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A psycholinguistic Study of the Cognitive Processes for the Undergraduate Students

A Thesis

Submitted to the Council of the College of Education for Human Sciences, Wasit University, in Partial Fulfilment of the Requirements for the M.A. Degree in English Language and Linguistics

By

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Examining Committees' Certification

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Dedication

To all Those Who Gave Me All the Love and Support During This Difficult Trip.

With My Sincere Love and Gratitude

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Table of Abbreviations

Symbol	Meaning
DL	Difficulty Level
DP	Discrimination Power
EFL	English Foreign Language
ESL	English as a Second Language
FL	Foreign Language
IA	Interactive Activation Model
JDM	Judgment and Decision Making
L1	Native Language
LINCS	Literacy Information and Communication System
MCQ	Multiple Choice Questions
SD	Standard Deviation
SDRT	Standard Diagnostic Reading Test

Abstract

Cognition encompasses fundamental mental functions such as sensation, attention, perception, and so on. As well as, memory, learning, language usage, problem-solving, decision-making, reasoning, and intellect are similarly complicated brain processes. Cognitive processes are techniques for incorporating new knowledge and making judgments based on a previous knowledge. These cognitive processes can occur spontaneously or intentionally, consciously or subconsciously, but they usually occur quickly. These cognitive processes operate continuously and without the students' awareness. Furthermore, understanding and identifying words and sentences necessitates that the fundamental cognitive processes of comprehension, decoding, and fluency do not need to be actively thought about it since they are automatic. Sometimes, students who have to consciously decode words and sentences are easily sidetracked and unable to focus on the meaning of what they read. This study aims to find out the undergraduate students' levels of the cognitive processes in recognizing words and sentences through constructing a test that consist of ten questions each of which assess a different cognitive process, also assessing to what extent they can use these processes. The current approach used for this study is a quantitative test research design that is used to analyze the data obtained. The sample consists of (100) fourth-year students from the department of English, College of Education for Human Sciences, University of Wasit. This study concludes that students have some ability to recognize most of the cognitive awareness components in recognizing words and sentences. Based on the findings, several suggestions and recommendations have been made for the University instructors and students to consider enhancing their cognitive processes levels and reading skills.

Chapter One
Introduction

1.1 Statement of the Problem

Understanding and recognizing words and sentences require that the basic processes of decoding and comprehending which become automatic so, that they do not have to be thought about consciously. Readers who must decode words and sentences consciously are distracted by many processes and are thus unable to concentrate on the meaning of what they are reading (Farrell; Hunter; Davidson & Osenga, 2019).

The fact that cognitive skills are not explicitly and academically taught does not mean that they cannot be taught. For over half a century, techniques to develop basic cognitive skills have been known and used in various clinical therapies but have not been practical to deliver in the classroom. Today, digital game-based learning is making the delivery of cognitive training programs viable in a classroom setting. Therefore, the undergraduate students concern the present study deals with an important area of psycholinguistics since it with uncovering the words and the sentences recognition. It is necessary to have cognitive processes. Psycholinguists, all over the world, have found that learners operate different cognitive processes to comprehend and reading a text in which these processes are in need to be identified (Gomez; Sole; Miralles & Sanchez, 2020).

The cognitive processes that support decoding, such as attention, visual discrimination, visual sequential processing, immediate memory and working memory, must be automatic for successful reading of fully understanding the words and the sentences of a written text. Many

struggling readers are deficient in these skills. Despite the necessity of these skills, they are not taught in universities. In fact, the primary challenge in improving words and sentences recognition is to close the gap between what the research tells us is needed for struggling readers and what is actually provided in our universities (Farrell et al, 2019).

1.2 Aims of the Study

The study tries to find out the following:

1- Finding out the undergraduate students' use of the cognitive processes in recognizing words and sentences.
2- Clarifying the role of psycholinguistics and how it affects word and sentence recognition concerning cognitive processes.
3- Illustrating the most used cognitive processes in recognizing words and sentences.
4- Discussing the difference between recognition and production of words and sentences concerning the cognitive processes.

1.3 Research Questions

The following questions are designed to fulfil the study's objectives:

1- What are the cognitive processes used by undergraduate students in recognizing words and sentences?
2- How do psycholinguistic roles affect word and sentence recognition concerning cognitive processes?
3- What are the most dominant and less dominant cognitive processes used by undergraduate students?

4- What are the differences between recognition and production of words and sentences by manipulating the cognitive processes?

1.4 Limits of the Study

The present study is limited to:

1- Cognitive processes in reading skills.
2- Words & sentence recognition and production.
3- Undergraduate students, fourth-year students, Department of English, at University of Wasit. During the academic year 2021-2022.

1.5 The Significance of the Study

The present study is significant to:

1- Psycholinguists to uncover and find out what are the cognitive processes used by the undergraduate students.
2- Language instructors to recognize and explore the processes used by their students in recognizing words and sentences.

1.6 Definitions of the Basic Terms

Certain practical concepts are introduced to the basic notions that exist in the research in the current section:

- Cognitive processes can be defined as a processes of information transfer that typically take place to connect multiple informational inputs (VandenBoss, 2013).

- Cognitive awareness can be described, as the individual's understanding of his/her own mental processes, ideas, and fundamental learning abilities (Huitt, 1997).
- Cognition, according to Merriam-Webster, can be defined as the act or process of knowing including both awareness and judgment (Webster, 1999).
- Production is the process of communicating through language (Dell; Burger; Suec &William, 1997).
- Recognition is the brain's ability to identify previously observed stimuli such as events, locations, people, things, and so on (Gough& Tunmer, 1986).

Chapter Two

Literature Review and Previous Studies

2.0 Introductory Notes

This chapter is dedicated to exploring different major important issues. The first issue deals with psycholinguistics as a major field of linguistics and then moved to explain the words and sentences recognition. Then, there is the matter of what cognitive processes are. In addition, there is an attempt to define the concept of cognitive processes and its significance, and its types and classification are being discussed too. These classifications are separated into two groups, each of which conveyed a distinct area of cognition. This chapter concludes with explanations for some of the previous studies that concerned with cognitive processes.

2.1 Psycholinguistics

In the nineteenth century, Wilhelm Maximilian Wundt, a German physician, physiologist, philosopher, and professor developed psychology from biology and philosophy and coined the term psychologist. This scientific term was coined in 1936 by Jaco Robert Kantor in his book "An Objective Psychology of Grammar" and was first used among his colleagues at Indiana University, but it was popularized thanks to his student Nicholas Henry Pronko's 1964 article "Language and Psycholinguistics: A Review." It was initially used psycholinguistics as a valid term. (Balamurugan& Thirunavukkarau, 2018).

Psycholinguistics is a field that integrates psychology and linguistics. Linguistics studies language, whereas psychology studies the mind and behaviour. Thus, it could be described as the general study of the brain and language. It examines the neural mechanisms involved in producing and understanding language and it is interested in how language interacts with the human mind (Purba, 2018).

This branch of language science decodes how the human brain acquires, processes, comprehends, and gives feedback on or develops a specific language. Psycholinguistics is a field that spans many disciplines. As a result, it is committed from various perspectives, including psychology, cognitive science, linguistics, and speech and language pathology. Subdivisions include orthography, syntax, semantics, phonology and so on. Psycholinguistics emphasized on language comprehension, production, and acquisition (Jodai, 2011).

This field currently interested in language functioning neurology, particularly scientists who researching sex differences, aphasia, and language after related or acquired injury to the undeveloped brain, and developmental disorders of language (dysphasia). Some psycholinguists have expanded their research to include nonhuman language learning trails (e.g., gorillas and chimps) to determine whether language is a human-only phenomenon. It appears to have its roots in studies of the link between language users' behaviour and cognitive characteristics (Nordquist, 2019).

Psycholinguistics discussed the progressive production and understanding of language, a child's acquisition of language, and the effects of brain damage on language abilities, this is according to H. Cowles (2011). Psycholinguistics, according to Taylor (1990), is

concerned with learning language and using it to communicate ideas in real-time, rather than in an ideal scenario.

Psycholinguists in this field is concerned with the processes of comprehension, production, and expression. For them listening, speaking, remembering, and learning are all mental processes that are crucial to being controlled by the students in order to enhance their mental abilities. While linguists look at how complicated words and sentences are formed in speech and how listening and reading break them down into their basic parts (Clark & Clark, 1977).

Concisely, psycholinguistics studies how people communicate. Many of the ideas used in the analysis of sound structure, word structure, and sentence structure also have a role in language processing; this is according to some psycholinguist studies. However, understanding how these linguistic concepts interact with other parts of human thinking to enable language production and comprehension is also required for a comprehensive account of language processing (Psycholinguistics in Applied Linguistics, 2000).

If psycholinguistic principles were made plain enough, they may be applied to twentieth-century technical conceptions. The basic objective of psycholinguistics, according to George Miller, is to characterize the psychological processes that occur when humans utilize sentences (Field, 2006).

Psychologists investigate the cognitive processes that underpin the use, storage, and acquisition of the language in particular. Affective and environmental factors are only concern when they affect performance. Even though psycholinguists realize that language users are humans with diverse linguistic repertoires, their primary purpose is to uncover common patterns of behaviour among them. Those patterns could be a

reflection of the human brain’s capacities and prejudices, or the language processing requirements (Aitchison, 2003).

To conclude, psycholinguistics is understood in language instruction as language psychology studies. It advances the study of any psychological components that might be involved in language acquisition. The practical application of language and communication is its main focus. Making a decision about how to implement different techniques to facilitate students' easier language acquisition is crucial (Purba, 2018).

2.2 Words and Sentences Recognition

In psychology, recognition is a type of remembering characterized by a sense of familiarity when something previously encountered is preformed again; in such instances, a right response can be detected when a stimulus is offered but may not be reproduced in the absence of such a stimulus. A frequent example is recognizing a familiar face without being able to recollect the person's name. Recognition appears to imply selective memory of and forgetting of certain aspects of experience. Since the late 1800s, experimental psychologists have employed controlled recognition tests to gain insight into the mechanisms of human memory compare and contrast recall (Spencer, 1997).

Word recognition, in the words of Literacy Information and Communication System, is reader's ability to correctly and almost effortlessly recognize printed words. It is also known as **isolated word recognition** because it takes into account a reader's ability to recognize words on their own from a list, without the need for contextually relevant terms. Practicing using flashcards, lists, and word grids, this is according

to the article, which claims that Rapid and easy Word Recognition is the key component of fluent reading may improve these skills.

Word recognition is a reading strategy that depends on an instantaneous understanding of what a word or well-known string of letters mean. This process exists as an alternative to reading and phonetics for recognizing and verbalizing visual language (Karidenier, 2002). Automaticity is crucial for word recognition. While blending letters, sounds, graphemes, and morphemes together are cognitive applications of learned grammatical principles.

Word recognition is measured in terms of reading speed, with highly recognized words being read more quickly than novel words (Larsen, 2004). This type of testing implies that understanding the meaning of the words being read is not required, only the ability to recognize them in a way that allows for accurate pronunciation. Because of this, context is meaningless, and word recognition is frequently tested using words that are presented alone in formats like flashcards (Karidenier, 2002). However, fluency and ease of word recognition allow for competence that fosters an understanding of the reading material (Luckner& Urbach, 2012).

Because of the domination of reading in human culture, the inherent usefulness of word recognition. Its role in learning a second language, developing reading skills, and learning to read aloud may be less obvious. More dependable and effective strategies for teaching first-language reading to children and adults may be developed as word recognition is better understood. Learners of second languages may also benefit from this information by picking up new words and letter combinations (Everson, 2011). Additionally, a deeper knowledge of the underlying mechanisms related to word recognition may pave the way for

more specialized reading therapy for those who have trouble reading among the learners.

2.2.1 Theories of words recognition

Several hypotheses have been proposed to explain how words can be recognized individually and still be quickly and precisely recognized (Larson, 2004). Initially, these theories proposed a system that recognized words as whole units (such as the word form), but as time went on, the theories grew more concerned with the significance of individual letters and letter-shape identification (ex. Serial letter recognition and parallel letter recognition).

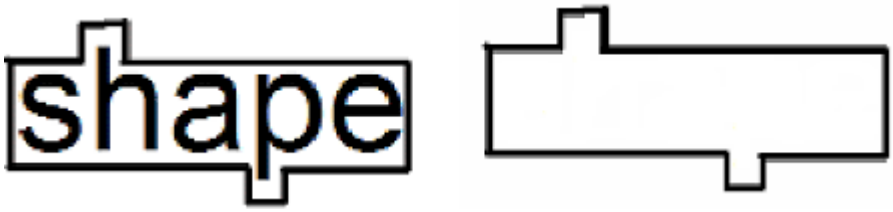
2.2.1.1 Word Shape Theory

The word shape, named after the Dutch psychologist Herman Bouma, refers to a word's general contour or form (Ranum, 1998). Herman Bouma emphasized the function of "global word form" in his (1973) word recognition experiment (Bouma& Bouwhuis, 1979). Theories of word form became popular in word recognition, implying that humans recognize words based on the relative shape of the letters in a group (Larson, 2004). People get accustomed to lines from earlier exposure, and subsequently, recognize them the next time the same word or shape is presented to them.

Word shape theory is supported by the slower rate at which people read texts printed fully in either all capital letters or ultimately capital and lowercase letters (Larson, 2004). It was claimed that a unique word shape form generated by shifting lower-case characters to capitals impairs recollection. This notion was further confirmed by James Cattell's

research, which provides evidence for a named effect "Word Superiority."

Figure 1: Model of Word Shape



This had more to do with people's improved ability to identify which letters were revealed to them if they appeared briefly within a word rather than a random assortment of letters. Additionally, groups of studies have demonstrated that misspelt words with comparable word shapes are less likely to be recognized than misspelt words with a different word form (Larson, 2004).

Many of the explanations for these effects have been contested, despite the fact that they have been repeatedly reproduced. According to some scientists, practice effects are to blame for the reduced reading of capital words. Reading uppercase words becomes quicker with practice, so there is no longer a need for the word. According to McClelland and Johnson, the impact of word superiority may also be due to familiarity with phonetic combinations of letters rather than the contour of the word (McClelland& Johnston, 1977).

2.2.1.2 Parallel Processing vs. Serial Processing Theory

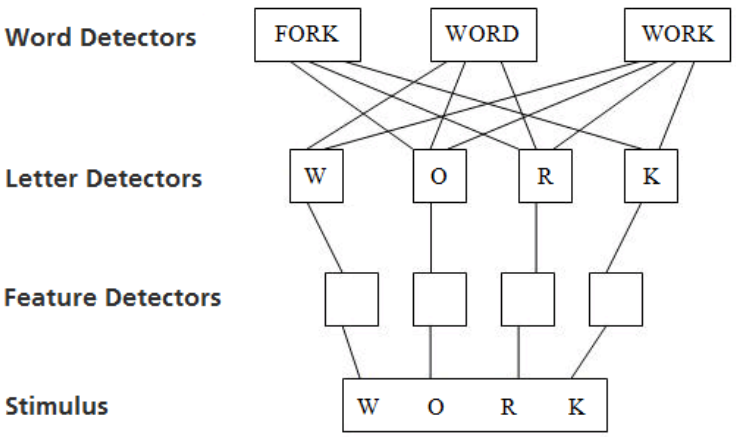
The model of Parallel Letter Recognition currently has the highest agreement on word recognition models (Larsen, 2004). All letters in a group are viewed in the same time in this approach, and word recognition is carried out using this information. The serial recognition paradigm, on

the other hand, supported letters to be identified separately before being combined to form words. Some linguists, however, rejected this model, because it does not account for the Word Superiority Effect, which asserts that readers can recognize letters more rapidly and accurately in the context of a word rather than in isolation. The serial recognition model predicts that single letters are recognized faster and more precisely than groups of letters, such as a word. Indeed, according to this paradigm, letters given in a word would hamper individual letter identification since each letter is addressed one at a time orderly.

2.2.1.3 Neural Networks of Word Recognition Theory

A recent study on neuron function has informed more current methods of word recognition (Larson, 2004). Word-recognizing receptors are thought to be activated by visual elements such as the horizontal and vertical lines or curves of a word. From those preceptors, neural signals are sent to either activate or suppress associations with other words in a person's memory.

Figure 2: Model of Neural Networks of Word Recognition



Excitatory signals are delivered to words with characters that match the visual representation of the word being observed. As the mind examines the word's appearance, further, inhibitory signals diminish the activation of words in one's memory having a dissimilar look. The correct word is finally activated in the neural network for word recognition because of the neuronal strengthening of connections to important letters and words and the concurrent weakening of links with irrelevant ones (Larson, 2004).

2.2.2 Recognition and Context Effects

The fundamental principle in perception that the more likely a stimulus is to occur, the less sensory information is required for its correct recognition has been confirmed by a number of studies over the last 60 years (Howes, 1954). The so-called cloze operation (Taylor 1953), which estimates a word's transitional probability in a sentence context by the percentage of respondents who choose that word when asked to complete a sentence with what they think would be the most likely final word (e.g., He mailed a letter without a ___), has been used frequently to illustrate this principle for linguistic material.

The amount of clarity of the stimulus required for its recognition has been shown to be inversely proportional to the logarithm of its probability in that linguistic context, whether measured by the minimum exposure duration required to recognize a written word or the minimum signal-to-noise ratio required to recognize a spoken word (Tulving & Gold 1963; Morton 1964). This general principle applies for the older and younger adults, for both written (Madden 1988) and spoken words (Wingfield; Aberdeen& Stine,1991; Perry & Wingfield 1994), as well as to older adults with impaired hearing (Pichora-Fuller; Schneider&

Daneman, 1995; Dubno; Ahlstorm& Horwitz, 2000; Grant & Seitz 2000). The SPIN test and other speech-in-noise tests related to it are also used in the audiometric evaluation, where intelligibility is measured for words presented in background noise with or without a restricting linguistic context (Kalikow; Stevens& Elliott, 1977; Wilson; McArdle & Smith, 2007).

In the past, university students were used as a convenient population for the initial studies of the facilitating effects of a linguistic context on word recognition. This tradition has been largely maintained in cognitive ageing research, with university freshmen serving as the young adults in comparison to an older adult cohort that is matched for education and verbal aptitude (Park & Schwarz, 2000; Craik & Salthouse, 2007). However, many studies on ageing, hearing acuity, and speech recognition only report age and hearing acuity and no other demographic data.

Pichora-Fuller and Souza (2003), who noted that the majority of studies on speech perception in older adults have relied on well-educated, self-selected volunteers, specifically noted this neglect of factors other than age and hearing acuity. It is very clear that to what extent these studies fairly represent the general population of older, or it might add younger adults as well, but as they point out, this is a good strategy for removing confounding variables like linguistic ability and educational achievement (Pichora-Fuller & Souza, 2003).

Mitchell and Green (1978) discovered no contextual effects on words in the middle of sentences. The sources for the materials were published short tales and novels. Alford tested for contextual effects on the fifth word of sentences taken from books and newspapers using a pronunciation task. Although the use of only the previous clause, a four-

word context could have distorted Alford's study toward finding a smaller effect than usual, he observed a context effect of only 19 msec, much smaller than that observed in previous studies that used predictable terminal nouns as targets (although the use of only a four-word context without the previous sentence may have biased Alford's study toward obtaining a smaller effect than usual).

Predicting incoming words in phrases appears to be a reasonably easy, natural, and highly accurate activity in the works of top-down theorists. Several empirical research (Miller& Coleman, 1967, Perfetti, Goldman& Hogaboam, 1979; Rubenstein & A. Born, 1958) have all shown that impending words in the text are not very predicted. One important fact emerges from a range of subject groups, texts, sentence placements, and other relevant characteristics. A reader's accuracy in predicting the next word in the passage is between 20% and 35% when given prior context. The reader's guess is usually erroneous three out of four times.

Alford (1980) discovered that a little more than four guesses were required before the average word was correctly guessed. As a result, there appears to become evident that the predictability levels of the stimuli employed in sentence context tests differ from those seen in natural text. Because of the oversampling of predictable sentence-female nouns, the results of experiments in the literature should probably not be taken as parameter estimates of the amount of the context effects occurring in actual situations.

2.2.3 Visual Word Recognition

Skilled reading is a tremendously complicated and varied action that relies on individual word recognition. The slightly curved marks on

the page must lead into the representation of the word, which in turn lead into the meaning of that word. Individual word recognition is a key component of skilled reading, which is a tremendously complex and varied activity. To access the meaning of the word, the squiggly marks on the page must map into a word representation. On the surface, this seems to be a straightforward pattern recognition technique. Orthography, phonology, morphology, and ultimately meaning are just a few of the information domains that words can encode and transmit (Yap& Balota, 2009).

Even though there are a variety of writing systems, the alphabetic writing systems studies, in which the phoneme is the unit of language expressed by the process of writing, have dominated reading research (Treiman & Kessler, 2007). Letter recognition was crucial to early models of visual word processing since letters are the building blocks of words in alphabetic writing systems. If their constituent letters can identify printed words, it is only natural to investigate if letters can be identified by their constituent properties.

The feature analytic approach is an essential strategy in this area. According to this viewpoint, a group of visual characteristics (e.g., junctions, vertical lines, horizontal lines, closed open forms, curved closed forms, and diagonal lines) are necessary for distinguishing between letters. As a result, the letter **H** is formed by the intersection of two vertical lines and one horizontal line. These and other element characteristics lay the groundwork for the first computational model of letter perception (Selfridge & Neisser, 1960).

Hubel and Wiesel (1962) identified receptive fields of cortical neurons in alert cats around the same period; these receptive fields appeared to be sensitive to horizontal, oblique, vertical, and interesting

lines. Although such features are anticipated to have a crucial influence on letter perception from the outset, numerous uncertainties remain. These include (1) how the features are bound together to form a letter; (2) how the system flexibly codes different sets of features that are required for letter recognition across fonts, visual angles, and levels of degradation; and (3) how the system adjusts to a handwritten text where the features are bound together to form a letter.

Letters are rarely offered on their own, but rather as part of a larger text. Cattell (1886) suggested that when letters (e.g., n) are offered in the context of letters that make words (born), they are easier to report than when provided in the context of letters that create non-words (gorn).

Because of the following paradox, the theoretical importance of the term superiority effect is profound. This effect boosted the popularity of McClelland and Rumelhart's (1981) interactive activation model of letter perception

This strong computational model has three layers (features, letters, and words) and two types of connections between representations facilitator (arrows) and inhibitory (filled circles). When a word is presented, the feature-, letter-, and word-level representations that correspond to that word are activated. Importantly, as nodes at the word level are activated, they begin to offer feedback to letters in specific positions. The word superiority effect is driven by this additional top-down influence of word-level representations on letter-level representations.

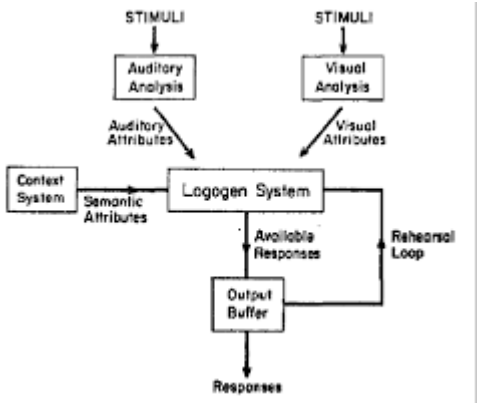
2.2.3.3 Models of Visual Word Recognition

Various outcomes from visual word recognition research have resulted in several models of the recognition process. In this section, three of the most popular models are presented.

a- Morton's Logogen Model

Words are represented by logogens in the logogen model (Morton, 1969), and recognition units are triggered based on various sorts of input information. One way to think about it is to think of the logogens as containers into which the input data is poured. The logogens can also be activated by appropriate contextual input information because this information can contain phonological as well as orthographic input. When the activation level of a recognition unit rises above a certain threshold, word recognition happens.

Figure 3: Morton Logogen Model



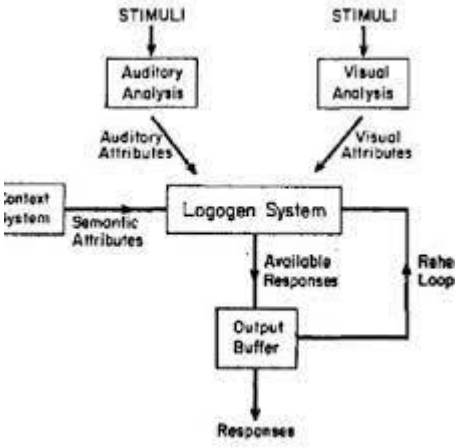
The Logogen model is comparable to the Cohort model, which presupposes that when encountering a word, all lexical entries that are positionally consistent with a kind of information that are activated by the first accessible orthographic code, in several ways. This is a parallel

model, with multiple word candidates active at any given time. It is also proposed that bottom-up input (in this case orthographic or phonological input) activates candidates first, with context effects coming into play only after logogens have been activation (Morton, 1969).

b- Forster's Search Model

A serial search paradigm is used in the search (Forster, 1976; Murray& Forster, 2004). In this way, it differs from both the Cohort model and the logogen model, both of which are parallel models. The input is checked against a candidate set of words one word at a time in serial search models. In a serial paradigm, frequency effects are simply accounted for by the order of words in the candidate set being verified. Since high-frequency words are checked first, high-frequency words are identified faster than low-frequency terms.

Figure 4: Foster's Serial Model



The type of input determines the candidate set that is verified in the Search model, which is dependent on the task at hand. For orthographic, phonological, and syntactic/semantic input, the model contains access files. There are many access files of each type, arranged according to

important variables, such as words with similar beginning letter sequences being grouped in the same bin. A master file, i.e. a comprehensive listing of words in the mental lexicon, is linked to the access files or ‘bins (Forster, 1976; Murray& Foster, 2004).

This layout is similar to that of a library, with the access files serving as a form of acatalogue, providing a code for each word in the same way that the library catalogue does. These codes enable the processor to discover the word in the master file, just as if book codes enable the user to locate a book on the appropriate stack or shelf (Forster, 1976).

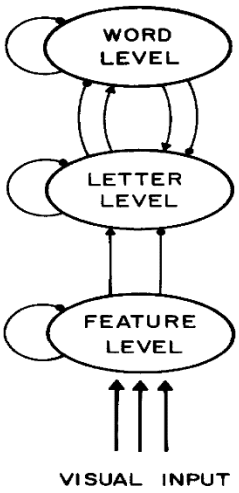
c- An Interactive Activation Model

The models described above imply that visual word recognition is a linear process in which recognition elements such as letters are identified in the input and translated onto lexical system representations for words. This included the Guangdong effect (Gangong, 1980), which resulted in a shift in perceptual boundaries between two categories (i.e. /d/ and /t/ phonemes) depending on which category produced a genuine word (e.g. 'tesk' and 'desk' vs. 'task'). To characterize these findings, computer-based word recognition models have been developed that allow activation to travel not only from the recognition elements at the input stage to the lexical system but also from the words in the lexical system back to the recognition elements.

Input activation is transmitted up through the model to units for letters that include those features as it is received at the level of letter features. Inhibitory connections, on the other hand, ensure that letters that lack those qualities, i.e., are incompatible with them, have their activation levels reduced, making them less likely to be recognized. The letter units

and the word units have similar activation and inhibitory connections. Some links allow activation or inhibitory effects to flow from words to letters, and from letters to letter features, down through the model. This means that when a word receives activation based on its initial letters, that word feeds that activation down to each of its component letters (Warren, 2013).

Figure 5: An Interactive Activation Model



This increases the activation level of letters that have not been seen before, making them easier to recognize. It is easy to see how such a system may predict the Guangdong effect: letters or phonemes that are activated at the lexical level are easily recognized. IA models can be expanded to include units that represent the semantic and syntactic properties of words, making it easier to recognize words that suit their context (Warren, 2013).

Interactive activation models, such as those described by Seidenberg and McClelland (1989), are referred to as "distributed models" since they lack representations for linguistic items like words. Instead, letters, words, and other symbols appear as activation patterns in the interactive network's elementary processing units. Variations in the strength of the linkages between units have been added to this class of

model to better portray unique patterns of competition and support. Individual units can also have varied resting levels of activity, which mimics the frequency effects shown in behavioural studies. Researchers have used such alterations to test their assumptions regarding a variety of possible consequences in word recognition and other areas of comprehension using computer implementations of this type of model.

2.3 The Cognitive Processes

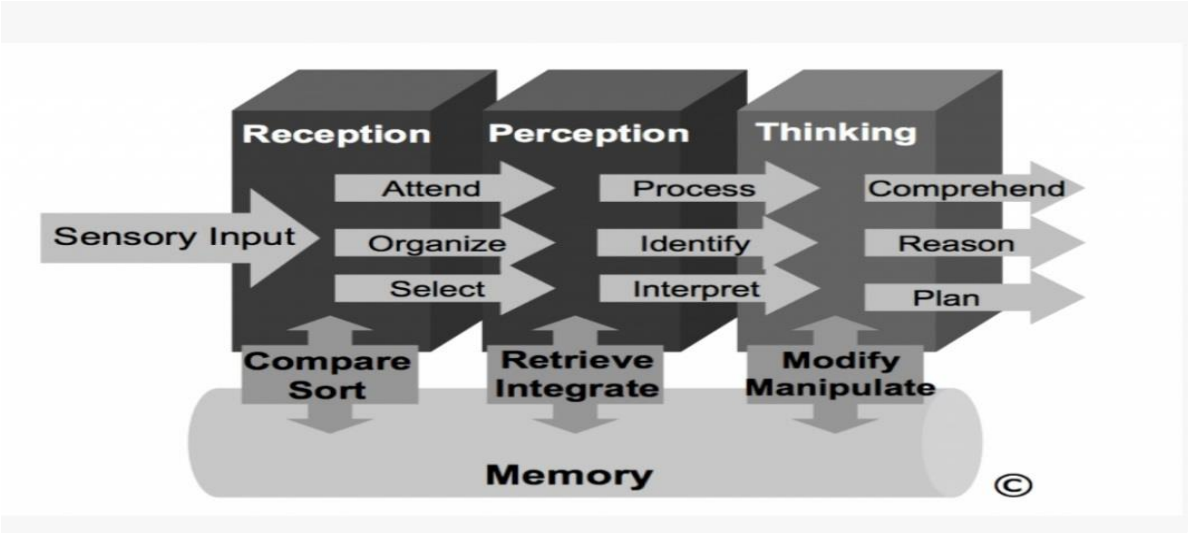
To comprehend human behaviour, one must first comprehend the mental processes through which humans collect knowledge and attempt to comprehend it. Not only one process is responsible for imparting meaning to this world; instead, cognitive processes are a collection of processes. Thus, cognitive processes are the mental processes through which humans acquire and comprehend information from the outside environments (Jones; Ross; Lynam; Perze& Leitch, 2011).

Those cognitive processes are basic ones that allow the brain to take in and process information underpin the tasks, which are necessary for reading. Paying attention, memory, following instruction, and organizing information are all essential skills that individuals who struggle with reading disabilities. It is vital to highlight that these cognitive abilities are not just important for reading, they are fundamental for learning any skill (Swanson; Harris & Graham, 2013).

Though it is a broad model of cognitive processing and learning, the model of mental processing shown below clarifies these functions. External and internal stimuli must be attended to, the most significant or relevant ones selected (for instance, ignore the dog barking outside, pay attention to the teacher), and then they must be organized, as shown in this model (for example, letters and words perceived in sequential order

left to right in the reading case). Reception is a category that encompasses the acts previously stated (Swanson et al, 2013).

Figure (6) Model of Mental Processes (https://www.mybrainware.com)



Perception is the process of associating meaning to the data received from sensory input that has been picked and structured. Letters are recognized and distinguished from one another, letter patterns are matched to sight words and other word patterns in memory, and novel word sounds are combined to form something recognizable. The process of integrating new information into existing memory is also part of seeing. Thinking is the next step, and it is here that conscious and concentrated activity takes place. The ability to absorb, interpret, reason, plan, and act on written information will be severely limited or non-existent if the many mental processes linked with receiving and processing written information are still carried out consciously (Malim, 1994).

One of this model's most striking characteristics is how memory serves as its main function. Memory is involved through the receiving, perceiving, and thinking processes when incoming sensory input is

compared to earlier patterns, earlier knowledge is retrieved to aid interpretation, and information is stored in memory (Malim, 1994).

2.3.1 The Cognitive Processes of Reading Skill

The classification of these processes differs from one author to the next. As a result, two common classifications will be considered. The first classification divides cognitive processes into three key categories: decoding, fluency, and understanding, which are then further separated into subcategories, these processes focus on operations that address the issue of invention and production. The second classification divides these cognitive processes into six categories, which deal with the practical or mental components of students or recognition (Siegel, 2005).

Working memory, phonological processing, and syntactic awareness are three cognitive processes that have been demonstrated to be important in the development of reading skills in the English language and to be distributed in individuals with reading disabilities. These three processes have such a strong influence that many psychological educational tests for individuals at risk of learning difficulties include some or all of them (Siegel, 2005).

2.3.1.1 The First classification of the cognitive processes

These are important skills since undergraduate students cannot be competent or proficient readers without them, but they are not the essential fundamentals. In fact, brains must construct a way and connection between areas that are not otherwise connected to decode words and associate a phoneme (language sound) with a symbol (visual representation, letters). Because brains developed for the spoken language

but not for reading, they adapted existing systems (the Visual Word Form Area in the back of the brain and Broca's Area in the front of the brain) to read. Reading, in addition to creating and activating this connection, requires brains to engage a range of other cognitive processes at the same time to decode words, including: (https://www.edcircuit.com/cognitive-skills-reading/)

a. Decoding

It can be defined as the process of converting coded data back to its original phrases or symbols. Information processing, communication, and computer science all use decoding (VandenBos, 2002). The process by which a receiver (e.g., the brain or a gadget like a cell phone) converts signals (sounds, writing, gestures, and electrical impulses) into meaningful messages in information theory (American psychological association, 2009).

Sustained Attention

It is concerned with what happens when our minds wander halfway through a word or between words, causing us to have to restart the decoding process (Dikker; Wan; Davidesco& Kaggen, 2017).

Sequential processing

If students cannot keep the letters in the right order or the words in the right order when they enter our brains, decoding will suffer (Hill, 2017).

Visual Discrimination

The ability of our brains to distinguish /b/ from /p/ or /m/ from /n/ in fractions of a second is crucial for successful decoding (Hill, 2017).

Auditory Discrimination

The ability to distinguish between language sounds is necessary for reading because without it, sounds cannot be connected to their written representations and students cannot hear the word they are trying to decode to determine whether what they are saying corresponds (Hill, 2017)

All of these mental skills are necessary for decoding, but they also need to function in a coordinated, well-integrated way. Decoding may involve additional cognitive abilities; the goal here is simply to highlight some of the most crucial ones.

b. Fluency

Humans depend on practice when it comes to improving the fluency. Practice is required to develop automaticity in the pairing of symbols and sounds, as well as to expand one's sight word vocabulary. Some other cognitive processes will also be involved. Fluency can be described as the ability to quickly and easily develop ideas, words, mental associations, or potential solutions to a problem; it is commonly regarded as an important aspect of creativity. Associative fluency is a term used to describe the ability to make connections between things. It refers to the ability to talk or write in a language that is not one's native tongue (VandenBos, 2002).

Visual Span

This refers to the amount of information that may be absorbed in a single glance. It entails the coordination of peripheral and central vision in theory, but in practice, it can imply the difference between reading word by word versus being able to take in groups or lines of words (Hill, 2017).

Flexible Attention

This has an impact on the reader's ability to easily transition between words, lines, and paragraphs when reading. It is also used to switch mindsets between detecting and decoding word recognition, which is critical (Hill, 2017)

Processing Speed

Although a person can correctly decode words, processing speed has an impact on reading efficiency and, as a result, fluency development (Hill, 2017).

Comprehension

The purpose of learning to read is to gain comprehension, but even after students have mastered decoding and achieved respectable fluency, comprehension frequently eludes them. Teachers and students struggle with this problem year after year. Following are three cognitive abilities that may aid or obstruct our efforts to comprehend what they read (Hill, 2017).

c. Memory

Memory is required for all aspects of information processing and is necessary for manipulating data, comparing, comprehending, and learning. Humans cannot claim to have learned something if they cannot recall it. Depending on how long information is stored, memory skills range from instant to long-term. The only time they are aware of the information is when they are holding it in working memory and altering it. It is critical to remember that knowledge that is not actively processed in working memory is unlikely to be stored in long-term memory (Hill, 2017).

Visualization

The ability to visualize anything when reading about is referred to as visualization. It could be a relationship between things or characters, rather than a depiction of an actual object. It could be a mind map, but it takes advantage of the visual processing system's capacity to generate a stronger memory, which can access after that (Hill, 2017).

Planning

Students will learn that there are different ways to read and grasp a text, as they become readers that are more proficient. They might read for a specific piece of information, for example, what time to meet the bus for the field trip. Students could read another text to get the substance of it or to get a sense of the emotional tone. Alternatively, they may read slowly and deeply to commit a large amount of information to memory or grasp a difficult topic. The ability to design the reading strategy will aid

in becoming more effective and efficient readers. (https://www.edcircuit.com/cognitive-skills-reading/)

2.3.1.2 Second Classification of the Cognitive Processes

Siegel (1993) mentions six processes as being important in the development of reading skills in the English language. Semantics, phonology, working memory, morphology, syntax, and orthography are the processes that circle them. The complications of researching the relationship between the learning of reading abilities and different orthographies vary greatly in the demands they impose on the beginning reader, according to Baddeley and Lieberman (1980).

The depth of the orthography, or its distance from the phonetic representation, and the particular linguistic unit morpheme, syllable, or phoneme that is explicitly represented, are two essentially distinct features of this variance. A deep orthography, such as English, necessitates more phonological development on the part of the reader than a shallow orthography, such as Vietnamese. Logographies (like the Chinese writing system), syllabifies (like Old Persian cuneiform), and alphabetic systems (like English) all necessitate progressively higher levels of language understanding (Borleffs; Maassen; Lyytinen& Zwarts, 2019).

a. Phonological Processing

It entails several abilities, the most important of which, in the context of reading development, is the ability to associate sounds with letters (i.e., the understanding of grapheme-phoneme conversion rules and the exceptions to these rules). This ability is the foundation for

decoding print, and while there are other ways to decode print, the phonological pathway is undoubtedly the most fundamental and crucial in the early stages of reading development (Carroll; Snowling; Hulme& Stevenson, 2003; Jorm, 1979; Shaywitz, 2003; Stanovich, 1988a, 1988b).

The most important underlying cognitive process in the development of reading skills in English, according to current ideas, is phonological processing. According to Stanovich (1988 a), phonological processing involves a variety of functions, the most important of which, in the context of the development of reading skills, is the association of sounds with letters or combinations of letters. This function is known as comprehending grapheme-phoneme conversion rules, and learning these rules is a difficult task due to the irregular character of the correspondences in English.

In the context of "dual-route" reading theories, the evolution of phonological processing and reading can be understood. These ideas take many forms, but their underlying premise is that there are two ways to grasp the meaning of the text (Coltheart, 2007; Forster & Chambers, 1973; Meyer, Schvanevelt, & Ruddy, 1974). One of these paths is direct lexical access, which entails visually reading a word without any phonological processing in between.

The phonological method, on the other hand, entails using grapheme-phoneme conversion principles to get lexical access to a print stimulus. To convert a graphemic code to a phonemic code grapheme-phoneme conversion rules are used. Because the execution of the rules does not rely on word-specific pronunciations, this technique is referred described as "no lexical." Instead, it is assumed that grapheme-phoneme conversion rules are explicitly kept and used to determine a word's pronunciation. Pseudo words, according to this concept, can only be read

by a no lexical route because they cannot have a lexical representation by definition (Taft, 1982).

b. Syntactic Awareness

It is also known as grammatical sensitivity, and it refers to the capacity to comprehend a language's syntax. This skill appears to be essential for fluent and effective text reading, as it necessitates forming predictions about the following words in the sequence. Single words that are difficult to integrate into a semantic network, such as function words, prepositions, and auxiliary verbs, may be affected by syntactic issues. Beginning readers learn about the syntactic features of function words when they are taught to read them in the context of a sentence, according to Ehri and Wilce (1980). As a result, the ability to interpret grammar could be a crucial component of word learning.

Other authors define syntactic awareness as the ability to comprehend the basic grammatical structure of the language in question. On a reading cloze task that measured syntax comprehension, Guthrie (1973) discovered that disabled readers performed at a lower level than chronologically and reading level-matched normal readers, although the disabled readers had an adequate sight-reading vocabulary to perform this task. Poor readers made more errors than regular readers, according to Cromer and Wiener (1966), demonstrating a lack of understanding of syntax in text reading tasks.

Glass and Perna (1986) discovered that children with a reading handicap performed worse on an oral language sentence comprehension exam than typical readers. In a reading cloze process, Willows and Ryan

(1981) discovered that less proficient readers were not as accurate as regular readers at substituting a missing word were.

Students with reading issues have syntactic difficulties, according to some data from other languages. In an oral cloze test including Chinese syntactic awareness, students with reading issues in Chinese (Cantonese) performed worse (So & Siegel, 1997). Students from Canada who spoke Portuguese as a first language received reading instruction in English, and attended a Portuguese Heritage Language Program in Portuguese had similar outcomes (Da Fontoura & Siegel, 1995). Children who scored poorly on the Portuguese word and pseudo word reading exams performed much worse on the Portuguese oral cloze than children who read Portuguese well.

c. Working Memory

It is the process of retaining information in short-term storage while processing incoming data and retrieving data from long-term storage. Because the reader must decode and/or recognize words while retaining what has been read and accessing information such as grapheme-phoneme conversion rules, working memory is important in reading. Working memory is also important for reading individual words, especially when learning to read words for the first time because the grapheme-phoneme conversion rules for each segment of the word must be remembered while the remaining segments are processed. Longer words, in terms of syllable count, exert greater demands on working memory (Swanson et al, 2013).

Furthermore, the amount of possible alternative grapheme-phoneme pronunciations may have an impact on the ease or difficulty of reading a particular word; hence, the complexity of a particular rule will influence

the difficulty of word recognition. Reading will be slower and less precise as more alternative pronunciations are introduced until the particular things are learned. More rules could be found and applied to the word now being read. Because the letters c and g have several pronunciations at the start of English words, words or pseudo words beginning with these letters may be more difficult to understand than words or pseudo words beginning with other letters, especially for beginning readers. The ability to store knowledge in short-term memory while processing incoming data is referred to as "working memory". Working memory in reading refers to the ability to decode or recognize words or phrases while also remembering what has been read (Swanson et al, 2013).

Siegel and Ryan (1989) researched working memory in normal and handicapped readers, as well as dyslexics. Two, three, four, or five sentences are read aloud in the modified form of this exercise, and the child is asked to fill in a missing word at the end of each phrase.

d. Semantic Processing

It is a term that relates to the comprehension of meaning. Word meanings are coded in semantic networks and recovered through these networks, according to theory. When it comes to reading, semantic processing is important for word retrieval. For example, the ease with which a word's meaning may be retrieved may be influenced, at least in part, by the connections it has with other words in a semantic network (Roman; Kirby; Parrlla; Wade-Woolley& Deacon, 2009).

e. Morphological awareness

It relates to a person's sensitivity to word morphemes. It was characterized as "conscious awareness of the morphemic structure of words and their ability to reflect on and change that structure," according to the definition of morphological awareness (Carlisle,1995, p.194). Morphological knowledge helps in decoding, spelling, and meaning construction in reading (Deacon et al, 2007; Kemp, 2006; Shaywitz, 2003; Siegel, 2008).

However, research on the significance of morphological awareness in reading development and reading difficulties is rising (Bowers et al, 2010; Deacon& Kirby, 2004). Morphemes, the smallest units of meaning within words, enable the maintenance of semantic links between words by making word pronunciation predictable (Chomsky & Halle, 1968; Shaywitz, 2003). The words printer and printing, for example, are constructed from two morphemes: the root print and the suffixes "-er" and "-ing". The reader is aware that both phrases refer to making a mark with pressure or ink, and it is the suffixes that reveal each word's distinct meaning.

Morphological awareness, according to Carlisle (1995), is "conscious awareness of the morphemic structure of words and their ability to reflect on and change that structure." In other terms, it refers to morpheme sensitivity in words.

Reading, spelling, and meaning building are all aided by morphological understanding (Deacon et al., 2007; Kemp, 2006; Shaywitz, 2003; Siegel, 2008). Derivational morphology (e.g., -ness refers to a noun, "-ize" refers to a verb, and "-ive" refers to an adjective) contributes to word decoding by assisting word segmentation and

decoding efficiency; to spelling by providing consistency of English spelling characteristics (e.g., -ness is always spelt with two "-s's"); and to reading comprehension by assisting the understanding of word meanings, easing the load on working memory (Siegel, 2008).

According to research on the relationship between morphological awareness and reading comprehension, the two variables have a positive relationship. Morphological awareness, for example, has been demonstrated to be a strong predictor of reading comprehension (Carlisle, 1995; Deacon & Kirby, 2004; Mahony, 1994). Furthermore, research has indicated that morphological awareness, in addition to phonological awareness, helps with reading comprehension.

Saiegh-Haddad and Geva (2008) explored the association between morphological and phonological awareness and reading in English–Arabic bilingual children. Their findings back up the theory that morphological structure and transparency differences between languages can affect the cross-linguistic contribution of morphological awareness abilities to reading.

Sixth graders with reading impairments scored considerably lower than usual readers on a measure of sensitivity to derivational morphology, according to Siegel (2008). Nonetheless, Casalis and a group of his colleagues (2004) found that children with reading disabilities used a morphological (meaning-related) technique to decipher words to compensate for their weak phonological skills. Deacon proposed this hypothesis as well (in press). Poor morphological awareness abilities may contribute to the reading and spelling difficulties seen in children with reading impairments, implying the need for morphological awareness teaching and testing in this population.

f. Orthographic processing

Orthographic processing relates to knowledge of the correct and wrong spellings of words, as well as an awareness of the writing traditions of the language in the issue. Legal and prohibited, as well as more and less likely sequences of letters, exist in all alphabetic systems, and a proficient reader makes use of these sequences to some extent. Rules for converting graphemes to phonemes based on their position.

Orthographic processing entails being aware of the structure of a language's words. In English, for example, there is no v at the end of a word, nor are there any words that begin with dl or contain the letters zxg. Two tasks created by Olson, Kliegal, Davidson and Foltz (1985) give a direct contrast between the visual (orthographic) and phonological processing paths. The youngster is presented with a real word and a pseudo word (for example, rain–rane and boal–bowl), and must choose the proper spelling. In the phonological task, the kid must choose which of two visually presented pseudo words (e.g., kake–dake and joap–joak) sounds like a real word. Each of these tasks is designed to allow only one process to operate; for example, in the visual task, both options sound identical, necessitating the use of visual memory for word orthography; phonological processes are not useful in this case because sounding out the words would result in the same response for each word.

The ability to distinguish lawful and illegitimate orthographic combinations of English letters is another facet of orthographic structural awareness. Siegel et al (1995) to measure this ability devised a task. Students show 17 sets of pronounceable pseudo words, one of which had a bigram that never appears in an English word in that position and the other of which contained a bigram that does appear in English.

Scientists conclude that learning to read proficiently necessitates the automatization of basic decoding and comprehension processes, which eliminates the need to think about them consciously. Learners who must intentionally decode letters and words become distracted by the process and hence are unable to focus on the meaning of what they are reading (Siegel et al, 1995).

Visual discrimination, attention, working memory, and visual sequential processing are all cognitive processes that enable decoding and must be automatic for good reading. These abilities are lacking in many struggling readers. Despite their importance, these skills are not taught in universities. In reality, closing the gap between what researches say is needed for struggling readers and what is being delivered in our universities is the fundamental obstacle to enhancing reading instruction. The fact that cognitive skills are not formally taught in schools does not rule out the possibility of teaching them. Techniques to build basic cognitive skills have been discovered and employed in various clinical therapies for more than half a century, but they have not been practical to offer in the classroom. Cognitive training programs can now be delivered in a classroom context thanks to digital game-based learning (Swanson et al, 2013).

2.4 Previous Studies

Numerous earlier studies that are discussed in the present study are surveyed chronologically. These studies have been beneficial to the researcher in the following ways:

• Giving strong insights into the current study.
• Making use of the techniques and tools used in statistics.
• Providing a broad overview that enables comparison between the study's findings and those of related studies.

An outline review of these studies is therefore crucial to achieving the goals of the current study. Understanding the importance of the relevant study and contributing to the outcomes is essential. The following factors can be used to group similar studies together for discussion: titles, research questions, goals, hypotheses, samples, instruments, and findings.

1- Cognitive Processes Underlying Coping Flexibility: Differentiation and Integration. Cecilia Cheng & Mike W.L. Cheung (2005). By proposing differentiation and integration as a two stress- appraisal processes, the following study was made by the researchers to analyze how individuals construct adaptive coping mechanisms across settings. The research reveals that distinction and integration are two important appraisal processes connected to individual coping flexibility differences. These two cognitive processes will enable the development of alternative tactics and the selection of options to satisfy unique situational demands providing a high perceptions and subtle possibilities among specific environment variables.

2- A Comparison of the Cognitive Processes Underlying Reading Comprehension in Native English and ESL Speakers. Pauline B. Low and Linda S. Siegel (2005). The findings of this study clarified that there are three underlying cognitive processes or factors (phonological processing, working memory, and syntactic awareness) can explain variability in reading comprehension performance for L1 and ESL speakers to some extent and these three factors contribute significantly to reading comprehension even when word reading ability is taken into account.
3- Cognitive Processes, models and metaphors in decision research. B.R. Newell (2008). This study entails that the homo-economics metaphor, with its emphasis on normative models and deviations from those models' predictions, has traditionally influenced decision research in psychology. This can be related to the fact that, humans are conceptualized as **information processors** in cognitive psychology, with processes such as perception, memory, classification, problem-solving, etc.
4- What is Cognitive Processes? Albert Newen (2015). The current study used by Newen to provide an affirmative response to the current question above. The research summarizes that the observation of interdependence implies that the concept of cognitive process is dependent on variety of factors including actual practice in traditional cognitive sciences, the development of specific research methods, and etc.
5- Explanation as cognitive processes. Zach Horne, Melis Muradoglu, and Andrei Cimpian (2019). The main goal of any cognitive science is to figure out how individuals understand things, and that what this study try to explained. This study described that people develop their

understanding of the world mostly through explanations. The fundamental point of this opinion is straightforward: the ability to develop explanations is influenced by a variety of other cognitive processes, each of which has its operating characteristics that affect how and what explanations are generated. Furthermore, a greater focus on metacognition, memory, attention and other similar cognitive processes will significantly advance the understanding of how people think and explained.

Chapter Three

Methodology

3.0 Introductory Notes

This chapter is meant to clarify the techniques used to achieve the study's objectives. It reveals the following process stages in particular:

1. Determining the population and selecting a sample for the current investigation.
2. Designing the Instrument and material selection.
3. Ensure the test's validity.
4. Conducting a pilot study of the test to ensure the validity, difficulty level of the test items, discrimination power, and time required for the final delivery of the test.
5. Identifying the scoring scheme and statistical methods used to analyze the generated findings.

3.1 Population and Sample Collection

Fraenkel and Wallen (2003) mentioned that a sample of a research study refers to the association from which information is obtained. The population is the larger group to which the results are supposed to be applied. The study's population consists of non-native speakers of Iraqi university fourth-year students enrolled in the English department during the academic year 2021-2022.

This sample was chosen for a variety of reasons; including the fact that they are advanced learners, study a variety of subjects, are more mature than others do. The study's sample consists of (100) students. Students in the fourth year of the English Department, College of Education for Scientific Humanities, Wasit University.

3.2 Instrument

The act of presenting questions, and collecting and evaluating data to find answers is known as research. Numbers, texts, and images can all be converted from data. Researchers are performing a study with quantitative data when data is digits. The research method is defined by (Leedy& Ormord, 2001; Williams, 2011) as the comprehensive measures done by a researcher before beginning a research project.

Because the current study is dealing with a broad variety of data and statistics, the researcher employs a quantitative approach to data analysis and collection. Aliga and Gunderson (2002) define quantitative analysis as the process of collecting numerical data and analyzing it with mathematical tools, particularly statistics, to better understand a problem or phenomenon.

According to Williams (2011), a quantitative technique indicates the entire process through which researchers initiate research projects. So, quantitative research is concerned with measuring and analyzing variables to achieve certain objectives. This approach entails using and analyzing numerical data using certain statistical processes to arrive at specific solutions to the supplied issues.

In qualitative research, variables are measured and analyzed to achieve specific outcomes. A variable is a quality or quantity-varying

trait or characteristic of things or persons (Fraser Health Authority, 2011). A variable is something you can manipulate and control in addition to something you can measure.

This research approach is concerned with measuring and evaluating various factors to investigate certain results. This quantitative research approach is used to investigate huge and chosen selected groups, and it collects data in the form of statistics and numbers to examine certain factors.

The test is made up of ten questions, each of which deals with a distinct cognitive process that undergraduate students employ. All of them have something to do with the production and recognition of words and sentences. The first five questions are about procedures that are closely related to the word "production," while the latter five are about "recognition."

In fact, both undergraduate students and lecturers, at some Iraqi Universities, in their instructional operations currently utilize such cognitive processes. It is worth mentioning that while all of the students' processes deal with different data, they all measure the college students' ability to produce and recognize words and sentences.

3.3 Selection of the Test Items Material

The items of the test are all meant to examine the cognitive processes employed by undergraduate students for the production and recognition of words and sentences. Sustained attention, sequential processing, visual span, visual discrimination, comprehension, phonological processing, syntactic awareness, semantic processing, morphological awareness, and orthographic processing are all examples of processes that deal with the reading skills abilities.

The material had been chosen randomly from different internet platforms, websites and some books (as shown in Table 1). The researcher in her preparation for this test may deliberately choose such a random material to be able to discover the undergraduate students' ability to perceive and absorb, as well as their ability to use their mental processes to recover or recall the information stored in their brains and to solve and find out the answers for all the questions included innovatively more than be just a matter of memorization and indoctrination process.

The elements of the questions were chosen by a committee of specialists from a jury of university instructors who agreed on some of them and differed on others that needed to be adjusted (See Appendix B).

***Table1**: The Items and their Chosen Material*

The Test Item	The Material
1- Sustained attention	Development skills, L.G Alexander
2- Sequential processing	Headway plus, John and Liz Soars
3- Visual discrimination	Headway plus, John and Liz Soars
4- Visual span	https://apps.get-headway.com
5- Comprehension	https://www.practiceaptitudetests.com
6- Phonological processing	https://www.rhymzone.com
7- Syntactic awareness	https://www.tmap.net
8- Semantic awareness	https://www.uww.edu
9- Morphological awareness	https://www.cs.bham.ac.uk
10- Orthographic processing	https://gato.docs.its.txstate.edu

3.4 Forming the Test Items

For each of the 10 questions that relate to the main test, as well as each cognitive process connected to invention and awareness of words

and sentences by undergraduate students, the researcher developed the test based on random and nonspecific information from internet websites and some books. Every question assesses and evaluates a certain cognitive process while also taking into consideration the students' mental abilities to tackle the problem. Because the students were in the fourth grade, the assessments were on a more advanced level to better assess their ability to apply their mental capacities.

The researcher classified cognitive processes into two categories. For undergraduate students, the first section of cognitive processes is focused on processes that address the issue of invention or production; attention; awareness; understanding; receipt; and export of information are all steps that a learner must go through to recover information and utilize it later. Decoding, fluency, understanding, and other processes are examples. The second half of these operations deal with the practical or mental components of students. These activities are critical for students' studying English to improve their reading and comprehension abilities. These processes include syntax, phonology, semantics, working memory, and orthography which are all instances of these processes, and everything in this study centers on them.

The test started with the first question that related to production of the words and sentences that measured the sustained attention of the student. A little long passage contains different variables and 10 questions that the testee should answer correctly and briefly. The second question deals with sequential processing that has a close connection with comprehending and sequentially integrating stimuli. The arrangement technique is used to measure the ability of the student to use this process.

In the third question, which concerns with the visual discrimination process, which in turn has a close relationship with the

ability to distinguish between the different items and forms, two pictures containing a group of differentiations are presented the students should verify them correctly. The fourth question is called a visual span process. This means the number of different visual aspects in a multi-element arrangement that may be processed simultaneously at a glance; a retelling short three paragraphs are used to measure the ability of the undergraduate students to retell something by using their information. The fifth question deals with the comprehension process, a group of ten-point each of which has different information or technique is used to masseur the students' ability to comprehend and interpret what they have read.

The students' capacity to distinguish words and sentences is the second categorization of cognitive processes utilized by undergraduate students. The sixth question is about phonological processing, or the students' capacity to convert sounds into letters and use them to construct a whole sentence. The question items consist of 10 distinct word groupings, each of which has three identical words with the same rhyme and pronunciation and one unique word. Following that, the seventh question is about syntactic awareness. The researcher picked 10 points for this question as well; each point is a phrase with an incorrect verb, and the students were asked to fill in the blanks. Each point represented a phrase that lacked a valid verb, and the students were instructed to finish the sentences with the right form of the verb.

The eighth question is a ten-point multiple-choice question in which the researcher asks the students to choose the correct and appropriate definition for a certain term. The ninth question assesses the students' morphological awareness. It is also an MCQ; it is a type of question with 10 points and a variety of inquiries on word forms and

meanings, with the students asked to pick the most relevant answer. The last question differs somewhat from the others. The last question differs from the others in that it assesses students' abilities in certain areas, such as spelling. The students were asked to remove and repair orthographic errors and misspelt words from a small paragraph.

3.5 Test Validity

To ensure the test's validity, the items should be presented to a jury of English language experts (Harris, 1969). "A valid test measures what it is supposed to measure" (Al-Mutawa & Kailani,1989, p. 146). The degree to which a test measures what it claims to measure or can be utilized successfully for the purpose for which it was designed is known as validity (Al-Juboury, 2003).

In reality, jury verdicts are frequently holistic, referring to the entire exam, while special emphasis may be paid to certain areas. As a result, the tests were given to a jury of nine experts in English language teaching, linguistics, and measurement and evaluation (see appendix B) to provide feedback and suggestions on the test items' suitability for the sample's level, as well as to determine whether they met the study's objectives. It is important to notice that all of the jurors believe that the test items are legitimate as a whole.

3.6 The Pilot Study and Item Analysis of the Test

It is extremely desirable to do a pilot test on the test design and then update it based on the findings. "Attempts to identify whether the test items pass the necessary attributes of measurement and discriminability" are the goals of pilot testing (Tuckman,1972, p.402).

The pilot study's goals are to identify the discriminating power and difficulty level of each question, estimate the time required to find the test, and calculate the overall test's reliability coefficient. Pilot testing is used to determine the test's possible range of performance and to identify any administration or scoring issues.

For the pilot research, fifty students were selected. At the University of Wasit, the Department of English and the College of Education for Scientific Humanities, each student is chosen from the fourth stage. To minimize misconceptions, the researcher explains what the testees should do while taking the exams. The undergraduate students are asked to reply to all test items, and the time provided to respond to those strategies is unconstrained. Answering all of the questions takes about 2 hours on average.

3.7 Item Discriminating Power

It refers to the extent to which the test item distinguishes between students with high and low accomplishments (Gronlund, 1981). According to Stanley and Kenneth (1972), DP is a measure of how well an item distinguishes between the excellent testees and the bad testees. According to Anastasy (1976), "if an item's discriminating power is 0.30 or above, it is acceptable; if it is less than 0.30, it is weak and should be replaced."

Using the DP formula on the test items revealed that the discriminating power of the test ranged between (0.8) and (0.90), as shown in Table (2). Brown (1981: 104) states that "the item is appropriate when its discrimination power is (20) percent or higher".

The DP of each item was calculated using the following formula:

DP = (RU-RL) / (1/2 T)

Where:

DP = Discrimination power

RU = the number of students in the upper group who has got the item right

RL = the number of students in the lower group who has got the item right

T = total number of students included in the item analysis

(Gronlund, 1976)

3.8 Item Difficulty Level

The advantage of item difficulty level (DL) is that it "allows the detection of items that are either tough or too easy (beyond the range of 0.25-0.75) or that fail to discriminate strongly enough amongst candidates" (Baker,2001).

The pilot test was used to determine the test item difficulty levels. That instance, difficulty levels should be consistent with the percentage of students that correctly answered the item (Wood, 1960, Ebel, 1972). The proportion of testees who pass the test is shown by DL (Bloom; Madaus& Hastings, 1981). That is to say, if the percentages are large, the items will be simple, and if the percentages are low, the items will be challenging. As a result, if the test items are too difficult or too easy, they will lack the necessary discriminating power (Madsen, 1983).

For calculating the difficulty level of each item, the following formula was used:

DL= (HC +LC)/N

Where:

DL: difficulty level

HC: High Correct

LC: Low Correct

N: Total number in the sample (Valette, 1967)

Table 2: *Ease factor, Difficulty factor & Discrimination power*.

Test 1					
S	**correct answers**		**Ease Factor**	**Difficulty factor**	**Discrimination power**
	upper group	**lower group**			
1	25	10	0.70	0.30	0.60
2	22	13	0.70	0.30	0.36
3	21	13	0.68	0.32	0.32
4	23	15	0.76	0.24	0.32
5	21	11	0.64	0.36	0.40
6	21	12	0.66	0.34	0.36
7	24	14	0.76	0.24	0.40
8	17	11	0.56	0.44	0.24
9	13	4	0.34	0.66	0.36
10	20	13	0.66	0.34	0.28
Test 2					
S	**correct answers**		**Ease factor**	**Difficulty factor**	**Discrimination power**
	upper group	**lower group**			
1	15	8	0.46	0.54	0.28
2	11	6	0.34	0.66	0.20
3	14	8	0.44	0.56	0.24
4	16	6	0.44	0.56	0.40
5	12	5	0.34	0.66	0.28
6	11	4	0.30	0.70	0.28

7	11	4	0.30	0.70	0.28
8	14	8	0.44	0.56	0.24
9	16	8	0.48	0.52	0.32
10	16	10	0.52	0.48	0.24

Test 3

S	correct answers		Ease factor	Difficulty factor	Discrimination power
	upper group	lower group			
1	19	11	0.60	0.40	0.32
2	13	7	0.40	0.60	0.24
3	22	13	0.70	0.30	0.36
4	16	10	0.52	0.48	0.24
5	18	10	0.56	0.44	0.32
6	10	4	0.28	0.72	0.24
7	17	11	0.56	0.44	0.24
8	16	9	0.50	0.50	0.28
9	17	11	0.56	0.44	0.24
10	19	10	0.58	0.42	0.36

Test 4

S	correct answers		Ease factor	Difficulty factor	Discrimination power
	upper group	lower group			
1	75	49	0.62	0.38	0.26
2	64	41	0.50	0.50	0.23
3	63	38	0.51	0.49	0.25

Test 5

S	correct answers		Ease factor	Difficulty factor	Discrimination power
	upper group	lower group			

1	20	11	0.62	0.38	0.36
2	15	8	0.46	0.54	0.28
3	11	5	0.32	0.68	0.24
4	13	6	0.38	0.62	0.28
5	13	7	0.40	0.60	0.24
6	21	13	0.68	0.32	0.32
7	23	13	0.72	0.28	0.40
8	18	11	0.58	0.42	0.28
9	14	7	0.42	0.58	0.28
10	19	11	0.60	0.40	0.32

Test 6

S	correct answers		Ease factor	Difficulty factor	Discrimination power
	upper group	lower group			
1	22	14	0.72	0.28	0.32
2	22	2	0.48	0.52	0.8
3	23	0	0.46	0.54	0.92
4	18	10	0.56	0.44	0.32
5	16	8	0.48	0.52	0.32
46	6	14	0.68	0.32	0.24
47	7	12	0.64	0.36	0.32
48	8	3	0.32	0.68	0.40
49	9	9	0.56	0.44	0.40
50	10	11	0.64	0.36	0.40

Test 7

S	correct answers		Ease Factor	Difficulty factor	Discrimination power
	upper group	lower group			
1	23	11	0.68	0.32	0.48

2	17	9	0.52	0.48	0.32
3	13	7	0.40	0.60	0.24
4	10	4	0.28	0.72	0.24
5	16	10	0.52	0.48	0.24
6	15	9	0.48	0.52	0.24
7	18	12	0.60	0.40	0.24
8	15	5	0.40	0.60	0.40
9	16	9	0.50	0.50	0.28
10	17	9	0.52	0.48	0.32

Test 8

S	correct answers		Ease factor	Difficulty factor	Discrimination power
	upper group	lower group			
1	17	10	0.54	0.46	0.28
2	15	8	0.46	0.54	0.28
3	12	5	0.34	0.66	0.28
4	20	13	0.66	0.34	0.28
5	18	11	0.58	0.42	0.28
6	18	12	0.60	0.40	0.24
7	12	5	0.34	0.66	0.28
8	17	11	0.56	0.44	0.24
9	18	9	0.54	0.46	0.36
10	17	7	0.48	0.52	0.40

Test 9

S	correct answers		Ease factor	Difficulty factor	Discrimination power
	upper group	lower group			
1	17	8	0.50	0.50	0.36
2	16	6	0.44	0.56	0.40
3	17	7	0.48	0.52	0.40
4	12	5	0.34	0.66	0.28

5	11	2	0.26	0.74	0.36
6	17	9	0.52	0.48	0.32
7	17	6	0.46	0.54	0.44
8	16	7	0.46	0.54	0.36
9	18	7	0.50	0.50	0.44
10	22	13	0.70	0.30	0.36

Test 10					
S	**correct answers**		**Ease factor**	**Difficulty factor**	**Discrimination power**
	upper group	**lower group**			
1	19	12	0.62	0.38	0.28
2	21	11	0.64	0.36	0.40
3	21	10	0.62	0.38	0.44
4	20	12	0.64	0.36	0.32
5	18	12	0.60	0.40	0.24
6	24	11	0.70	0.30	0.52
7	21	13	0.68	0.32	0.32
8	23	14	0.74	0.26	0.36
9	20	13	0.66	0.34	0.28
10	20	10	0.60	0.40	0.40

3.9 Test Reliability

Test reliability refers to "the degree to which a test consistently measures whatever it measures" for dependability (Gay; Geoffery; Mills& Peter, 2012). Furthermore, dependability should be defined in terms of fixed ratings for the same individuals. When students' results are consistent, the exam is genuinely dependable; nevertheless, when scores fluctuate for no apparent cause, the test is unreliable (Harmer, 2001). According to Richard and Schmidt (2010), "reliability" refers to the

degree to which tests produce consistent results. Tests are deemed to be dependable if they produce consistent results when administered at different times or by different persons.

The "assessment of language exams" has a second significant element. It's "a measuring instrument's inclination to produce consistent information regardless of whether it meets the intended goal" (Ahmann and Glock, 1975). Within the stability scores, reliability should be measured by measuring whatever they test for the same pupils from test to test or from time to time (Ebel, 1972, Lado, 1975).

Tests become more trustworthy when they cover a wide range of topics, allowing them to play a critical role in determining students' results in terms of limited-range content (Al-Hamash et al; 1989). Various methodologies, such as Kuder-Richardson, split-half, equivalent forms, and test-retest, can be used to determine test reliability.

First: The reliability of the test was extracted for the substantive items by the split-half method as follows:

1- Half-split method: The reliability coefficient for half of the test was (0.84), and after correcting the stability by the Spearman-Brown coefficient, the reliability coefficient for the test as a whole became (0.91).
2- Second: - The reliability of the test was extracted for the articles by the Alpha Cronbach method, where the reliability coefficient reached (0.76).

3.10 Final Application of the Test

The test was applied on (11/5/2022) it has been administrated to 100 testees of the fourth year, Department of English, College of Education for Humanities at Wasit University.

The researcher was able to secure the assistance of two professors to keep an eye on the test volunteers, who were all separated into two different rooms. As a result, test takers have two hours to finish all test items or all needed questions.

3.11 Scoring Scheme

AL-Hamash et al. (1985) emphasized the need of developing an accurate scoring method for the entire exam to ensure impartiality and dependability.

A well-defined scoring methodology was used for the sake of impartiality and dependability. A score has been assigned to the exam (100). The grades were divided in such a way that each correct answer received one grade and the erroneous response received zero. Items that were left blank were also given a zero score since on the presumption that the testee had failed to provide the correct answers. The following table shows the scoring system that was used:

Table 3: *Scoring Scheme*

Test Items	No. of items	Scores
1- Sustained attention	10	10
2- Sequential processing	10	10
3- Visual discrimination	10	10
4- Visual span	3	10
5- Comprehension	10	10
6- Phonological processing	10	10
7- Syntactic awareness	10	10
8- Semantic processing	10	10

9- Morphological awareness	10	10
10- Orthographic processing	1	10
11- Total	84	100

All of the approaches' scores should be out of 100, as mentioned above, to achieve the study's aims and preserve uniformity. This method is used by the researcher to make testing or test approaches for college students easier, clearer, and more realistic.

3.12 Statistical Tools

The statistical tools listed below are employed:

1- The p- value can be defined as Probability of obtaining a real-valued test statistic at least as extreme as the one actually obtained.

$$Z_c = \frac{(\bar{X}-\mu)}{(\sigma_x)}$$

Z_c = Z-Score
$\bar{X}$ = Sample Mean
μ = Population Mean
σ_x = Standard Error associated with the Sample

2- An ANOVA test is a type of statistical test used to determine if there is a statistically significant difference between two or more categorical groups by testing for differences of means using variance.

$$F = \frac{MST}{MSE}$$

$$MST = \frac{\sum_{i=1}^{k}(T_i^2/n_i) - G^2/n}{k-1}$$

$$MSE = \frac{\sum_{i=1}^{k}\sum_{j=1}^{n_i} Y_{ij}^2 - \sum_{i=1}^{k}(T_i^2/n_i)}{n-k}$$

3- Schaffer test is used to compare and calculated two types of statistics.

$$f(x,y) = 0.5 + \frac{sin^2(\sqrt{x^2+y^2}) - 0.5}{[1+0.001\cdot(x^2+y^2)]^2}$$

$$-100 \leq x_i \leq 100$$

$$\text{minimum at } f(0,\cdots,0) = 0$$

4- Item discriminating power to calculate the DP of each item. The following formula is used:

DP= (RU-RL) / (1/2 T)

5- Difficulty level:

DL=HC+LC/N

6- **Alpha – Cronbach Formula**: It is used to calculate the reliability coefficient of the instrument, the completely ten tests.

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum S_2}{S_x^2}\right)$$

n= No. of items in a test (Mehrens and Lehmann, 1991)

Chapter Four

Discussion &Results

4.0 Introductory Notes

This chapter is dedicated to uncovering and discussing the processes used to analyze the test findings following the final administration. The analysis of the results is given under the study's objectives and questions. The undergraduate students employed for cognitive processes were selected using statistics tables and linguistic viewpoint. Conclusions have been reached based on the data obtained, and comments and proposals have been presented. Starting with the study's objectives and research questions posed in Chapter 1:

1. Finding out undergraduate students' awareness of the cognitive processes in recognizing words and sentences.
2. Clarifying the role of psycholinguistics and how it affects word and sentence recognition concerning cognitive processes.
3. Illustrating the most used cognitive processes in recognizing words and sentences.
4. Discussing the difference between recognition and production of words and sentences concerning the cognitive processes.

These objectives are met by answering the following research questions:

1. What are the cognitive processes used by undergraduate students in recognizing words and sentences?
2. What are the most dominant and less dominant cognitive processes used by undergraduate students in recognizing words and sentences?

3. How do psycholinguistic roles affect word and sentence recognition concerning cognitive processes?
4. What are the differences between recognition and production of words and sentences by manipulating the cognitive processes?

4.1 Data Analysis

This section discusses the study's findings, which obtained as follows:

1- The first classification of the test deals with the test results for the first five processes related to fluency, decoding, and understanding. In turn, these processes are related as well to the production level of the students recognizing words and sentences. Those processes are sustained attention, sequential processing, visual discrimination, visual span, and comprehension.

2- The second classification of the test deals with the test results for the five last processes related to the practical or mental components of students. In turn, these processes are related to the recognition level of the students recognizing words and sentences. These cognitive processes are phonological processing, syntactic awareness, semantic processing, morphological awareness, and orthographic processing.

4.1.1 The Results of the Students' Responses for the First Classification of the Cognitive Processes

The students' responses to the first classification of the test are assessed to meet all the goals of this study and to answer its questions. Table (5) shows the statistical analysis of the arithmetic then the hypothetical mean.

Table 4: *The Arithmetic and Hypothetical Means of the Students' Responses in the First Five Cognitive Processes.*

The overall cognitive processes	The overall grade of the level	number of paragraphs	Arithmetic mean	hypothetical mean	standard deviation	t-test value	P-Value	Indication
	50	43	28.45	23.5	6.63	42.89	0.000	Significant

Table (4) shows that the arithmetic mean of the total students' responses in the first five cognitive processes test is (28.45), which is significantly higher than the hypothetical mean of (23.5). This indicates that the students have a good awareness of the cognitive processes in English. Furthermore, to corroborate this finding, the t-value for one independent sample was computed, which is (42.89), and to determine the significance of this value, the P-value, which is 0.000, was determined to be less than the level of significance of 0.05, indicating that the t-value is statistically significant.

To find out the students' responses to each test (item) of the cognitive processes, the following table states each type of the five cognitive processes:

Table 5*: The Arithmetic Mean, Hypothetical Mean, Standard Deviation, t-test value, and p-value*

Levels	The overall grade of the level	number of paragraph	Arithmetic mean	hypothetical mean	stranded deviaton	t-test value	P-Value	Indication
Test 1	10	10	7.2100	5.5	1.79390	40.192	0.000	Significant
Test 2	10	10	4.07	4	2.49806	24.459	0.000	Significant
Test 3	10	10	6.1100	5	1.76438	33.496	0.000	Significant
Test 4	10	3	5.9100	6.5	2.10519	24.463	0.000	Not significant
Test 5	10	10	5.1500	5	1.74596	37.859	0.000	Significant

Table (5) shows that:

1- The Arithmetic mean of the students' responses in the cognitive processes regarding the sustained attention test is (7.2100) which is statistically higher than that of the hypothetical mean which is (5.5) this means that the students have a good awareness of recognizing words and sentences in this process. Moreover, to confirm the result the t-value for one independent sample has been calculated which is (40.192) and to know the significance of this value the P-value that is

0.000 has been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

2- The Arithmetic mean of the students' responses in the cognitive processes relating to the sequential processing is (4.07) which is statistically higher than that of the hypothetical mean which is (4) this means that the students have a good awareness of the words and sentences in this process. Moreover, to confirm the result the t-value for one independent sample has been calculated which is (15.593) and to know the significance of this value the P-value that is 0.000 has been found higher than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

3- The Arithmetic mean of the students' responses to the cognitive processes concerning the visual discrimination test is (6.1100) which is statistically higher than that of the hypothetical mean which is (5) this means that the students have a good awareness of the words and sentences in this process. Moreover, to confirm the result the t-value for one independent sample has been calculated which is (24.459) and to know the significance of this value the P-value that is 0.000 has been found higher than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

4- The arithmetic mean of the students' responses in the cognitive test to the visual span process is (5.9100) which is statistically lower than that of the hypothetical mean which is (6.5) this means that the students do have not a good awareness of recognizing words and sentences in this process. Moreover, to confirm the result the t-value for one independent sample has been calculated which is (33.496) and to know the significance of this value the P-value that is 0.000 has

been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically not significant.

5- The arithmetic mean of the students' responses in the cognitive processes test to the comprehension test is (5.1500) which is statistically higher than that of the hypothetical mean which is (5) this means that the students have good awareness in recognizing words and sentences in this process. Moreover, to confirm the result the t-value for one independent sample has been calculated which is (24.463) and to know the significance of this value the P-value that is 0.000 has been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

To find out if there are any differences among students' types of cognitive processes awareness in recognizing words and sentences, an ANOVA test is used and the results are presented in Table (6) below:

Table (6) *F-ratio and P-value of Students' Responses to the First Five Cognitive Processes*

Contrast source	Sum of Squares	Df	Mean Square	F Value	P Value	Indication
Levels	545.120	4	136.28	28.61	0.000	Significant

Table (6) shows that the F-ratio of the students' cognitive awareness in recognizing words and sentences in these five tests has been calculated which is (28.61) and to find out its significance the P-value is compared with the level of significance in which the P-value is found (0.000), which is lower than the level of significance and this means that the F-ratio is significant and this, in turn, means that there are differences among these tests.

To identify the source of difference among these five levels of cognitive processes awareness in recognizing words and sentences and their directions, Schaffer's test is applied for past comparisons and the results are shown in Table (7) below.

Table (7) *Scheffe's Dimensional Comparison Test for the First Five Cognitive Processes*

I	J	i-j	P value	Indication
Test 1	Test 2	3.14	0.000	Significant
	Test 3	1.1	0.014	Significant
	Test 4	1.3	0.002	Significant
	Test 5	2.06	0.000	Significant
Test 2	Test 1	-3.14	0.000	Significant
	Test 3	-2.04	0.000	Significant
	Test 4	-1.84	0.000	Significant
	Test 5	-1.08	0.016	Significant
Test 3	Test 1	-1.1	0.014	Significant
	Test 2	2.04	0.000	Significant
	Test 4	0.2	0.981	not significant
	Test 5	0.96	0.048	Significant
Test 4	Test 1	-1.3	0.002	Significant
	Test 2	1.84	0.000	Significant
	Test 3	-0.20	0.981	not significant
	Test 5	0.76	0.196	not significant
Test 5	Test 1	-2.06	0.000	Significant
	Test 2	1.08	0.016	Significant
	Test 3	-0.96	0.048	Significant
	Test 4	-0.76	0.196	not significant

Table (7) shows that:

1- Concerning the sustained attention test, the results show that the students have a good ability to retain attentional focus on meaningful stimuli for a long period since the calculated values of (i-j) for this test in comparison with the other four tests namely: sequential processing, visual discrimination, visual span, and comprehension are (3.14, 1.1, 1.3, 2.06) respectively. This means that the arithmetic mean of the sustained attention process is higher than the four other processes and this, in turn, means that the students have a high level of cognitive awareness in recognizing words and sentences regarding this process. To confirm the result, the p-value is calculated and has been found (0.000) which is lower than the level of significance so, the results are significant and this process is founded at the first level or the highest in the students' cognitive processes awareness.
2- For the sequential processing test, the results show that the students do not have a good mental ability to integrate and comprehend stimuli sequentially if it is compared with visual discrimination, visual span, and comprehension due to the calculated value of (i-j) for these three tests namely: visual discrimination, visual span and comprehension which are (- 2.04, - 1.84, - 1.08) respectively. This means that the arithmetic mean of the sequential processing process is the lower than that of these processes and this, in turn, means that the students have a low level of cognitive awareness in recognizing words and sentences regarding the other processes. To confirm this result, the p-value is calculated and has been found (0.000) which is lower than the significance level so, the results are significant and the sequential

processing process is founded the lowest in the students' cognitive processes awareness.

3- Regarding the visual discrimination test, the results show that the students have a good cognitive ability to distinguish between objects, shapes, and symbols, and to classify them since the calculated values of (i-j) for the visual discrimination in comparison with the other remaining tests visual span and comprehension are (0.2, 0.96) respectively. This means that the arithmetic mean of the visual discrimination is higher in comparison with the visual span process and comprehension process. This in turn means that the students have a good level of cognitive awareness in recognizing words and sentences regarding this process. To confirm this result, the p-value is calculated and has been found (0.000) which is lower than the significance level and the result is significant, except that it founded non-significant regarding the visual span process test and this means that they are equal, yet it is higher than visual span process since the i-j is (0.2).
4- Concerning the visual span process, the results show that the students have good cognitive awareness in recognizing words and sentences compared with the comprehension process since the calculated value of (i-j) for this process is (0.76). This means that the visual span is higher than the comprehension process. To confirm this, result the p-value is calculated and has been found (0.000) which is lower than the significance level (0.05), but it founded non- significant regarding the comprehension process test and this means that they are equal, yet it is higher than comprehension process since the i-j is (0.196).

4.1.2 The Results of the Students' Responses for the Second Classification of the Cognitive Processes

The student's responses to this part of the cognitive processes test are assessed to meet the study's goals and answer its questions. Table (8) shows the Arithmetic, Hypothetical statistical analysis.

Table (8): The Overall Grade of Level for the Five First Cognitive Processes

The overall cognitive processes	The overall grade of the level	number of paragraphs	Arithmetic mean	hypothetical mean	standard deviation	t-test value	P Value	Indication
	50	50	33.06	31	6.03	54.83	0.000	Significant

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Table (8) shows that the Arithmetic means of the overall students' responses in this test is (33.06) which is statistically higher than that of the hypothetical mean which is (31) this means that the students have good cognitive awareness in recognizing words and sentences regarding this part of cognitive processes test. Moreover, to confirm this result the t-value for one independent sample has been calculated which is (54.83) and to know the significance of this value the P-value which is (0.000) has been found lower than the level of significance (0.05) and this, in turn, means that the t-value is statistically significant. To find out the students' responses to each test (item) of the cognitive processes awareness, the following table states each type of the cognitive process.

Table (9) *The Arithmetic Mean and Hypothetical Mean of the Students' Responses in the Last Five Cognitive Processes*

Levels	The overall grade of the level	number of paragraph	Arithmetic mean	hypothetical mean	standard deviation	t- test value	p-value	Indication
Test 6	10	10	6.61	5.5	1.75	37.859	0.000	Significant
Test 7	10	10	5.51	5.5	1.91	28.855	0.000	Significant
Test 8	10	10	5.96	6	1.90	31.349	0.000	not significant
Test 9	10	10	5.86	5.5	2.59	22.593	0.000	Significant
Test 10	10	10	9.12	6	1.48	61.663	0.000	Significant

Table (9) shows that:

1- The Arithmetic mean of the students' responses to the phonological processing test is (6.61) which is statistically higher than that of the hypothetical mean which is (5.5) this means that the students have a good cognitive awareness of phonology and recognizing words and sentences. Moreover, to confirm this result the t-value for one independent sample has been calculated which is (37.859) and to know the significance of this value the P-value which is 0.000 has been found lower than the significance level of 0.05 and this, in turn means that the t-value is statistically significant.

2- The Arithmetic mean of the students' responses to the syntactic awareness test is (5.51) which is statistically higher than that of the hypothetical mean which is (5.5) this means that the students have a

good cognitive awareness of syntax and recognizing words and sentences. Moreover, to confirm this result the t-value for one independent sample has been calculated which is (28.855) and to know the significance of this value the P-value which is 0.000 has been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

3- The Arithmetic mean of the students' responses to the semantic processing test is (5.96) which is statistically lower than that of the hypothetical mean which is (6) this means that the students do have not a good cognitive awareness of semantics and recognizing words and sentences. Moreover, to confirm this result the t-value for one independent sample has been calculated which is (31.349) and to know the significance of this value the P-value which is 0.000 has been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically not-significant.

4- The Arithmetic mean of the students' responses to the morphological awareness test is (5.86) which is statistically higher than that of the hypothetical mean which is (5.5) this means that the students have a good cognitive awareness of morphology and recognizing words and sentences. Moreover, to confirm the result, the t-value for one independent sample has been calculated which is (22.593) and to know the significance of this value the P-value that is 0.000 has been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

5- The Arithmetic mean of the students' responses to the orthographic processing test is (9.12) which is statistically higher than that of the hypothetical mean which is (6) this means that the students have a good cognitive awareness of spelling and recognizing words and

sentences. Moreover, to confirm this result the t-value for one independent sample has been calculated which is (61.663) and to know the significance of this value the P-value that is 0.000 has been found lower than the significance level of 0.05 and this, in turn, means that the t-value is statistically significant.

To find out if there are any differences among students' types of cognitive processes awareness among this classification, an ANOVA test is used and the results are presented in Table (10) below:

Table (10)*: The Contrast Source, df, t-test, p-value for the second classification of the cognitive processes*

Contrast source	Sum of Squares	Df	Mean Square	F Value	P Value	Indication
Levels of cognitive processes	849.508	4	212.377	55.236	0.000	Significant

Table (10) shows that the F-ratio of the students' cognitive processes awareness in these five tests has been calculated which is (55.2356) and to find out its significance the P-value is compared with the level of significance in which the P-value is found to be (0.000) which is lower than the level significance and this means that the F-ratio is significant and this, in turn, means that there are differences among this second classification of the cognitive processes.

To identify the source of difference among these five types of cognitive processes and their directions. Schaffer test is applied for past comparisons and the results are shown in Table (11) below:

Table (11)*: Scheffe's Dimensional Comparison Test for the Last Five Cognitive Processes*

I	J	i-j	P value	Indication
Test 6	Test 7	1.1	0.004	Significant
	Test 8	0.65	0.242	not significant
	Test 9	0.75	0.122	not significant
	Test 10	-2.51	0.000	Significant
Test 7	Test 6	-1.10	0.004	Significant
	Test 8	-0.450	0.621	not significant
	Test 9	-0.35	0.810	not significant
	Test 10	-3.61	0.000	Significant
Test 8	Test 6	-0.65	0.242	not significant
	Test 7	0.45	0.621	not significant
	Test 9	0.10	0.998	not significant
	Test 10	-3.16	0.000	Significant
Test 9	Test 6	-0.75	0.122	not significant
	Test 7	0.35	0.810	not significant
	Test 8	-0.10	0.998	not significant
	Test 10	-3.26	0.000	Significant
Test 10	Test 6	2.51	0.000	Significant
	Test 7	3.61	0.000	Significant
	Test 8	3.16	0.000	Significant
	Test 9	3.26	0.000	Significant

Table (11) shows the following:

1- Concerning the phonological processing test, the results show that the students have good cognitive awareness in recognizing words and sentences regarding this process since the calculated values of (i-j) for this process in comparison with the other four tests namely: syntactic awareness, semantic processing, morphological awareness, and

orthographic processing are (1.1, 0.65, 0.75, - 2.51) respectively. This means that the athematic mean of the phonological processing is higher than the other tests except that of orthographic processing which is higher than it, and this, in turn, means that the students have a high level of phonological processing awareness. To confirm this result, the p-value is calculated and has been found (0.000) which is lower than the significance level so, the results are significant, but it is not- significant when compared with semantic processing and morphological awareness, they are equal.

2- Regarding the syntactic awareness test, the results show that the students do not have good cognitive awareness in recognizing words and sentences regarding this process since the calculated values of (i-j) for this process in comparison with the other tests namely: semantic processing, morphological awareness, and orthographic processing are (- 0.450, - 0.35, - 3.61) respectively. This means that the athematic mean of the phonological processing is lower than the other tests. Moreover, this, in turn, means that the students have a low level of syntactic awareness process. To confirm the result, the p-value is calculated and has been found (0.000) which is lower than the significance level so, the results are significant, but it is found not-significant when compared with semantic processing and morphological awareness they are equal.

3- For the semantic processing test, the results show that the students have good cognitive awareness in recognizing words and sentences regarding this process since the calculated values of (i-j) for this process in comparison with the other tests namely: morphological awareness and orthographic processing are (0.10, - 3.16) respectively. This means that the athematic mean of the semantic processing is

higher than the morphological awareness process but lower than the orthographic processing process. This, in turn, means that the students have a high level of syntactic awareness process. To confirm this, result the p-value is calculated and has been found (0.000) which is lower than the significance level so, the results are significant, but it is found not- significant when compared with morphological awareness they are equal.

4- The morphological awareness results show that the students have good cognitive awareness in recognizing words and sentences regarding this process since the calculated values of (i-j) for this process in comparison with the other tests is (- 3.26). This means that the athematic mean of morphological awareness is lower than orthographic processing. This, in turn, means that the students have a high level of cognitive awareness regarding orthographic processing. To confirm this, result the p-value is calculated and has been found (0.000) which is lower than the significance level so, the results are significant.

4.1.3 The Most Prominent Cognitive Processes Used by the Students in Recognizing Words and Sentences

The students' responses to the cognitive processes test are assessed to meet the study goals and answer its questions. Table (12) shows the arithmetic and hypothetical statistical analysis.

Table (12): The Overall Grade of the Cognitive Processes, The Arithmetic and Hypothetical mean, t-test, p-value

cognitive processes	The overall grade of the level	number of paragraphs	Arithmetic mean	hypothetical mean	standard deviation	t-test value	P Value	Indication
	100	93	61.51	58	11.18	55.03	0.000	Significant

Table (12) shows that the Arithmetic means of the overall grade for the students in all the tests is (61.51) which is statistically higher than that of the hypothetical mean which is (58) this means that the students have good cognitive awareness in recognizing words and sentences regarding the cognitive processes tests. Moreover, to confirm the result the t-value for one independent sample has been calculated which is (55.03) and to know the significance of this value the P-value that is 0.000 has been found lower than the level of significance of 0.05 and this, in turn, means that the t-value is statistically significant. To find out the most common cognitive processes that are used by the students, the following table states each type of the cognitive process.

Table (13) *Most Used Cognitive Processes*

I	J	I – j	P value	Indication
Test 1	Test 2	3.14	0.000	Significant
	Test 3	1.10	0.002	Significant
	Test 4	1.30	0.021	Significant
	Test 5	2.06	0.000	Significant
	Test 6	0.60	0.899	Significant not
	Test 7	1.70	0.000	Significant
	Test 8	1.25	0.035	Significant
	Test 9	1.35	0.013	Significant
	Test 10	-1.91	0.000	Significant
Test 2	Test 3	-2.04	0.000	Significant
	Test 4	-1.84	0.000	Significant
	Test 5	-1.08	0.016	Significant
	Test 6	-2.54	0.000	Significant
	Test 7	-1.44	0.004	Significant
	Test 8	-1.89	0.000	Significant
	Test 9	-1.79	0.000	Significant
	Test 10	-5.05	0.000	Significant
Test 3	Test 4	0.20	0.981	Significant not
	Test 5	0.96	0.048	Significant
	Test 6	-0.50	0.968	Significant not
	Test 7	0.60	0.899	Significant not
	Test 8	0.15	1	Significant not
	Test 9	0.25	1	Significant not
	Test 10	-3.01	0.000	Significant
	Test 5	0.76	0.196	Significant not
	Test 6	-0.70	0.77	Significant not

Test 4	Test 7	0.40	0.993	Significant not
	Test 8	-0.05	1	Significant not
	Test 9	0.05	1	Significant not
	Test 10	-3.21	0.000	Significant
Test 5	Test 6	-1.46	0.004	Significant
	Test 7	-0.36	0.997	Significant not
	Test 8	-0.81	0.573	Significant not
	Test 9	-0.71	0.754	Significant not
	Test 10	-3.97	0.000	Significant
Test 6	Test 7	1.10	0.004	Significant
	Test 8	0.65	0.242	Significant not
	Test 9	0.75	0.122	Significant not
	Test 10	-2.51	0.000	Significant
Test 7	Test 8	-0.45	0.621	Significant not
	Test 9	-0.35	0.810	Significant not
	Test 10	-3.61	0.000	Significant
Test 8	Test 9	0.10	0.998	Significant not
	Test 10	-3.16	0.000	Significant
Test 9	Test 10	-3.26	0.000	Significant

Table (13) shows that:

1- Concerning the sustained attention process, the results show that this test is higher than the other tests. Therefore, the students have a good cognitive ability to recognize words and sentences. Regarding this process, the calculated values of (i-j) for this process in comparison with the other processes are (3.14, 1.10, 1.30, 2.06, 0.60, 1.70, 1.25, 1.35, -1.91) respectively. This means that the arithmetic mean of the sustained attention process is higher than the other processes except that of the orthographic processing, which in turn, means that the students have a higher level of sustained attention awareness. To

confirm this result, the P-value is calculated and has been found (0.000) which is lower than of significance level. Then, the results are significant, but it is not significant when compared with the phonological processing, they are equal.

2- Relating to the sequential processing, the results show that this test is the lowest when compared with the other tests. Therefore, the students do not have a good cognitive ability in recognizing words and sentences. Regarding this process since the calculated values of (i-j) for this process in comparison with the other processes are (-2.04, -1.84, -1.08, -2.54, -1.44, -1.89, -1.79, -5.05) respectively. This means that the arithmetic mean of the sequential processing is lower than the other processes, which in turn, means that the students have a poor level of awareness regarding this process. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the significance level. Then, the results are significant, and all the processes are higher than this process.

3- For the visual discrimination process, the results show that this test is higher than the other tests. Therefore, the students have a good cognitive ability to recognize words and sentences regarding this process since the calculated values of (i-j) for this process in comparison with the other processes are (0.20, 0.96, -0.50, 0..60, 0.15, 0.25, -3.01) respectively. This means that the arithmetic means of the visual discrimination process is higher than the other processes except that of the phonological processing and the orthographic processing, which in turn, means that the students have a higher level of visual discrimination awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the level of significance. Then, the results are significant, but it is not significant

when compared with the visual span, phonological processing, syntactic awareness, semantic processing, and morphological awareness they are equal.

4- Regarding the visual span process, the results show that this test is higher than the other tests. Therefore, the students have a good cognitive ability in recognizing words and sentences. Regarding this process since the calculated values of (i-j) for this process in comparison with the other processes are (0.76, -0.70, 0.40, -0.05, 0.05, -3.21) respectively. This means that the arithmetic mean of the visual span process is higher than the other processes except that of the phonological processing, semantic processing and orthographic processing, which in turn, means that the students have a good level of cognitive awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the level of significance. Then, the results are significant, but it is not significant when compared with comprehension, syntactic awareness, semantic processing, and morphological awareness they are equal.

5- For the comprehension process, the results show that this test is lower than the other tests. Therefore, the students have a poor cognitive ability in recognizing words and sentences. Regarding this process, the calculated values of (i-j) for this process in comparison with the other processes are (-1.46, -0.36, -0.81, -0.71, -3.97) respectively. This means that the arithmetic mean of the comprehension process is lower than the other processes, which in turn, means that the students do not have a good level of cognitive awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the significance level. Then, the results are significant, but it is not

significant when compared with syntactic awareness, semantic processing, and morphological awareness they are equal.

6- In the phonological processing, the results show that this test is higher than the other tests. Therefore, the students have a good cognitive ability in recognizing words and sentences. Regarding this process, the calculated values of (i-j) for this process in comparison with the other processes are (1.10, 0.65, 0.75, -2.51) respectively. This means that the arithmetic mean of the phonological processing is higher than the other processes except that of the orthographic processing, which in turn, means that the students have a good level of cognitive awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the significance level. Then, the results are significant, but it is not significant when compared with semantic processing, and morphological awareness they are equal.

7- With reference to the syntactic awareness process, the results show that this test is lower than the other tests. Therefore, the students do not have a good cognitive ability in recognizing words and sentences. Regarding this process, the calculated values of (i-j) for this process in comparison with the other processes are (-0.45, -0.35, -3.61) respectively. This means that the arithmetic mean of the syntactic awareness process is lower than the other processes, which in turn, means that the students have a bad level of cognitive awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the significance level. Then, the results are significant, but it is not significant when compared with semantic processing, and morphological awareness they are equal.

8- With regard to semantic processing, the results show that this test has a high level. Therefore, the students have a good cognitive ability in recognizing words and sentences. Regarding this process, the calculated values of (i-j) for this process in comparison with the other processes are (0.10, -3.16) respectively. This means that the arithmetic mean of the semantic processing is higher than the other processes except that of the orthographic processing, which in turn, means that the students have a good level of cognitive awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the significance level. Then, the results are significant, but it is not significant when compared with morphological awareness they are equal.

9- As for the morphological awareness process, the results show that this test has a high level. Therefore, the students have a good cognitive ability in recognizing words and sentences. Regarding this process the calculated values of (i-j) for this process in comparison with the other process is (-3.26) respectively. This means that the arithmetic mean of the morphological awareness process is higher than the other processes except that of the orthographic processing, which in turn, means that the students have a good level of cognitive awareness. To confirm this result, the P-value is calculated and has been found (0.000) which is lower than the level of significance. Then, the results are significant.

4.1.4 The Difference between the Students' Responses to the levels of Production and Recognition

Concerning the disparity in awareness among university students in terms of production and recognition of words and sentences among all cognitive processes tests. These tests' findings have been computed and statistically displayed in Table (14) below:

Table (14): Production& Recognition Comparison in Recognizing Words and Sentences

Levels	Number of Items	Arithmetc mean	Variane	Df	t-test value		Statistical Significance at(0.05)
Production	43	28.45	6.63	198	t-value	p-value	Significance
Recognition	50	33.06	6.03		5.143	0.000	

The table shows that when the researcher compares the degrees of production levels with the degrees of levels of recognition, it is clear that the arithmetic means of production reached (28.45) with a standard deviation of (6.63), while in recognition the arithmetic mean reached (33.06) with a standard deviation of (6.03). After applying the t-test equation for the two independent samples, the t-value reached (5.143) at the significance level (0.000), and this indicates the existence of a statistical difference between the levels of production and recognition.

In favor of the levels of recognition, that is, the students appeared that they have a higher level of cognition than production, and this is

because production requires higher mental processes and higher-order thinking, as opposed to understanding and cognition, which do not necessarily require these higher cognitive processes. There is another reason attributed to the emergence of such a result, which is the reliance of students in all their university study stages on the useless method of memorization and indoctrination to show their basic cognitive abilities in the learning process. The educational systems that are used at the universities are very old-fashioned and cannot enhance the cognitive abilities and qualifications of the students, and that can be another reason why the students' results come to be like this.

4.2 The Discussion

The current discussion and conclusions are based on the outcomes presented in the previous sections of this chapter. To reach suitable findings, the study's research questions, which are defined in the first chapter, are explored independently in the following parts.

4.2.1 Answering the First Research Question

Concerning the first question, "What are the cognitive processes used by undergraduate students in recognizing words and sentences?" The results demonstrate that the students have such a mid-way level of cognitive awareness and cognitive differences in recognizing words and sentences although their arithmetic means exceed the hypothetical ones. This outcome can be attributable to a variety of factors and reasons. Firstly, the researcher notice that there are individual differences in the use of the cognitive processes among the students, and that leads to the

fact that there are cognitive processes that have been used more than the rest and thus excel over them.

The results show that the students, with all their responses to the concerned questions, used all the cognitive processes, which are (sustained attention, sequential processing, visual discrimination, visual span, comprehension, phonological processing, syntactic awareness, semantic processing, morphological awareness, and orthographic processing) that included in this study, but there is a slight change in the percentage of their use. Perhaps this is because students may face many difficulties and struggles in using those processes or do not have enough awareness of the correct way in using them.

Despite the importance of these cognitive capabilities, they have been neglected by the supervisors and instructors in universities and did not give any sufficient importance. The only solution is to make the students well aware of the right way to use their cognitive abilities and cognitive processes and help them develop them through successive research on these processes and how to develop and how to encourage the instructors to use them and applied them properly during teaching.

4.2.2 Answering the Second Research Question

In terms of the second question, “What are the most dominant and less dominant cognitive processes used by undergraduate students in recognizing words and sentences?" The findings show that the students engage a variety of cognitive processes that are dominant and less dominant in identifying words and sentences. Throughout the results, the researcher can discover the superiority of some cognitive processes that were used by the students over other processes. The researcher finds out the following:

1- Concerning the sustained attention process, the students show a high cognitive ability using this process. Its result was the highest when compared with the other processes. This process is concerned with what happens when our minds wander halfway through a word or between words, causing us to have to restart the decoding process. Therefore, in applying this process the student needs to be focused on the given material and try to keep his/her mind ignoring any other distractions and inhabit attention shifts to irrelevant activities. When the students answer the test that relates to this cognitive process, they show a high degree of concentration and understanding. This means that students have a good awareness of recognizing words and sentences at this level of processing.
2- Concerning the sequential processing, the students show a low cognitive ability using this process. Its result was the lowest when compared to the other cognitive processes. This process is mainly concerned with how the decoding process will be affected if the learner cannot keep the letters or words in the appropriate order when they enter their brains. The students show a poor cognitive ability in using and recognizing words and sentences and putting them in the correct order. This means that the students who have reading disabilities and this will lead us to conclude that some students who suffer from dyslexia, which is a common learning difficulty.
3- The visual discrimination process result shows that the students have a mid-way cognitive ability using this process. This process is mainly concerned with the ability of the learner's brain to discern some sounds or words from others in a fraction of a second for decoding to be successful. Therefore, the researcher conclude that the students

have a poor cognitive awareness in recognizing and discerning words and sentences.

4- In the case of the visual span process, the students also show a mid-way cognitive ability in recognizing words and sentences using this process. Visual span refers to the amount of information that the learner may absorb in a single glance. This means that the students show a little cognitive awareness and attention to the information given to him/her.

5- Regarding the comprehension process, the students show a mid-way cognitive ability in recognizing words and sentences. Comprehension is the ability to comprehend and interpret what the learner has read and why he/ she read in the first place. Regarding this process, the result was good and acceptable among the others. However, year after year, teachers and students grapple with this issue. Therefore, more attention should be given to this process because it is essential in the process of learning.

6- The phonological processing result shows a high and good cognitive awareness that the students have. The students show a high ability to associate words with sounds and are capable of recognizing words and sentences regarding this process. The students seem to practice well and develop this ability by using Roach's book (2009).

7- Concerning the syntactic awareness process, students' responses are also located mid-way. That is, they have some ability to formulate the syntactic structures of their words and sentences to prevent any potential grammatical mistakes. One reason for their lack of skill is that they do not notice the internal grammatical structure of phrases. Word-order correction tasks need not just linguistic skills but also

active memory: word clusters must be precisely stored and reassembled to generate structurally right sentences.

8- In terms of semantic processing, learners achieve acceptable results in determining the appropriate responses of the semantic units. It is worth noting that such awareness is built on the recognition of words and sentences. Furthermore, most students keep a large number of words in their mental lexicon in terms of sense relationships, i.e. synonyms. They have a decent methodology for separating these difficulties. As a result, they allow them to pass the test, but they must improve such skills to achieve the greatest results.

9- Students receive high marks for morphological awareness since this cognitive process is seen as straightforward and uncomplicated, as well as the ones who are well acquainted with morphemes that are deemed tangible and observable.

10- In terms of orthographic processing, students receive high marks because this cognitive process is regarded as simple and easy process for them, as well as students who are highly acknowledged for recognizing misspelt words and sentences and correcting them, both of which are regarded as concrete and observable.

4.2.3 Answering the Third Research Question

Concerning the third question, namely “How do psycholinguistic roles affect word and sentence recognition concerning cognitive processes?" Through this study, the results showed that psycholinguistics has a lot to do with the cognitive processes and reading skills. In the processes of gaining any information, the students will deal with two important processes which they are bottom-up processing so as to emphasize the comprehension activity and top- down processing to stress

the fact that recognizing words and sentences rest primarily on the students' knowledge base. The students' mental capabilities were mid-way in answering the tests' questions, so that can be as a result of the bad comprehension or understanding for the questions' items.

4.2.4 Answering the Fourth Research Question

Concerning the fourth and last question, namely “What is the difference between recognition and production of words and sentences by manipulating the cognitive processes?” The result reveals that the process of recognition shows a higher level than production due to many reasons. In favour of the levels of recognition, that is, the students appeared that they have a higher level of cognition than production, and this is since production requires higher mental processes and higher-order thinking, as opposed to understanding and cognition, which do not necessarily require these higher cognitive processes. There is another reason attributed to the emergence of such a result, which is the reliance of students in all their university study stages on the useless method of memorization and indoctrination to show their basic cognitive abilities in the learning process.

Chapter Five

Conclusions, Pedagogical Recommendations, Further Suggestions

5.0 Introductory Notes

This chapter draws several conclusions and findings of the research. Later, a set of recommendations and suggestions have been made for pedagogical purposes and possible extensions of the present research.

5.1 Conclusions

According to the results obtained from the research, the following conclusions have been drawn:

1- According to the students' responses, the analytical results show that the students have a good level of awareness of their cognitive abilities, but still they need to improve this knowledge by developing their reading and comprehending skills.
2- The test results show the presence of the individuals' differences in using their cognitive processes to recognize words and sentences. The emergence of these differences in the use of the cognitive processes is due to the disparity of mental ability possessed by each student.
3- The results show that some cognitive processes appeared or were used more than the other processes, such as the process of sustained attention, comprehension, phonological processing, and orthographic processing. Although these cognitive processes can be developed by letting the students

familiar with them or giving them more quizzes or tests to develop their ability in using such processes.

4- The test results showed that the students manifested a mid-way and weakness in using other cognitive processes such as sequential processing, comprehension, visual span, visual discrimination, syntactic awareness, semantic processing, and morphological awareness. This may be because of that students have a weak level of attention and comprehension in recognizing words and sentences regarding these processes.

5- During the process of analyzing the results, there were clear differences between the students' ability at the recognition and production level in recognizing words and sentences. The results show a high cognitive awareness of the last five cognitive processes, which require a high cognitive ability, as well as the students need not think for a long time and use a great mental effort. While solving the questions that need a kind of production ability, the students' need all those factors and imagination to add some information by using their thinking and cognitive abilities.

5.2 Pedagogical Recommendations

1- It is beneficial for the university instructors to focus on and pay attention to their students' cognitive awareness, and mental competence in reading skills, particularly in recognizing words and sentences. As a result, instructors may rely on common methods such as searching and learning to uncover and improve certain cognitive processes while also encouraging students to express themselves and appreciate the concept of individual differences among them.

2- Moreover, University instructors can attend particular seminars, articles, research studies, technology and everything that deal with the psychological aspects and new methods to improve their understanding of cognitive processes and how to cope with them.
3- Students should learn how to use the concept of cognitive processes, especially which related to attention, perception, thinking, and comprehension because they are essential to developing the students' brains.
4- For the undergraduate students, they have to gain the capability and enough awareness to make use of their cognitive processes and change their old-fashioned ways of the learning process in recognizing words and sentences.
5- Each student needs to find his/ her strengths and weak points to develop it. Cognitive processes are important and integral part of the educational process; the students should alert their instructors to the need to the necessity of these processes in their study. The instructors can find that throughout a periodical tests.
6- Likewise, students should pay attention to their mental health, as any defects will affect the processes of cognition, attention, perception, comprehension, and cognitive awareness.
7- Regarding the continuous evaluation in the world and since science is in a process of continuous progression of finding modern alternatives to enhance the students' cognitive processes to increase their awareness and mental abilities, the Ministry of Higher Education must take serious steps in terms to develop the teaching methods at universities and focus on the cognitive processes.
8- Developing the students' skills and giving them a kind of freedom and sufficient space for production. Never restricting them to a certain

academic content that shapes their brains, and their thinking ability, and will not benefit them in their practical life in the future.

5.3 Suggestions for Further Research

The following is a group of suggestions that are worthy to be investigated:

1- A study on the cognitive awareness and its importance in the educational process.
2- A similar study can be conducted at universities for both sexes (males& females).
3- A study can illustrate on mental health for the students and its prominent role in the process of education for them.
4- A study can be related to investigate the individual differences in learning ability among undergraduate students.

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Appendices

Appendix (A)

A letter to the Jury Member

Dear Mr. and Mrs.

The researcher intends to conduct a study entitled "A Psycholinguistic Study of the Cognitive Processes Used by Undergraduate Students". The study aims at finding out:

1- Undergraduate students' awareness of the cognitive processes in recognizing words and sentences.
2. Finding out the role of psycholinguistics and how it affects the words and sentences recognition in relation to cognitive processes.
3- The most usable cognitive processes used by undergraduate students in recognizing words and sentences.
4- The difference between recognition and production of words and sentences concerning the cognitive processes.

I would appreciate it if you, as a linguistics and ELT expert, could decide on the acceptability of the given test. Any suggestions for improvements or changes would be much welcome. Thank you in advance for your cooperation and assistance.

M. A. Candidate
Fatima R. Jabbar

Appendix (B)

List of Jury Members

No.	Academic Rank	Name	Place of Work
1	Prof.	Abbas Luttfy	College of Education, Al- Iraqia University
2	Instructor	Athraa Ali Hussein	College of Educcation, Misan University
3	Asst. Prof.	Faris Kadhim Te'ama	College of Education for Human Sciences, Wasit University
4	Asst. Prof.	Fatima Raheem Abd Al-Hussein	College of Basic Education, Misan University
5	PhD.	Haider Kadhim Khudair	College of Education for Human Science, Karbala University
6	PhD.	Mazin Al-Hulu	College of Arts, Wasit University
7	Asst. Prof.	Mohammed Nassir	College of Education for Human Science, Wasit University
8	PhD.	Nadiah Majeed	College of Education, Al- Iraqia University
9	PhD.	Qassim Hammadi Al-Ibadi	College of Education for Human Science, Wasit University
10	Asst. Prof.	Sabeeha Daham	College of Basic Education, University of Babylon

Appendix (C)

Tests Items

Test 1: Sustained attention

Q) Read the passage carefully, and then answer the following questions:

Few countries will admit officially that they employ spies. However, from time to time, a spy is caught and the public sometimes gets a glimpse of what is going on behind the political scenes. Spies are rarely shot these days. They are frequently tried and imprisoned. If a spy is important enough, he is sometimes handed back to an enemy have caught. Few people have the opportunity to witness such exchanges, for they are carried out in secret. One cold winter morning on December 17th, last year, a small blue car stopped on a bridge in a provincial heavy black coats got out and stood on the bridge. While they waited there, they kept on looking over the side. Fifteen minutes later, a motorboat sailed past and drew up by the riverbank. No words were spoken when they met the men from the boat. After a while, moved off and three men returned to the bridge. Now, only two of them were wearing black coats. The third was dressed in a light grey jacket. Anyone who had been watching the scene might not have realized that two master spies had been exchanged on that cold winter morning.

- **Now answer these questions briefly and correctly:**

1- Did the car stop or not?

2- How many men get out?

3- How were they dressed?

4- Where did they keep looking?

5- Where did they stand?

6- Did a motorboat appear or not?

7- Where did the motorboat stop?

8- Where did the men go?

9- Why did they go to the riverbank?

10- Did the boat move off or not?

List of correct answers

1- Car stopped.

2- Three men got out.

3- Black coats.

4- Looked over side.

5- Stood- on the bridge.

6- Motorboat appeared.

7- Stopped – Riverbank.

8- Men- Down steps.

9- Met boat.

10- Boat moved off.

Test 2: Sequential Processing

Q) The sentences below are about what English people eat, but they are in the wrong order. Read the sentences and decide on the best order.

For breakfast, most people have just cereal and maybe toast and jam. English food has a bad reputation. For many people, lunch is a quick meal at about 1.00 pm. It is not a time to relax, because we are too busy at work or at school. It is true that, for many years, food in Britain was not good. The evening meal is our main meal. We do not eat late. Every high

street in Britain has an Indian restaurant and a Chinese restaurant. In London, there are restaurants from all over the world. Sunday lunch is traditionally the one time in the week when the family eats together.

-Write the sentences in order here:

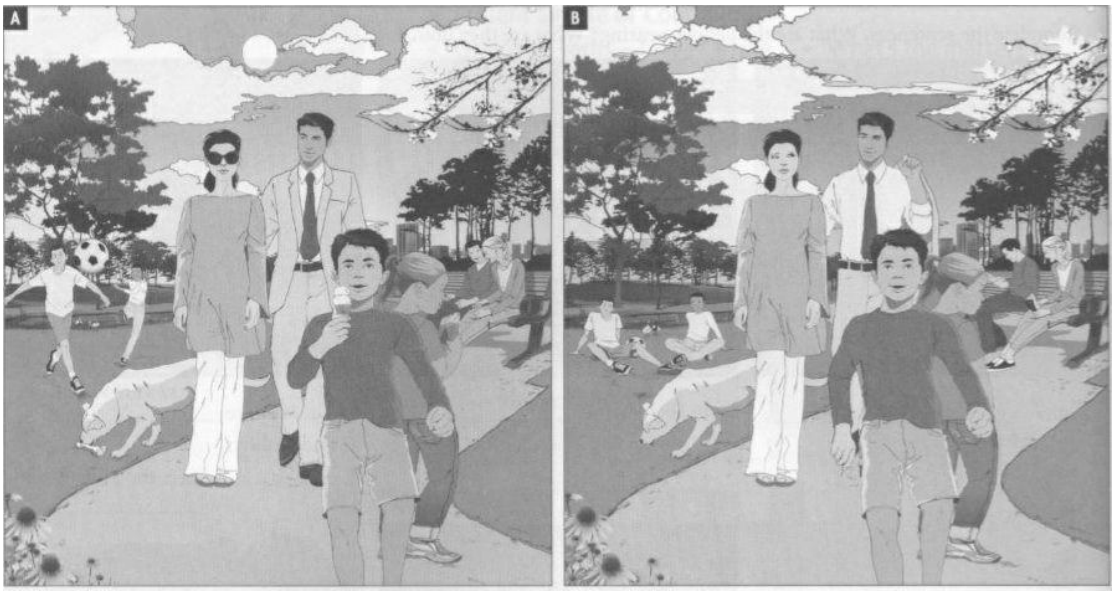
1- ----------
2- ----------
3- ----------
4- ----------
5- ----------
6- ----------
7- ----------
8- ----------
9- ----------
10- ----------

List of the correct answers:

1- English food has a bad reputation.
2- It is true that, for many years, food in Britain was not good.
3- For breakfast, most people have just cereal and maybe toast and jam.
4- For many people, lunch is a quick meal at about 1.00 pm.
5- It is not a time to relax, because we are too busy at work or at school.
6- The evening meal is our main meal.
7- We do not eat late.
8- Sunday lunch is traditionally the one time in the week when the family eats together.
9- Every high street in Britain has an Indian restaurant and a Chinese restaurant.
10- In London, there are restaurants from all over the world.

Test 3: Visual Discrimination

Q) Look at the two pictures. Write what is not happening in picture B.



In picture B:

1- The man is ----------.

2- The children ----------.

3- The woman ----------.

4- The boys----------.

5- The sun----------.

6- The ducks----------.

7- The girls----------.

8- The clouds----------.

9- The dog----------.

10- The sky ----------.

List of the correct answers

In picture B:

1- The man is not wearing a jacket.
2- The children are not eating ice cream.
3- The woman is not wearing sunglasses.
4- The boys are not playing football.
5- The sun is not shining.
6- The ducks are not swimming in the pond.
7- The girls are not talking.
8- The clouds are covering the sun.
9- The dog is not eating the bone.
10- The sky is cloudy.

Test 4: Visual Span

Q) Look at each of the following passages carefully, and then try to skim it or retell it properly.

1- Bill Gates is a businessman from the United States. He is the chairman of Microsoft. He has 50$ billion. He is one of the richest men in the world. His wife's name is Melinda, and they have three children. They have a very big house next to a lake in Washington. He and his wife have a charity called Bill and Melinda Gates Foundation. It is a charity for world health and education.
2- Queen Elizabeth II of England is one of the richest women in the world. She has 600$ million. She has a house in Scotland, Balmoral, and a house in Sandringham, in the east of England. She has paintings by Leonardo da Vinci, Raphael, Vermeer, Canaletto, Rubens, Rembrandt, and Monet. She also has many horses. She has four children. Her husband, Prince Philip, is from Greece.

3- Tony has a house in London. ‘Our house is small, but we love it. My wife’s name is Abigail. We both have good jobs. Abigail is a police officer, and I am a teacher. We have two children, Oliver and Jess, and their school is five minutes from our house. We have an older Renault car’. ‘I have some money, but not a lot. We have problems; everyone has problems! But we are happy!’

List of correct answers

1- US businessman Bill Gates is Microsoft's chairman. He owns a fortune of $50 billion dollars. He is a billionaire. Melinda is his wife, and the couple has three children together. In Washington, they live in a large mansion by a lake. Bill and Melinda Gates Foundation is a foundation founded by him and his wife. It is global health and education nonprofit.

2- Queen Elizabeth of England is one of the wealthiest ladies in the world. She is worth 600 million dollars. She owns Balmoral in Scotland and Sandringham in the east of England. She owns works by Leonardo da Vinci, Raphael, Vermeer, Canaletto, Rubens, Rembrandt, and Claude Monet. She also owns a lot of horses. She has four children. Her spouse, Prince Philip, is Greek.

3- Tony owns property in London. 'Our home is little, but we adore it.' Abigail is the name of my wife. We both have decent jobs. Abigail works as a cop, and I am a teacher. We have two children, Oliver and Jess, and their school is only five minutes away. We have an older Renault vehicle.' 'I have a little money, but not much.

Test5: Comprehension

Q) Try to read each of the following points, and then answer them correctly.

1) Read the passage and then choose the best answer to the question. Answer the question based on what is stated or implied in the passage.

In the words of Thomas De Quincey, "it is notorious that the memory strengthens as you lay burdens upon it". If, like most people, you have trouble recalling the names of those you have just met, try this: The next time you are introduced, plan to remember the names. Say to yourself, "I will listen carefully; I will repeat each person's name to be sure I have it, and I will remember". You will discover how effective this technique is and probably recall those names for the rest of your life.

-The passage suggests that people remember names best when they:

1- Are intelligent.
2- Decide to do so.
3- Are interested in people.
4- Meet new people

2) Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- When we write a check that we know is going to "bounce", we are performing a criminal act.
- It is a crime to knowingly write a "bad" check, one we know we do not have sufficient funds to cover.

-What does the second statement do?

1- It provides supporting evidence for the first statement.

2- It provides a contradictory point of view.

3- It restates the central idea of the first sentence.

4-It concludes the first sentence.

3) Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- Paris, France, is a city that has long been known as a center of artistic and cultural expression.
- In the 1920s, Paris was home to many famous artists and writers from around the world, such as Picasso and Hemingway.

-What does the second sentence do?

1- It states an effect

2- It draws a conclusion

3- It provides a contrast

4- It reinforces the first.

4) Read the underlined sentences, and then choose the best answer to the question or the best answer to the question or the best completion of the statement.

- Anthony got a substantial raise at work. He will now have much more work to do.
- How is the second sentence related to the first sentence?

1- It states a consequence.

2- It expands on the first statement.

3- It contrasts the first statement

4- It reinforces the first sentence.

5) Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- Most people collect star-wars toys for sentimental reasons.
- Some people collect them strictly to make money.
- What is the relationship between the two sentences?

1- The first sentence states an idea, and the second sentence explains that idea.

2- The second sentence contrasts with the first sentence.

3- The second sentence repeats the first sentence.

4-The first sentence is the cause, and the second sentence is the effect.

6) You cannot be a hero without being a coward. What does this sentence suggest?

1- Heroes are transformed, cowards.

2- To be truly heroic, you first have to know the meaning of fear.

3-Heroes are cowards in disguise.

4-None of these.

7) Emily has three dogs and two cats. They are all brown, but one of the dogs has spots. His name is Spot.

Now, which of the following is true:

1- Emily has three animals in total.

2- Emily has more cats than dogs.

3- All of Emily's dogs have spots.

4- None of these.

8- The clown pulled silly faces to make the children laugh.
The word ‘silly’ in this sentence means:
1- Funny
2- Bad
3- Tricky
4- Scary

9- Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.
-Public speaking is very different from everyday conversations.

-First of all, speeches are much more structured than a typical informal discussion.

-What does the second sentence do?
1- It shows an exception to the first sentence.
2- It offers support for the statement made in the first sentence
3- It contradicts the statement made in the first sentence.
4- It compares two kinds of speeches.

10-Read the passage and then choose the best answer to the question. Answer the question based on what is stated or implied in the passage.

The internet is very important to the modern world. People use the internet for entertainment, communication, learning, and as a news source. There can also be cons to the internet, as some sociologists worry that people are slowly forgetting how to communicate in person, but the fact remains that the internet is here to stay.

- The main idea of this passage is that the internet:

1- Is it hard to use?

2-Is it an integral part of society?

3-Is it used to entertain?

4-Is it for people who have technology.

List of correct answers

1- Answer: choice number 2.

2- Answer: choice number 2.

3- Answer: choice number 4.

4- Answer: choice number 1.

5- Answer: choice number 3.

6- Answer: choice number 2.

7- Answer: choice number 4.

8- Answer: choice number 1.

9- Answer: choice number 2.

10- Answer: choice number 2.

Test6: Phonological Processing

Q) Tick the word that has a different pronunciation:

Boy	toy	noise	house
Meet	meat	seat	tie
Sing	bring	think	thought
Write	rate	right	might
Girl	set	bird	birth
Pray	cry	play	make
Fan	done	son	but
Psych	make	lake	right
Queue	few	ewe	no
Cat	mat	what	sat

List of correct answers

1- House

2- Tie

3- Thought

4- Rate

5- Girl

6- Make

7- But

8- Lake

9- No

10- What

Test7: Syntactic Awareness

Q) Complete the sentences with the correct form of the verb in brackets:

1- I am sorry. I did not mean ----- (forget) your birthday.

2- I will always remember ----- (receive) my first paycheck.

3- The long-term unemployed often find it difficult ----- (find) a job.

4- We regret----- (tell) you your application has been unsuccessful.

5- Tim denied ----- (break) the window.

6- It took me a while to get used to ----- (live) alone.

7- I adore ----- (spend) time with family and friends.

8- At school, we were made ----- (learn) long poems by heart.

9- We were against the decision ----- (close) the local primary school.

10- Rain had got in through a ----- (break) window.

List of correct answers

1- Forgot

2- To received

3- Find

4- To tell

5- Broke

6- Live

7- Spending

8- Learn

9- Close

10- Broken

Test8: Semantic Processing

Q) Choose a word from the left side that matches the word on the right.

1-

- Words
- People meaning
- Situations

2-

- Distance
- Universe space
- Area

3-

- Gore
- Race blood
- Life

4-

- Culture
- Teaching education
- Travel

5-

- Light
- Place electricity
- Power

6-

- Rating
- Guessing assessment
- Collecting

7-

- Episode
- Event accident
- Incident

8-

- Twist
- Scheme trick
- Deception

9-

- Store
- Wealth treasure
- Value

10-

- Line
- Curl queue
- Column

List of correct answers

1- Words
2- Distance
3- /Life
4- Teaching
5- Power
6- Rating
7- Incident
8- Deception
9- Wealth
10- Line

Test 9: Morphological awareness

Q) Choose the most suitable answer:

1- Which of the following words is opposite in meaning to the remaining three?

a- Overweight
b- Fat
c- Plump
d- Skinny

2- The money you receive every month for your work is your:

a- Wages
b- Salary
c- Pension

d- Profit

3- After you have applied for a job, you may be invited for a (n):

a- Conversation

b- Meeting

c- Qualification

d- Interview

4- In the Departed Leonardo DiCaprio ----- as police officer Billy Costigan.

a- Plays

b- Acts

c- Stars

d- Presents

5- The Lord of The Rings is ------ in an imaginary world called Middle-Earth.

a- Placed

b- Set

c- Situated

d- Based

6- Leave me alone! I do not want to go ------ now.

a- Nowhere

b- Everywhere

c- Anywhere

d- Somewhere

7- Does anybody know how far---- from the city centre?

a- We are

b- We were

c- Are we

d- Were we

8- I have never known anybody ------ is as dedicated to children like you.

a- Which

b- Who

c- Whose

d- That

9- His mother told ------ crying.

a- Him to stop

b- To stop

c- He stops

d- Stop

10- Bread, Pasta and rice are

a- Dairy food

b- Fats

c- Cereal products

d- Junk foods

List of correct answers

1- Skinny

2- Salary

3- Interview

4- Acts

5- Placed

6- Anywhere

7- Are we

8- Who

9- Him to stop

10- Dairy food.

Test10: Orthographic Processing

Q) Correct the spelling mistakes in the paragraph below.

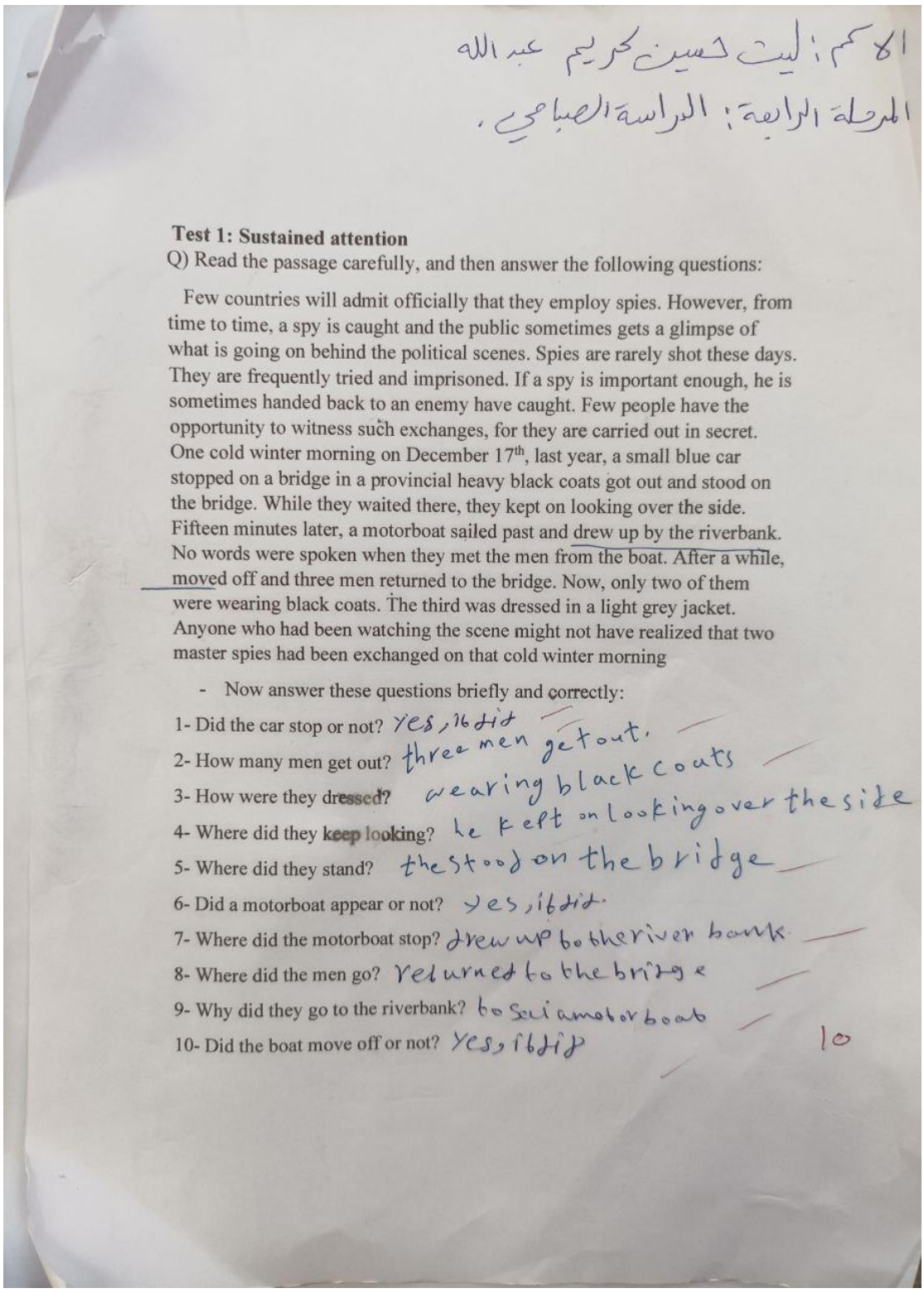
George is new that he should not drink alchohol on a Wedsday night, especially since his govermnet proffesor had schedualed an important exam on Thrusday. However, he beleived he would loose his friends if he did not go out with them. The pressure to fit in with his peers was worst then the fear of bad grades. To be popular among his friends, one had to be either a musclar athlete or a wild and crazy drinker.

List of the correct answers

1- New ------ knew
2- Alchohol----- alcohol.
3- Wedsday----- Wednesday.
4- Govermnet----- government
5- Proffesor-----professor
6- Thrusday----- Thursday
7- Loose----- lose
8- Worst ------- worse
9- Then---- than
10- Musclar----muscular.

Appendix (D)

Sample of the Students Responses to the Test Questions



الاسم: ليث حسين كريم عبد الله
المرحلة الرابعة: الدراسة الصباحي.

Test 1: Sustained attention

Q) Read the passage carefully, and then answer the following questions:

Few countries will admit officially that they employ spies. However, from time to time, a spy is caught and the public sometimes gets a glimpse of what is going on behind the political scenes. Spies are rarely shot these days. They are frequently tried and imprisoned. If a spy is important enough, he is sometimes handed back to an enemy have caught. Few people have the opportunity to witness such exchanges, for they are carried out in secret. One cold winter morning on December 17th, last year, a small blue car stopped on a bridge in a provincial heavy black coats got out and stood on the bridge. While they waited there, they kept on looking over the side. Fifteen minutes later, a motorboat sailed past and drew up by the riverbank. No words were spoken when they met the men from the boat. After a while, moved off and three men returned to the bridge. Now, only two of them were wearing black coats. The third was dressed in a light grey jacket. Anyone who had been watching the scene might not have realized that two master spies had been exchanged on that cold winter morning

- Now answer these questions briefly and correctly:

1- Did the car stop or not? yes, it did
2- How many men get out? three men get out.
3- How were they dressed? wearing black coats
4- Where did they keep looking? he kept on looking over the side
5- Where did they stand? the stood on the bridge
6- Did a motorboat appear or not? yes, it did.
7- Where did the motorboat stop? drew up to the river bank.
8- Where did the men go? returned to the bridge
9- Why did they go to the riverbank? to see a motor boat
10- Did the boat move off or not? yes, it did

10

Test 2: Sequential Processing

Q) The sentences below are about what English people eat, but they are in the wrong order. Read the sentences and decide on the best order.

For breakfast, most people have just cereal and maybe toast and jam. English food has a bad reputation. For many people, lunch is a quick meal at about 1.00 pm. It is not a time to relax, because we are too busy at work or at school. It is true that, for many years, food in Britain was not good. The evening meal is our main meal. We do not eat late. Every high street in Britain has an Indian restaurant and a Chinese restaurant. In London, there are restaurants from all over the world. Sunday lunch is traditionally the one time in the week when the family eats together.

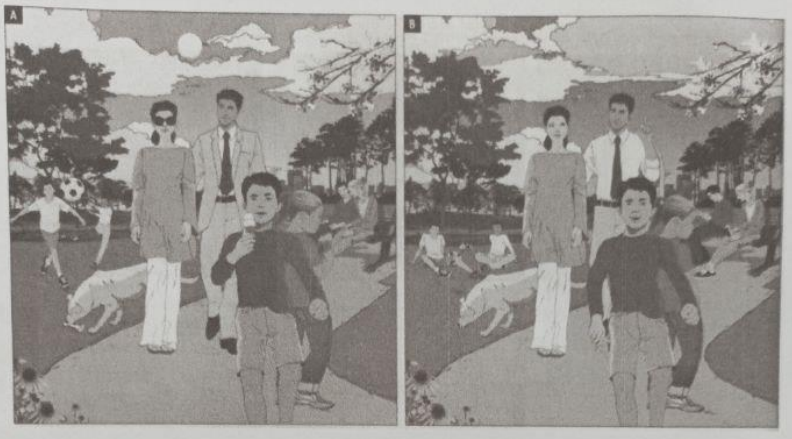
- Write the sentences in order here:

1- ~~the lunch of English~~ People is quick meal at abou
2- ~~for breakfast~~
3- ~~for many People lunch~~
4- ~~sunday lunch is traditionally~~
5- ~~sunday lunch is traditional~~ for many eats together
6- ~~the evening meal is our~~ main meal
7- ~~English food bad~~
8- ~~everyone's eat late~~
9- ~~every high street~~
10- ~~in london there are~~ restaurants

Test 3: Visual Discrimination

Q) Look at the two pictures. Write what is not happening in picture B.

1- the women don't wear glass
2- the boy dont eat icecream



In picture B:

1- The man is wearing a jacket
2- The children playing football
3- The woman ~~don't have~~ glass
4- The boys ~~eat~~ ice cream
5- The sun is biden
6- The ducks ~~watching~~ the group.
7- The girls ~~read the book~~.
8- The clouds ~~if find~~ alot
9- The dog ~~didn't eat the~~ bone
10- The sky ~~full of~~ clouds

7

Test 4: Visual Span

Q) Look at each of the following passages carefully, and then try to skim it or retell it properly.

1- Bill Gates is a businessman from the United States. He is the chairman of Microsoft. He has 50$ billion. He is one of the richest men in the world. His wife's name is Melinda, and they have three children. They have a very big house next to a lake in Washington. He and his wife have a charity called Bill and Melinda Gates Foundation. It is a charity for world health and education.

8

Bill Gates is a businessman from the united states. He is the chairman of Microsoft. His wifes name is Melinda ____.

Queen Elizabeth II of England is one of the richest women in the world - She has a house in Scotland - Her husband Prince Philip is from Greece.

2

2- Queen Elizabeth II of England is one of the richest women in the world. She has 600$ million. She has a house in Scotland, Balmoral, and a house in Sandringham, in the east of England. She has paintings by Leonardo da Vinci, Raphael, Vermeer, Canaletto, Rubens, Rembrandt, and Monet. She also has many horses. She has four children. Her husband, Prince Philip, is from Greece.

Tony has a house in London - he have two children oliver and Jess and their school is five minutes our house.

3- Tony has a house in London. 'Our house is small, but we love it. My wife's name is Abigail. We both have good jobs. Abigail is a police officer, and I am a teacher. We have two children, Oliver and Jess, and their school is five minutes from our house. We have an older Renault car'. 'I have some money, but not a lot. We have problems; Everyone has problems! But we are happy!'

2

Test5: Comprehension

Q) Try to read each of the following points, and then answer them correctly.

1) Read the passage and then choose the best answer to the question. Answer the question based on what is stated or implied in the passage.

In the words of Thomas De Quincey, "it is notorious that the memory strengthens as you lay burdens upon it". If, like most people, you have trouble recalling the names of those you have just met, try this: The next time you are introduced, plan to remember the names. Say to yourself, "I will listen carefully; I will repeat each person's name to be sure I have it, and I will remember". You will discover how effective this technique is and probably recall those names for the rest of your life.

- The passage suggests that people remember names best when they:

1- Are intelligent

2- Decide to do so

3- Are interested in people

4- Meet new people

1/2

2) Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- When we write a check that we know is going to "bounce", we are performing a criminal act.

- It is a crime to knowingly write a "bad" check, one we know we do not have sufficient funds to cover.

* What does the second statement do?

1- It provides supporting evidence for the first statement.

2- It provides a contradictory point of view.

3- It restates the central idea of the first sentence.

4-It concludes the first sentence.

3) Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- Paris, France, is a city that has long been known as a center of artistic and cultural expression.

- In the 1920s, Paris was home to many famous artists and writers from around the world, such as Picasso and Hemingway.

· What does the second sentence do?

1- It states an effect

2- It draws a conclusion

3- It provides a contrast

4- It reinforces the first

4) Read the underlined sentences, and then choose the best answer to the question or the best answer to the question or the best completion of the statement.

- Anthony got a substantial raise at work. He will now have much more work to do.

· How is the second sentence related to the first sentence?

1- It states a consequence.

2- It expands on the first statement.

3- It contrasts the first statement

4- It reinforces the first sentence.

5) Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- Most people collect star-wars toys for sentimental reasons.

- Some people collect them strictly to make money.

· * What is the relationship between the two sentences?

1- The first sentence states an idea, and the second sentence explains that idea.

2- The second sentence contrasts with the first sentence.

3- The second sentence repeats the first sentence.

4- The first sentence is the cause, and the second sentence is the effect.

6- You cannot be a hero without being a coward. What does this sentence suggest?

1- Heroes are transformed, cowards.

2- To be truly heroic, you first have to know the meaning of fear.

3- Heroes are cowards in disguise.

4- None of these.

7- Emily has three dogs and two cats. They are all brown, but one of the dogs has spots. His name is Spot.

Now, which of the following is true:

1- Emily has three animals in total.

2- Emily has more cats than dogs.

3- All of Emily's dogs have spots.

4- None of these.

8- The clown pulled silly faces to make the children laugh.

The word 'silly' in this sentence means:

1- Funny

2- Bad

3- Tricky

4- Scary

9- Read the underlined sentences, and then choose the best answer to the question or the best completion of the statement.

- Public speaking is very different from everyday conversations.
- First of all, speeches are much more structured than a typical informal discussion.

What does the second sentence do?

1- It shows an exception to the first sentence.

2- It offers support for the statement made in the first sentence

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4- It compares two kinds of speeches.

10- Read the passage and then choose the best answer to the question. Answer the question based on what is stated or implied in the passage.

The internet is very important to the modern world. People use the internet for entertainment, communication, learning, and as a news source. There can also be cons to the internet, as some sociologists worry that people are slowly forgetting how to communicate in person, but the fact remains that the internet is here to stay.

- The main idea of this passage is that the internet:

1- Is hard to use?

2- Is it an integral part of society?

3- Is used to entertain?

4- Is it for people who have technology?

Test6: Phonological Processing

Q) Tick the word that has a different pronunciation:

Boy	toy	noise	house
Meet	meat	seat	tie
Sing	bring	think	thought
Write	rate	right	might
Girl	set	bird	birth
Pray	cry	play	make
Fan	done	son	but
Psych	make	lake	right
Queue	few	ewe	no
Cat	mat	what	sat

Test7: Syntactic Awareness

Q) Complete the sentences with the correct form of the verb in brackets:

1- I am sorry. I did not mean ----- (forget) your birthday.

2- I will always remember ----- (receive) my first paycheck.

3- The long-term unemployed often find it difficult ----- (find) a job.

4- We regret----- (tell) you your application has been unsuccessful.

5- Tim denied ----- (break) the window.

6- It took me a while to get used to ----- (live) alone.

7- I adore ----- (spend) time with family and friends.

8- At school, we were made ----- (learn) long poems by heart.

9- We were against the decision ----- (close) the local primary school.

10- Rain had got in through a ----- (break) window.

Test8: Semantic Processing

Q) Choose a word from the left side that matches the word on the right.

1-

- Words
- People
- Situations

meaning

2-

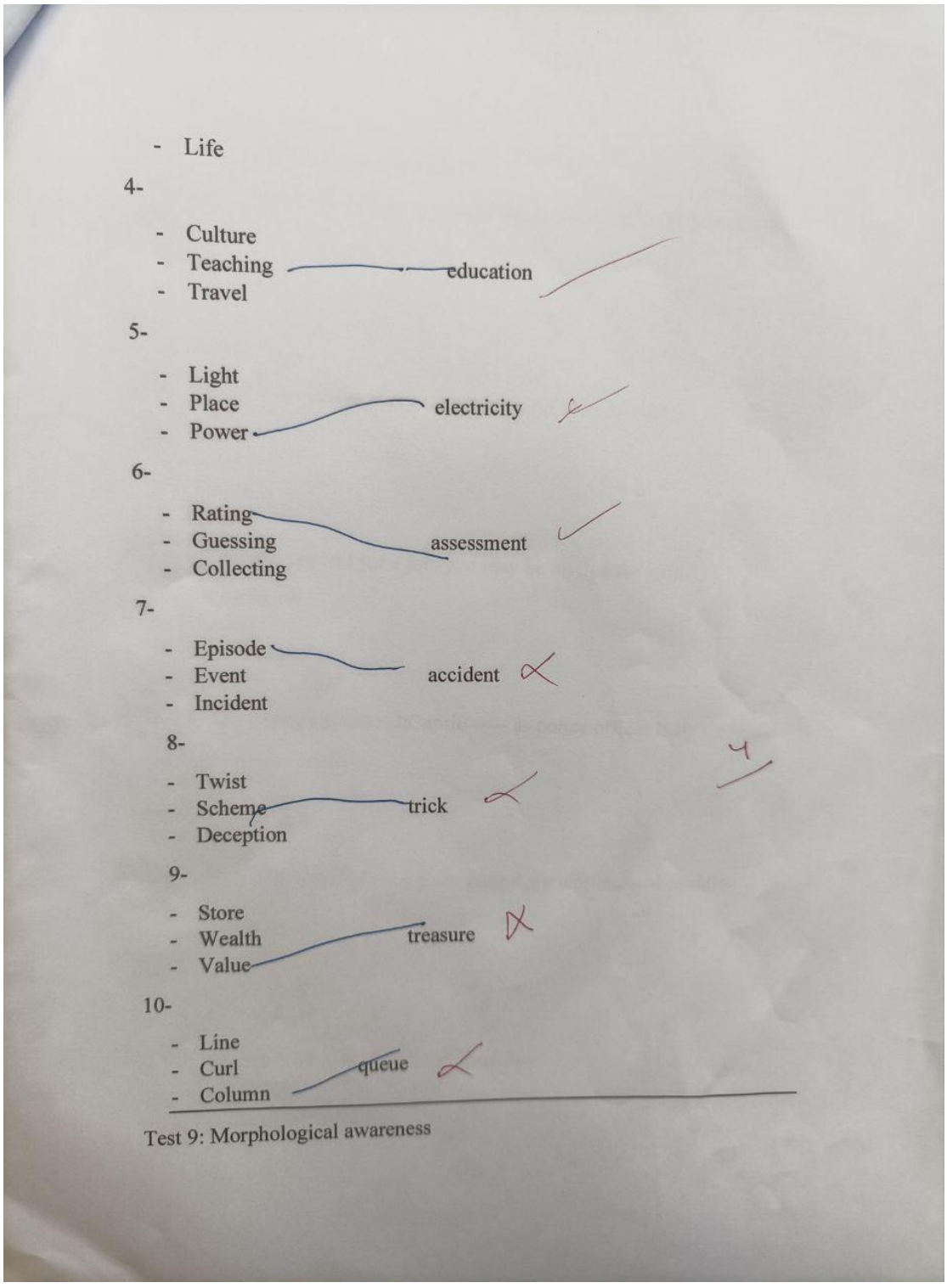
- Distance
- Universe
- Area

space

3-

- Gore
- Race

blood



- Life

4-

- Culture
- Teaching
- Travel

education

5-

- Light
- Place
- Power

electricity

6-

- Rating
- Guessing
- Collecting

assessment

7-

- Episode
- Event
- Incident

accident

8-

- Twist
- Scheme
- Deception

trick

9-

- Store
- Wealth
- Value

treasure

10-

- Line
- Curl
- Column

queue

Test 9: Morphological awareness

Q) Choose the most suitable answer:

1- Which of the following words is opposite in meaning to the remaining three?

a- Overweight
b- Fat
c- Plump
d- Skinny

2- The money you receive every month for your work is your:

a- Wages
b- Salary
c- Pension
d- Profit

3- After you have applied for a job, you may be invited for a(n):

a- Conversation
b- Meeting
c- Qualification
d- Interview

4- In The Departed Leonardo DiCaprio ----- as police officer Billy Costigan.

a- Plays
b- Acts
c- Stars
d- Presents

5- The Lord of The Rings is ------ in an imaginary world called Middle-Earth.

a- Placed
b- Set
c- Situated
d- Based

6- Leave me alone! I do not want to go ------ now.

a- Nowhere
b- Everywhere

c- Anywhere
d- Somewhere

7- Does anybody know how far---- from the city centre?

a- We are
b- We were
c- Are we
d- Were we

8- I have never known anybody ------ is as dedicated to children like you.

a- Which
b- Who
c- Whose
d- That

9- His mother told ------ crying.

a- Him to stop
b- To stop
c- He stops
d- Stop

10- Bread, Pasta and rice are

a- Dairy food
b- Fats
c- Cereal products
d- Junk food

Test10: Orthographic Processing

Q) Correct the spelling mistakes in the paragraph below.

George is new that he should not drink alchohol on a Wedsday night, especially since his govermnet proffesor had schedualed an important exam on Thrusday. However, he beleived he would loose his friends if he did not go out with them. The pressure to fit in with his peers was worst then the fear of bad grades. To be popular among his friends, one had to be either a musclar athlete or a wild and crazy drinker.

المستخلص

يشمل الإدراك الوظائف العقلية الأساسية مثل الإحساس والانتباه والإدراك وما إلى ذلك. بالإضافة إلى الذاكرة، والتعلم، واستخدام اللغة، وحل المشكلات، واتخاذ القرار، والاستدلال، والفكر وهي عمليات دماغية معقدة بالمثل. العمليات المعرفية هي تقنيات لدمج المعرفة الجديدة وإصدار الأحكام بناءً على المعرفة السابقة. يمكن أن تحدث هذه العمليات المعرفية تلقائيًا أو عن قصد، بوعي أو بغير وعي، ولكنها تحدث عادةً بسرعة. تعمل هذه العمليات المعرفية بشكل مستمر وبدون وعينا. علاوة على ذلك، فإن فهم الكلمات والجمل وتحديدها يستلزم أن العمليات المعرفية الأساسية للفهم وفك التشفير والطلاقة لا تحتاج إلى التفكير فيها بنشاط لأنها تلقائية. في بعض الأحيان، القراء الذين يتعين عليهم فك تشفير الكلمات والجمل بوعي يتم إزعاجهم بسهولة وغير قادرين على التركيز على معنى ما يقرؤونه. وتهدف هذه الدراسة إلى معرفة وعي الطلاب الجامعيين بالعمليات المعرفية في التعرف على الكلمات والجمل، وإلى أي مدى يمكنهم استخدام هذه العمليات. النهج الحالي المستخدم لهذه الدراسة هو تصميم بحث اختبار كمي يستخدم لتحليل البيانات التي تم الحصول عليها. وتكونت العينة من (100) طالب وطالبة من قسم اللغة الإنجليزية، كلية التربية للعلوم الإنسانية، جامعة واسط. خلصت هذه الدراسة إلى أن الطلاب لديهم بعض القدرة على التعرف على معظم مكونات الوعي المعرفي في التعرف على الكلمات والجمل. بناءً على النتائج، تم تقديم العديد من الاقتراحات والتوصيات لأساتذة الجامعة والطلاب للنظر في تعزيز الوعي بالعمليات المعرفية ومهارات القراءة.

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة واسط / كلية التربية للعلوم الانسانية
قسم اللغة الإنكليزية

دراسة نفسية لغوية للعمليات المعرفية للطلاب الجامعيين

رسالة تقدمت بـــها

فاطمة رحيم جبار

الى مجلس كلية التربية للعلوم الإنسانية – جامعة واسط

جزءا من متطلبات نيل درجة الماجستير في اللغة
الانجليزية وعلم اللغة

بإشراف

أ.د علي محسن غرب المجداوي

١٤٤٤هـ ٢٠٢٢م