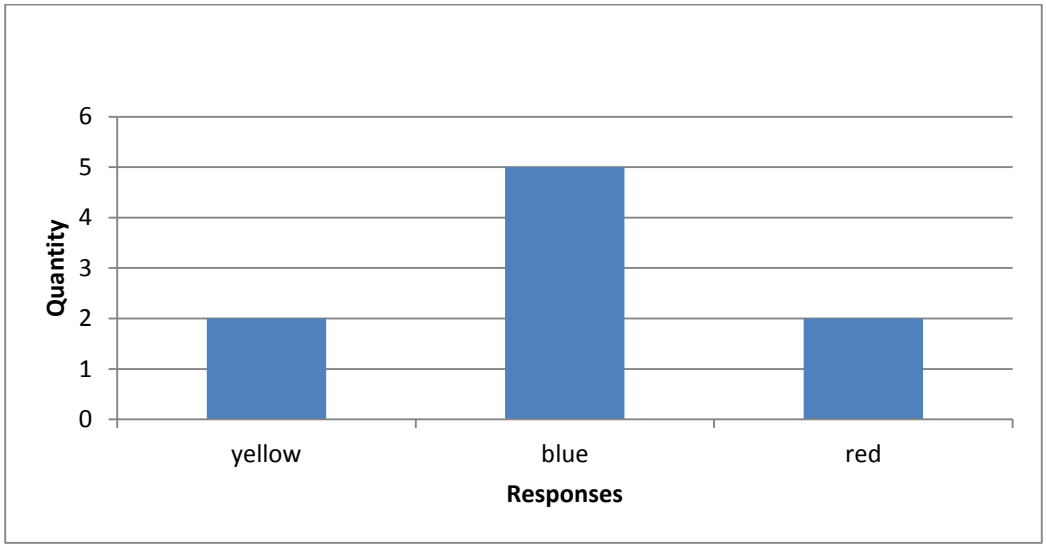
Co-ordinational Responses Given to 'Red'



Note. This stimulus includes all the co-ordinational responses

Figure 6

Co-ordinational Responses Given to 'Green'



Note. This stimulus includes all the co-ordinational responses

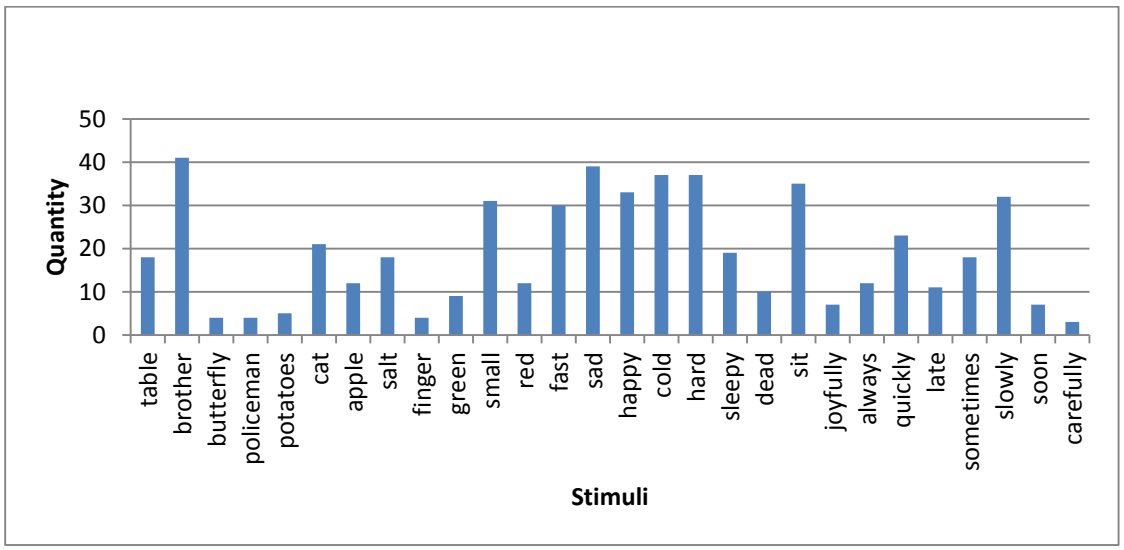
Twelve students in all participated; each of them was assigned a term that described a different color to stimulus 'red'. Five pupils wrote 'blue', one 'grey', three 'yellow', one 'pink', one 'maroon', and one 'green'. Some color contrasts are more pronounced than others (Murphy 2003). As the opposites of one another on the so-called color wheel, red and green are actual antonyms. Given this knowledge, it is intriguing that two students

responded ‘red’ with the stimulus ‘green’ and one student responded with the genuine antonym ‘green’ to the stimulus ‘red’. Five students, indeed, connected the stimulus ‘red’ and the color ‘blue’. The stimulus ‘green’ was connected with ‘blue’ by five students. So it appears that ‘blue’ has solidified itself as a striking contrast to other colors. Considering that most participants did not initially associate coordination, or even another color, with ‘red’ and ‘green’. Therefore, it appears that the color co-ordinations are not as powerful as collocations.

The entire test consisted of twenty-seven stimuli: the majority of which led to connections based on coordination. Figure 7 displays 27 stimuli, the majority of which were coordination-related. It is obvious that these stimuli are not as effective as those of the stimuli that primarily triggered collocation.

Figure 7

Co-ordinational Responses Given to All Stimuli



Note. These stimuli include all the co-ordinational responses

4.1.2 Super-ordination

Lexical relations of inclusion in hyponymy include terminology like superordinate term and subordinate term. ‘Table’, ‘apple’, ‘green’, ‘red’, ‘butterfly’, ‘potatoes’, ‘cat’, and ‘cold’ are the stimuli in this test that genuinely have an obvious super-ordinate bringing a cluster of subordinates together. The obvious super-ordinates are, of course, ‘furniture’, ‘fruit’, ‘color’, ‘insect’, ‘vegetable’, ‘animal’, and ‘winter’ in that order. Eleven participants responded ‘fruit’ to ‘apple’ and one ‘furniture’ to ‘table’. To the color ‘green’, nine students

responded ‘color’. Five students wrote ‘color’ with the stimulus ‘red’. Eight students wrote ‘insect’ with ‘butterfly, six ‘vegetable’ with ‘potatoes’, three ‘family’ and one ‘human’ with ‘brother’, and ten ‘animal’ with ‘cat’, three ‘winter’ with ‘cold’, and three ‘winter’ with ‘snow’. Within a classification scheme, each of these responses demonstrates superior order. Therefore, there is a great chance to look at second language learners’ propensity for super-ordinative association.

Another instance of subordination occurs when we discuss another feature of super-ordination, namely meronymy. In an interesting turn of events, the stimulus ‘finger’ prompted 18 students to write a subordinate and use the stimulus as a meronymy. Whatever a superordinate is in super-ordination, a meronym is in meronymy (Schmitt, 2000). The word ‘nail’, which is a finger’s equivalent, was suggested. A hazy illustration of a subordinate relationship also happened in respect to ‘finger’. Four individuals identified the word ‘thumb’ as being associated with the word ‘finger’. A finger is defined as following in one dictionary: “any of five terminating member of the hand” (HarperCollins, 2019, p. 190). A thumb is defined as following in one dictionary: “the short, thick first digit of human hand, set lower and apart from other four and opposable to them” (HarperCollins, 2019, p. 1334). In this test, one respondent really connected the word ‘ten’ with the finger. However, that is still just one person’s interpretation of how the thumb adheres to the word ‘finger’. Therefore, there is no answer to the intriguing issue of whether the participant in this instance intended the thumb to belong to the fingers or not. If we suppose that a person does not consider their thumb to be a finger, then the word association should actually be considered to be coordination.

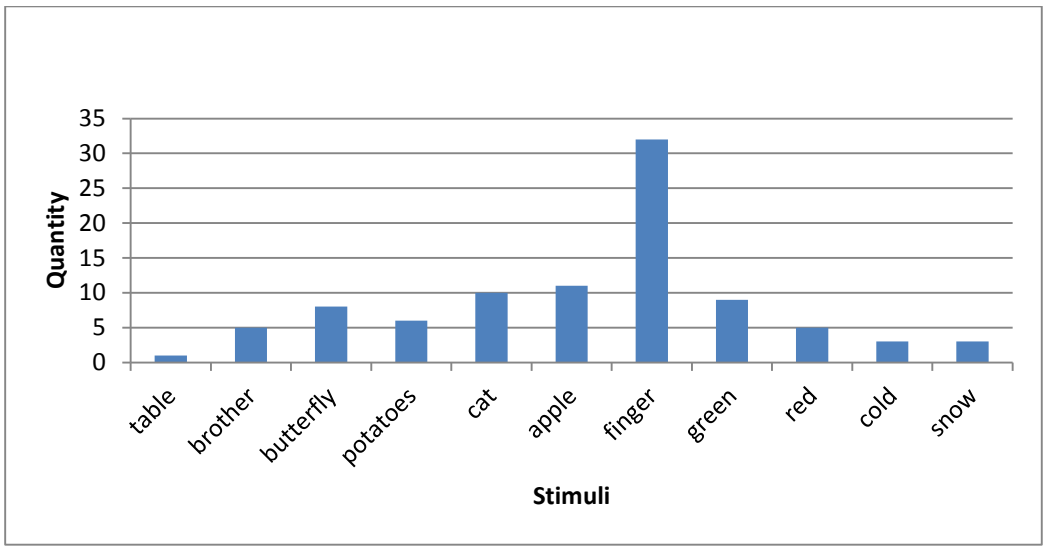
The question of whether the participant in this instance meant the thumb to belong to the fingers or not cannot be answered, but it is an intriguing one. In word association, coordination must be regarded as the correct term if we believe that the person does not consider the thumb to be a finger. In keeping with meronymy, the stimulus ‘finger’ also set off a super-ordinate or tangential meronymy. Eighteen students chose ‘hand’ in response to ‘finger’. It is unquestionably possible to think of the word ‘hand’ as a unifying phrase for all the parts at the end of one’s arm, or, to put it another way, a whole-part relationship. In reality, out of the forty incentives, only the stimulus ‘finger’ led to the primary production of a super-ordinate/meronym.

In this word association test, the participants’ connections between a superordinate and its subordinates are not very strong, or at least, their connections cannot be compared

to other kinds of connections. Super-ordination cannot, therefore, be the most crucial technique for these students to keep their recall of English vocabulary. In the end, only eleven stimuli primarily achieved linkages based on super-ordination. Figure 8 shows super-ordination responses of all stimuli in word association test.

Figure 8

Super-ordination Responses Given to All Stimuli



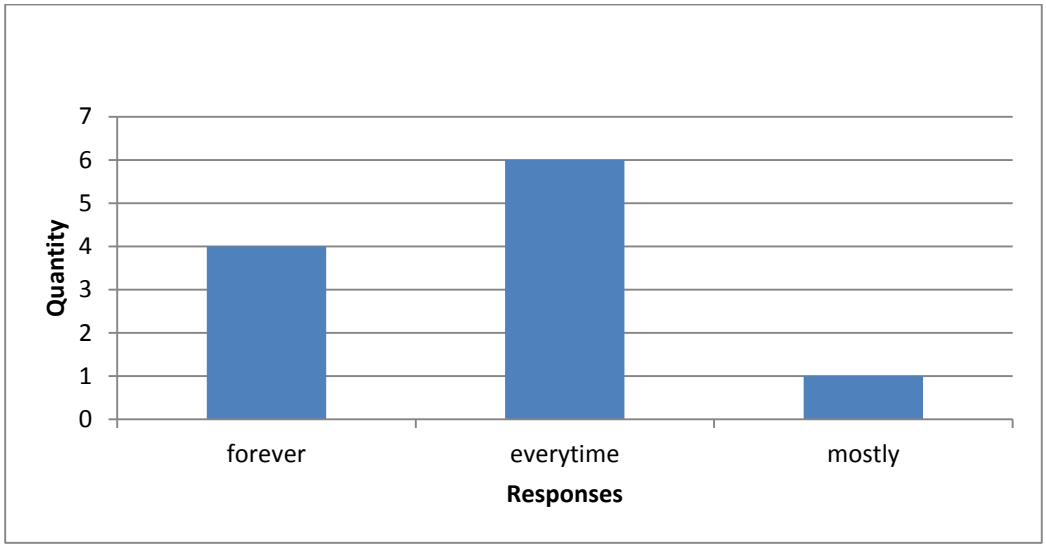
Note. These stimuli include all the super-ordination responses

4.1.3 Synonymy

Although it is rare for two terms to mean the exact same thing, the term "synonym" refers to a wider context. As a result, this word association test produced few synonyms. Naturally, nevertheless, some were manufactured. Two students were exceptions as they connected the word 'worried' to the word 'sad'. This synonymy illustration is not the best from this test. Other stimuli also displayed a higher incidence of synonymy, and these are being further studied. Figure 9 shows synonym responses of stimulus 'always' in word association test.

Figure 9

Synonym Responses Given to Stimulus 'Always'



Note. The stimulus includes all the synonyms responses

Eleven respondents consistently responded with the word 'always' in response to the stimuli. This indicates that the synonymy was not the most typical response to the word 'always'. Six participants responded 'every time' with the stimulus 'always'. This indicates that the most typical reaction to 'always' was the synonymy 'every time'. Seven other students, however, responded with different synonyms for the stimulus 'always'. Four participants responded 'forever' with 'always'. One participant wrote 'mostly' with 'always'. The participants' intention to assign 'always' a synonym was evident from these linkages. It indicates that these second language learners are significantly less likely to provide synonyms during the word association test.

With the stimulus 'fast' one student responded 'speedy'. With adverb 'carefully' one student responded 'cautiously'. Nineteen students answered 'fastly' in response to the adverb 'quickly', which should be viewed as a synonym. In this relationship, the word 'fast' has the adverbial ending 'ly-'. It is, therefore, assumed that the students selected 'fastly' as an adverbial form of 'fast' with 'quickly', which seems pretty sensible given how adverbs are typically created. This takes the overall percentage of students who wrote a synonym in response to 'quickly' to 19%, indicating that 'quickly' was the main trigger for synonyms.

Ten respondents each responded 'cold' in response to the stimuli. With the stimulus 'cold', four subjects reacted 'freezing' and four 'icy'. Two individuals, however,

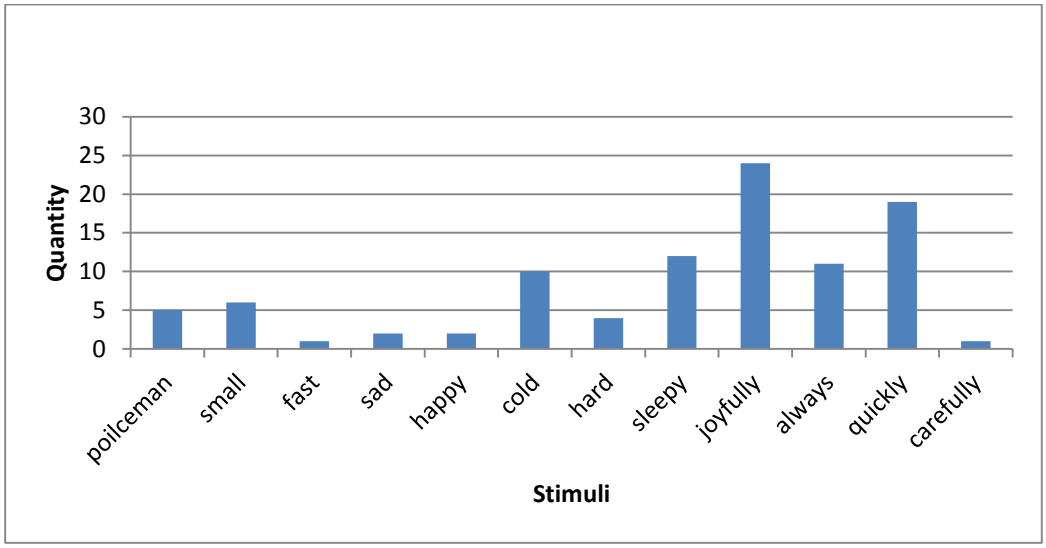
substituted ‘snow’ for the stimulus ‘cold’ by using another word. Three students responded ‘difficult’ and one ‘tough’ with the stimulus ‘hard’. Five students responded ‘tiny’ and one ‘little’ with the stimulus ‘small’. This indicates that the most typical responses to these stimuli were these synonyms. Twenty-two participants responded ‘happy’ with the stimulus ‘joyfully’. This indicates that the most frequent reaction to the stimulus ‘joyfully’ was the synonym ‘happy’. Two other participants, however, responded with different synonyms for the stimulus ‘joyfully’. One participants responded ‘gleeful’ and one ‘cheerful’ with ‘joyfully’. These links demonstrated the participants’ intention to define ‘joyfully’ using synonyms. The word association test results suggest that these participants are much less likely to provide synonyms.

The word ‘sleepy’ was mostly met by synonyms. Twelve students responded ‘tired’ with the stimulus ‘sleepy’. The result suggested that these second language learners perceive the terms ‘sleepy’ and ‘tired’ as being very similar. However, the two terms are defined somewhat differently in a dictionary: “Sleepy means you are ready to fall asleep” (HarperCollins, 2019, p. 1237). In contrast, when you are tired, “you are in need of sleep and rest” (HarperCollins, 2019, p. 1552). Additionally, ‘tired’ is not even listed as a synonym for ‘sleepy’ in a dictionary that lists synonyms. However, ‘sleepy’ is included as a synonym for ‘tired’. As a result, even though dictionaries do not always agree, the terms ‘sleepy’ and ‘tired’ are strongly linked in participants’ mental lexicon as having analogous meanings. Although ‘sleepy’ is a stronger word than ‘tired’ according to the dictionary, this does not indicate that the two terms are not synonyms. Two words that basically convey the same meaning are to be regarded as synonyms because synonymy is based on similarity (Schmitt, 2000). The outcome showed that the students treated and perceived ‘tired’ and ‘sleepy’ in exactly the same ways. Of course, it is impossible to determine whether the learners view the two terms differently, but at the very least, the respondents’ responses must indicate that ‘sleepy’ and ‘tired’ are strongly synonymous. The fact that ‘sleepy’ had twelve synonyms; however, it suggests that they are unable to account for the activation of the majority of associations with this stimulus.

The discussion of the number of synonyms provided by the participants in this word association test reveals that there are not many of them. Figure 10 shows the total of twelve stimuli, the majority of which led to the production of synonyms.

Figure 10

Synonymy Responses Given to All Stimuli



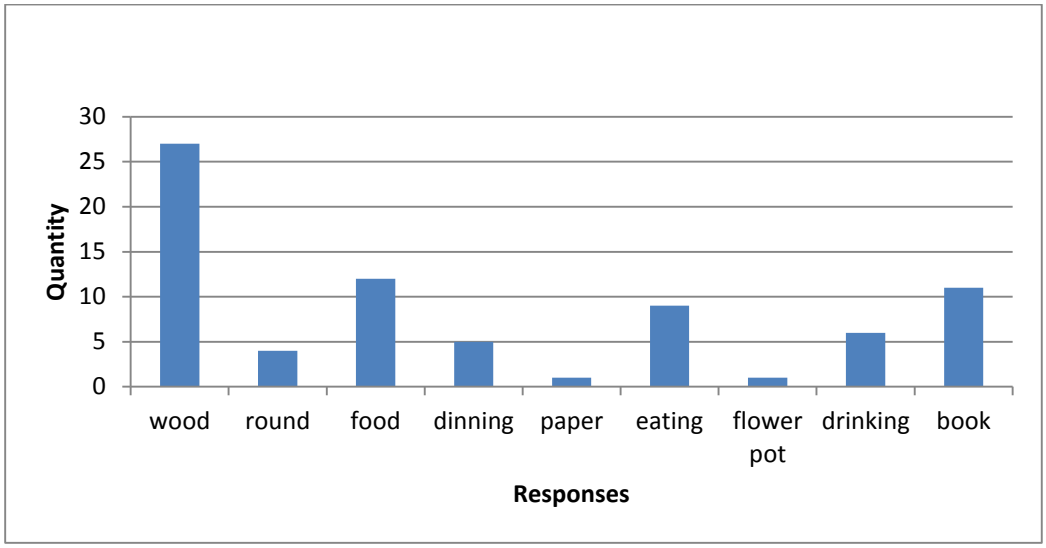
Note. These stimuli include all the synonym responses

4.2 Position based Associations

Despite the fact that the students might not be able to use the same terms that are presented with the same stimulus, the majority of pupils have provided collocational linkages. In word association tests, people reply consistently even though the words they use to respond are different (McCarthy, 1990). However, there are collocational connections between the reactions and the stimulus. To substantiate this, the word ‘table’ in this word association test elicited a variety of well-known collocations. All of these associations can be seen in Figure 11.

Figure 11

Collocational Responses Given to Stimulus 'Table'



Note. Stimulus 'table' includes all the Collocational Responses

Seventy-six participants responded in all, using common collocations from everyday speech. Twenty-seven participants wrote 'wood' with the word 'table' as in 'wooden-table'. Nine participants responded 'eating' with 'table' as a table at which food is consumed, whereas five students wrote 'dinning' as in 'dinning-table'. Eleven participants wrote 'book' with 'table', which is a table with book shelves underneath. Six participants defined 'drinking' with table as a table at a gathering or venue where drinks are set out so that attendees can get drinks. The usage of the word 'drinking' with the word 'table' demonstrates that the student has a strong understanding of the target word. Twelve participants combined the words 'food' and 'table', showing that they personally understood the target word to mean that the whole family is seated at the table and eating. The association between 'round' and 'table' demonstrates how each student's individual and personal understanding of the target word affects their mental vocabulary. Due to the fact that a 'round table' is perfect for a small family gathering and creates a cozier, more intimate atmosphere, four participants wrote the terms 'round' with the stimulus 'table'. An informal gathering of several individuals for discussion or deliberation is also known as a 'round table'.

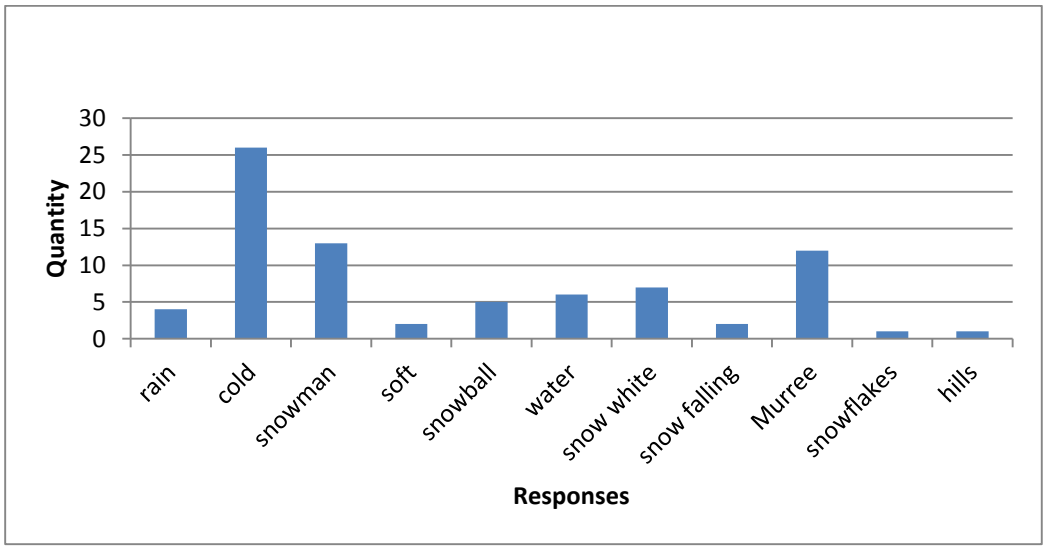
One participant wrote 'paper' and another wrote 'pot' with the table as a 'flower pot'. It is also possible to claim these responses to 'table' are collocations. Even though these associations may not be used as frequently in everyday speech, this shows that

collocations play a significant part in the mental lexicon of English language learners. The stimulus ‘table’ received 76 total collocational replies, taking into consideration both common and less common collocations.

The stimulus ‘snow’ serves as another illustration of how the participants in this word association test tended to combine words of various types. Collocation is the term used to describe all associations made with the word ‘snow’. Figure 12 shows each of these collocations.

Figure 12

Collocational Responses Given to Stimulus ‘Snow’



Note. Stimulus ‘snow’ includes all the collocational responses

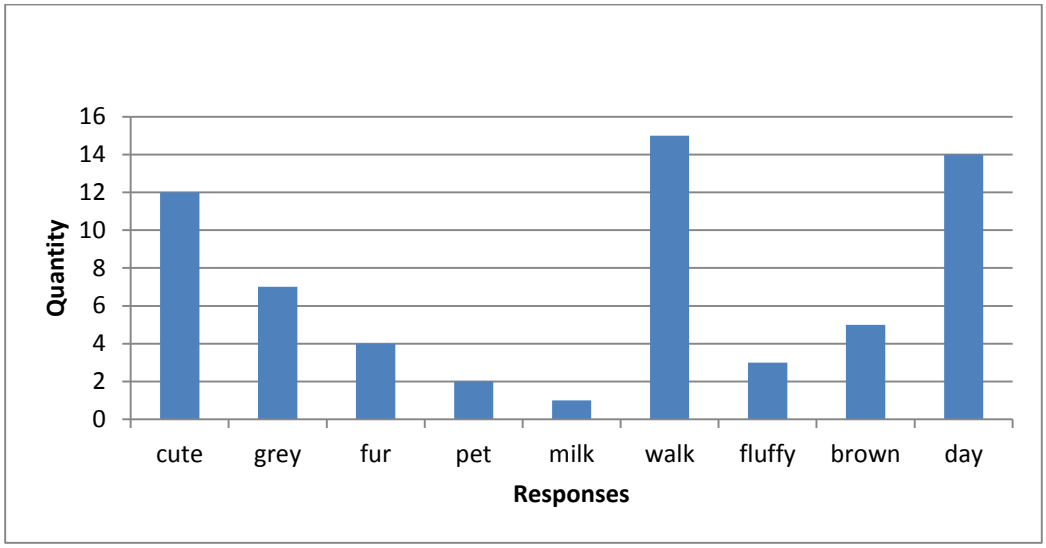
It is possible that some of the collocations used are simpler than others. Nevertheless, the conclusion must be drawn that they are all collocational word associations when all of them are taken into account in terms of what collocation means. Words that are more likely than just by chance to appear in the same context as the stimulus is referred to as collocations (Reppen & Simpson, 2019). As a result, when considering associations with the stimulus ‘snow’, even those that initially seem improbable, become more likely. Consider the word ‘rain’ as an example. It might not initially appear reasonable that ‘snow’ and ‘rain’ would be related in this context. However, it actually happens frequently because it is a sort of precipitation that can happen in particular meteorological circumstances, notably during harsh winters. This is because it can snow and rain at the same time. In this word association test when two students associate the words ‘rain’ and ‘snow’, it becomes obvious how each student’s unique and personal interpretation of the target word affects

his/her mental lexicon. They linked ‘cold’ with ‘snow’ because when it is cold, the moisture in the air absorbs all of the heat in the atmosphere, causing the temperature to drop. Due to the fact that people experience cold in the snow, this collocation shows that the student has a personal understanding of the target word. Thirteen students responded ‘snowman’ with the stimulus word ‘snow’. The phrase ‘snowman’ being used with the word ‘snow’ demonstrates that the learner understands the target word on a personal level. This is due to the fact that snowman is often created by youngsters as models of people made of snow. Two students responded ‘snow’ with ‘ball’ in this word association test. A ‘snowball’ is an object made of snow that is spherical in shape and is often formed by scooping snow with the hands and compacting it into a ball. Games like ‘snow-ball’ combat frequently involve the usage of snow balls. The physical activity known as a ‘snow-ball’ battle involves throwing snowballs at opponents with the goal of striking them. People tend to play this hobby more frequently during the winter when there is enough snow, which is why, based on their own experiences and perceptions of the target term, they associate ‘ball’ with ‘snow’. Seven students wrote ‘snow white’ with ‘snow’. A Disney character like ‘snow white’ might not seem like it would go well along with the word ‘snow’, but this collocation shows that students’ mental lexicon is influenced by their unique interpretation of the target word. Twelve students responded ‘Murree’ with the stimulus ‘snow’. The term ‘Murree’ being used with the word ‘snow’ shows that the student has a personal grasp of the target word. This is because Murree is well-known for its snowfall in Pakistan, and many visitors travel there in the winter to experience it. The total collocational replies supplied to ‘snow’ were seventy-nine, or 79%, when both commonly used collocations and the less frequently used ones were included.

Additionally, there is an example of a stimulus, ‘cat’, which had several word types to create collocational associations. Figure 13 shows each of these collocations.

Figure 13

Collocational Responses Given to Stimulus 'Cat'



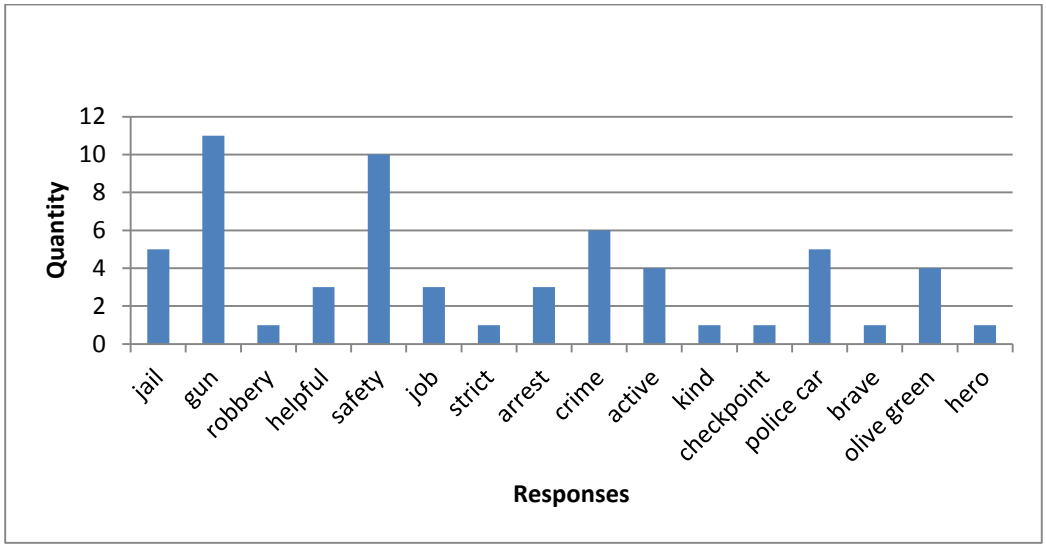
Note. Stimulus 'cat' includes all the collocational responses

Twelve students wrote 'cute' four 'fur', two 'pet', one 'milk', three 'fluffy' with the stimulus 'cat'. When the word 'cat' is taken into account, all of these seem more logical collocational associations. Fifteen students responded 'walk' and fourteen 'day' with the stimulus 'cat'. In modeling, the 'cat walk' needs the ability to showcase a designer's work while strolling down a long aisle, frequently in front of a sizable audience, and 'cat day' is a recognized official day to raise awareness of cats. This collocation demonstrated how well the pupils personally understood the context of the stimulus word 'cat'. Total sixty-three collocational responses were given in response to the stimulus 'cat', including both commonly and less frequently used collocations.

In this word association test, the participants had a tendency to combine several words with the stimulus 'policeman', and this relationship must be referred to as collocation. Figure 14 shows each of these collocations.

Figure 14

Collocational Responses Given to Stimulus 'Policeman'



Note. Stimulus 'policeman' includes all the collocational responses

With the stimulus 'policeman', eleven students wrote 'gun', because a police officer always carries a gun in a holster. Five students responded 'jail', three 'arrest', and six 'crime' with the stimulus 'police'. As criminals are captured by the police and then locked up in jail, this collocation demonstrated how well the pupils' specific comprehension of the stimulus word 'police' was created. Ten students responded 'safety', three 'job', three 'arrest', and four 'active' with the stimulus 'police'. All these collocations with 'police' reveal that the pupils personally understand that the job of the police is to maintain public order and safety enforce the law, and to stop, identify, and investigate illegal conduct. Even while these associations may not be used as frequently in daily life, it is clear that collocation plays a significant part in these students' mental lexicon. Other associations with the stimulus 'police' that can be considered examples of collocation include 'helpful', 'strict', 'police station', 'complain', 'car', 'hero', 'power' and 'checkpoint'. Some students selected these terms because they are obvious everyday collocations that are frequently used. The stimulus 'policeman' received 61 total collocational replies, cover both frequently used collocations and less frequently used ones.

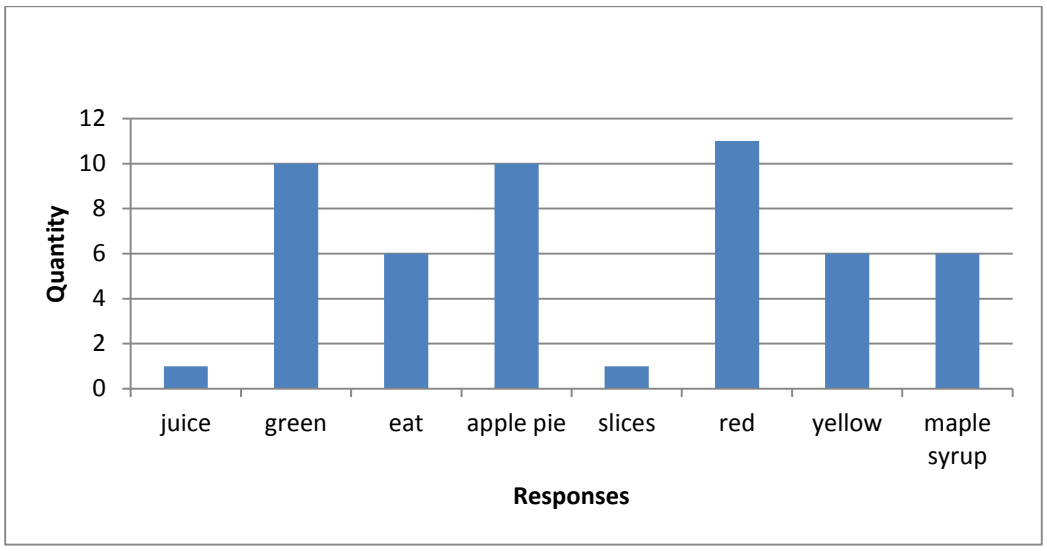
With the stimulus 'potatoes' twenty-three students responded with 'fries' and eight 'chips'. Potatoes are sliced into uniform strips, and then fried to make fries and chips. Fries and chips are some of the young people's favorite food in Pakistan; so many pupils chose these words as their response because they enjoy them. Seven students responded 'white'

with ‘salt’. It is a table salt that is used in food on a regular basis. One student gave the answers ‘lays’ and seven ‘chips’ with ‘salt’ because these foods include salt. These collocation shows that students’ mental lexicon is influenced by their personal interpretation and experience of the target word. The total collocational responses to ‘salt’ were forty-eight with 48% and ‘potatoes’ were fifty-seven with 57%. These responses cover both frequently used collocations and less frequently used ones.

In this word association test, the participants had a tendency to combine several words with the stimulus ‘apple’, and this relationship must be referred to as collocation. Figure 15 shows each of these collocations.

Figure 15

Collocational Responses Given to Stimulus ‘Apple’



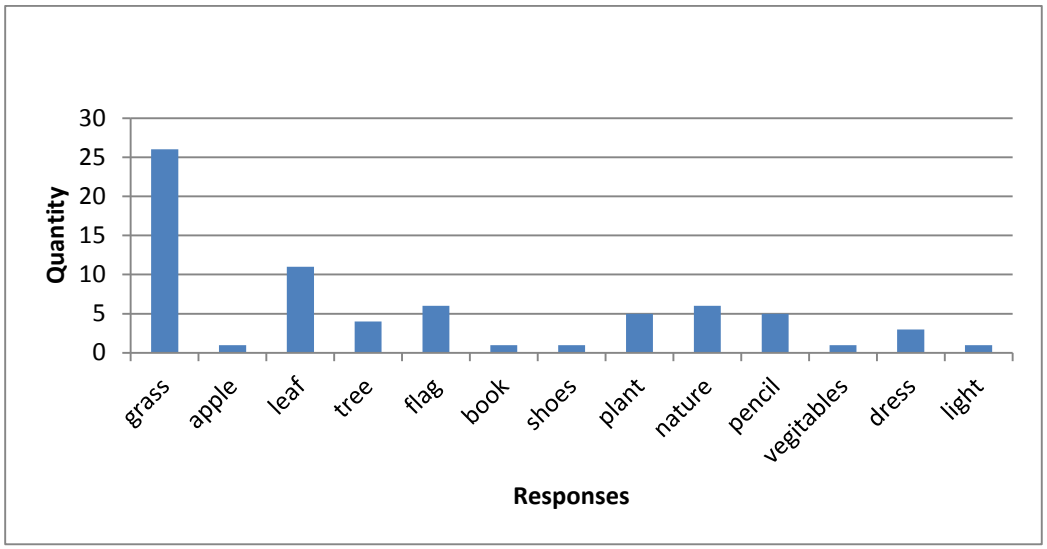
Note. Stimulus ‘apple’ includes all the collocational responses

Nine pupils responded ‘apple pie’ with the stimulus ‘apple’. The term ‘apple pie’ refers to a pie whose main filling ingredient is an apple. This collocation shows that a student’s mental lexicon is influenced by their unique understanding of the target word. The collocation of ‘maple syrup’ by six and ‘apple pie’ by ten students suggests that students’ mental lexicon is influenced by their unique understanding of the target term, even though it may not seem particularly plausible that these two words would be used together. The total number of collocations for ‘apple’ was 61%. Collocations that are utilized less frequently were also included, as well as those that are exceedingly common.

Figure 16 shows color-related associations in the word association responses with the stimulus ‘green’.

Figure 16

Collocational Responses Given to Stimulus ‘Green’



Note. Stimulus ‘green’ includes all the collocational responses

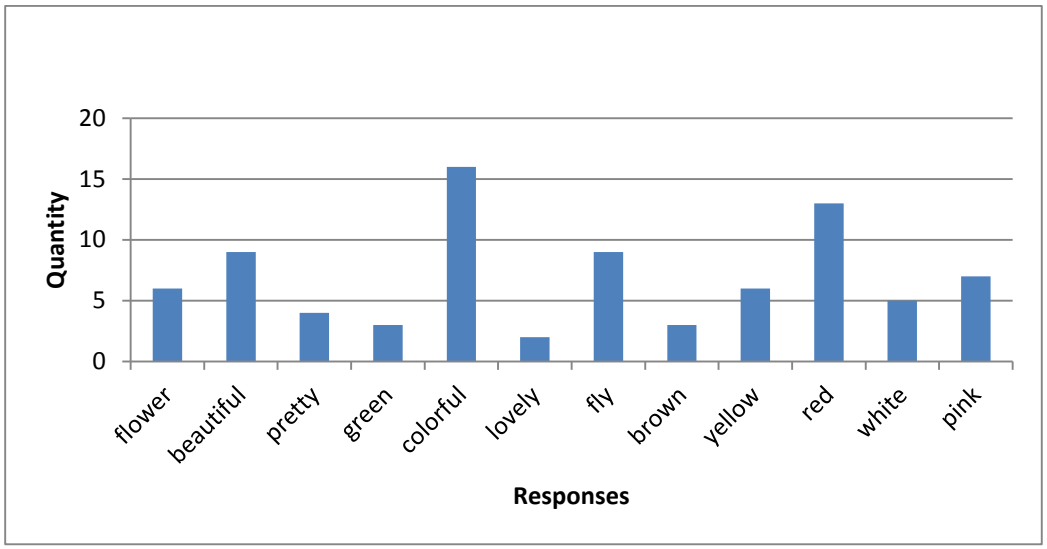
Figure 16 illustrates that among the 26 participants, ‘grass’ was the association made most frequently with the color ‘green’. In this test, the responses to ‘grass’ included ‘tree’, ‘plant’, ‘leaf’, and ‘nature’. In total, this indicates that astonishingly seventy-one of the participants assigned collocation to ‘green’. It is evident that these students are prone to producing collocations when presented with colors when comparing this result to the connections made to the stimulus ‘red’. The word association for ‘red’ based on collocations was 72% overall, with ‘blood’ being the most often mentioned one with twelve responses.

The participants also gave names of various colors to describe the stimuli. Four pupils chose the color ‘olive green’ in response to the stimulus ‘policeman’. This link is based on contextual factors; for example, the Punjab police force in Pakistan wears ‘olive green’ uniforms; as a result, this must be the reason why the participants wrote ‘olive green’. In the figure 5 above eleven students gave collocation ‘red’, ten ‘green’, and six ‘yellow’ with the stimulus ‘apple’. The association most frequently given was ‘red’ with stimulus ‘apple’. A total of 22% of the responses to ‘apple’ had a color component. Seven participants gave collocation ‘brown’ with the stimulus ‘potatoes’ and seven ‘grey’ and five ‘brown’ with the stimulus ‘cat’.

Additionally, results from the stimulus ‘butterfly’ were really intriguing. Figure 17 displays color-related associations for the stimulus ‘butterfly’.

Figure 17

Collocational Responses Given to Stimulus ‘Butterfly’



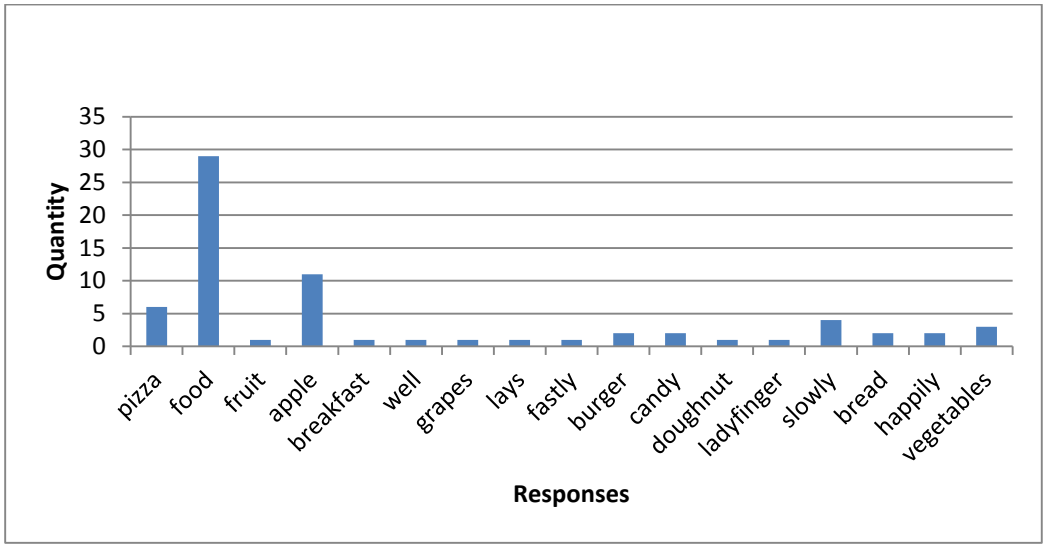
Note. Stimulus ‘butterfly’ includes all the collocational responses

Sixteen of the students wrote ‘colorful’, and 34 others responded with the names of certain colors, including ‘green’, ‘brown’, ‘yellow’, ‘red’, ‘white’, and ‘pink’. So, for over 50% of the students, color played a role in their initial understanding of the word ‘butterfly’. Therefore, these students appear to be more likely to link stimuli to various color categories. The ingenuity of second language learners is evident in all these collocational links between colors.

In addition, there are several instances of stimulus ‘eat’ that resulted in unanimity in collocations. Figure 18 shows each of these collocations.

Figure 18

Collocational Responses Given to Stimulus 'Eat'



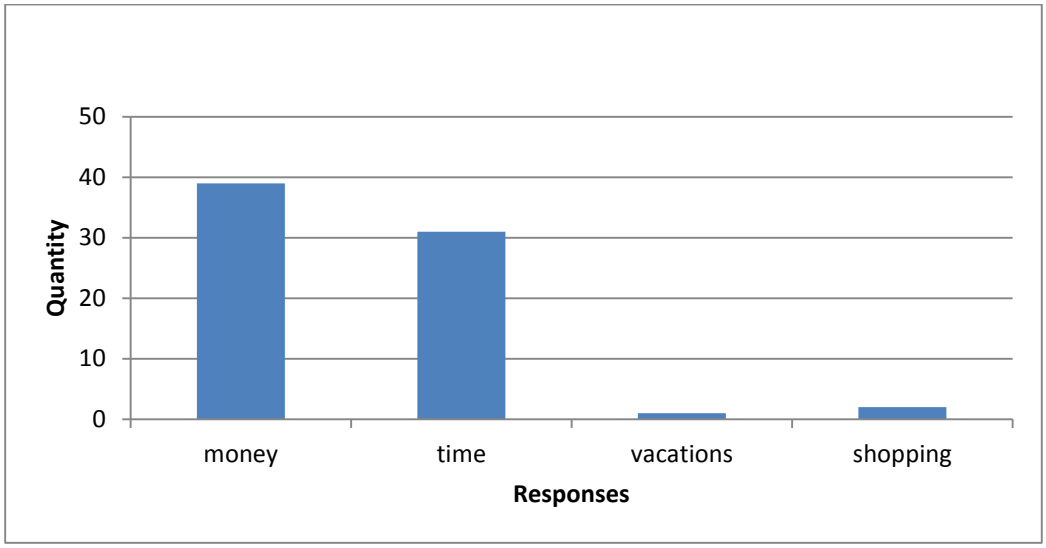
Note. Stimulus 'eat' includes all the collocational responses

For instance, twenty-nine individuals associated the word 'eat' with the word 'food'. This implies that 'eat' and 'food' are quite often tightly related for second language learners. Given that one of a person's essential requirements is food, it should come as no surprise that the verb 'eat' produces the noun 'food'. The fact that many people respond in the same way to the same stimuli and that 'food' has a well-established network in the mental vocabulary (Marschark *et al,* 2004). However, it seems that 'food' and 'eat' are more closely related. The majority of participants gave specific food responses, including 'burger', 'doughnuts', 'candy', 'apple', 'lady finger', 'bread', 'vegetables', and 'grapes'. A total of 73 collocational responses were given in response to the stimulus 'eat', including both common and uncommon collocations.

The word 'spend' was linked with commonly used words in this word association test. These collocations are separately shown in Figure 19.

Figure 19

Collocational Responses Given to Stimulus 'Spend'



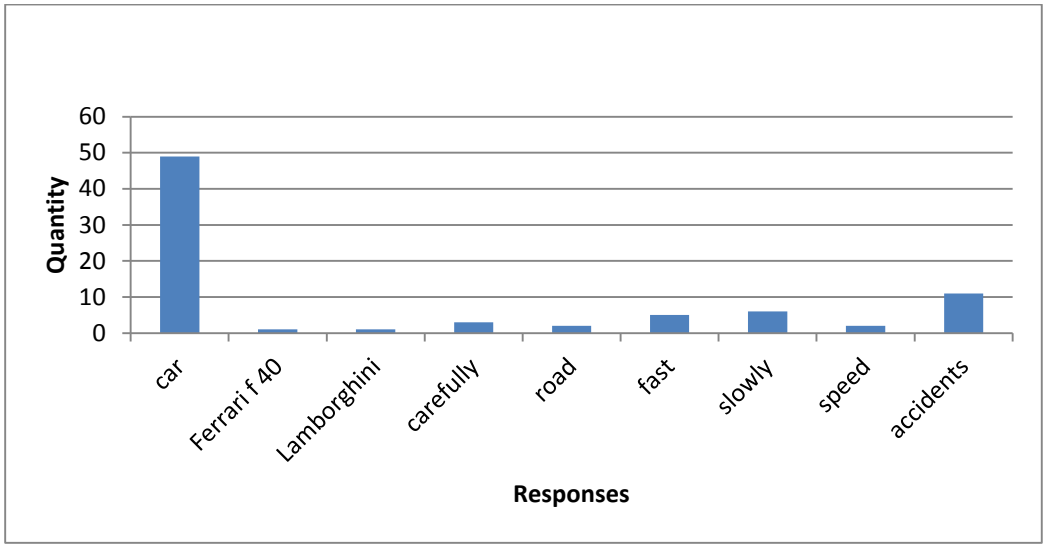
Note. Stimulus 'spend' includes all the collocational responses

Thirty-nine students chose 'money' as their response to the stimulus 'spend'. It is quite clear from the responses that the participants' mental lexicon selected that word because it is a collocation that is undoubtedly commonly used in daily life. Time is yet another noun that is equally as easily related to the verb 'spend'. Thirty-one individuals chose 'time' in response to the stimulus 'spend'. Therefore, even two natural partners are compatible with 'spend'. The collocation relationship is crucial to the study of vocabulary; it is similar to a marriage contract between words, and the like terms are more closely wed to one another (McCarthy, 1990). As a result, the concepts of 'spend', 'money', and 'time' have developed an extremely strong connection in the brains of second language learners.

In this word association test, the word 'drive' was connected to frequently used words. Figure 20 displays each of these collocations independently.

Figure 20

Collocational Responses Given to Stimulus 'Drive'



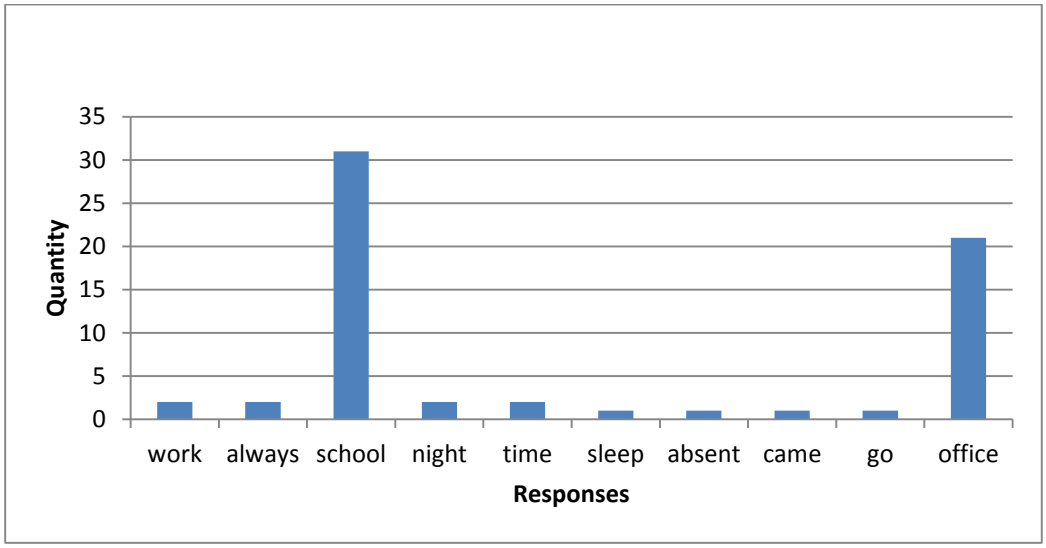
Note. Stimulus 'drive' includes all the collocational responses

Forty-nine students responded 'car' with the stimulus 'drive'. It is quite clear from the responses that the participants' mental lexicon selected that word because it is unquestionably a frequently used collocation in everyday life. In the mental vocabulary of English language learners who are learning it as a second language, 'drive' and 'car' have established an extraordinarily strong relationship. Eleven students replied to the stimulus 'drive' with the word 'accidents'. This collocation refers to the immediate environment because driving-related accidents are frequent tragedies in Pakistan. Therefore, it is quite clear from the responses that many pupils reacted to the stimulus 'drive' with 'accidents'.

The stimulus 'late' is yet another example of how participants in this word association test tended to connect words of different sorts. Additionally, there are a few occasions where a stimulus produced unanimity in collocations. Each of these collocations is displayed in Figure 21.

Figure 21

Collocational Responses Given to Stimulus 'Late'



Note. Stimulus 'late' includes all the collocational responses

Thirty-one students responded 'school' and twenty-one 'office' respectively to the stimulus 'late'. Although it may not seem reasonable that 'school' and 'office' would be associated with the stimulus 'late', this collocation shows that students' mental lexicon is influenced by their own understanding and experience of the target word. A total of forty-five collocational responses were given in response to the stimulus 'late', including both common and uncommon collocations.

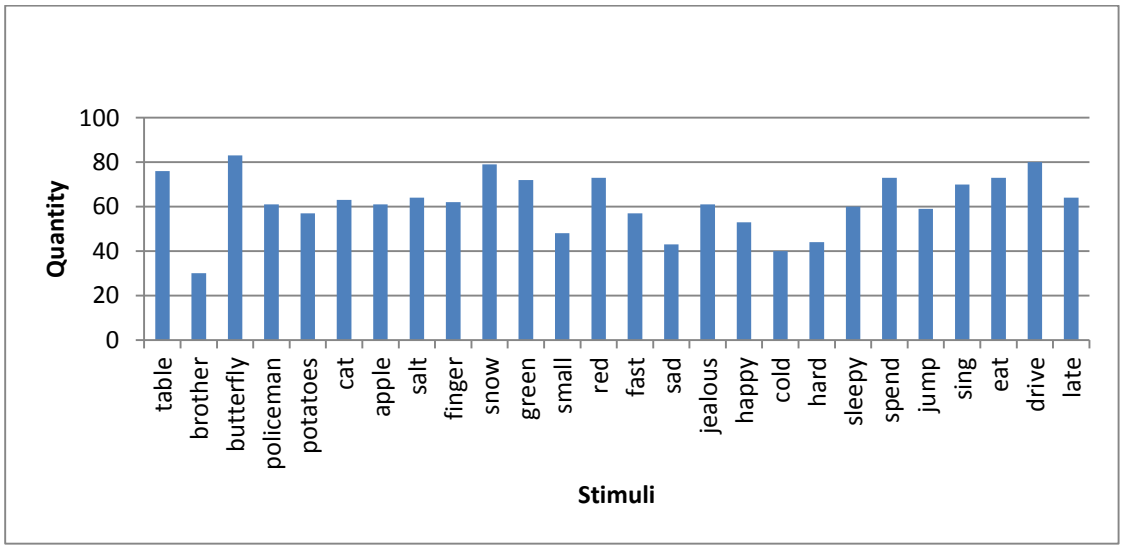
The learners' experiences and perceptions are what shape their evolving mental lexicon (Aitchison, 2003). Some of the responses to the word association test suggested that a term in the mental lexicon can continue to develop and establish a new network with new words, unique to a given person. Eleven students responded 'sonic' and seven 'Usain Bolt' with the stimulus 'fast'. Sonic is a video game that features fast, speed-based plat forming. The fastest runner in the world is Usain Bolt. However, the respondent develops a new network for the term 'fast' as a result of the use of the words 'sonic' and 'Usain Bolt'. When given the stimulus 'Jealous', nine student wrote 'Olivia Rodrigo' while six wrote 'Jack and jealous'. 'Olivia Rodrigo' is a singer most known for her song 'Jealousy', and 'Jack and Jealous' is a music collection featuring a wide range of tracks. Common collocations in languages are closely related to cultural concepts (Post, 2007). The term 'collocation' refers to a connection between two words that are most likely to appear together in context (Atchison, 2003). This collocation serves as an example of how songs

and singers can add new associations to the mental vocabulary. Fourteen students responded ‘Ali Zafar’ and ten ‘Pasoori song’ with the stimulus ‘sing’. In Pakistan, Ali Zafar is a well-known singer, and the Pasoori song has become incredibly popular recently. This relationship relates to the environment and cultural elements; in Pakistan, fans of Ali Zafar’s music enjoy his singing, and Pasoori song is currently one of the most popular songs among the younger generation.

Finally, it is clear from the data like there are countless associations based on collocation. Therefore, all of the stimuli that primarily caused collocations are shown in Figure 22.

Figure 22

Collocational Responses Given to All Stimuli



Note. These stimuli include all the collocational responses

Overall, the significant majority of twenty-six stimuli (out of forty) were the primary triggers of collocation. The smallest number of collocations a stimulus can have and yet be dominant over other word associations is thirty collocations, or 30%, given to the word ‘brother’. The stimulus ‘butterfly’, which was discussed in detail above, elicited the largest percentage of collocation replies (83%), with 83 responses.

4.3 Combining the Word Associations

Combining the word associations mean to emphasize the key results regarding word associations that have emerged from the outcomes of the word association test that was

carried out. Table 2 shows percentage of each type of association in the word association test.

Table 2

Percentage of each type of word association type is calculated

Word Class	Position-based Associations	Meaning-based Associations
Nouns	626	208
Percentage	62.6%	20.8%
Adjectives	551	297
Percentage	55.1%	29.7%
Verbs	710	45
Percentage	71%	4.5%
Adverbs	391	168
Percentage	39.1%	16.8%

Note. In the word association test, percentages of nouns, adjectives, verbs, and adverbs are calculated.

It can be seen in the above table that in the category of position-based association, nouns received 626 responses, or 62.6%; adjectives received 551, or 55.1%; verbs received 710, or 71%, and adverbs received 391 responses, or 39.1%. In position-based association, collocation relationships were common.

Adverbs received 168 responses, or 16.8% of the total, while verbs received 45 responses, or 4.5%, and nouns received 208 responses, or 20.8% of the total in the category of meaning-based association.

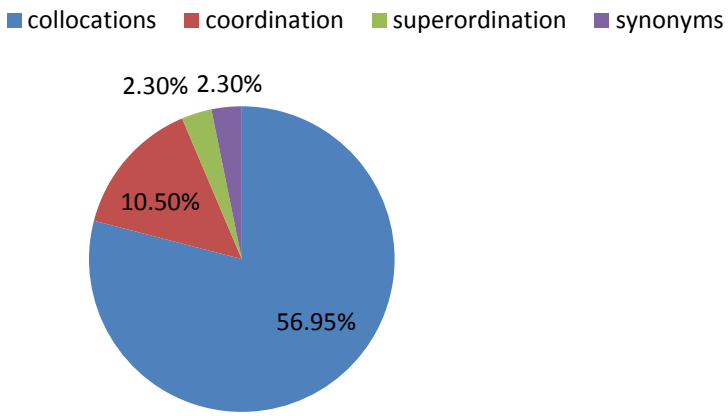
In meaning-based associations' coordination, super-ordination and synonyms were dominant. Adjectives received 247 coordination responses with 24.7%, 17 super-ordination responses with 1.7%, and 33 synonyms responses with 3.3%. Nouns received 27 coordination responses with 2.7%, 76 super-ordination responses with 7.6%, and 5 synonyms responses with 0.5%. Adverbs received 113 coordination responses with 11.3%,

and 55 synonyms responses with 5.5%. Verbs received 45 coordination responses with 4.5%.

The test's most important result is how much of an effect collocation has had on the participants. Figure 23 shows percentage of word association with all stimuli.

Figure 23

Percentage of Word Associations with All Stimuli

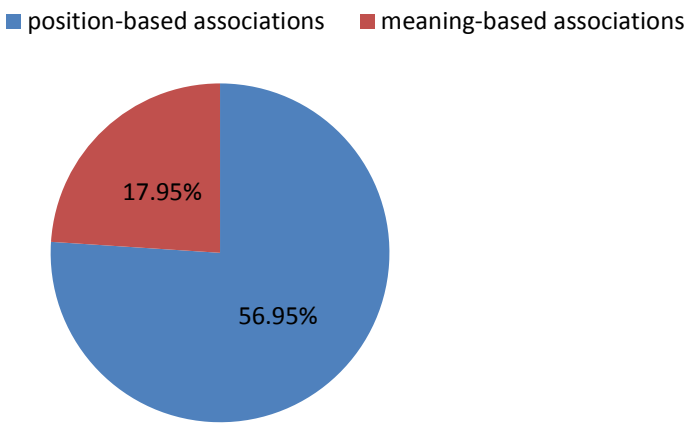


Note. The figure is based on percentage of collocation, coordination, superordination, and synonyms in word association test

Collocational relationships are clearly superior as shown in figure 13. The importance of the position-based connections generated by this test, which naturally accounts for the same large percentage of all word associations as collocation at 56.95% is displayed in the figure. Coordination, super-ordination, and synonyms are used to produce results that primarily stimulate meaning-based linkages. Coordination, super-ordination and synonyms were predominant in meaning-based linkages. As a consequence, there are 56.95% of links with collocations, 10.5% with co-ordinations, 2.3% with synonyms, and 2.3% with super-ordinations. Figure 24 displays the word associations division across the entire test.

Figure 24

Word Associations Division across the Entire Test.



Note. Word associations are divided in the word association test.

As a result, just 17.95% of relationships are meaning- based. The distribution of the data was dominated by position-based association, which accounted for 56.95% of the total data gathered.

4.4 Form-based and Erratic Associations

Eighty-three clear form-based correlations have been found in the word association test. The few form-based connections that have been generated and the majority of them are based on rhyme, such as ‘table-cable’, ‘cat-fat’, ‘finger-zinger’, ‘spend-depend’, ‘jump-bump’, ‘sing-wing’, ‘play-clay’, ‘look-cook’, ‘late-plate’, and ‘soon-moon’.

Table 3 provides the further study of all form-based associations and erratic associations. They are displayed below and then interpretation is given on the data.

Table 3

The entire test's Form-based Associations and Erratic Associations

Word Class	Form-based Associations	Erratic Associations
Nouns	28	138
Percentage	2.8%	13.8%
Adjectives	15	137
Percentage	1.5%	13.7%
Verbs	22	223
Percentage	2.2%	22.3%
Adverbs	18	423
Percentage	1.8%	42.3%
Total	2.075%	23.025%

Note. The table displays the percentage of erratic and form-based associations across all stimuli in the word association test.

It is seen that nouns activated have been 2.8%, verbs 2.2%, adjectives 1.5%, and adverbs 1.8% form-based associations. That makes up exactly 2.75% of the total form-based associations that 100 students from the 40 stimuli created collectively. That obviously indicates that these participants have weak connections between phonological structures. However, 'weak' is a gradable word, and this simply indicates that the connections appear weak in comparison to position-based and meaning-based relationships. This does not suggest that the language learning of these people is underdeveloped; on the other hand, it suggests that it is likely well advanced.

It is seen that nouns activated have been 13.8%, verbs 22.3%, adjectives 13.7%, and adverbs 42.3% erratic associations. That makes up exactly 23.25% of the total erratic associations that 100 students from the 40 stimuli created collectively. It indicates that respondents misunderstood some of the stimuli in erratic association and made the incorrect associations. Some of the pupils left the response blank having failed to respond to the stimulus word. It seems that respondents intentionally or unintentionally left the response blank because they were unable to provide answer to it.

4.5 Word Class

This section discusses whether or not word associations have changed as a result of the stimuli in relation to *word class*. Each word class' final outcome is derived based on which *word class* received the majority of the stimuli within that particular *word class*. Thus, such calculations take into account all of the word classes in the word associations. Instead, it should be viewed as estimation based on the word class that is associated with each stimulus the most and has the greatest influence on language learners who are learning a second language.

4.5.1 Nouns

There were ten stimuli which belonged to nouns: 'table', 'brother', 'butterfly', 'policeman', 'potatoes', 'cat', 'apple', 'salt', 'snow', and 'finger'. A large number of the nouns had word associations that were mostly nouns. Co-ordination, super-ordination and synonym responses which were given to nouns *word class* were counted as nouns. 'Table' activated eighteen, 'brother' forty, 'butterfly' four, 'policeman' four, 'potatoes' five, 'cat' twenty-one, 'apple' twelve, 'salt' eighteen, and 'finger' four co-ordinations. 'Brother' activated five, 'table' one, 'potatoes' six, 'butterfly' eight, 'cat' ten, 'apple' eleven, 'snow' three, and 'finger' thirty-two super-ordinations. These co-ordinations and super-ordinations that were provided for the nouns *word class* were all nouns. 'Policeman' activated five synonyms. Two types of synonyms, i.e. 'officer' and 'bully man' were predominantly triggered by the noun 'policeman' among the responders. These synonyms that were provided for the 'policeman' were all nouns.

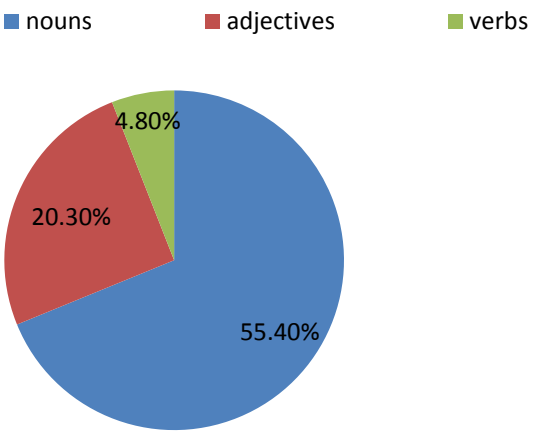
'Butterfly' activated fifty, 'table' ten, 'policeman' eighteen, 'potatoes' seventeen, 'cat' twenty-seven, 'apple' twenty-five, 'salt' twenty-one, 'finger' four, and 'snow' twenty-six adjectives. These adjectives were all collocations with the corresponding nouns.

'Table activated seventy-six, 'policeman' forty-seven, 'butterfly' seventeen, 'potatoes' thirty-six, 'cat' eleven, 'apple' twenty-seven, 'salt' forty-three, 'finger' forty-two, and 'snow' forty-eight nouns. In this word association test, every noun actually predominantly prompted other nouns. 'Table' activated ten, 'butterfly' four, 'potatoes' four, 'cat' fifteen, 'apple' six, 'finger' two, and 'snow' two verbs. These verbs and nouns were all collocational linkages with their corresponding nouns.

Figure 25 shows the respondents' propensity to relate a noun to another noun.

Figure 25

Division of Word Classes given to Nouns



Note. The figure is based on percentage of nouns with other *word classes*

The general pattern of the noun stimuli indicates that they have mostly elicited nouns from the participants, which imply that participants generally make position-based (collocations) linkages when exposed to nouns.

4.5.2 Adjectives

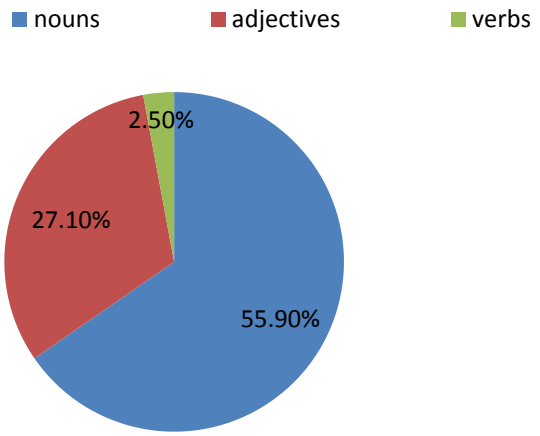
There were ten stimuli which belonged to adjectives -- 'green', 'small', 'red', 'fast', 'sad', 'jealous', 'happy', 'cold', 'hard', and 'sleepy'. The majority of the adjectives had word associations that were primarily adjectives. In actuality, a large number of adjectives contributed to the development of the adjective word class. 'Green' activated nine, 'small' thirty-seven, 'red' twelve, 'fast' thirty-one, 'sad' forty-two, 'happy' thirty-five, 'cold' forty-five, 'hard' forty-one, and 'sleepy' nineteen adjectives. Co-ordination and synonym responses which were given to adjectives word class were counted as adjectives. 'Green' received nine, 'small' thirty-one, 'red' twelve, 'fast' thirty, 'sad' thirty-nine, 'happy' thirty-three, 'cold' thirty-seven, and 'sleepy' nineteen co-ordinations. 'Small' activated six, 'fast' one, 'sad' two, 'happy' two, 'cold' ten, 'hard' four, and 'sleepy' twelve synonyms. These co-ordinations and synonyms that were provided for the adjective word class were all adjectives.

The majority of nouns were thus activated by these ten adjectives. 'Green' activated eighty, 'small' forty-eight, 'red' seventy-eight, 'fast' forty-six, 'sad' forty-one, 'jealous' sixty, 'happy' fifty-one, 'cold' forty-five, 'hard' forty-four, and 'sleepy' sixty-five nouns.

'Fast' received eleven, 'happy' one, and 'sleepy' twelve verbs. 'Jealous' received one and 'happy' one adverb. Figure 26 displays the respondents' propensity to link a noun to an adjective.

Figure 26

Division of Word Classes given to Adjectives



Note. The figure is based on percentage of adjectives with other word classes

Additionally, the fact that nouns outperformed adjectives strongly suggest that participants primarily make position-based (collocation) associations when confronted with adjective. The image demonstrates the participants' propensity to respond to an adjective with a noun. Adjectives rarely serve as the basis for meaning-based linkages.

4.5.3 Verbs

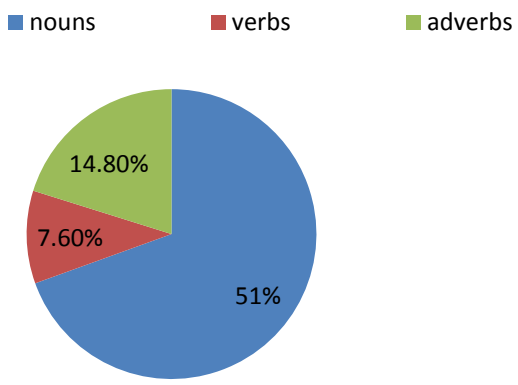
Ten verbs in all were included in this test. These ten verbs are: 'spend', 'jump', 'look', 'sing', 'eat', 'live', 'sit', 'drive', 'play', and 'smell'. The individuals primarily used nouns in response to the verb stimuli, which is the general pattern.

Word connections based on nouns significantly outperform these verbs. For example, 'spend' produced seventy, 'jump' forty-nine, 'sing' fifty-four, 'eat' sixty-six, 'drive' seventy-one, and 'play' eighty nouns. The fact that the majority of nouns were generated in response to the verb stimulus suggests that participants were more likely to associate with the collocations. This indicates that these verbs primarily triggered nouns as a whole. On the other hand, 'live' generated ten co-ordinations, and 'sit' produced thirty-five. 'Spend' produced two, 'jump' ten, 'look' sixteen, 'live' two, 'sit' two, 'drive' four, and 'smell' five verbs. 'Jump' produced twenty, 'look' ten, 'sing' eight, 'eat' seven, 'live'

two, ‘sit’ three, ‘drive’ nine, ‘play’ four, and ‘smell’ five adverbs. In response to the verb stimulus, some verbs and adverbs were produced, indicating that participants were more likely to identify these verbs and adverbs with collocations. Figure 27 displays the respondents’ propensity to link nouns verbs and adverbs to verbs.

Figure 27

Division of Word Classes given to Verbs



Note. The figure is based on percentage of verbs with other word classes

The overall pattern of the verb stimuli shows that they have mostly elicited nouns from the participants, which suggest that participants primarily make position-based (collocations) connections when exposed to verbs.

4.5.4 Adverbs

Ten adverbs were provided as stimuli: ‘always’, ‘joyfully’, ‘immediately’, ‘beautifully’, ‘suddenly’, ‘late’, ‘sometimes’, ‘slowly’, ‘soon’, and ‘carefully’. Adverbs like ‘sometimes’ activated three, ‘soon’ one, and ‘always’ three adjectives. With the stimulus ‘joyfully’ thirty-one students responded with adjectives. Adverb ‘joyfully’ produced thirty-one adjectives. The biggest agreeing word class for the stimulus ‘joyfully’ was this one. Many distinct types of nouns were predominantly triggered by the adverb ‘late’ among the responders. The adverb ‘late’ was associated with forty words, most of which were nouns. It appears that the respondents misunderstood this stimulus based on their responses to ‘late’. The grammatical function of an adverb may be unclear to the students. Adverbs have the ability to describe verbs, as is well known. However, unlike adjectives, an adverb is unable to characterize a noun. However, the word associations

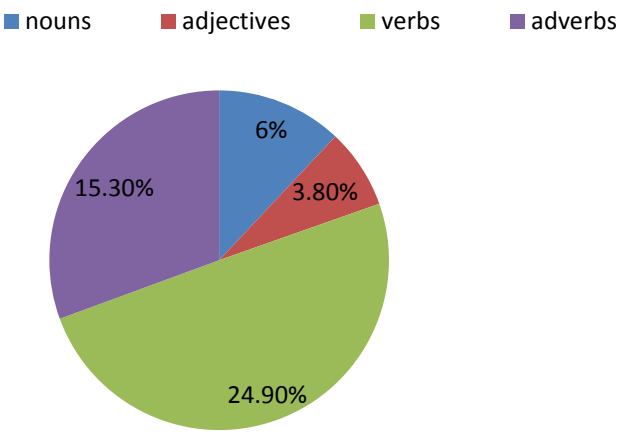
supplied for ‘late’ were more nouns than verbs. These nouns were all collocations to the stimulus ‘late’. Since ‘late’ is frequently associated with ‘office’ and ‘school’ in people’s daily lives, it can be concluded that the participants have employed the adverb as collocated associations in their responses.

‘Joyfully’, activated eight, ‘always’ thirty, ‘quickly’ thirty-four, ‘beautifully’ twelve, ‘suddenly’ forty-five, ‘late’ three ‘sometimes’, thirty, ‘slowly’ sixteen, and ‘soon’ twenty-three verbs. With ‘carefully’ and slowly thirty-six students responded with verbs. The word class that was assigned to the stimuli ‘slowly’ and ‘carefully’ was the biggest agreeing word class. These stimuli appear to have been accurately perceived by the respondents based on their responses to these stimuli. The grammatical action of adverb may be understood by the students. As is well known, an adverb has the ability to describe a verb. Therefore, adverbs were the primary words associated with the majority of the verbs. In actuality, a large number of adverbs contributed to the development of the verb word class.

Adverbs like ‘quickly’ activated forty-nine, ‘always’ twenty-three, ‘late’ nine, ‘sometimes’ eighteen, ‘slowly’ thirty-two, ‘soon’ nine, and ‘carefully’ four adverbs. ‘Slowly’ responded thirty-two and ‘quickly’ twenty coordination. ‘Joyfully’ responded twenty-four, ‘quickly’ nineteen, and ‘always’ eleven synonyms. These co-ordinations and synonyms that were provided for the adverbs word class were all adverbs. It appears that the respondents correctly understood these stimuli based on their responses to them. The grammatical function of an adverb may be understood by the students. It is evident that many replies to these stimuli were in agreement, which demonstrate the participants’ familiarity with the terms and established lexical organization. As a result, the bulk of the adverbs’ word associations were mainly adverbs. In reality, a plenty of adverbs helped shape the adverb word class. Figure 28 shows the percentage of adverbs with other word classes.

Figure 28

Division of Word Classes given to Adverbs



Note. The figure is based on percentage of adverbs with other word classes

Figure 28 illustrates how adverbs are divided into several word classes. In this test, eleven adverbs were included, and the results show that participants are more likely to choose words from other word classes to adverbs. The outcome illustrates how students were inclined to select a word class other than an adverb. In other words, the students tended to reply to adverbs less frequently, which indicate that they were less likely to give meaning-based associations to adverbs. The figure shows how participants often respond to adverbs with more verbs. Additionally, the fact that verbs outperformed adverbs strongly imply that when participants encounter adverbs, they predominantly build position-based (collocational) associations.

In this test, nouns were mostly produced by all word classes. Looking at word classes and association types yields the same conclusion. Most often, position-based associations with less meaning-based ones were provided by respondents. In other words, the test's results indicate that respondents mostly used word classes to form collocations. As a result, linkages based on co-ordinations, super-ordinations, and synonyms are far less common.

4.6 Findings

The researcher has chosen forty words for the word association test in order to determine how words are organized in the mental lexicon. The terms were drawn from the suggested grade 4 English textbooks at Beacon House, Roots IVY, Roots International, The

City School, and APS. Following the word association test, the responses of 100 students were analyzed using Fitzpatrick's (2007) model of 'classification of association response'.

The percentage of responses and the actual number of responses were used to express the word association test findings. The proportion of nouns, adjectives, verbs, and adverbs that belong to each category is calculated.

The result of the study showed that some respondents made meaning-based associations as a result, just 17.95% of relationships are meaning-based. The entire test consisted of twenty-seven stimuli which led to connections based on coordination. The participants' connections in this word association test between a superordinate and its subordinates are not particularly strong, or at the very least. Adverbs received 16.8%, verbs received 4.5%, and nouns received 20.8% responses in the category of meaning-based association. Adjectives received 247 coordination responses with 24.7%, 17 super-ordination responses with 1.7%, and 33 synonyms responses with 1.3%. Nouns received 27 coordination responses with 2.7%, 76 super-ordination responses with 7.6%, and 5 synonyms responses with 0.5%. Adverbs received 113 coordination responses with 11.3%, and 55 synonyms, responses with 5.5%. Verbs received 45 coordination responses with 4.5%. In general, these participants' mental lexicons are structured in a way that make meaning-based linkages less likely to occur.

The purpose of this part is to emphasize the key results regarding word associations that have emerged from the outcomes of the word association test that was carried out. The examination of the tables, figures, graphs, and statistical analysis reveals that all 100 students who took part in this investigation's responses tended to provide collocational correlations. In total, 26 of the 40 stimuli (a considerable number) served as the main sources of collocation. The word 'brother' has 30% of the minimum amount of collocations that a stimulus can have while still dominating other word associations. With 83% of responses, the stimulus 'butterfly' produced the most collocation reactions. Nouns received 62.6%, adjectives received 55.1%, verbs received 71%, and adverbs received 39.1% responses in the category of position-based association. Position-based associations frequently used collocation associations. Position-based association, which accounted for 56.95% of the total data collected, dominated the distribution of the data. The result shows that collocational relationships are clearly superior. Collocation associations were prevalent in position-based association. Data analysis indicated that position-based association was the most robust lexical network in the participants' mental lexicon. The findings of the

word association test showed that the participants' mental lexicon was impacted by their comprehension and use of the target term.

Having analyzed the data, the connections appear weak in form-based associations in comparison to position-based and meaning-based relationships. The outcome demonstrates that respondents created inaccurate associations and misinterpreted some of the cues in erratic association. The outcome also suggests that respondents either purposefully or accidentally left the response blank due to their inability to offer a suitable answer to it.

In this test, nouns were mostly produced by all word classes. The test's findings showed that respondents primarily employed word classes to create collocations. This indicates that they primarily made position-based associations. The result included some co-ordinations, super-ordinations, and synonyms. The findings showed that linkages based on co-ordinations, super-ordinations, and synonyms are far less common.

CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND IMPLICATIONS FOR TEACHERS

Conclusion, recommendations and implications for the teachers are covered in this chapter. The conclusion of this study have been presented in the beginning, it includes the study's overall conclusion. The researcher has made a few recommendations for upcoming researchers. The researcher has provided teachers with a few implications at the end of the chapter.

5.1 Conclusion

The organization of words in the students' mental lexicons in grade 4 at the selected schools was the focus of the research. The first question of this study was to find out the kinds of meaning-based associations that English language learners of grade 4 make when presented with a single word. It was found that some respondents made meaning-based associations; as a result, just 17.95% of relationships are meaning-based. The entire test consisted of twenty-seven stimuli which led to connections based on coordination. The participants' connections in this word association test between a superordinate and its subordinates are not particularly strong, or at the very least. Adverbs received 16.8%, verbs received 4.5%, and nouns received 20.8% responses in the category of meaning-based association. Adjectives received 247 coordination responses with 24.7%, 17 super-ordination responses with 1.7%, and 33 synonym responses with 1.3%. Nouns received 27 coordination responses with 2.7%, 76 super-ordination responses with 7.6%, and 5 synonym responses with 0.5%. Adverbs received 113 coordination responses with 11.3%, and 55 synonym responses with 5.5%. Verbs received 45 coordination responses with 4.5%. Super-ordination cannot be the most important strategy for these pupils to maintain their memory of English language because the participants' links between a superordinate and its subordinates in this word association test are not particularly strong. In this word association test, a few co-ordinations and synonyms were found. In general, these participants' mental lexicons are structured in a way that makes meaning-based linkages less likely to occur.

The second research question of this study was to find out how the English Language learners of grade 4 make position-based associations between the words through

word association response. To this, it was found that many respondents mostly gave position-based associations. Fitzpatrick's (2007) model of 'classification of association response' was used to assess the students' responses to the word association test, and it was found that the majority of replies mostly elicited collocational associations. In total, 26 of the 40 stimuli (a considerable number) served as the main sources of collocation. The word 'brother' has 30% of the minimum number of collocations that a stimulus can have while still dominating other word associations. With 83% of responses, the stimulus 'butterfly' produced the most collocation reactions. Nouns received 62.6%, adjectives received 55.1%, verbs received 71%, and adverbs received 39.1% responses in the category of position-based association. Position-based association frequently used collocation associations. The significance of position-based connections produced by this test, which naturally accounts for a significant portion of all word associations as collocation, is 56.95%. The result shows that collocational relationships are clearly superior. The findings suggest that the students' knowledge and prior exposure to the target word can have an impact on their mental lexicon. These collocations demonstrate how the pupils' interpretations of the target term affect their mental lexicon. The results of the word association test showed that common collocations in word association test are closely related to social and cultural concepts. Some results of the word association test revealed that a term in the mental lexicon can keep growing and forming a new network with new words. The results of the word association test revealed that majority of the words were chosen by the participants' mental lexicon because they are collocations that are obviously often used in daily life.

The third research question of this study was to find out how the lexical networks of the English language learners of grade 4 are characterized and influenced by the lexical class of the words. As a result, the participants' responses to the overall pattern of noun stimuli have tended to be nouns, which suggest that participants typically form position-based (collocation) links when exposed to nouns. The general structure of the verb stimuli has predominantly elicited nouns from the participants, which shows that when exposed to the verbs, participants primarily make position-based (collocations) linkages. The results show that students were more likely to choose a word class other than an adverb; they also responded to adverbs less frequently, suggesting that they were less likely to associate meaning-based associations with them. According to the test's findings, most respondents assigned word classes to create collocations. As a result, coordination, super-ordination, and synonym linkages are quite less frequent.

According to the findings, position-based linkages were given by nearly most of the respondents. In position-based association, collocation relationships were common. Less meaning-based links are likely to be made by the students. According to test results, respondents primarily used word classes to create collocations. The result shows that the students' mental lexicon is influenced by their unique interpretation of the target word. In general, these individuals' mental lexicons are organized in a way that reduces the likelihood of occurrence of meaning-based links. The findings indicated that position-based association was the most robust lexical network in the participants' mental lexicon.

5.2 Recommendations

The phrase 'mental lexicon' is derived from psycholinguistics, where it is studied how vocabulary is stored in the long-term memory of the human brain. Lexical relation is a method used in psycholinguistics to look at how peoples' mental model networks are set up in their brains.

Some recommendations are offered for future researchers after discussing the study's findings.

- This study investigated the organization of words in the mental lexicon of English language learners by analyzing the position-based and meaning-based features. For future study, the researcher suggests that other features (form-based and unpredictable correlations) be thoroughly investigated alongside position-based and meaning-based features.
- Future researchers can explore the mental lexicon of students at government schools in Pakistan (Lahore, Karachi and Islamabad) between the ages of 8 and 13.
- This study investigated the organization of words in the mental lexicon of English language learners of grade 4. The lexicon of higher level students such as eighth, ninth, tenth grade can be analyzed by the future researchers. The future researchers can also compare and contrast the mental lexicon of lower-level school classes (four, fifth, sixth, seventh) with that of higher-level classes (eighth, ninth, tenth).

5.3 IMPLICATIONS FOR THE TEACHERS

The purpose of this study is to investigate the organization of words in the mental lexicon of English language learners by analyzing the position-based and meaning-based features, so it can be used as a reference to determine teaching methods that can help

strengthen the network of words in the mental lexicon. The results of the word association test show how highly organized is the mental lexicon of the grade 4 learners. The findings of this study show that position-based association is the dominant network in the mental lexicon of the English language learners and less meaning-based links are made by them. The study's findings imply that teaching vocabulary and its meanings is insufficient for expanding English language learners' mental lexicon.

- According to the findings of this study, students should keep a 'vocabulary journal' in which they can write new words and all of the connections that they can think of such as a part of speech, syllables, spelling, words with similar meanings, super-ordinates, opposites, categories the word belongs to, words that usually connect to the word and personal experience, and so on. By writing down all of these connections, English language learners may help their mental lexicon establish stronger linkages between words, which will help them recall new and old terminology.
- It should be clear that words are by definition relative and multidimensional in meaning and usage. The student should know that only a few word and meaning remain static: knowing a word also means understanding what happens near the word as the process of association clearly shows. Pedagogical implications from this insight highlight the significance of language activities and instruction. It has been demonstrated that vocabulary and grammar are not distinct concepts. Reading for comprehension, word generation games, cloze procedures, word generation games and word puzzle tools, and crosswords all focus on making it easier to understand, remember, and produce lexical items. Additionally, this would assist teachers in developing and broadening the students' mental lexicon.

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APPENDIX A

Grade…….

Please note that this test must be completed independently. After reading each of the stimulus words, you are supposed to write down the first word that comes to mind. If you don't recognize a word, move on to the next one and don't worry about the spellings.

Stimulus Word	Word Class	Response
Table	noun	
Brother	noun	
Butterfly	noun	
Policeman	noun	
Potatoes	noun	
Cat	noun	
Apple	noun	
Salt	noun	
Finger	noun	
Snow	noun	

Stimulus Word	Word Class	Response
Green	adjective	
Small	adjective	
Red	adjective	
Fast	adjective	
Sad	adjective	
Jealous	adjective	
Happy	adjective	
Cold	adjective	
Hard	adjective	
Sleepy	adjective	

Stimulus Word	Word Class	Response
Spend	verb	
Jump	verb	
Look	verb	
Sing	verb	
Eat	verb	
Live	verb	
Sit	verb	
Drive	verb	
Play	verb	
Smell	verb	

Stimulus Word	Word Class	Response
Joyfully	adverb	
Always	adverb	
Quickly	adverb	
Beautifully	adverb	
Suddenly	adverb	
Late	adverb	
Sometimes	adverb	
Slowly	adverb	
Soon	adverb	
Carefully	adverb	

APPENDIX B

The Principal

Roots International School

Rawalpindi

Subject: Request for Permission to Conduct Research Study in School.

Dear Madam /Sir,

I would like to ask your permission to allow me to conduct a test in your school. I am a student of M.Phil in English Linguistics at National University of Modern Languages (NUML), Islamabad and is presently conducting a thesis entitled "Organization of Words in the Mental Lexicon. A psycholinguistic Study". I want to collect data from grade four of your school. The test will last only about 30 minutes. Rest assured that all information will be treated with outmost confidentiality. The data will be used for the research purpose only. I hope that this request will merit your favorable approval.

Yours truly,

Rizwana Jabeen

M.Phil English (Linguistics)

Date:

Noted by:

Dr. Khurram Shahzad

Signature

Dr. Khurram Shahzad
Assistant Professor (BPS-19)
Department of English
National University of Modern Languages
H-9, Islamabad

Thesis Supervisor/Assistant Professor/Ph.D. Program coordinator Department of English National University of Modern Languages (NUML), Islamabad

Approved by:

Principal

Signature

Roots International School, Rawalpindi

The Principal

Beacon House School

Rawalpindi

Subject: Request for Permission to Conduct Research Study in School.

Dear Madam /Sir,

I would like to ask your permission to allow me to conduct a test in your school. I am a student of M.Phil in English Linguistics at National University of Modern Languages (NUML), Islamabad and is presently conducting a thesis entitled "Organization of Words in the Mental Lexicon. A psycholinguistic Study". I want to collect data from grade four of your school. The test will last only about 30 minutes. Rest assured that all information will be treated with outmost confidentiality. The data will be used for the research purpose only. I hope that this request will merit your favorable approval.

Yours truly,

Rizwana Jabeen

M.Phil English (Linguistics)

Date:

Noted by:

Dr. Khurram Shahzad
Assistant Professor (BPS-19)
Department of English
National University of Modern Languages
H-9, Islamabad

Dr. Khurram Shahzad Signature

Thesis Supervisor/Assistant Professor/Ph.D. Program coordinator Department of English National University of Modern Languages (NUML), Islamabad

Approved by:

Principal Signature

Beacon House School, Rawalpindi

The Principal

The City School

Rawalpindi

Subject: Request for Permission to Conduct Research Study in School.

Dear Madam /Sir,

I would like to ask your permission to allow me to conduct a test in your school. I am a student of M.Phil in English Linguistics at National University of Modern Languages (NUML), Islamabad and is presently conducting a thesis entitled "Organization of Words in the Mental Lexicon. A psycholinguistic Study". I want to collect data from grade four of your school. The test will last only about 30 minutes. Rest assured that all information will be treated with outmost confidentiality. The data will be used for the research purpose only. I hope that this request will merit your favorable approval.

Yours truly,

Rizwana Jabeen

M.Phil English (Linguistics)

Date:

Noted by:

Dr. Khurram Shahzad

Assistant Professor (BPS-19)
Department of English
National University of Modern Languages
H-9, Islamabad

Dr. Khurram Shahzad Signature

Thesis Supervisor/Assistant Professor/Ph.D. Program coordinator Department of English National University of Modern Languages (NUML), Islamabad

Approved by:

Principal Saba Shadi Signature

The City School, Rawalpindi

The Principal

Army Public School

Rawalpindi

Subject: Request for Permission to Conduct Research Study in School.

Dear Madam /Sir,

I would like to ask your permission to allow me to conduct a test in your school. I am a student of M.Phil in English Linguistics at National University of Modern Languages (NUML), Islamabad and is presently conducting a thesis entitled "Organization of Words in the Mental Lexicon. A psycholinguistic Study". I want to collect data from grade four of your school. The test will last only about 30 minutes. Rest assured that all information will be treated with outmost confidentiality. The data will be used for the research purpose only. I hope that this request will merit your favorable approval.

Yours truly,

Rizwana Jabeen

M.Phil English (Linguistics)

Date:

Noted by:

Dr. Khurram Shahzad

Signature

Dr. Khurram Shahzad
Assistant Professor (BPS-19)
Department of English
National University of Modern Languages
H-9, Islamabad

Thesis Supervisor/Assistant Professor/Ph.D. Program coordinator Department of English National University of Modern Languages (NUML), Islamabad

Approved by:

Principal

Signature

Army Public School, Rawalpindi

The Principal

Roots IVY School

Rawalpindi

Subject: Request for Permission to Conduct Research Study in School.

Dear Madam /Sir,

I would like to ask your permission to allow me to conduct a test in your school. I am a student of M.Phil in English Linguistics at National University of Modern Languages (NUML), Islamabad and is presently conducting a thesis entitled "Organization of Words in the Mental Lexicon. A psycholinguistic Study". I want to collect data from grade four of your school. The test will last only about 30 minutes. Rest assured that all information will be treated with outmost confidentiality. The data will be used for the research purpose only. I hope that this request will merit your favorable approval.

Yours truly,

Rizwana Jabeen

M.Phil English (Linguistics)

Date:

Noted by:

Dr. Khurram Shahzad

Assistant Professor (BPS-19)
Department of English
National University of Modern Languages
H-9, Islamabad

Dr. Khurram Shahzad Signature

Thesis Supervisor/Assistant Professor/Ph.D. Program coordinator Department of English National University of Modern Languages (NUML), Islamabad

Approved by:

Principal Signature

Roots IVY School, Rawalpindi

APPENDIX C

Grade…IV - B…..

Please note that this test must be completed independently. After reading each of the stimulus words, you are supposed to write down the first word that comes to mind. If you don't recognize a word, move on to the next one and don't worry about the spellings.

Stimulus Word	Word Class	Response
Table	noun	Cup collocation
Brother	noun	Sister coordination
Butterfly	noun	fly collocation
Policeman	noun	officer synonym
Potatoes	noun	Tomatoes phonological
Cat	noun	dog coordination
Apple	noun	Pine apple coordination
Salt	noun	spicy coordination
Finger	noun	hand superordination
Snow	noun	winter superordination

Stimulus Word	Word Class	Response
Green	adjective	sad wrong
Small	adjective	big coordination
Red	adjective	dress collocation
Fast	adjective	slow coordination
Sad	adjective	Happy "
Jealous	adjective	unjealous wrong
Happy	adjective	sad coordination
Cold	adjective	Hot "
Hard	adjective	Soft "
Sleepy	adjective	fresh "

Grade..4 C.....

Please note that this test must be completed independently. After reading each of the stimulus words, you are supposed to write down the first word that comes to mind. If you don't recognize a word, move on to the next one and don't worry about the spellings.

Stimulus Word	Word Class	Response
Table	noun	Wood collocation
Brother	noun	Sister coordinate
Butterfly	noun	Wings collocation
Policeman	noun	thief coordinate
Potatoes	noun	fries collocation
Cat	noun	food u
Apple	noun	Slice u
Salt	noun	Peper coordinate
Finger	noun	ring collocation
Snow	noun	man u

Stimulus Word	Word Class	Response
Green	adjective	Leave collocation
Small	adjective	big coordinate
Red	adjective	Apple collocation
Fast	adjective	Slow coordinate
Sad	adjective	happy u
Jealous	adjective	people collocation
Happy	adjective	Sad coordinate
Cold	adjective	Hot u
Hard	adjective	soft u
Sleepy	adjective	active u

Grade....4 A.....

Please note that this test must be completed independently. After reading each of the stimulus words, you are supposed to write down the first word that comes to mind. If you don't recognize a word, move on to the next one and don't worry about the spellings.

Stimulus Word	Word Class	Response
Table	noun	wood collocation
Brother	noun	sister coordination
Butterfly	noun	flower collocation
Policeman	noun	gun "
Potatoes	noun	Fries "
Cat	noun	dog coordination
Apple	noun	juice collocation
Salt	noun	water "
Finger	noun	thumb coordination
Snow	noun	white collocation

Stimulus Word	Word Class	Response
Green	adjective	tree collocation
Small	adjective	big coordination
Red	adjective	bed collocation
Fast	adjective	Fur wrong
Sad	adjective	happy coordination wrong
Jealous	adjective	apple wrong
Happy	adjective	smile collocation
Cold	adjective	freez "
Hard	adjective	well "
Sleepy	adjective	night "

Stimulus Word	Word Class	Response
Spend	verb	money collocation
Jump	verb	high collocation
Look	verb	book — synonym
Sing	verb	song collocation
Eat	verb	food collocation
Live	verb	die coordination
Sit	verb	stand coordination
Drive	verb	car collocation
Play	verb	football collocation
Smell	verb	bad 4

Stimulus Word	Word Class	Response
Joyfully	adverb	happy Synonym
Always	adverb	sad collocation
Quickly	adverb	slowly coordination
Beautifully	adverb	butterfly wrong
Suddenly	adverb	quik Synonym
Late	adverb	dute wrong
Sometimes	adverb	everytimes coordination
Slowly	adverb	fastly coordination
Soon	adverb	moon synonym
Carefully	adverb	drive collocation

Stimulus Word	Word Class	Response
Spend	Verb	Time collocation
Jump	Verb	Run coordination
Look	Verb	See synonym
Sing	verb	Ring phonological
Eat	verb	meet phonological
Live	verb	Place collocation
Sit	verb	Stand — coord
Drive	verb	Car collocation
Play	verb	Brother wrong
Smell	verb	Big wrong

Stimulus Word	Word Class	Response
Joyfully	adverb	Blank
Always	adverb	4
Quickly	adverb	4
Beautifully	adverb	People wrong
Suddenly	adverb	Blank
Late	adverb	4
Sometimes	adverb	4
Slowly	adverb	4
Soon	adverb	4
Carefully	adverb	4

Stimulus Word	Word Class	Response
Spend	Verb	Time collocation
Jump	Verb	playing collocation
Look	Verb	elephant collocation
Sing	verb	music collo
Eat	verb	beg wrong
Live	verb	stay Synonym
Sit	verb	chair collocation
Drive	verb	car collocation
Play	verb	game collocation
Smell	verb	begger wrong

Stimulus Word	Word Class	Response
Joyfully	adverb	playing collocation
Always	adverb	Blank
Quickly	adverb	go School collocation
Beautifully	adverb	fast wrong
Suddenly	adverb	pretty wrong wrong
Late	adverb	pen
Sometimes	adverb	Blank
Slowly	adverb	lasy wrong
Soon	adverb	sun wrong
Carefully	adverb	Blank