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# DEPTH OF WORD KNOWLEDGE IN THE DEVELOPMENT OF MENTAL LEXICON: EXPLORING WORD ASSOCIATION RESPONSES OF PAKISTANI L2 UNDERGRADUATE LEARNERS IN LAHORE

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## ABSTRACT

*This study investigates the lexical competency among Pakistani L2 graduate students, focusing on paradigmatic and syntagmatic mental links using word association tests. This study explores the complexity of language competency within this specific group by investigating the associative (paradigmatic) and sequential (syntagmatic) relationships between words in the mental lexicon. Stephen Krashen's vocabulary acquisition theory has been employed as a theoretical framework. A selected group of Pakistani L2 graduate learners was presented with stimulus words from McCarthy's vocabulary list (1990), encouraging quick replies with associated terms, using word association tests based on Fitzpatrick's classification. The results of these tests were rigorously evaluated to reveal patterns of both associative associations (paradigmatic relations) and sequential connections (syntagmatic relations) within these students' mental lexicon. Meanwhile, the study also incorporated language competence exams to identify possible relationships between proficiency levels and mental vocabulary organization among these individuals using the SPSS tool. The outcome of this study demonstrated a spectrum of lexical competence among Pakistani L2 graduate students, demonstrating varying levels of competency in mental word arrangement. The examination of paradigmatic and syntagmatic relationships sheds light on the subtle strengths and weaknesses of associative and sequential associations in their mental lexicon. These findings highlight the importance of understanding the mental arrangement of vocabulary in language acquisition, as well as potential pathways for targeted linguistic interventions to improve the lexical competence of second language learners in this group.*

***Keywords:*** Lexical Competence, Paradigmatic relations, Syntagmatic relations, Word Association Tests, Mental lexicon

## Introduction

The concept of lexical competence is related to semantic competence (Marconi, 1997). The lexeme or vocabulary is referred to as an item that conveys the meaning. Second language learning is based on the pillars of understanding, acquisition, and retrieval of the lexical items. All these concepts are closely relevant to language learning. Thus, language learning depends on the mental lexicon. According to Richards and Schmidt (2002), mental lexicon is a term that explicitly describes the mental storage of words of a person. It is also concerned with the meaning and its associations. On the other hand, the word lexicon in Greek was known as a 'dictionary'. Many of the recent researchers have used this term in the form of mental lexicon (Aitchison, 2003; Channell, 1988; McCarthy, 1990). According to McCarthy (1990), the term mental lexicon is defined in terms of a library, a thesaurus, and an encyclopedia. In literal terms, this word can also be associated with a dictionary, a computer, and a net. Likewise, Brown (2006) expressed this term in a different metaphor. He explained that mental lexicon is a modern terminology, which is a more contemporary metaphor than the Internet and World Wide Web. So, all of these concepts are just pointing towards a single concept, which is associated with input, storage, and the recycling of the old data from the long-term memory.

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However, in this research, the word mental lexicon is defined in terms of the complexity of the storage of words in the human mind. In this study, only the L2 learners are pointed out. I have checked their mental cognition and association through the Word Association Test.

A vast area of research has been conducted on the mental lexicon of native speakers as well as bilinguals. However, this study is most specifically designed to evaluate the status of the mental lexicon of second language learners. This research study explores the role of the mental lexicon in organizing L2 lexical items, given the relationship between L1 and L2 mental lexicons. Many of the studies have clarified that there is a strong connection between the mental lexicon of both L1 and L2 (Channell, 1988).

Moreover, word association is a tool to explore semantic networks. It is a technique in which a stimulus word is used, and then the respondent answers that word with a response word. It is just like a trigger and a response word answer. These kinds of tests are designed to evaluate the mental capability of a person by checking their comprehension of the trigger word and then responding accordingly (Istifici, 2010; Rapp, 2014; Playfoot, 2018).

The Word Association Test can be used to test the mental lexicons of first-language and second-language learners in the field of psycholinguistics. This test also provides information about the word associations and their analysis. Aitchison (Passand, 2015) has conducted a research study on word associations through the process of word retention, considering the independent storage. This study is so simple to apply to research studies. It follows the stimulus-response method, and the researcher is viewed as the source that provides impetus words. The test is formed in various forms, such as oral stimulus words, written stimulus words, and oral prompting words. The number of response words depends on the aims of the research study. In the current study, the researcher has explored the lexical competence of L2 in Pakistani graduate learners. The researcher has conducted a Word Association Test (WAT) among 500 Pakistani graduates whose L1 is mainly Urdu or the other regional languages. The primary focus of researchers is to figure out the mental links between stimulus words and response words. The researcher has only focused on paradigmatic and syntagmatic relations.

**Significance of the Study**

This study is essential as it focuses on the lexical acquaintance and the development of the language by the L2 learners of the English language. It is very significant for the learners of L2 to develop their mental lexicon while living and studying the English language in Pakistan, as the English language is considered one of the challenging languages to learn in the context of the Urdu language and other languages too. It provides the platform through which teachers can benefit from the development of mental lexicon**.**

**Purpose of the Study**

This study aims to shed light on the complexity of language competency within this specific group by investigating the associative (paradigmatic) and sequential (syntagmatic) relationships between words in the mental lexicon. The vocabulary acquisition theory investigates how humans acquire, remember, and utilize new words. It examines tactics such as comprehending context, breaking down word parts, and linking meanings. This theory also analyzes how exposure, practice, and individual characteristics impact word acquisition at various ages and ability levels. This study aims to employ Stephen Krashen's vocabulary acquisition theory as a theoretical framework.

**Research Objectives**

This research study has the following research objectives:

1. To investigate the lexical competency among Pakistani L2 graduate students, focusing on paradigmatic and syntagmatic mental links

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2. To shed light on the complexity of language competency within this specific group by investigating the associative (paradigmatic) and sequential (syntagmatic) relationships between words in the mental lexicon.

**Research Questions**

This research study has the following research questions:

1. What kind of lexical competence do Pakistani L2 graduates have, focusing on paradigmatic and syntagmatic mental links?
2. What complexities of language exist in L2 graduates based on the paradigmatic and syntagmatic relations between words in the mental lexicon?

## LITERATURE REVIEW

### Teaching English as a Second Language

English language learning is considered a sign of upward social mobility as well as a gateway to better employment. Manan et al. (2016) have conducted a research study to evaluate English language teaching policies, delusions, and solutions. They observed that Pakistani society is characterized by class consciousness and class division. So, the parents from the middle and lower classes try to enroll their children in private English medium schools. In Pakistan, it is believed that if a child is to learn English, he must be enrolled in an English medium school from early childhood. They used a a mixed-methods approach to evaluate 11 English-medium schools that were offering low fees. The data was collected through questionnaires, interviews, and class observations. The inclusive criteria were students, teachers, and Principals. The findings of the study suggested that the policy of English medium schools is counterproductive, as language learners were not proficient. Unavailability of teachers, poor pedagogy, and overall poor curriculum lead to less efficiency of students. This study suggested that the knowledge must be conveyed through mother tongue for better concepts. English should be treated as a second language rather than medium of teaching.

Nadeem (2005) conducted a research study to evaluate the status of English language at primary level. the setting of the study was Government primary schools grade 4. The data was collected through questionnaires for teachers, classroom observations and the result of test that were conducted for grade 4. The data was collected from 400 primary schools. The study findings indicated that teachers were following classical approach rather than skill oriented approach. The students had learnt language since 4 years but still they were not capable enough to grasp the basic language skills i.e. speaking and listening in particular. The major drawback behind such happening is that teachers were distributing theoretical knowledge rather than incorporating skill base learning. The major pressure of syllabus covering also had a pressure over teachers. This study suggested that teachers must follow realistic pedagogical techniques for better language teaching.

Vocabulary building is considered as a challenging task for Pakistani bilinguals. Shah, S.H.R et al. (2022) investigated how English vocabulary learning is a difficult task for college students of Pakistan. They basically shift their focus towards challenges during learning the words. They conducted semi structured interviews for 5 participants. The findings of the study exhibited that students face problems like short-term memory, lack of reading, poor pronunciation, and inappropriate use of words. In light of these findings, the researcher suggested that effective cognitive and metacognitive strategies should be adopted.

### Development of Lexical competence

The most important part of learning a language is to develop the lexical competence. According to Wilkin's (1972), the knowledge of vocabulary is the central part of learning a language. He stated that there is a famous dictum 'little amount of knowledge can be incorporated without grammar but nothing can be communicated without lexical competence'

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so it doesn't matter either its L1, L2 or any other foreign language (Decarrico, 2001). Because of such crucial importance, it is mandatory for both teachers and learners for being lexically competent. The development of lexical competence is a challenging task so it can be taught in an effective way. It is also significant to remember the vocabulary items. The best methods and techniques adopted by the language teachers and learners are related to how can the language be learnt in an effective way and in what way is best for storing the words in memory. It all depends on an individual's preferences, beliefs and values. Indeed, the set of these beliefs exhibit the learner's interest in learning a language (Ellis, 1994).

Lehan, V. et al. (2023) conducted a research study to explore the development of lexical competence through applying a model in distance learning. They provided internet facility to the educational institutions to enhance their ability of linguistic competence. This study suggested that teachers utilize various tools for the development of lexical competence. It includes Kahoot! (95.6%), Moodle (95.5%), Duolingo (89.7%), Google Forms (89.6%), Lingohut (89.2%), and Quizlet (84.7%). However, teachers also employ the techniques like translation of target language words, development of natural speech patterns and creating the analogy of word associations. This study concluded that computerized technologies have 95% positive impact on lexical development.

**The Role of Psycholinguistics in Second Language**

Acquisition-Focus on Lexical Competence Lexical competence which is the area of knowledge concerning how language is acquired, understood and used is fundamental in the study of second language learners' (L2) comprehending. This field looks at how working memory, perception and other processing facilities play a role in acquisition and deployment of the required vocabulary in a second language. Implications of psycholinguistic findings for young L2 learners are discussed based on current theories that explain how L2 learners understand and store specific words, and how lexical knowledge is stored and processed in the human mind. Awareness of these processes for L2 learners may be beneficial in enhancing teaching procedures as educators seek to improve the vocabulary acquisition. Back to the basics: the Mental Lexicon and Lexical Organization Of particular relevance in L2 vocabulary learning is the 'mental lexicon,' a mental structure in which words and their meaning reside and may be connected.

The mental lexicon, which is hypothesized in the psycholinguistic theory, could be clustered semantically and syntactically; words are related by bonds (Nation, 2013, Schmitt, 2008). It can enable fast access to words when in communication within this organization. Nonetheless, having a small vocabulary intake restricts L2 learners' formation of an extensive mental lexicon, which in term hinders word recognition (de Groot, 2011; Altarriba and Basnight-Brown, 2012). For example, L2 learners tend to translate from their first language (L1), which hinders the building of direct association in the target language. The structural aspect of mental lexicon development is characterized by the way different words are stored, whereby frequency of use, contexts, and other factors, such as those of Schmitt (2008) and Ellis (2005), are considered.

**Bilingualism and its contribution to lexical reception-bilingualism and lexical production**

Second language (L2) learners with bilingualism, which is the capacity to read, write and listen and speak two languages, or multilingualism, being the possession of many languages, can impact the lexical proficiency in learners. In the Pakistani context, the graduate learners in particular, use Urdu, regional languages, and of course, English; bilingualism in relation to English vocabulary has its advantages and disadvantages. The language systems previously developed by the bilingual or multilingual learners have an influence on how the learners learn, process, and retrieve the vocabulary in English. In light of these findings, this

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commentary demonstrates how L1-L2 differences, bilingual cognisity, and interlanguage connection play a role in the lexical acquisition of L2 English for bi-dialectal individuals. Numerous studies have revealed that the new generation of these reading is characterized by such features as cognitive flexibility and enhanced lexical access.

**Relationship between Word Association and Lexical Development**

Vocabulary acquisition depends on the process of word association. It helps the learners to understand the language and process the lexical item in their mental lexicon. Roux, P. W. (2013) conducted a research study to explore how words are produced in the human mind, and the other focus was to find out the relationship between lexical skills and the process of word association. He observed the English language of two groups, i.e., native English speakers and Japanese English speakers. These two groups were selected to comprehend how their mental lexicon makes mental links, as mental lexicon plays an integral role in vocabulary acquisition. The research findings firstly suggested that there are significant differences in the word association of both groups. So, both groups had some distinguishing patterns that segregated native speakers from foreign speakers. This research suggests that the semantic field and phonological aspects play a vital role in word learning.

Khan, S. and Anjum, M. A. I. (2023) stated that language learners base their L1 and L2 on the process of lexical acquisition and development of the mind with associative language. The principal objective of the study was to seek the restoration of words in the mental lexicon. They made an effort to create a relationship between the mental lexicon and the process of word association. The participants were a group of Afghan Urdu speakers and a group of Urdu speakers. The data sets after analysis indicated that L2 learners make more use of paradigmatic relations compared to L1 speakers. To conclude, the findings highlighted the significance of lexical association with the word association process. It also contributes to description of mental lexicon and L2 language learning and teaching pedagogies.

Murphy, R. et al. (2009) determined the use of word association. The study stated that McCarthy (1990) explored the relationship between the mental lexicon and word association, and also found the correlation between them and word association patterns. The research also suggests that the mental lexicon is tricky to explore because of its complex organizational patterns. It also explored that mental lexicon depends on the semantic field or word, its phonological patterns, as well as conceptual relations. The findings suggested that words are processed in the mind through links.

**The Meta–cognition and Other Aspects of Lexical Processing among L2 Learners**

For the acquisition of a second language (L2), memory, as well as perception and speed of processing, are essential in how learners store or accumulate and use words or “vocabulary acquisition” or lexical competence. Acquisition of Vocabulary is the Main Component of Lexical Competence, which captures the knowledge of words of the second language by a learner. For L2 learners, awareness of the cognitive factors involved in lexical processing contributes to the explanation of why particular approaches to Vocabulary Acquisition facilitate learning and why some pupils progress fluently or else encounter difficulties in their studies. Memory and Lexical Competence Memory is a fundamental cognitive activity related to language acquisition ability and directly involved in lexical function. At this level, particularly worthy of mention is work memory, which is responsible for short-term retention and manipulation of information, as we observed earlier in the case of vocabulary learning (Baddeley 2012).

Short-term memory plays a part in maintaining long-term vocabulary, as does working memory. However, in the current studies, it has been found that the semantic memory is more proximal to the lexical knowledge since it enables the L2 learners to form a coherent network

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over the words, which can be precisely searched and exhaustively used. Perception in segmentation is significant because it is a cognitive process that occurs in L2 lexical processing. Another cognitive process that affects lexical competence in L2 learners is perception. In language learning, perception is understood chiefly as the learner's capacity to distinguish and recognize sounds (phonemes) of the new language he or she is acquiring. Because phonemes in every language are distinct, L2 learners can quickly fail to differentiate the new phonemes, which may cause difficulty in vocabulary acquisition. For example, Japanese learn of English may have problems in distinguishing between the r and I because of the accented distinction between the two in Japanese (Flege et al., 1997).

Furthermore, studies in orthographic processing, which is the ability to identify letters and the patterns of letters, reveal that learners who have a more remarkable orthographic ability develop better lexical knowledge (Perfetti & Hart, 2002). The results have also shown that when L2 learners can identify the spelling structures of new words, they can also spell, read, and memorise better, and the speed of processing in L2 lexical development. Fluency is defined as the time it takes the learner to grasp, capture, and act on information. Concerning L2 learning, it is critical to recall that processing speed becomes essential for the process of lexical access, which represents the process of recognizing words stored in long-term memory during speaking and listening. This is because FF offers an enhancement in the number of responses to the information processing system; hence, the learner can understand and, in real time, respond to spoken language, a prerequisite in being able to converse (Segalowitz, 2010) fluently.

According to Hulstijn et al. (1996), by exposing L2 learners to familiar words, in this case, for repeated activities in different contexts, L2 learners can use the words more quickly and with a certain amount of precision. In conjunction with this, there is an enhancement in processing speed, which can be associated with the automatization of some of the word retrieval processes, in that it does not require much control. The higher the level of lexical knowledge and the more automatic the processing, the higher the learner's lexical proficiency and efficiency (Nation, 2013). Violative correspondence between Memory Perception and Processing speed. It is argued that memory, perception, and processing speed are interconnected with and rely on one another during L2 lexical processing.

**Theoretical Perspective**

**Vocabulary Acquisition Theory**

Vocabulary acquisition theory has been used as a theoretical framework to analyze the data qualitatively. Krashen states that the language acquisition process is closer to the process of how children learn their L1. Natural communication involves the conveying of a message as well as the comprehension of that message. The meaningful interaction during communication is one in which the message has been understood by the listener as well, and the listener responds to that message accordingly. It may not involve the pure grammatical expression.

Krashen believes that explicit teaching and error correction are not explicitly required during language acquisition. So, it is essential to note that the prime focus of communication is to learn the best and not to focus on the grammatical forms. Stephen Krashen believes that when a native English speaker interacts with a non-native speaker, he uses simple and understandable sentences. L1 of the speaker also helps the speaker to understand the context of communication (Krashen 1982).

## RESEARCH METHODOLOGY

**Sampling and Data Collection**

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In the present study, the data were collected from 500 undergraduate students in Pakistan. The selection criteria are based on the purposive sampling technique. The inclusion criteria of participants depend on the following conditions: they must be Pakistanis and L2 learners of English.

**Ethical consideration**

In the present study, I have set some principles to create a code of conduct for the smooth conduct of the whole process. This study treats a real-life scenario because it investigates the effective behavior of the mental lexicon of participants. All participants of the survey are participating voluntarily in the word association test. All the potential participants have reviewed an informed consent, which is based on the fact that all the information they provide is kept confidential. Any kind of psychological, social, physical, and legal harm is avoided to ensure the natural responses. The data has been analyzed appropriately, and the reactions are not manipulated to ensure credibility and academic integrity.

**Word Association Test**

The researcher has defined a standard for designing word association tests. The number of words that have been extracted from different word classes, i.e., nouns, verbs, adjectives, and adverbs. Although words show some kind of linkage with each other. So in this case, there is a probability that words can occur on the above-mentioned links. Almost 13 types of links have been discussed from a theoretical perspective. So, there are many chances that all of those links would appear in responses as well. So, the test contains 25 stimulus words from the English open class words category.

So, there is no clear-cut standard that has been chosen for selecting words. However, it has led to one problem, which is that the responses of the participants have become desired, or they are restricted from producing desired responses. For example, if the selection of words does not contain synonymy and antonymy, then the reactions of the participants lack such a lexical category. There is one advantage of introducing randomly selected word classes: the participants are more engaged in their culture and have given neutral responses as well. So, lexical and non-lexical relations are easily identified in reactions.

Each individual has administered the test individually. The test contents are based on selected categories of nouns, verbs, adjectives, and adverbs. The words are arranged in an orderly manner so that every participant is familiar with the word category. The test is a blend of familiar and less common words. The fundamental disadvantage of choosing less common words is that the participants struggle to answer those words. This might hurt the results of the study.

**3.4.2 Categorization in Terms of Lexical Category**

The responses of the participants have been categorized based on their form. In the present study, they have categorized paradigmatic and syntagmatic associations. The paradigmatic association is the one in which the response shows the same word class as the lexical category of the stimulus word. For example, the answer to the verb (to walk) in the verb (to run) shows a paradigmatic relationship. On the other hand, syntagmatic association is one in which the response does not belong to the same lexical category. For example, the reaction to the adjective (corrupt) in the noun (politician) represents a syntagmatic relation.

**Lexical Semantic Relations**

***Synonym, Antonyms, Hyponymy, Meronym***

**Non-Lexical Semantic Relation**

***Phonological Relation, Collocation, Metaphor, Metonymy, Connotation***

**Data Analysis**

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The present study utilizes a mixed-method approach. In which the qualitative analysis has been done through the lens of vocabulary acquisition theory by Stephen Krashen. Fitzpatrick classification theory has been used for quantitative analysis, and that classification has been done through the Word Association Test.

## Results and Discussion

### Fitzpatrick Classification Theory

Linguistic researchers have explained the Word Association Test in terms of the working of the mental lexicon in language development. This concept is associated with the syntagmatic and paradigmatic relationships, which are further explained by Fitzpatrick in 2007.

Linguistic research has traditionally made use of word association tests to gain some insight as to how the mental lexicon expands during language development. However, studies in L1 and L2 word association research using a particular typology – the 'syntagmatic-paradigmatic shift' (see paragraph 3.3 for a whole discussion of this terminology) - have, over the years, reported several inconsistent and contradictory results, most recently addressed by Fitzpatrick (2007). In light of this new evidence, and to further inform the given research questions, this study also attempts a brief contrastive analysis of the conventional classification methodology in the area of WA research and the more recently proposed model by Fitzpatrick (2007),

### Theory Associated with Data

In light of the above-mentioned data, the research questions of the present research study are explored using the Word Association Test. Then, the responses are divided into meaning-based, form-based, position-based, Erratic, and further associations.

**Meaning-based association**:

The following table describes the meaning-based associations as well as their further categories:

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| Category | Subcategory | Frequency Count | Example |
|---|---|---|---|
| **Meaning-based association** | **Synonym** | | |
| | Lexical set/context Related | 130 | Small-baby, small-seed, quickly -tiger, play -leisure, Play-game,coffee-beans, suddenly-fast, coffee-cold, coffe-caffine, city- Lahore, walnut-cake, fast- Ferrari, play-games, fast-quick, city- tour, colorful- flower, magazine-advertisements, think-tank, quickly-run, study-plan, brightly- moon, walnut- almond, play-football, study-higher, fat-calories, brightly, performed, Brightly-sun, Walnut-brown, small-village, Magazine-publication, magazine- fashion, Thin-improved, quickly-observe, walnut-almond, study- Newspaper, walnut-brownie, sing-song, station-section, play-back, walnut – delicious, etc. |
| | Conceptually related | 110 | Red-Rose, Red- tomatoes, quickly -blinking of the eye, colorful-cheerful, Station-hill, stay-home, train-run, newspaper-bulletin, study-note, newspaper-information, study- hard work, station-wait, reading habit, big-world, reading newspaper, magazine-directory, think -past events, colorful-colorless, fat -lady, magazine l-fashion, think- wisely, train-seat, train-light, read knowledge, stay -calm, station-bus, read- carefully, station-rush, play, energetic, magazine-entertainment, fat – potato, station people, colorful-rice, Coffee-Cappuccino, Fast-Train, Newspaper-Article, Eiffel-Tower, |
| **Position-based association** | **Collocation** | | |
| | Consecutive xy | 30 | Small-mistakes, Slowly-tortoise, play-boy, study–abroad, stay-away, newspaper -democracy, study-book, stay-here, coffee-maker, walnut-tea, magazine-celebrity, think–positive, stay-outside, Red-Rose, fat-cow, coffee- black, big-hand, etc |
| | Consecutive yx | 45 | Dawn- newspaper, Belly- Fat, carbohydrates- Fats, quickly-answer, Red-ring, play- ground, sudden -plan, fast-writing, etc. |
| | Other collocational association | 20 | Fat-gain, fit-fat, newspaper articles, thin-layer, stay-out, Colorful- my mind, colorful,- someone's life, newspaper-dawn, Magazine-Akhbar-e - |

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| | | | |
|---|---|---|---|
| | | | jahan, play – games, colorful clothes, Red- suite, Red- lipstick, colorful life, etc. |
| **Form-based association** | Change of affix | 10 | Sing-singer, think-overthinking, play-player, |
| **Others** | Erratic association | 17 | Study-headache, Think – nothing, Read- social media, yesterday-boring, walnut- favorite, colorful-nails, study -room, magazine- not interested, quickly- sleep, colorful lotus. |

Table 1: Meaning Based Associations of Word Association Test Responses

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**Defining synonym**:

Synonyms are those words that convey a similar meaning. In Word Test Association, the frequency of synonyms is 80%. The following are examples of the synonyms that are the collective responses of the participants.

The trigger word *Train* led to the response of Transport. Almost 11% of the L2 users responded with the same word, which was the same response. The trigger word *Big* led to the response of Large. This response was given by 4% of the respondents. While the trigger words Fat and Thin led to the responses of Thick and Smart. Almost 6% of the participants have given a response to these words synonymously. Likewise, the trigger word *quickly* elicited three responses, i.e., fast, rapid, and immediate. The respondents provide this type of response about 7%. As for the participants, the trigger word was an adverb.

The trigger word *station* responded with the response word stop, as most of the participants consider this closed-class word as a noun, and then responded to it as a noun. Almost 6% of the participants responded to it accordingly. The trigger word *yesterday* responded as the past. About 8% of the participants responded with this word and considered it a noun, which denotes the past event. The trigger word *think* is reacted to as brainstorming. About 3% of the respondents have given this response. The trigger word *"brightly" elicits a response like "shine"*. About 15% of the participants responded to this word and considered it an adverb. The trigger word *colorful* led to the response word " rainbow. About 20% of the people responded to this word.

**Specific synonym**:

Specific synonyms are those words that give a similar meaning in a specific context. The respondents have shown a particular response of 75%. The trigger word *small* has carried out the response words, i.e., baby and seed. About 10% of the participants have responded to it accordingly. Just like this, the trigger word play responded as leisure and a game. The respondents consider this word to be a verb. About 8% of the participants have responded to it with this word.

The trigger word *coffee* is responded to as cold, caffeine, and beans. 15% of the participants have responded to it with this word. The trigger word *walnut* has elicited different responses. About 12% of the respondents have given responses like cake, almond, and dry fruit. The trigger word *study* led to various responses, such as plan, higher. 15% of the L2 users responded with these words. The trigger word *fast* also elicits multiple responses. About 10% of the participants have responded to this word like Ferrari, and quickly.

**Lexical set/context related**:

It indicates the same lexical sets that convey the same meaning to a certain extent. About 130 respondents have given the lexical set and context-related response.

The trigger word *magazine* has been responded to as a publication and fashion. This particular response has been shown by 10% of the respondents. The trigger word *walnut* elicited two more responses, i.e., brownie and delicious. Almost 15% of the respondents gave this response. The trigger word *sing* brings up the reaction of song. 30% of the participants responded with a trigger word like this. The trigger word *study and play* have elicited reactions from the newspaper and back, respectively. Their response percentages were 10% and 15% respectively.

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1. **Conceptually related**:

The category is defined as when two words have a conceptual link to each other. Almost 110 respondents have responded in conceptually related categories.

The trigger word *Red* has carried out the response word Rose, tomato, which means they are conceptually related to each other. Most of the respondents have related its meaning to the colour of the objects. This response has been given by 20% of the people. The trigger word *"quick" comes with the blinking of the eye, as this concept is not directly* relevant to the trigger word. There are 10% responses to this word. The trigger word *colorful* has been associated with the response word cheerful. Almost 5% of the participants responded to this word. The word *station* has led to the response word wait as the station is just a place where people wait for the train or bus. That is why 10% of the people have responded with this trigger word. The trigger word *newspaper* has carried out the response word information. 5% of the respondents have interpreted the word with the hub information. The trigger word *study* revealed that 4% of the participants responded with hard work. They reacted to the study with hard work.

The trigger word *reading* has been associated with reasons like habit and knowledge. This response has been carried out by 10% of the participants. The trigger word *magazine* has responded with entertainment. This response has been shown by 5% of the respondents. Just like this, the trigger word *play* has made the word sound energetic. Seven responses are with this word. The trigger word *fat* has responded with potato. There are 13 responses to this.

2. **Position-based association**:

This type of association consists of consecutive collocation in which one word follows the other. It also includes a different kind of association that is based on the trigger word followed by a response word. There are some other types of collocations, too, in which the response word does not directly follow the trigger word. The following are the types of position-based associations.

**Consecutive xy collocation**:

Consecutive collocations are those in which one word follows directly after the other. The frequency of these collocations is 30 in the word association test.

The trigger word *small* has been carried out with the response word mistakes. Five respondents have led it. The trigger word *play* is collocated with the boy. This response has been recorded 4 times. The trigger word *newspaper* carried out the response word democracy. Three responses showed collocation of these two words. The trigger word *study* has come up with the word book. This type of collocation is tested in 10 responses. The trigger word *stay* is collocated with here. There are eight responses to it. Moreover, the trigger word *coffee* has been introduced by the maker. Seven respondents gave this response. The trigger word *walnut* is collocated with tea. The frequency of this response is 30. The trigger word *think* is collocated with positive. Its frequency is 50. The trigger word coffee is collocated with black. The frequency of this response in the word association test is 45 times. Just like this, the trigger word *fat* is collocated with the response word cow. The frequency of this word is shown as 20.

**Consecutive yx collocation**:

The consecutive collocations are those in which the trigger word follows the response word directly. For example, the word weight collocates with the word paper. The frequency of these collocations is 45.

The examples of consecutive collocation have also been extracted from the word association test. The trigger word *Dawn* is carried out in the consecutive collocation with the word newspaper. The frequency of this occurrence is 50 times. The trigger word *Belly* has

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come with the word fat. The frequency of this word is 20. The trigger word *quickly* had collocated with the answer. There are 25 responses to it. The trigger word *"sudden" has come up with the word "plan"*. Its frequency is 30 times. The trigger word *play* is collocated with ground. Its frequency is 35 times. The trigger word *fit* comes up with the response word fat. This consecutive collocation has come up 50 times.

**Other collocational association**:

These associations are those in which the response word is collocated with the trigger word in a phrase, not directly. For example, the word bird collocates with the worm in a phrase like birds get the worm. There are such kinds of responses in the word association test as well. Their frequency is 20.

The trigger word colorful has been associated with my mind and someone's life. The frequency of this response is 13. Which means that both of these collocations come up with phrases like ' colorful thoughts of mind'. Just like this, the word *magazine* is collocated with Akhbar-e-Jahan. Which shows the frequency of it 5 times. On the other hand, the word "Red" comes with lipstick as a response word. Again, this word only belongs to the phrase and does not directly collocate with the trigger word. It can come in a phrase like z Colorful- my mind, colorful,- someone's life, newspaper-dawn, Magazine-Akhbar-e Play – games, colorful-clothes, Red- suite, Red- lipstick, colorful-life

**4. Form-based association**:

**Change of affix**:

An affix can be changed by adding a prefix or a suffix to the word. It also affects the form of the word. For example, the word " scared can be scary. Such kinds of collocations are found in the responses of the word association test. Their frequency is 10. The examples of the change of affixes have been analysed below:

The trigger word *"sing" yields the response "singer"*. There are 30 responses to it. The trigger word *sing* is collocated with singer. The frequency of this response is 40. The trigger word *think* is responded to as overthinking. The respondents have added the prefix over. The frequency of this response is 25 times. Then the trigger word *play* is carried out by the response word player. The respondents have changed the word class of the words, changing them from verbs to nouns. The frequency of this word is 20 times.

**Similar form only**:

The similar forms are defined as when the sound of the response word looks identical to the trigger word, but they convey different meanings. For example, words such as *very* and *berry*. There are no examples of similar forms in the word association test

**5. Others**:

**Erratic association**:

These are the associations in which the trigger word does not show any kind of association; instead, it shows obscurity. The frequency of Erratic association is 17.

In the word association test, the trigger word "read" has been associated with the response word "social media". It has a frequency of 15. The trigger word *colorful* has come up with the response word nails. Although they don't have any kind of connection between them, the frequency is 4 times greater. The trigger word *yesterday* elicited the response word boring. This is an erratic organization because it is obsolete. The trigger word *magazine* is collocated with not interested. The frequency of this word is 4 times.

**Blank**: no response given.

These categories help categorize and analyze the relationships between words in word association tests, providing insights into how words are stored and connected in the mental lexicon. The students answered all of the trigger words. Nothing remained blank.

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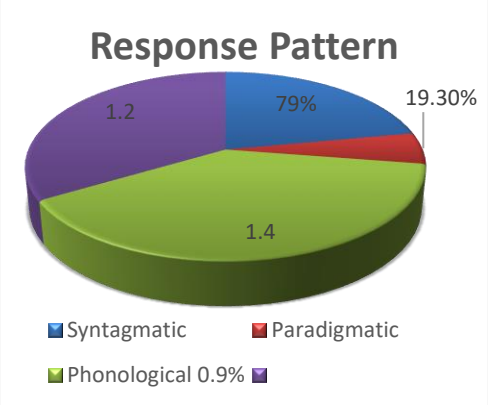
**Results Summary**

Thus, the results indicate the total number of responses, which are further categorized into meaning-based, position-based, form-based, and erratic responses.

| Classification WA responses | Total Responses | Meaning Based Association | Position Based Association | % of Total Meaning-Based responses | %Age of Position-Based Responses | % age of total responses |
|---|---|---|---|---|---|---|
| Meaning Based | 103 | 39 | 64 | 37 | 60 | 76 |
| Form Based | 56 | 19 | 37 | 19 | 45 | 45 |
| Position Based | 77 | 32 | 45 | 33.5 | 67 | 36 |
| Erratic Responses | 5 | 3 | 2 | 70 | 30 | 10 |

In this research study, the formative assessment was conducted using the Word Association Test. This technique is used to evaluate the word associations of the L2 learners in a modern education system. The students were presented with different trigger words that belonged to other word classes. The analysis has been done based on their collocations. The participants were given instructions before responding to the Word Association test. The results indicate their cognitive approach towards words. It has also been shown through the results that they had shown an impact of their L1 as well while answering the test questions. In addition, the total number of words has been collected after their responses. There were 2150 words in response to the trigger words, which were 25 in number and belonged to different open word classes.

In the present study, it has been explored that the mental lexicon is a highly complex and highly arranged part of the human mind. Although this is the storage bank of humans, the knowledge of the human being is still limited due to some of the constraints at the individual or societal level. The researcher has straightforwardly conducted the word association test. The results provide information about the mental lexicon of the students. There are almost 79% syntagmatic, 18.3% paradigmatic, and 0.9% phonologically-based vocabulary that the students have identified.




There is so much research that has been done on the topic of word association. Just like this study, many of the non-native speakers respond primarily in a syntagmatic way (Carter, 1998; Coulthard et al., 2000; Deese, 1965; Meara, 1982). As McCarthy (1990) has summarized, word association response is mainly related to coordination. Such coordination is followed by

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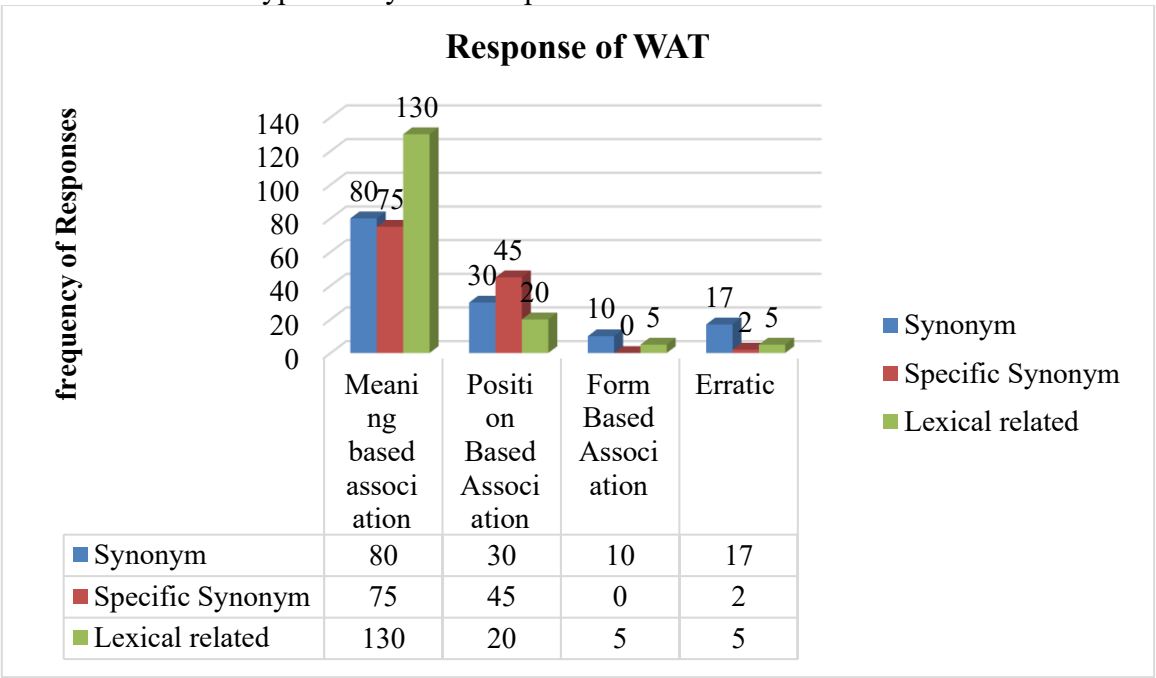
collocation, synonymy, and superordination. It is shown through the responses that collocation has occurred in three types. Only a few responses were not collocated.




| | Meaning based association | Position Based Association | Form Based Association | Erratic |
|---|---|---|---|---|
| Synonym | 80 | 30 | 10 | 17 |
| Specific Synonym | 75 | 45 | 0 | 2 |
| Lexical related | 130 | 20 | 5 | 5 |

The results of the Word Association test indicated the significance of the Word Association Test. It also analyzed the key concepts of the participants during the implementation phase through their responses. The relevance of the key concepts of the respondents was also explored through keen observation. It has been concluded after the analysis that the words of the respondents show diversity in accordance with their collocations.

The same results have been expressed in the study of Freeman and Lestik (1988). According to them, the students lose interest in the subject when the teacher follows the traditional method. Sometimes, the students face many difficulties during the learning process of L2. It becomes compulsory for them to get an appropriate education for meaningful understanding (Ruzgar, 2014). Several studies have indicated a similar result to the present study. These studies have also noted the cognitive and comprehensive skills of the participants (Deveci et al., 2014; Karaca, 2018; Doğan et al., 2018; Ekici & Kurt, 2014).

There are some other studies whose results have indicated the misconceptions of the respondents in response to the Word Association Test. These studies have been conducted to analyze the misconceptions of the L2 learners and to eliminate their misunderstanding about word choices and their relevance (Aydemir, 2014; Işıklı et al., 2011; Keskin & Örgün, 2015; Ercan et al., 2010; Kaya & Flow, 2015). The recent study has evaluated that the Word Association test is a practical approach to determine the knowledge and misconceptions of the students about the choice of words and their implementation. It is a significant tool for formative assessment. Although the Word Association test is an essential tool to assess participants' cognitive abilities, it reveals why students choose misconceptions regarding words. Word Association neglects the factor of the misconceptions of the responses. According to researchers, the irrelevant word responses should be included in the unrelated word category because the teacher lacks insight into the students' experiences.

**Word numbers according to the key concepts of the Word Association Test**

| Trigger Words | Number of Response words | Number of Related Words | Number of Unrelated words |
|---|---|---|---|

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| | | | |
|---|---|---|---|
| Coffee | 203 | 35 | 68 |
| Walnut | 209 | 132 | 77 |
| Station | 218 | 148 | 70 |
| City | 251 | 162 | 89 |
| Train | 247 | 154 | 93 |
| Newspaper | 187 | 118 | 69 |
| Magazine | 239 | 155 | 84 |
| Big | 221 | 142 | 79 |
| Fat | 218 | 166 | 52 |
| Thin | 200 | 151 | 49 |
| Colorful | 2193 | 1473 | 720 |

This table indicates the frequencies of the responses that have been generated through the trigger words. It has described the frequency of the related and unrelated responses.

According to Karaca (2018), students have different perceptions regarding different professions. But misconceptions of the students arise regarding a profession when they tackle different words that have an occupational characteristic in them. In a recent study, students have shown their cognitive skills as well as misconceptions regarding words. So, it can be inferred that the Word Association Test also indicates the background knowledge of the students. Bahar and Özaltı (2003) stated that the students' prior knowledge is revealed through their choice of words. That is why the Word Association test plays a significant role in the cognitive skills of the students. Words belong to a broader perspective, and they provide different meanings in different contexts.

Polat (2013) has also expressed that the Word Association test is an impressive tool to diagnose and identify the word choices of the L2 learners. Bahar and Özatlı (2003), Ercan et al. (2010), and Kaya and Taşdere (2016) have also observed different participants' word choices as well as their education process. Those participants have also implemented their background knowledge while responding to that test. This study has also revealed that students come from various educational backgrounds when they start learning English as a second language. This study has also shown that the Word Association Test is a formative assessment.

**Conclusion**

In a nutshell, the study has revealed the hidden patterns of the lexical development of second language acquisition. The overall results indicated that the response words have been categorized into different categories based on their collocations. But the responses are still insufficient because they do not reveal the personal experiences of the participants while choosing a word class or a word pattern. But this formative assessment has shown that background knowledge has an immense impact on the nature of students ' answers. It also shows that there are some mental complexities while uttering a mental lexicon.

The basic purpose of this research study was to explore how the lexical development process occurs in second language learners. And the results of the survey match the McCarthy point of view that the mental lexicon of the L2 learners is highly sequenced, and sometimes it may deviate due to grey areas in their thought processes. That is why the erratic responses are generated. Wolter (2001) stated that there are some words that L2 learners use less frequently. But again, the development of the mental lexicon of any respondent varies person to person,

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which is how much a person perceives the trigger word and then responds to it accordingly. Thus, the lexical development is based on the storage capacity of a person. The overall results of the research study have shown that most of the responses are linked with word classes and the level of correspondence of the participants. It is highly commendable and a long process to understand the complexity of the mental lexicon.

**Delimitation of the Study**

This study is limited to the L2 learners who are studying in the universities of Lahore, Punjab. The upcoming researchers can explore the different regions of a similar province, as well as move to other provinces.

**Contribution of the Study**

This study contributes to the field of language learning and language acquisition. This study is equally beneficial for the researchers, teachers, and students. It provides the tools through which language can be learnt through techniques and background knowledge. It is a superficial utilization of the mentioned classification system that is directly linked with the validity of the robust methodology.

**Implication of the Study**

This study implies gateways to other researchers so that they can apply any other theory to check the results of the Word Association Test. They can also explore Krashen's theory and then apply it to the language learning process.

**Note:** This manuscript has been taken from Uzma Afghan's MPhil Thesis Dissertation Titled *"Depth of Word Knowledge in the Development of Mental Lexicon: Exploring Word Association Responses of Pakistani L2 Undergraduate Learners in Lahore"* to fulfil the degree requirements

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