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Exploring the Dynamics between Gender, Motivation and Learning Styles with Multitasking-attention, Working Memory and Bottom-up Processing in Note-taking

The case of First Year LMD students, Department of English, University of Béjaia

A Dissertation Submitted in Partial Fulfillment of the Requirements for a Master's Degree in Linguistics

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Dedications

To my Beloved Grandmother, the one I will love all the rest of my life

To my Parents who are the secret of my success

My Brothers and My Sweet Sister

To my dearest and soulmate Younes

To my closest friends Seloua, Yasmina, Leticia, Souad & Larbi

And all the ones I love.

Nesrine.

……

To the most precious people in my life

To my parents

To my sweetheart sister: Aldja

To my brother: Ghilas

To my best friends: Djamila, Nesrine, Djidji & Sarah

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Abstract

The current research deals with investigating the way students learn through note-taking as a strategy by taking into account the learners' psychological characteristics and their role in the learning process. First-year students of the Department of English at the University of Abderrahman Mira have been taken as a case for this study. It aims to explore the role of working memory, bottom-up processing, and multitasking attention, motivation, learning style, and gender when learning through note-taking. This study relies on Witkin's learning styles theory to measure field-dependent & independent learning style, Self-Determination Theory of Motivation, the Wechsler Memory Scale, and Mirsky's four-factor Model of Attention measurement. This study is based on mixed methods research. It gathers both qualitative and quantitative methods. Therefore, two different research instruments are used. An online questionnaire was sent to twenty-three students from two different groups, in addition to classroom observation sessions. Graphs were used for numerical data analysis; a qualitative method of data analysis was used to analyze the data collected from classroom observation. The results showed that there is a very close relationship between individual differences and cognitive abilities. Both cognitive and psychological characteristics maintain note-taking as a learning strategy, thus; they form the characteristics of a successful learner.

Key words: Individual Differences, Note-taking, Learning Styles, Gender, Motivation, Multitasking Attention, BUP.

List of Abbreviations

BUP: Bottom-Up and Top-Down Processing

FDI: Field-dependence & Independence

FLTL: Foreign Language Teaching and Learning

IQ: Intelligence Quotient

IDs: Individual Differences

LTM: Long Term Memory

LMD: Licence, Master, Doctorat diploma system

OIT: Organismic Integration Theory

PRI: Perceptual Reasoning Index

PSI: Processing Speed Index

SDT: Self-Determination Theory

STM: Short Term Memory

SRL: Self-Regulated Learning

VCI: Verbal Comphension Index

WAIS: Wechsler Adult Intelligent Scale

WM: Working Memory

WMS: Working Memory Scale

WMI: Working Memory Index

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% : Percentage

F: Female

M: Male

ABS: Absent

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General Introduction

GENERAL INTRODUCTION

The need to learn English is shared worldwide, and EFL learners learn in different ways. They use different strategies and styles depending on their learning needs. Learners come to university with different academic backgrounds; this explains why some of them are less prepared than others for studying at a university setting, where they are expected to acquire an increased amount of information in a limited lapse of time. They are called out to be autonomous and regulate their own learning.

Note-taking is viewed as a means for successful learning at the university; it is a skill that involves learners' cognitive skills through information memorization, storage, and retrieval, for succeeding in several academic performances. Though this learning strategy is very useful for some learners, it is not for others, depending on their awareness, comprehension, and attention. Psycholinguists have categorized a variety of factors that play a role in raising the note-taking skill. Learners would engage actively with the content of the lectures in fact, it is cognitively demanding and therefore, learners need to take in what they hear, extract what they need to write, make connections between information, summarize them, and then reproduce notes. Consequently, this process engages memory and plays a role in its fostering. It can help focusing and better understanding the main concepts as it helps improve the listening skill. Depending on learners' learning styles, the impact of note-taking on learning differs from one individual to another. According to psychologists such as Noam Chomsky, a body of individual differences shapes the attitude of learners towards note-taking as a learning tool.

However, learners use this strategy in different ways, and not all of them can succeed. It is an important skill to master at university. Students face new types of learning and huge amounts of information to retain, and they need to develop reliable mechanisms to record and retrieve information when needed. It is a learning strategy that needs to be studied as a process of understanding the received information.

1. Problem Statement

At the university level, EFL learners face a new learning environment, where lessons are not presented the same way learners were used to, so that they can just write down and learn easily. They are rather provided by explanations on the board, and they are expected to adopt note-taking as a strategy to keep up with the lesson. While this strategy allows some learners to shape their understanding of the lectures, others cannot rely on this strategy, and they may struggle to keep up with the process due to many factors. These factors can be shaped in some individual differences, including learning styles, motivation, and gender, combined with multitasking attention, working memory, and bottom-up/top-down processing. Thus, this process can play an integral role in students' learning and lecture comprehension. This study explores the role of individual differences and investigates the importance of working memory, bottom-up processing and multitasking attention in note-taking.

2. Research Questions

What is the relationship between individual differences and the note-taking process?

How are multitasking attention, BUP, and WM related with gender, motivation, and learning styles?

3. Aim of the Study

The study explores the importance of the learners' psychological characteristics and their role in the learning process. It investigates the role of working memory, multitasking attention and bottom-up processing when learning through note-taking. This research investigates the way students learn through note-taking as a strategy, by taking into account their motivation and learning styles.

4. Significance of the Study

Many studies have been conducted about note-taking and its impact on language learning, and most of them assert its positive role in EFL classrooms. Even though note-taking could be misused by some learners, due to their unawareness of its utility, it is, nevertheless, still useful for learning. Moreover, several studies concluded that good practices of note-taking can lead to efficient learning, and to better course outcomes. Additionally, we cannot neglect the learners' individual characteristics that contribute in taking notes. The goal of this study is to explore both the psychological and cognitive factors that are giving rise to the comprehension, processing and memorization of the notes taken during lectures.

5. Research Methodology

The choice of the research methodology in this study is dependent on the problem and the aim we want to reach. The study is designed as exploratory. It focuses on investigating the role of both a chosen number of individual differences and cognitive skills involved in enhancing note-taking in language learning classrooms. We opted for both quantitative and qualitative research in order to investigate the learning process in students' note-taking. We also used scales to measure the variables towards the selected learners, including learning styles, motivation, attention, bottom-up processing and WM.

6. Population and Sampling

In order to collect the relevant data for the present study, we selected first year LMD students of English at the University of Béjaia as a population. The sample of our study is a a group of males and females from three different groups.

7. Data Collection Tools

For an adequate collection of data, we decided to use questionnaires with students in order for us to discover their learning styles type, and measure their motivation and WM. We opted for an observational design to explore and measure their attention and perception through quantitative data.

8. Organization of the Study

This study is divided into four chapters. The first chapter is a review of the existing literature that deals with the variables we have explored and measured. It contains two main sections: the first section deals with the conceptual definitions of the six variables of our exploratory research (motivation, gender, learning styles, bottom-up processing, multitasking attention, and working memory), and the second deals with a conceptual definition of the field of psycholinguistics, including language processing, lexical storage and retrieval, and language acquisition. We called the second chapter the theoretical background where we made a selection of the most relevant theories to rely on in the data analysis phase. The third chapter includes the methodology we used in data collection, and explains all the rsearch design. The last chapter is devoted for the presentation of the findings, discussion, and analysis. We finished by making a general conclusion which is a general review of our research, and it includes the major findings of the examination.

Chapter One
A General Overview about Psychology in Foreign Language Teaching & Learning

Introduction

This brief introduction draws the background that goes beyond note-taking as a cognitive process and as a learning strategy, and the way it helps in enhancing learning during lectures through the integration of WM, attention, and bottom-up processing, in relation to motivation, gender, and earning styles. Note-taking is known as a valuable life skill. People who take good notes are more effective in following out their goals. Students who take notes during lessons are more likely to understand and remember information thus, notes play a role in boosting information processing, by constructing a conceptual mental representation of ideas, and then understand meanings, and finally interpret them in form of notes. Other cognitive skills are involved when taking notes. When taking notes, students need to keep focused while listening. Not all students have the ability to focus on two or more tasks; instead, some of them can manage the interference between two cognitive tasks when they are done at the same time. According to some psychologists, the perception and memorization of information occurs when subjects receive focused attention. Previously conducted researches claim that other factors function during the note-taking process. These factors are shaped by some psychological factors, studied in the field of psycholinguistics. This leads to conclude that successful learning through note-taking as a learning strategy depends on learners' individual differences. Learners differ in their learning abilities, and when they go to university they may face difficulties in adopting the new learning strategies. They may encounter difficulties when experiencing new tasks and they approach learning in different ways according to some psychological characteristics. The way they approach learning is influenced by their cognitive style, in other words, the way they process information. As learners differ, their differences have an impact on their use of learning strategies, and their habitual way of processing information.

The purpose of this study is to explore the relationship between these variables, and the role of both individual differences and cognitive styles in note-taking. We will discover the teacher's and learners' attitudes towards note-taking as a learning strategy, and investigate the mechanisms of retaining and processing information from lectures. In the first section, we will examine the psychological side and the cognitive skills that play a role in maintaining note-taking. The second section considers the psycholinguistic field which focuses on examining the relationship between learners' behavior and cognitive characteristics of language perception, processing, and use.

I. An applied linguistic Perspective to Note-taking

In linguistics, researchers provide analysis of language structure, since it is consistent with rules which determine its use and application. Applied linguistics is a problem-based approach to study and provide solutions to real-life language use. It is tightly linked to foreign language teaching and learning, translation and bilingualism, and lexicography, among other topics. Moreover, it analyzes language and examines the factors that are related to its use, including psychological and social factors (Conrad, Hartig, & Santellman, 2021). Therefore, in applied linguistics, the focus is on language use, language learning, and language teaching. Broadly, applied linguistics concerns the role of language in human life.

Throughout time, the field of applied linguistics has extended to exploit other sciences such as psychology, which is the study of the mind and behavior. Before 1870, psychology was a part of philosophy and then was developed by Wilhelm Wundt (the father of psychology) in 1882, at the University of Leipzig, Germany. Later on, researchers like Stanley Hall, Sigmund Freud, Alfred Binet, and Theodore Simon developed theories and went deeper to support psychological analysis. It is becoming the most popular growing studied subject, because it is an experiment-based science, which can review all these because, to

many, psychology is still viewed as not scientific because of the difficulty to apply scientific methods in a reliable way.

Psychology is the study of mind and behavior; it is a discipline which embraces aspects of human experience (American Psychological Association). It is connected to medical sciences, social sciences, and education, among other fields. It is stated that it includes biological studies of how humans are influenced, how they use their senses to discover the world, how and why people develop language, how people understand and think, what motivates people, and how personalities develop (Train, 2007). Likewise, personalities develop when there is continually changing and improvement in one's functioning and behavior. Psychology provides education with a better understanding of the process of learning, and this is the focus of educational psychology. It is a field that is interested in applying the principles and resources of psychology to direct learning situations. To state it differently, it is the psychology of learning.

1. Educational Psychology

This field of study has the responsibility of providing techniques and strategies of learning. It is defined as "*the most important branch of applied psychology, the study of psychological aspects of educational situations and a study of educational problems regarding psychological facts*" (Aggarwal, 2010). Researchers refer to the way learners use their own strategies by using the term self-regulation in learning. "Self-regulation refers to learning that results from students' self-regulated thoughts and behaviors that are systematically oriented toward the attainment of their learning goals" (Weiner, 2003). This explains how learners' behaviors change through learning by using different strategies and methods, as stated by Weiner "*At any rate, the person is not the same as he was before learning*"(pp.6). The more learners know to use good learning strategies, the more their attitude and behavior would

positively change. Psychologists claim that teaching good strategies is purposeful for reaching learning goals. Thus, teaching learners how to take notes, one pertinent aspect of SRL and learning strategies, during lectures for learning, is equally teaching them to overcome the difficulties they face when struggling to adjust to a learning situation. Learners use learning strategies when being exposed to an educational setting, through experience, as stated Snigh (2009) "*whatever we learn, we learn through experiences gained in our environment. Learning in no way can be sad to be a gift or contribution from our hereditary stock*" . He added, *"It is, therefore, the environment which is supposed to influence and shape our learning"* (pp.71).

In contrast, teaching a learning strategy is influenced either by teacher-related factors or learner-related factors, both, or environmental ones. On one hand, scholars state that any learning task is regulated by the learner, they claim that his characteristics and way of learning define what he will achieve. On the other hand, the teacher is supposed to play the role of a friend, a philosopher, and a guide thus, his role is significant in the classroom (Snigh, 2009). Additionally, note-taking as a strategy depends on learning objectives. Educational psychology as a field of study examines the human mind and personality in both teaching and learning processes.

This opens access to researchers to select, organize, interpret and integrate techniques and materials within the field of psychology to education. Aquino & Razon claim in their book *Educational Psychology 1993 Edition* " *thus, it seeks to provide for the teacher the fundamental principles which will be of service in meeting the problems which arise in the classroom and in evaluating the means to be employed to achieve the objectives of the educational process*".(pp.2). This is to say that learners' attitudes play a role in resulting in a modification in their behavior to acquire note-taking.

2. Individual Differences

When going deeper in the field of educational psychology, researchers conclude that learners use different learning strategies within an educational sitting. The strategies they use depend on their personal characteristics and their learning abilities, and this is what results different outcomes. Some of them encounter difficulties in retaining knowledge in classroom while others do not. The study of learner individual differences has shown that they are a major factor that can have an impact on learning behavior. Jonassen & Grabowski stated in the *Handbook of Individual Differences, Learning, and Instruction* (2011) that every learner learns according to his psychological characteristics, such as intelligence, cognitive style and personality, and these factors play a role in maintaining learners' behavior.

A professor of psycholinguistics, Dornyei; defines individual differences as the psychological traits that distinguish individuals from one another (2005). He claims that if human species were alike, it would be easier to formulate generalizations and conclusions. This demonstrates that humans have generally different personalities and traits, and thus learn differently. Therefore, teachers need to take into consideration the learner individual differences so that to correspond to the learners needs.

2.1. Learning Styles

Most of the studies believe that learning style; which is part of individual differences, plays an important role in second language acquisition; the term is used commonly in the literature body. It has different meanings in relation to different individuals.

Learning is the central position in education process. According to S.K.Mangal & Shubhra Mangal (2019), the concept of learning is a natural and common point between all the individuals; a person begins the learning process immediately after birth; we continuously learn many things, even we do not necessarily be aware of it. S.K.Mangal and S.Mangal

(2019), gave an example of the child when s/he come close to a burning matchstick, s/he burnt then draw back from it; another time, when seeing a burning matchstick; the child will avoid it because s/he knows that s/he will burn like the first time; so, the child not only learnt to avoid burning matchstick, but he recognized that all burning things should be avoided; in this case, the child's behavior is changed, this change is brought by experience. S.K Mangal & Shubhra Mangal (2019), defined learning as behavior change, this is a brief definition, there are some definitions that are given by some scholars like:

"*Henry P.Smith (1962:260): Learning is the acquisition of new behavior or the strengthening or weakening of old behavior as the result of experience*." (S.K.Mngal & Shubhra Mangal , 2019,P.02).

2.2. Gender

Gender differences in academic achievement have been discussed for centuries; it has been taken as an important element since the early 1970s. Dr Dilek, mentioned in her article Gender and Language (2011.P.460); that the British sociologist Giddens (1989), defined gender as "*psychological, social and cultural differences between man and woman*". In other words, gender is something acquired by social properties; through our relationships and interaction with other individuals, and through cultural expectations and norms, it is not a matter of individual characteristics. Gender is not innate, it is not something we born with or we posses, whereas, it is something that an individual act or perform.

Second language acquisition plays an important role in the applied linguistics' field. As it is known, men and women are brought up differently in speech, and have different roles in society. Dr Dilek (2011) reported that Labov's research supposed that women might be better at learning linguistic shapes and second language. Dilek claims that other studies discovered that male students are less successful in exams than female students at both primary school

and university. There is another variable is related to gender, which is "motivation", in addition to language learning. It is found that female students in a Canadian university are more motivated, and have more positive modes when learning French as a second language than male students

2.3. Motivation

It is adequate that gender variable should be followed by the discussion of the other major ID variable which affects language learning success: motivation. Motivation has a great importance and role not just in second language acquisition, but in every learning process. It is known that motivated learners are more likely to succeed in their goal achievements rather than not motivated learners. Dörnyei stated in his book "*The Psychology of The Language Learner: Individual Differences in Second Language Acquisition"* (2005), that motivation is the first stimulant to start learning a second language and keep on in the learning process; he indicated that learners who possess great abilities without enough motivation could not accomplish their appropriate goals.

3. Cognitive Psychology

Researchers in the domain claim that the concern of cognitive frames is to describe how the brain processes information (Lawrence, 2014). Cognitive psychology is a robust area which deals with attention, perception, learning, memory, language, emotion, concept formation and thinking (Michael & Mark, 2000). This branch of psychology seeks to understand the process of knowledge acquisition, perception, and representation in the mind, and how the newly acquired knowledge directs and changes behavior. The subjects of the field of cognitive psychology include perception, memory, attention, learning, language use,

and thinking. The study of the way memory works, the way individuals understand language and produce it accurately, the way they perceive the environment, the way they reason and solve problems, the way of thinking; are all foundational questions that are crucial to understanding what a human is (Nick & Angus, 2012).

3.1. Bottom-up and Top-down Processing

Humans' interaction with the outside world makes it what makes sense of life. One of the most studied subjects in cognitive psychology is perception, which forms our awareness of things in the world. In cognitive science, perception is the process of understanding sensory information, to be aware f what happens around, because individuals are allowed to identify and recognize stimuli and give meanings to them. Thus, perception is defined as an ultimate source of knowledge about facts. "*We know about our surroundings because we can experience them through perception; we know about scientific phenomena because they are observed*" (Matthen, 2015, pp. 1). To go deeper, perception is a process that holds phases through which a correct understanding of a stimulus occurs; they are selection, organization, and interpretation. Selection is the first stage where the stimuli arrive at the sensory organs to be interpreted. Qiong (2017) claims in his article that humans perceive a countless number of stimuli, and they cannot perceive all of them because this would give rise to information overload and disorder, however, humans should limit their attention to essential aspects in order not to get overloaded. The organization phase is where stimuli are put into order by categorizing them and giving them meaning, and this allows humans to structure their knowledge. The third stage of perception is called interpretation. Once stimuli are categorized and structured, they are attached to their meanings. Qiong added in his article that different interpretations can be given to the same stimulus. He illustrated this with the example of a kiss or a hug in public that can be interpreted by an individual as a way of greeting, while another individual can interpret it as a lovemaking behavior. Differences in interpretations

arise mainly due to cultural differences. In addition, individuals from close cultures have related knowledge, and they may assign similar meanings, and thus similar perceptions.

These three phases of perception are involved in the two processes of perception: bottom-up and top-down processing. Bottom-up processing refers to the sensory analysis that begins with the coming of data from the environment; this latter is transferred to the brain in a form of an image to give it meaning. In another hand, top-down processing is the process by which pragmatic knowledge and contextual information are utilized to achieve a relevant interpretation of stimuli.

3.2. Working Memory

Memory was the first studied subject in psychology and philosophy for several years and has become a major topic in the branch of cognitive psychology. For years, researchers in the field conducted many studies to determine the meaning of memory, how it is formed, its organization, and its functions. Memory is important in the human species because it enables individuals to recall information and events in their lives and accordingly have a sense of self. It is stated in the book *Cognitive Psychology: A Students Handbook* that memory is what allows humans to recognize persons and things around them, moreover, it enables individuals to recall linguistic clues and communicate (Michael & Mark, 2015). However, the study of human memory is interesting and complex, because a memory depends on its nature and the interconnections between four factors related to events, participants, encoding, and retrieval, as claimed by Styles "*psychologists have been able to distinguish many varieties of memory, with different capacities, that endure for different periods of time and store different kinds of knowledge information using different representations*" (Styles, 2005, pp. 8).

3.3. Attention

Though we all have a clear understanding of what "paying attention" is, the study of attention is diversified in the field of cognitive psychology. It is involved in all cognitive skills of human brains, and it refers to all the processes by which we perceive selectively. Through time, studies realized that attention plays the role of flexible control of what to concentrate on, and what to select as distractions and thus, avoid it.

Attention is an active part of consciousness and selective mental activity of focusing on a given matter at a given time. Nevertheless, it is not about focusing on a particular task; it also involves passing over deals of stimuli. Thus, attention allows individuals to select what is important to focus on, and decide what to tune out. *" we select the things we may attend to is altogether indefinite, depending on the power of the individual intellect, on the form of the apprehension, and on what the things are*" (James, 2018, chapter XI). For this reason, people's ability to pay attention depends on the situation and the number of distractions they encounter.

II. A Psycholinguistic Perspective to Note-taking

Psycholinguistics appeared as a result of the Chomskyan revolution in the late 1950s and 1960s. It was first called neurolinguistics, in the 18th century, where linguists have been interested in studying the relationships between linguistic behavior and language processing, and developing mind and language acquisition theories. It is known as the study of the neural mechanism of the human brain. Psycholinguistics is a field of study which holds the two disciplines of linguistics and psychology. It is generally defined as the study of language and mind, and it examines the language processing in the brain while perceiving and producing language. In other words, it is defined as the study of language science of how a human brain decodes and processes language to give feedback or language production.

Psycholinguistics is linked to the science of cognition, linguistics, psychology, and language pathology, thus, it is an interdisciplinary field (Balamurugan & Thirunavukkarasu, 2018). This field consists of three theories, including acquisition, production, and comprehension. First language acquisition is mainly a question of nature and nurture, the first assumes that human brains provide individuals with the ability to have language knowledge, and the second claims that language is acquired by firstly understanding how language is used. When it comes to second language acquisition, it refers to the process of developing knowledge about an additional language to the first language, and it is influenced by individual factors including age, personality, motivation, experiences, and cognition, in addition to some factors such as self-esteem, inhibition, risk-taking anxiety, and empathy. The second theory of psycholinguistics is production, and it refers to the production of spoken and written language. Basically, it deals with the ways individuals process language in their brains to convey meanings, and then use words to communicate them in conversations. It is about creating and understanding language in the brain. The third theory is language comprehension, which refers to the ability to understand the meanings conveyed in language.

1. The Brain and Language Processing

Humans come to life with the ability to learn their native language without any formal training, and the ability to deal with any communicative situation without much thinking about it, it is thus automatic (Friederici, 2017). Though language is one of the most complex cognitive skills, human brains are able to build up and understand it, along with a range of cognitive skills. The brain is composed of a range of faculties that are responsible for given cognitive tasks, as claimed by Friederici, the brain is composed of grey and white matter, and both of them are responsible for all cognitive skills and language processing. The grey matter contains about 100 billion neuronal cells, they are connected to each other and they receive and forward signals. In contrast, white matter contains few cells that connect adjoining brain regions. When going back in the history of the relationship between language and brain, it is assumed that language is located in the left frontal lobe, and observations have shown that the left hemisphere of the brain leads to language impairments (Friederici, 2017).

Language processing refers to the way human brains produce language for the purpose of communicating meaningful ideas. It is a complex process that takes place in the brain, where language items are analyzed in different networks. To explain how language is processed in the mind, Rodrigo claims in his article that words are processed along in different regions of the brain, such as the Wernicke area which is responsible for word perception; and the frontal cortex for word comprehension and sentence articulation. The author added in his article that the activity occurs mainly in the frontal lobe (Oliveira, 2019).

2. Lexical Storage and Retrieval

Psycholinguists and linguists explain the mechanism that leads speakers to have meaningful, accurate, and fluent conversations. Human communication requires the use of words to convey meanings of concepts, and for this, individuals need to store them in their

mental lexicon, which is stored in the long-term lexical memory; and retrieve them when needed in association with their corresponding meanings (Traft, 2013). The same author defined lexical access in his article as the act of retrieval, and he illustrated this with the example of reading situations and acoustic stimulus. In such situations, the stimulus is matched with the appropriate representation in the mental lexicon, as does the phonological structure of the acoustic stimulus. Nevertheless, a word interpretation varies according to the context of the communication, and this is due to the variety of meanings of a lexicon in the real world, but it is not difficult to interpret meanings since it is easy for an individual to manage his knowledge about his environment, and thus correctly use of lexicon categories.

3. Second Language Acquisition and Use

Psycholinguistics is a branch of cognitive science; it studies the relationship between human mind and human language. The field of psycholinguistics investigates how individuals produce, comprehend, and acquire language (Maftoon, Shakouri, 2012). There are many languages that humans can acquire, the first language learned by an individual since his/her birth called mother tongue; any other language acquired is known as a second language. The definition of second language acquisition refers to the systematic study of people's learning another language; in addition to the native language. Learners acquire language through a subconscious process, which means they learn another language without regarding its grammatical rules (Hoque 2019), the scope of SLA includes both the informal and formal learning, informal learning occurs when an individual moves from his/her native country to others, then she/he picks up native speaker's language through interacting, for instance: an American child goes to French; whereas formal learning refers to when a person learns a target language in the classroom, for example when French learners learn English as foreign language in the classroom. (Saville-Troike, 2012).

4. An Overview about Note-taking

Some students like to record everything said by the lecturer or the writer, others to select the relevant points and ideas. Note-taking is a helpful strategy that every learner uses to remember information during classroom lectures, it is thus, the dominant study activity at university. In general, learners take notes to record the needed information. The purpose of this activity is to revise what is heard or seen when studying. According to Haghverdi, Biria & Karimi (2010), note-taking is necessary in researching, learning, and teaching process, it helps to learn, create and plan for future activities.

Note-taking facilitates for students to identify the significant materials that have been reproduced into their own notes. Thus, it increases the effectiveness of the learning process. The process of note-taking has explained as the reception of student's mind of some inputs from the teacher or the instructor when explaining or writing them on the blackboard, then the learner re-expresses and re-encodes that information in a form that is easier for him/her to remember and think about them.(Haghverdi, Biria and Karimi,2010)

According to Haghverdi et. al. (2010) note-taking is an important tool; because it makes learner active by extending his/her attention span, keeping the learner focused on his/her subject and task, remembering what he/she has read or heard then organizing his/her ideas. Note-taking influences academic success because learners become dependent by using their abilities in taking notes during classroom lectures. Note-taking allows the learner to gather information from books, lectures, and this is what keeps students awake because it forces them to involve their cognition actively, since it seeks the bottom-up and top-down processing when listening or reading(Boch & Piolat, 2005). Hence, we come up to say that note-taking is cognitively related to students WM, and this results a correct understanding and information production.

Conclusion

This chapter puts emphasis on the essentials notions related to our topic, and it stated the conceptual definitions of the investigated variables in our topic. These definitions involve three IDs: gender, motivation, and learning styles; in addition to three cognitive skills: bottom-up and top-down processing, attention and WM. We threw a light on how psychologists, psycholinguists, neuropsychologists and linguists have investigated the conceptual explanations of the notions having connections to our work.

Chapter Two
Theoretical Background to Learning Styles, Motivation, and Cognitive Variables

Introduction

The present study aims to shed light on our study to investigate the networks of learners' individual differences and the cognitive skills involved in note-taking during classroom lectures. As mentioned previously, taking notes is a dominant activity at the university level, in all the fields. This activity requires skillful and motivated learners to succeed in understanding what they are learning, thus in language learning, which is the ultimate goal of EFL students. In this theoretical part, readers are provided with valuable information related to our topic. It contains a selection of background theories we used to predict and understand their appropriateness to our research. We introduced the main related theories of measuring motivation and learning styles as learners' IDs and WM, attention, and bottom-up processing. We aimed at conveying to readers the knowledge and ideas that have been established to guide our study.

Previous studies have investigated the meanings of individual differences and cognitive abilities of second language learners.

1. Witkin's Learning Styles Theory

What is Style?

Riding & Rayner indicated in their book which! titled *Cognitive Styles and Learning Strategies: Understanding Style Differences in Learning and Behavior* (2013), that the concept of style is used mostly in a psychological study, more precisely in individual differences in learning and behavior. We find the concept of style in different contexts like fashion, arts and even in academic disciplines including psychology. The term style used to identify and describe a group of individual qualities and behavior; it is the matter of individuality.

Learning Style

It is apparent that all individuals differ from one to another, and each of us possesses specific characteristics that distinguish him/her from other persons. In learning for instance; each student prefers a specific manner or way in learning process. It is a matter of how people prefer to use their abilities in the learning. In his book *Individual Differences In Second Language Acquisition* (2006, p.55), Dörnyei mentioned the standard definition of learning style which refers to "*an individual's natural, habitual and preferred way(s) of absorbing, processing and retaining new information and skills"*, in other words; the concept shows a review of individual's habitual, preferred way in perceiving, interacting with, and response to the learning environment. Learning styles viewed as an attractive concept for educationalist, because they are not innate that leads automatically to success, but they are learned, they refer to personal preferences. According to Oxford & Ehrman (1993) there are four major dimensions of learning styles that are important in second language acquisition:

The analytic-global parameter:

One of a very important aspect of language learning styles, it refers to field-independent and field-dependent. Analytic learners are those who concentrate on details, they like to be more precise; and do not like to guess without thinking, they like contrastive analysis and dissecting words and sentences. Whereas; global learners use the general idea to emphasise details, they like interaction with others, they avoid grammatical details and like paraphrasing and using synonyms and guessing.

Sensory preferences:

It refers to the physical learning channels that the student feels more comfortable when using them. Visual students prefer to learn by reading, watching. Auditory students are more comfortable when they learn by classroom interaction (conversations and oral directions), sometimes they have difficulties in written work. Hands-on students like to learn with tangible tools and movements; they prefer to have a lot of breaks and change their position in the classroom.

Intuitive/random learning vs. sensing/sequential learning:

Intuitive/random students think in abstract ways and large-scale, they have the ability to extract and realize the major principles of how language works, including its system; they often prefer to guide their own learning by creating new theories and possibilities. However, sensing or sequential students think in concrete ways, they focus on concrete facts, what is true, and practice in their learning process, they prefer to not use imagination. This kind of learners can achieve their learning goals but slowly and stably.

Relative orientation toward closure or openness:

Orientation to closure students; are those who need more clarification to reach their decisions. Students with this dimension are hard-working and organized, they prefer direct lessons and grammar rules to spell incorrect way. Less oriented to closure or open learners;

are less dependent than closure-oriented students, they take the second language less seriously and see it as enjoyment rather than a task to be judged. These students prefer to not prepare and plan for learning a second language.

The theory of learning styles has been established over the last fifty years. Most of the research in this notion has focused on cognition (perception) and attention. (Wooldridge & Melanie, 2006). Field dependency and field independency (FDI) model of learning style is invented by Witkin (1977), it is defined as a cognitive style that refers to the different preferences between individuals in learning; it identifies the perception of individuals while they distinguishing the surrounding objects (Sabet & Mohammadi, 2013). FDI deals with the individual use of the global or analytical ways in learning (Wooldridge & Melanie, 2006). To differentiate between field dependency and field independency model. Field-dependent learners tend to be global and impressionistic; they depend on external clues from their environment, in other words, they like interacting with other learners in the classroom, and accept the structure provided by other students in a more social and collaborative way. Field-dependent students are easy to be distracted because they are likely to possess a short attention extension (Hadhi, 2013). Field-dependent people prefer casual learning surroundings, Wooldridge (1995) stated that field-dependent persons are less achievement-oriented and more socially oriented (Wooldridge & Melanie, 2006). Field-dependent learners tend to be global and impressionistic; they depend on external clues from their environment, in other words, they like interacting with other learners in the classroom, and accept the structure provided by other students in a more social and collaborative way. Field-dependent students are easy to be distracted because they are likely to possess a short attention extension (Pribadi Hadhi, 2013). Field-dependent people prefer casual learning surroundings, Wooldridge (1995) stated that field-dependent persons are less achievement-oriented and more socially oriented (Wooldridge & Haimes-Bartolf, 2006).

2. Self-Determination Theory of Motivation

Motivation can be divided into many types. The following are some major types:

Integrative Motivation & Instrumental Motivation

Integrative motivation is when the learner acquires a second language for a cultural purpose, that is, to learn another language to integrate into the target language society. Instrumental motivation refers to the need of learning a second language for external reasons like a job, passing an exam etc. (Alizadeh , 2016).

Intrinsic & Extrinsic Motivation

Intrinsic motivation is defined as a force within the learner, the inner feeling and engagement to do the task; the learner sees the task as enjoyable to do without any pressures from the external entourage. Extrinsic motivation refers to the actions that the learner does to gain some rewards from outside like parents, teachers...etc, or stopping a punishment. (Alizadeh ,2016).

Intrinsic and *extrinsic* motivation has been widely studied. We say a person is motivated when she/he is moved to do something. A person who does not feel with inspiration to do something calls an unmotivated person. People have different kinds of motivation; they differ from the orientation of motivation (the lead that gives rise to action). In self-determination theory by Ryan & Deci (2000), the distinction is basically made between extrinsic and intrinsic motivation.

Intrinsic Motivation

Intrinsic motivation appeared as an important phenomenon in education and learning achievement. It is considered as the main factor in high-quality learning and creativity. Intrinsic motivation is defined as the doing an action or an activity for self and innate satisfaction, not for other's pleasure and external prods like rewards and pressures. Intrinsic motivation is important because, from birth, healthy humans are active, curious, and cheerful,

they are always ready to explore and learn new things and skills. This type of motivation was a criticized portion in social, cognitive, and physical development because when a person acts through innate enjoyment, he/she will improve his/her skills and knowledge. Intrinsic motivation is found within individuals, which means that it exists between persons and tasks. A person could be intrinsically motivated for some activities, not for all ones. Two different definitions are given to the term "intrinsic motivation", because it was suggested as a critical reaction from the 1940s to the 1960s, to the two theories that were dominant in empirical psychology. The intrinsic motivation approach is based foremost on inherent needs, but also on innate satisfaction by engaging in interesting activities (Ryan & Deci, 2000). Intrinsic motivation has been defined operationally in different ways; there are two major ways to measure it, the first called the "free choice" measure, conducted by Deci (1971). The experimenter was exposed to ask the participants if they are under varying conditions, for instance: getting a reward or not when doing the target task. The second instrument called "self-reports" measures the person's enjoyment and interest when doing the target activity (Ryan & Deci, 2000).

Extrinsic motivation

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3. The Wechsler Adult Intelligence Scale (WAIS)

All of us want to be intelligent, but the question is what intelligence is? Is it something inherited or something that changes through time? One thing is certain, which that there is no exact definition to intelligence; it is rather generally explained as the ability to solve new problems, to learn from experiences, and use those experiences to solve other problems. Human brains consist of giving individuals a large set of abilities and skills that separate us from other species. Over time, researchers have developed various scales to measure intelligence in linguistic or mathematical ability, mainly within an educational setting. Intelligent people have the ability to absorb information quicker than others; they are capable of retaining a great amount of information in their STM and are better at recalling the information from their LTM. This determines to what extent intelligent people are good at doing tasks efficiently with less effort.

There had been interesting investigations in the study of mental processes and cognition in the ninetieth century; and referred to as cognitive science. Jay & Gordon claim in the book

*Cognitive Science: An Introduction to the Study of Mind (*2011), that the mind is difficult to study because it is not something we can easily observe, measure, or manipulate; and it is the most complex entity in the universe. This complexity is illustrated as follows: The human brain contains billions of cells and neurons linked to billions of other cells; this is how the brain is considered a compound mental phenomenon of perception and memory. The scientific study of psychology started at the end of the ninetieth century when William Wundt conducted his research on perception. Then followed Hermann Ebbinghaus with her first research on memory.

Cognitive psychology is defined as a young branch of psychology and has become a common subfield. It essentially focuses on studying the brain functions and examining the role of mental processes in perception, thinking, memorization and learning. It is defined by Groome in his book *An Introduction to Cognitive psychology: Processes and Disorders*; as the study of understanding and knowing, more precisely, it is the study of how the brain processes information taken from the environment, how the brain makes its sense and use. "*Psychologists found it difficult to come up with a simple and unified definition of cognitive psychology. Clearly, cognition involves various kinds of information processing which occur at different stages*" (Groom, 2013, pp3).

This scale is designed to measure the cognitive abilities of adults and older adolescents, and it is in its fourth edition, it is considered as the most used IQ test in the world. The test is provided with updated advanced norms, and it provides assessments of cognitive functioning. Moreover, it is an examination tool of cognitive strengths and weaknesses (Climie & Rostad, 2011). WAIS comprises four supplemental tests: Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI), and Processing Speed Index (PSI), in addition to ten core subtests that form a full IQ test.

3.1. The Wechsler Memory Scale (WMS)

Michael & Mark determined the stages of memory in their book, and they are three. The first is the encoding stage which involves the processes of perception, this results in the storage of information in the memory, and this is the second stage. The third stage is about regaining the stored information from memory. These three stages represent a process that determines the architecture of human memory, this is, human memory is the construction of short-term memory (STM); also called the working memory (WM), and long-term memory (LTM).

Elizabeth illustrates the structure of WM with the example of multiplying two large numbers, here the working memory occupies in remembering the numbers while trying to do the multiplication and remembering the products as well. The working memory gets overloaded, and it may lose the numbers to multiply (Styles, 2005). Consequently, WM is short and lasts for very few limited seconds, and this is how an individual may remember the first half of information and make sense of the rest. Therefore, WM represents the short time of keeping information before it is forgotten or transferred to LTM. When trying to get answers to questions about the usefulness of WM in daily life, Mark and Michael added that WM is mostly useful when performing complex tasks where several processes are involved, mainly in arithmetic and numerous tasks (Michael & Mark, 2015).

The Wechsler memory scale is used in clinical instruments that are designed to serve and detect memory disorders, and assess various domains of memory: long-term memory, short-term memory, and working memory. It is developed by David Wechsler in 1945; it combines the existing methods of evaluating memory. The Working Memory index is composed of subtests that assess simultaneous and sequential processing, attention, and concentration. It covers two main core subtests: Digit Span for auditory processing, attention, and mental manipulation, and Arithmetic for concentration, mental calculation, and numerical reasoning.

It also includes a supplemental subtest, called Letter Numbering Sequencing, which concerns sequential processing, mental manipulation, and concentration (Valentine, Block, Eversole, Broxly & Dawson, 2020).

For WM measurement, prior to formal memory testing is required, it is called screening and it aims at making sure that the memory functioning is adequate to be tested. The scale measures registration; and it refers to the ability of an individual to temporarily store information in the STM or WM, which should be evaluated in verbal and non-verbal modalities to settle the memory span of an individual, and his capacity of storing and manipulating information. It deals also with encoding, which is the capacity to immediately recall information; both verbally and visually. Then, it assesses the retention of the learned information, through the use of delayed recall and recognition paradigms (Kent, 2017).

3.2. Mirsky's Attention Model

There have been huge studies looking at the importance of attention since it plays a critical role in various areas. Attention is an examined concept in cognitive psychology, and a major topic of investigation in the field of neuroscience, psychology, education, cognitive neuroscience, and neuropsychology. It is highly significant for the achievement of numerous tasks. Attention leads to a better perception, and when humans perceive they remember. Consequently, this is learning (Oakley, 2004). When there is a considerable amount of information to manage, attention is the mechanism that manages to multitask. This process refers to the ability to maintain more than one task simultaneously, which requires switching between tasks. Human brains have the ability to switch very quickly, and this becomes automatic the more the switching is experienced. Human cognition requires the functions of many processes when multitasking, like driving and talking on the phone and the more the tasks are complicated, the more the cognitive skills work slower, and thus make mistakes. To

define multitasking attention, we would say that it is divided attention between non-sequential tasks that are performed in learning situations. Therefore, recent studies have shown that multitasking has effects on academic achievements, and this depends mainly on the individual's experience it has with a given task difficulty through practice. Multitasking causes the brain to not fully focus, take longer to accomplish tasks, and make more errors; instead, it can be trained.

Although individuals can retain a limited amount of information, their motivation decides to manage their attention between task switching and dual tasking. The first refers to the brain's ability to shift attention from a task to another, takes a longer time to finish, and leads to making more mistakes. While the second is the attention's division among a selection of tasks to do at once, and like all fields, sex differences are a factor that promotes multitasking skills. Therefore, the distractions that come with multitasking causes the brain to run out. In contrast, multitasking can improve productivity, and thus keep the brain fresh.

Mirsky's Attention Model refers to a model of attention measurement, and it is the most used because it is based on a variety of experimental and clinical verifications, additionally, it is based on data collected from different subject groups that give it the possibility to be generalized on different populations. Mirsky's "four-factor" attention model was a theory of attention brought by A.F Mirsky. He originated four factors of attention: sustain, shift, focus-execute, and encode. According to Mirsky, each factor is linked to its adapted area in the brain; therefore, though these factors may seem separate, they actually are connected to each other and structure the human attentional mechanism. The assessment of attention by using the Mirsky's Model is based on firstly assessing the ability to identify a stimulus to focus on, and move secondly to measure continuous visual and auditory attention over a long period of time. The third factor is about measuring a person's ability to make conceptual shifts, while the last factor is mainly related to the ability to store information in the STM.

Conclusion

This chapter is devoted to present the theoretical frameworks to rely on in our research, thus, previous research studies have been highlighted. Relying on the models of some scholars, we defined how to measure the variables we are exploring, since the concern of our study is to measure the consistency of tests in relation to our research. We selected the Self-Determination theory to measure students' motivation and make distinctions between intrinsically and extrinsically motivated students, and we chose Witkin's Learning Styles Theory to analyze the students' learning styles. Moreover, we will rely on the Wechsler Intelligence Scale to measure students' attention, and the Wechsler Memory Scale for working memory measurement.

Chapter Three
Design and Methodology
&
Results

Introduction

The first section of this chapter is an outline of the methodology followed throughout our study to achieve the aims and answer the questions. It describes the context and setting of the study and presents the participants who are first-year EFL students of Abderrahmane Mira University. It also explains the procedures of data collection tools that are questionnaires and observation. In addition, it provides explanations of data analysis procedures. The second section is devoted to the presentation of the findings of the data collected through the use of illustrations such as tables and diagrams.

I. Research Design & Methodology

1. Context of the study and participants

1.1. Context and Setting

In order for us to do our observation sessions and distribute the questionnaire, we have selected English students from the University of Béjaia as a sitting or investigation in this research. We have selected two of the main subjects they attend regularly: linguistics and literature, during the second semester of the year 2021, by the end of May and the opening of June.

1.2. The Participants

Our research is conducted in the department of English at Béjaia University, and it concerned twenty-three (23) students: twelve (12) females and eleven (11) males from three groups of first-year EFL students at the University of Béjaia, aged between 19 to 22 responding to questionnaires and attending sessions of two subjects (linguistics and literature) for observation, in collaboration with their two teachers. The choice of first-year students was not random, in other words, students of this level are newly using note-taking as a strategy of learning, and this is a reason to explore whether they are adapted to taking notes in a suitable manner, to get well prepared for higher levels where note-taking is used as a main strategy.

2. Data Collection Tools and Procedures

It deals with the description of our data collection tools and the techniques we used to analyze and interpret the findings. We opted for two methods to collect the data: classroom observation and a questionnaire addressed to the selected sample.

2.1. Classroom Observation

We used this research tool in classroom, where we could gather data through observable behavior and physical characteristics in their natural setting. The classroom observation helped us in our research to get valid data and report what is actually happening in classroom.

As regards the procedure of the observations, our study needed a structured classroom about which we got the permission of the teachers and we have prepared a checklist scheme including the main points to observe the students' attention during lectures. Moreover, we attended sessions in order to take their taken notes at the end of each session in order for us to measure their level of perception through a percentage given by their teachers. The Classroom observations were conducted during eighteen hours and a half (18h30), and we have attended thirteen (13) supervised practical sessions in which teachers have allowed us to attend their sessions. The number of students was twelve (12) females and eleven (11) males from three different groups of first year students. We focused all over the observation phase on the students' behavior to measure their multitasking attention during lectures.

2.2. Student's Questionnaire

Questionnaires are considered as a research instrument that includes structured questions and statements and is used by researchers for data gathering. The aim of using this instrument is to measure attitudinal data, behavioral data, and factual data, within a short period of time. It serves as a tool that helps to get individual data about a specific topic. A questionnaire is an efficient way of getting a large amount of data, however, it has some limitations, like the uncertainty of the answers, and some participants may not collaborate and refuse to answer.

Our data were collected from questionnaires addressed to the participants: eleven (11) males and twelve (12) females from three different groups of first-year in the department of English at Béjaia University.

The questionnaire of this study includes twenty-one (21) questions, divided into three sections, and they are close-ended questions.

The first section: it deals with eight (8) questions about motivation. The questions are designed to categorize intrinsically and extrinsically motivated students, according to Deci & Ryan's Self Determination Theory.

The second section: it covers nine (9) open-ended questions, devoted to explore students' learning styles (field-dependent or field-independent). The questions are inspired from the Witkin's Learning Styles Theory.

The third section: it includes four (4) questions to measure the student' WM. The questions are inspired from the WMS (Wechsler Memory Scale).

3. Methods and Data Analysis

In this study we used the mixed-method that suits the research, thus, it is both exploratory and descriptive. It is exploratory because it investigates the student's attention during classroom lectures through their behavior and their perception by rating the notes they take. It is also descriptive in the way it deepens our understanding of the relationship between their personality traits and their cognitive functions. We used a questionnaire for the descriptive part to measure students' learning styles, motivation, and WM. The observation is used for obtaining qualitative data, while the latter is used for quantitative data.

3.1. Qualitative Content Analysis

Qualitative method of data analysis is used to analyze the non numerical data. We used this method to interpret the data collected from the classroom observation sessions.

3.2. Quantitative analysis

We used the quantitative method for the analysis of the quantifiable data gathered from the questionnaire. In order to interpret the data, we used Microsoft office Excel program to arrange them through the use of graphs.

II. Results

1. Results of Classroom Observation

Student's level: first year Group number: 12 Student's number: 08.
Student's age: 19-22 Subjects: literature. 05 males/ 03 females

	First session Tuesday, May 18th, 2021 08h00-9h30		*Second session* Tuesday, June 1st, 2021 08h00-9h30		*Third session* Tuesday, June 8th, 2021 08h00-9h30	
	Yes	No	Yes	No	yes	No
St1	F: 1 M: 0	F: 2 M: 5	F: 1 M: 1	F: 2 M: 4	F: 1 M: 3	F: 2 M: 2
St2	F: 2 M: 2	F: 1 M: 2	F: 2 M: 3	F: 1 M: 2	F: 1 M: 3	F: 2 M: 2
St3	F: 0 M: 0	F: 3 M: 5	F: 1 M: 0	F: 2 M: 5	F: 1 M: 3	F: 2 M: 2
St4	F: 2 M: 3	F: 1 M: 2	F: 2 M: 5	F: 1 M: 0	F: 2 M: 3	F: 1 M: 2
St5	F: 0 M: 3	F: 3 M: 2	F: 2 M: 3	F: 1 M: 2	F: 2 M: 3	F: 1 M: 2

Table 01: **Measuring Males and Females' attention during three observed literature sessions.**

We notice from the table above that in statement one, most of the selected students could easily keep up with their teacher's explanation when they get distracted. In the second statement; females could switch from one task to another than males because males prefer to listen to their teacher and take notes than doing something else, contrary to females. Most of the students in statement three were able to coordinate between listening to the teacher and taking notes. Statement four shows that few students were not able to shift their attention back to what they were doing before being distracted. The last statement shows that it was easy for males to alternate between two tasks than females. In the end, we notice that most of the students were attentive and motivated by these modules, thus they were always present, and like to take notes.

Student's level: first year Group number: 3 & 4 Student's number: 15

Student's age: 19-22 Subjects: linguistics. 06 males/ 09 females

	First session Tuesday, May 18th, 2021 09h40-11h10		*Second session* Tuesday, May 25th, 2021 09h40-11h10		*Third session* Tuesday, June 1st, 2021 09h40-11h10		*Fourth session* Tuesday, June 8th, 2021 09h40-11h10		*Fifth session* Tuesday, June 15th, 2021 09h40-11h10	
	Yes	No	yes	No	yes	No	yes	no	yes	no
St 1	F: 2 M: 2	F: 7 M: 2	F: 4 M: 2	F: 5 M: 4	F: 2 M: 3	F: 6 M: 2	F: 3 M: 1	F: 5 M: 3	F: 1 M: 3	F: 6 M: 3
St 2	F: 8 M: 2	F: 1 M: 2	F: 8 M: 3	F: 1 M: 3	F: 8 M: 3	F: 0 M: 2	F: 8 M: 3	F: 0 M: 1	F: 7 M: 3	F: 0 M: 3
St 3	F: 0 M: 2	F: 9 M: 2	F: 0 M: 3	F: 9 M: 3	F: 0 M: 3	F: 8 M: 2	F: 0 M: 1	F: 8 M: 3	F: 4 M: 2	F: 3 M: 4
St 4	F: 9 M: 2	F: 0 M: 2	F: 9 M: 3	F: 0 M: 3	F: 8 M: 3	F: 0 M: 2	F: 8 M: 3	F: 0 M: 1	F: 6 M: 4	F: 1 M: 2
St 5	F: 7 M: 2	F: 2 M: 2	F: 7 M: 4	F: 2 M: 2	F: 8 M: 3	F: 0 M: 2	F: 8 M: 3	F: 0 M: 1	F: 7 M: 4	F: 0 M: 2

Table 02: Measuring Males and Females' attention during five observed linguistics sessions.

The table above represents the measurement of student's attention during linguistics sessions; we notice that the number of females is more than males. In this group, we observed that females were the most attentive than males; all the statements were answered positively by most females rather than males. Males are absent nearly in all sessions, contrary to females.

Students' Perception

In order for us to evaluate students' perception, we asked for the teachers' collaboration. We took pictures of the students' notes, and have asked the teachers to make an evaluation of the students' understanding of each lesson. In order to make this evaluation, teachers provided a percentage to each student's notes.

Student's level: first year Group number: 12 Student's number: 08.
Student's age: 19-22 Subjects: literature. 05 males/ 03 females

	First session Tuesday, May 18th, 2021 08h00-9h30		*Second session* Tuesday, June 1st, 2021 08h00-9h30		*Third session* Tuesday, June 8th, 2021 08h00-9h30	
	Females	Males	Females	Males	Females	Males
1	45%	35%	45%	70%	40%	50%
2	45%	55%	60%	70%	45%	90%
3	45%	80%	60%	60%	80%	50%
4	/	70%	/	90%	/	75%
5	/	65%	/	80%	/	40%

Table 03: evaluating males and females' perception during three literature observed sessions

Student's level: first year Group number: 3 & 4 Student's number: 15
Student's age: 19-22 Subjects: linguistics. 06 males/ 09 females

	First session Tuesday, May 18th, 2021 09h40-11h10		*Second session* Tuesday, May 25th, 2021 09h40-11h10		*Third session* Tuesday, June 1st, 2021 09h40-11h10		*Fourth session* Tuesday, June 8th, 2021 09h40-11h10		*Fifth session* Tuesday, June 15th, 2021 09h40-11h10	
	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males
1	70%	65%	75%	60%	75%	80%	60%	80%	60%	80%
2	75%	60%	70%	70%	65%	65%	70%	65%	70%	70%
3	80%	60%	85%	60%	90%	NO NOTES	90%	NO NOTES	90%	ABS
4	85%	NO NOTES	85%	NO NOTES	80%	ABS	90%	70%	90%	ABS

5	70%	60%	60%	65%	75%	80%	70%	ABS	70%	NO NOTES
6	70%	NO NOTES	ABS	10%	85%	30%	ABS	ABS	ABS	65%
7	80%	/	70%	/	85%	/	90%	/	90%	/
8	65%	/	70%	/	ABS	/	75%	/	75%	/
9	60%	/	60%	/	ABS	/	75%	/	75%	/

Table 04: evaluating males and females' perception during five lingustics observed sessions

In table 03, the teacher of literature evaluated students' perception and the amount of notes they took, and estimated males' percentages between 35% and 90%, while female's perceptions were evaluated between 40% and 80%. Tables 4 shows the linguistics teacher's evaluation of students perception, it is between 10% as the lowest percentage and 80% as the highest percentage, while females' percentage was arranged between 10% and 90%.

2. Results of Students' Questionnaire

This questionnaire is handled to twenty-three (23) first year students in the department of English at the University of Bejaia, among them twelve (12) females and eleven (11) males. This questionnaire opens by asking the respondents about their gender, and then it follows by three sections of twenty-one questions to measure their motivation, investigate their learning styles, and measure their WM.

Identifying the gender of the participants

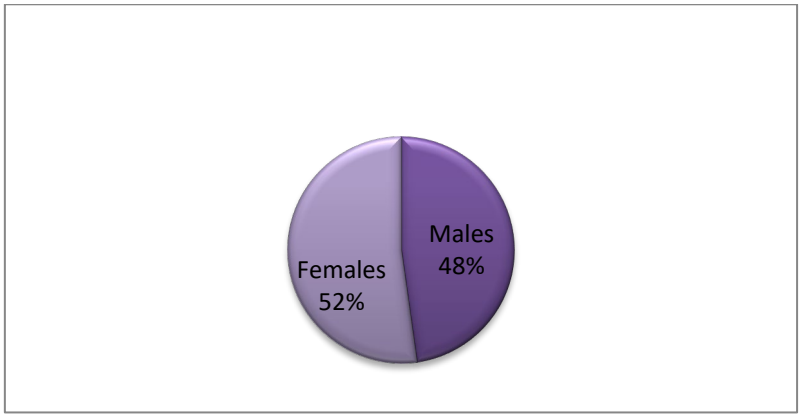

Diagram 01 : Identifying students gender.

We selected more females than males, since the number of females in the department of English is about three times more than the number of males. This selection is made to be representative.

Section one: Measuring Motivation

Q1: Taking notes during lectures is important for me.

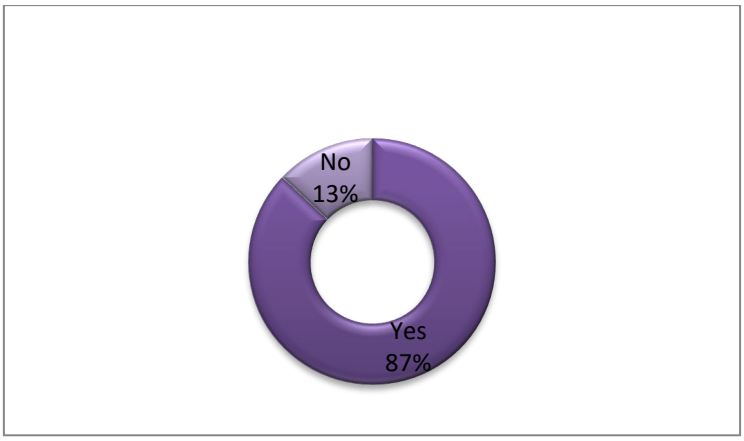

Diagram 02: The importance of note-taking to students.

The diagram represents the student's view of the importance of note-taking during classroom lectures. As it is shown, more than 87% regard it as important since they are the category of students that use note-taking as a learning style. The remaining 13% say that it is not important, and they almost are the ones that do not take notes during classroom lectures.

Q2: I take notes during lectures because it is a fundamental task for learning.

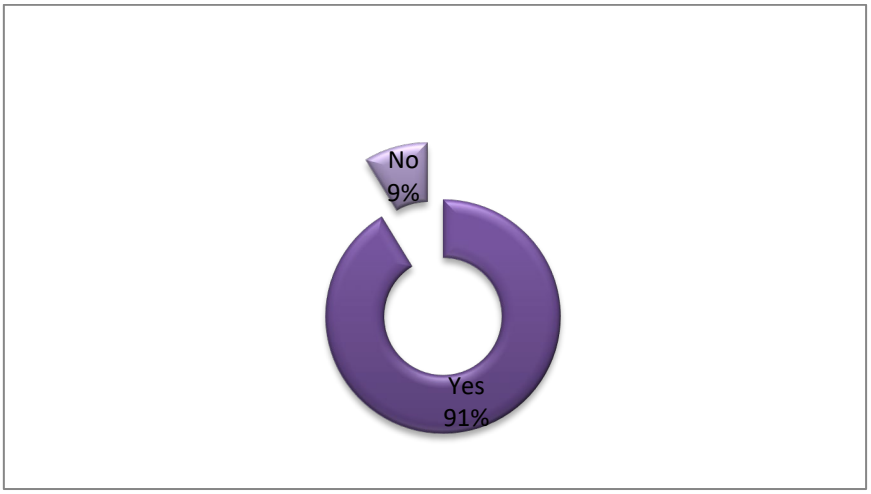

Diagram 03: Students' view of taking notes as a fundamental task of learning.

The illustration above shows that 91% of students are convinced that taking notes during lectures is a primary principle of learning in classroom, whereas 9% do not share the same view.

Q3: I am satisfied if I take as much notes as possible in my studies.

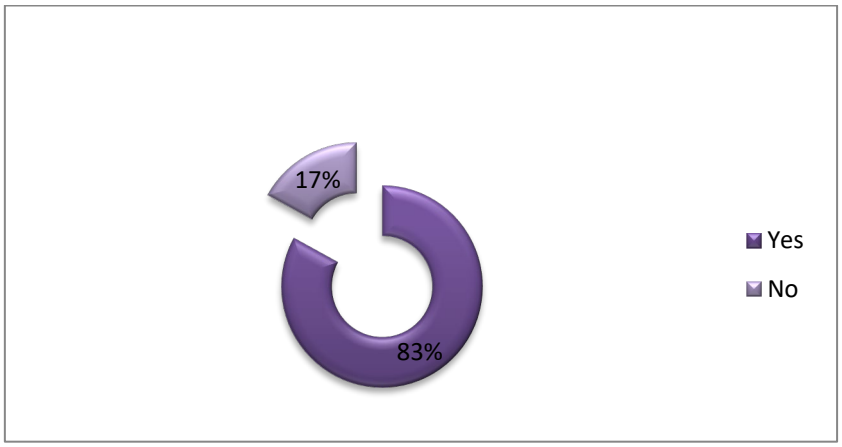

Diagram 04: Student's satisfaction of taking as much notes as possible

From diagram 4, we can clearly see that the majority of students (83%) find it interesting to take as much notes as possible for their satisfaction, and the other 17% of students do not, since they are the category that does not take notes.

Q4: I take notes because that provides me with a better understanding of the information I want to acquire.

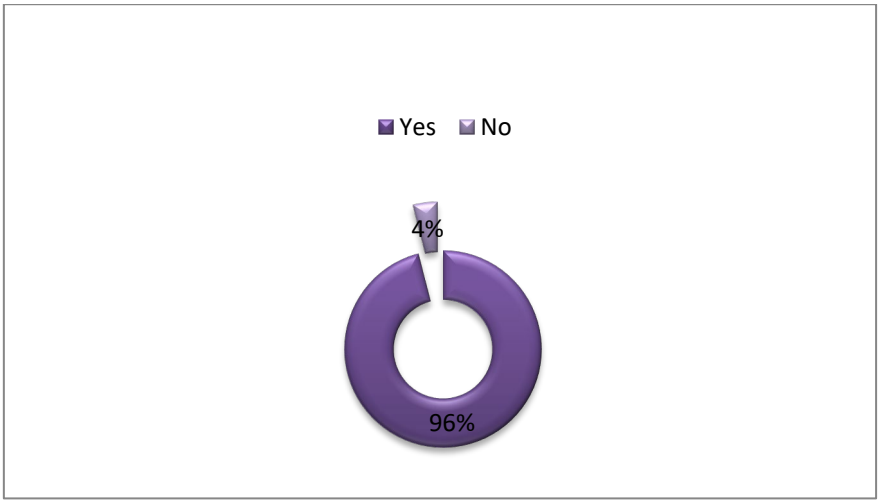

Diagram 05: Student's view of the effectiveness of note-taking in understanding information.

The diagram shows that 96% of students perceive information in a better way when using note-taking during the teacher's explanation of lectures. The remaining 4% represent the students that do not agree with the statement.

Q5: During lectures, I take notes when the teacher asks me to do so.

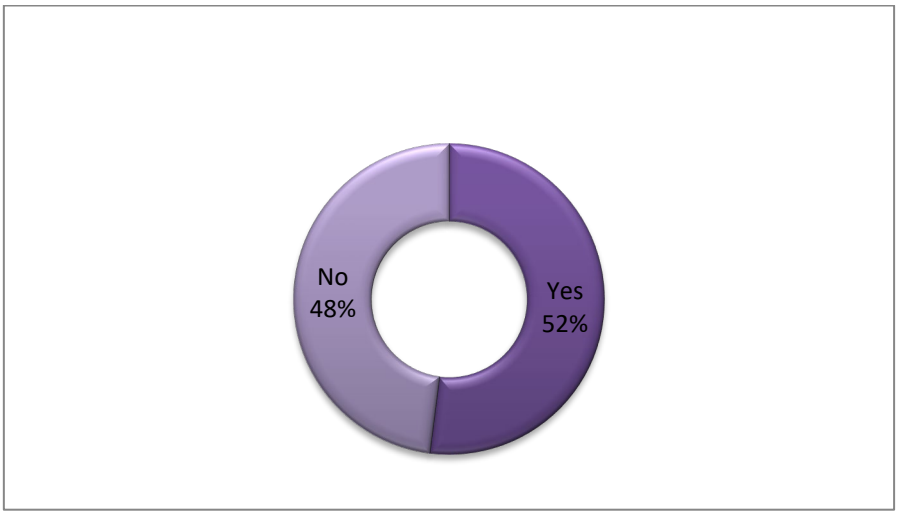

Diagram 06: Students' autonomy in taking-notes.

As shown above, nearly the half of students (48%) do not take notes only if the teacher asks them to do so, they rather do it because they are used to, and because they use note-taking as a strategy of learning. In contrast, 52% of the students are dependent on the teacher's asking.

Q6: I take notes only if it helps get better marks.

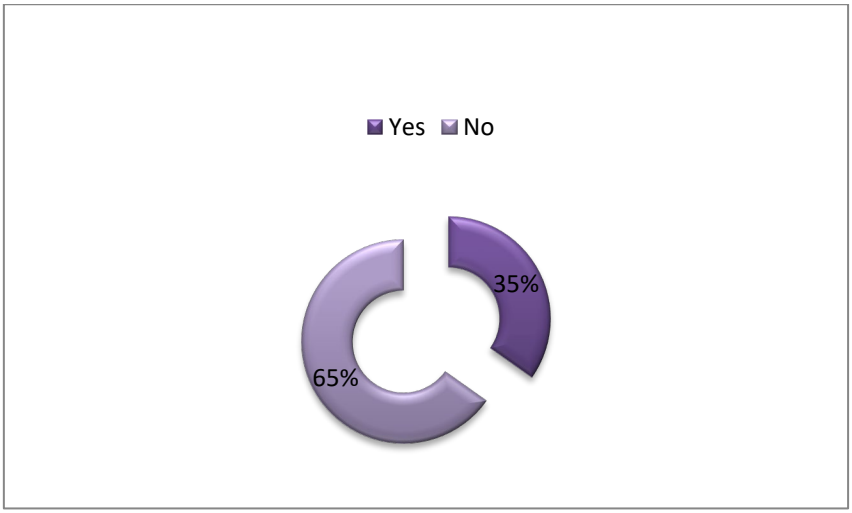

Diagram 07: Students' conviction about note-taking as a way of getting better marks.

From the gathered data it, it has been noticed that 65% of our population share the idea that taking notes enhances the chances to get better marks, which means that they are motivated to take notes during lectures. On the other hand, 35% are less convinced by this idea and are more likely to think that note-taking is not a factor that leads to getting better marks.

Q7: I rely on others to get things done (copying from others, sharing and exchanging ideas with others).

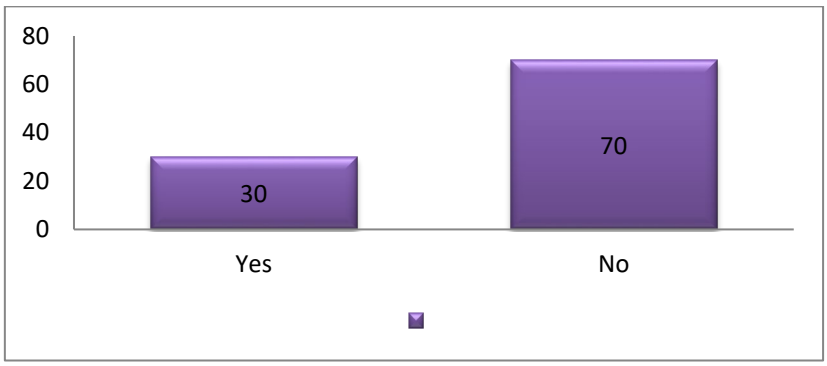

Diagram 08: Students' reliance on others.

As represented below, only 30% of the population prefers exchanging and sharing thoughts and ideas about studies, since they find it as a best way to understand and remember the information they acquire. 70% of the students d not rely on others, and they rather are more autonomous.

Q8: I take notes during lectures because that's the rule.

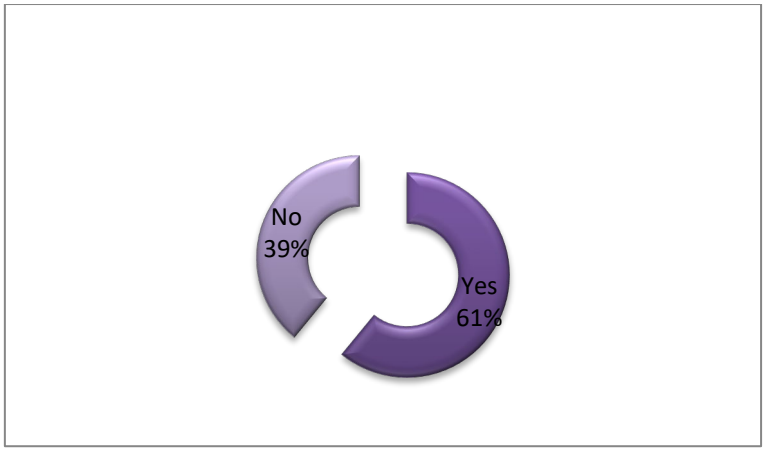

Diagram 09: Students' view of note-taking as a rule.

Diagram 09 demonstrates that 61% of the students think that note-taking is a part of the rules they should not deny in learning, whereas the remaining 39% are convinced that taking notes during lectures is not a rule but they view it as a principle in a learning sitting.

Section two: Learning styles

Q9: I better perceive information: Analytically / Globally

Option	Number of students	Percentage
Analytically	12	47,8%
Globally	11	52,2%
Total	23	100%

Table 05: Students' best way of perceiving information.

The table shows that the majority (52,2%) of students perceive information in an analytical way, which means they belong to the category of learners that prefer examining details and focusing on facts to understand concepts. The others that represent (47,8%) of the population perceive information globally.

Q10: I acquire more knowledge when working in groups.

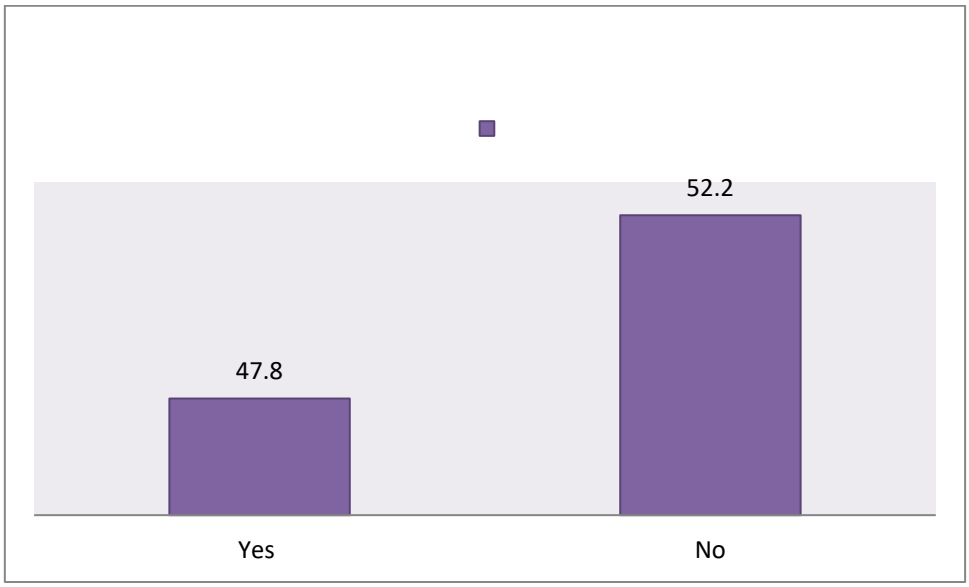

Diagram10: Students' preference of working in groups.

We can see from the illustrated results that the majority of students prefer individual working, in contrast, 47,8% say that they like working in groups since it is a way of acquiring more knowledge. 52,2% of the population represent the students that are more independent.

Q11: I rely more on my teacher's and classmates' support.

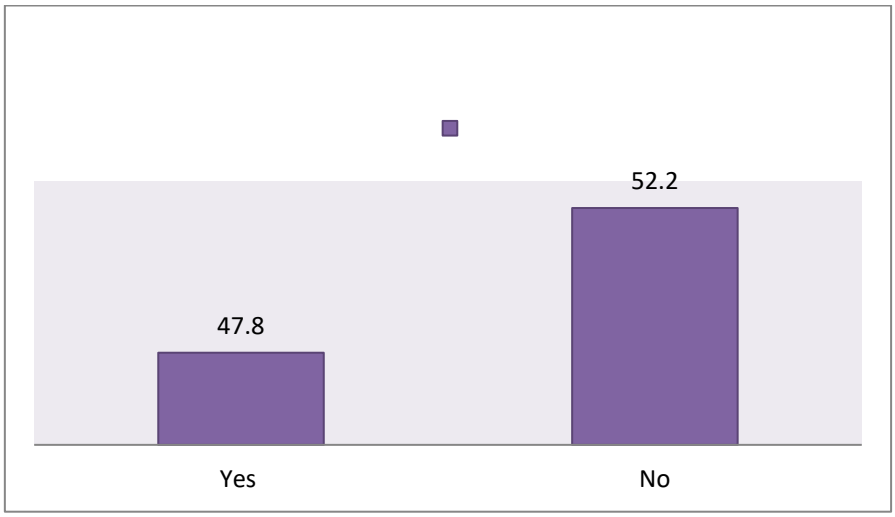

Diagram11: Students' reliance on the teacher's and classmates' support.

As shown in the diagram, more than 50% are the students that are self- determined and their success does not depend on the others support, the remaining others are more likely to depend on the teacher or classmates support.

Q12: I prefer a casual learning environment far from distractions.

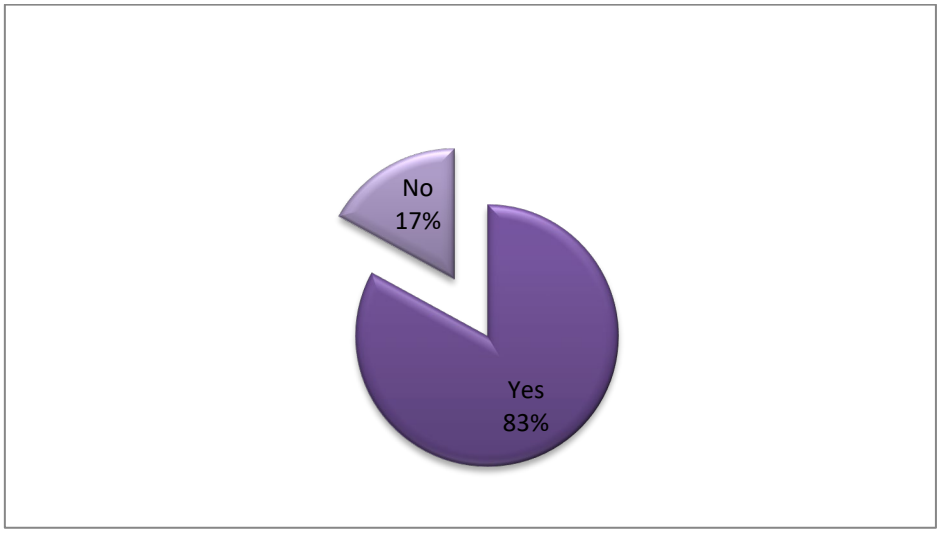

Diagram12: Students' preference of a casual learning environment.

The diagram shows that 83% of the students prefer to learn far from distractions in order to focus better and understand what they are learning, and only17% of them do not pay attention to distractions and they do not prefer a causal learning environment.

Q13: I rely on explicit structure, directions, assignments and guidelines.

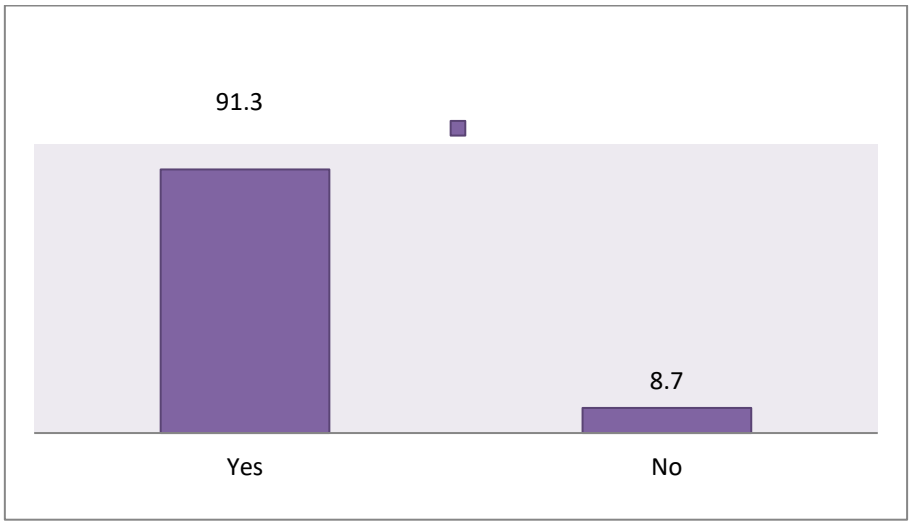

Diagram 13: Students' reliance on explicit directions and guidelines.

As we can see in the diagram, the statistics show that 91,3% of students enjoy having explicit directions to learn, whereas only 8,7 % of learners do not prefer guidelines and structures to learn.

Q14: When taking notes, I write down detailed information.

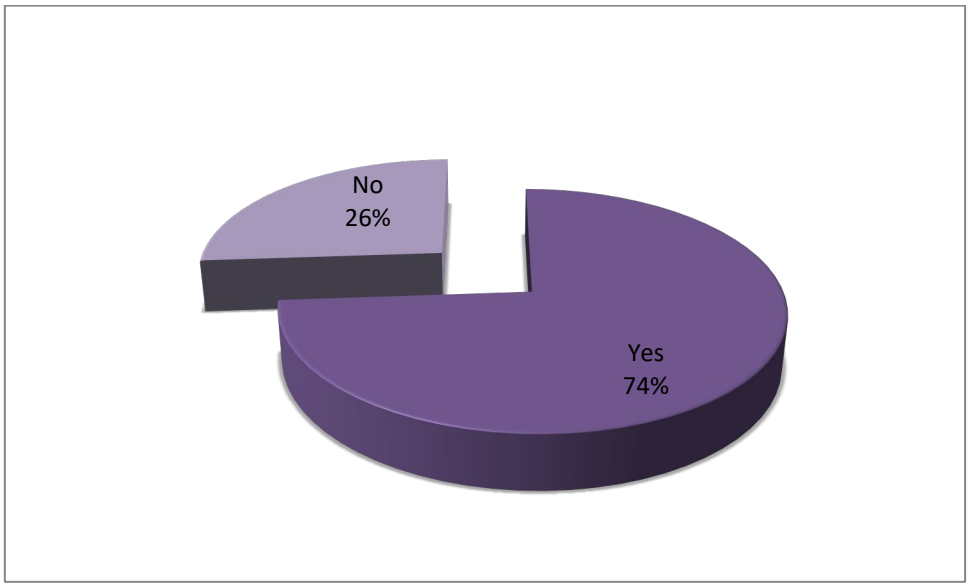

Diagram 14: Students' noting of detailed information.

The results in the diagram above show clearly that 74% of learners prefer to write detailed information when taking notes during lectures, and 26% of them use a different way which is noting general information briefly.

Q15: I do not really care about getting rewards (certificates or stamps) for my works.

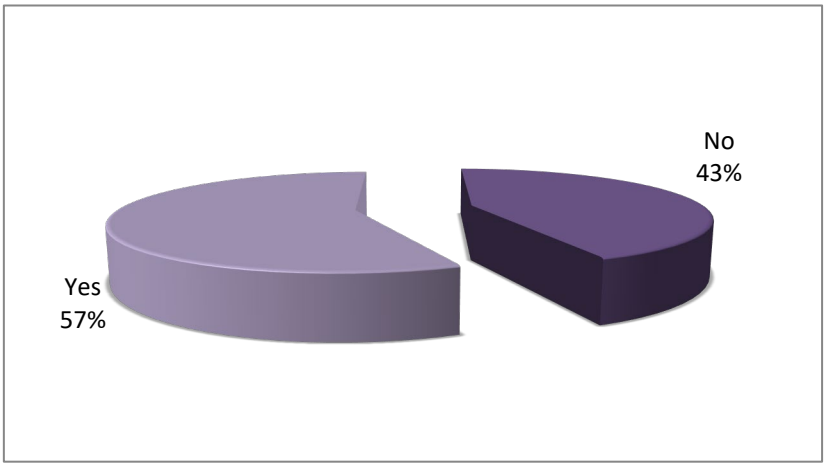

Diagram 15 : Students' care about getting rewards for their achievements.

As shown in the diagram 15, most of students that represent 57% of the population are interested in getting rewards for their success, since it is a way that encourages them to work better for more achievements. In another hand, 43% of them do not give much importance to getting rewards or stamps when they succeed.

Q16: I don't enjoy getting a lot of instructions.

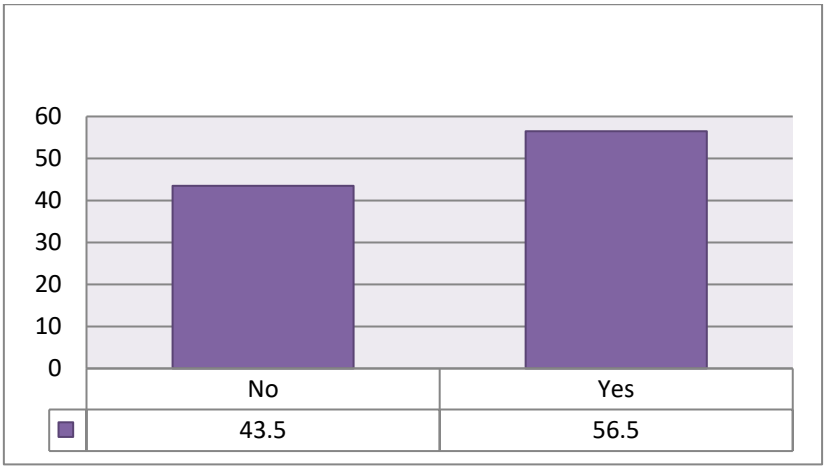

Diagram 16: Students' enjoyment of getting a lot of instructions.

The results in the diagram above concern the student's enjoyment of getting a lot of instructions when accomplishing a work in their studies, it is found that 56,5% agree with the statement and said yes, and 43,5% said no, since they do not like a lot of instructions and guidelines.

Q17: I tend to use logic and facts to take my decisions rather than my emotions and intuitions.

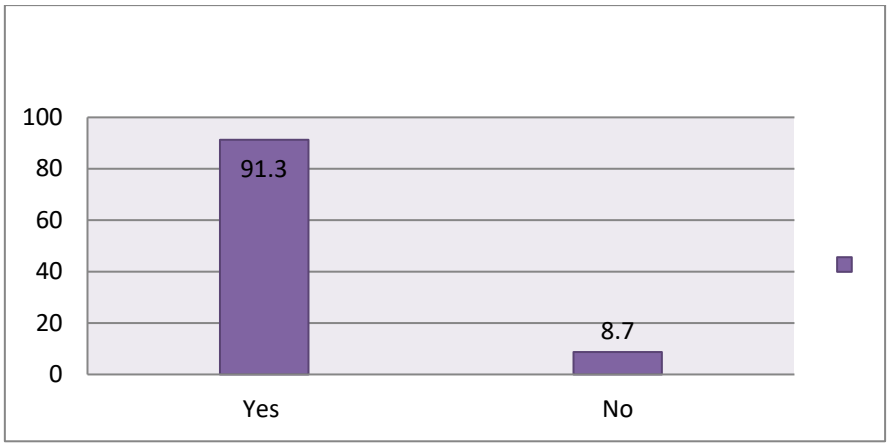

Diagram 17: Students' use of logic rather than emotions to take decisions.

According to the results shown in diagram 17, more than 90% of students rely on logic when taking decisions, and only about 8% use their emotions and intuitions.

Section three: Working memory

Q18: I have difficulty remembering long sentences given in several steps (for example when following a work assignment or following a chronological order).

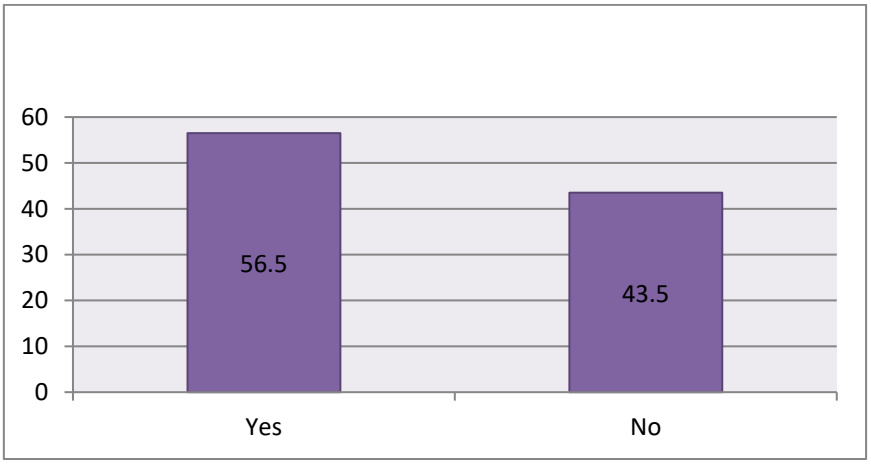

Diagram 18: Student's difficulty in remembering long sentences given in several steps.

As we can clearly see in diagram 18, 56,5% of students do not face troubles in remembering long sentences when they need to write them down, as opposed to 43,5% of them, they cannot remember.

Q19: I am consistent in remembering many facts

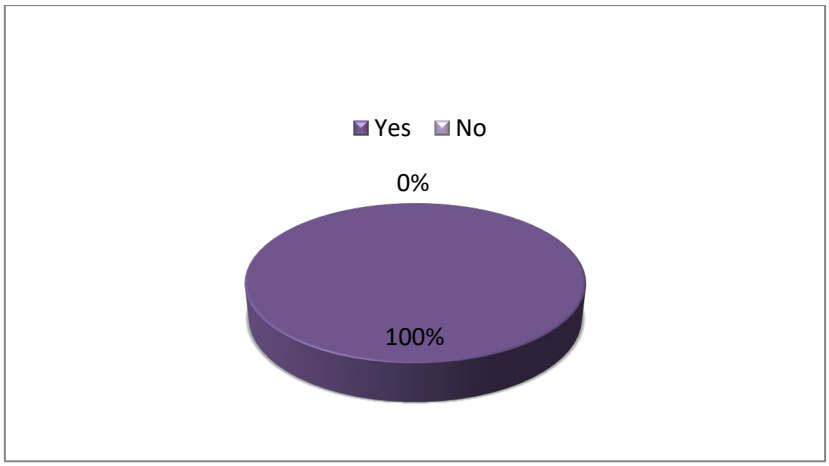

Diagram 19: Student's consistency in remembering many facts.

Diagram 19 shows that 100% of the selected sample does not face any problems in remembering many facts, which means that their working memory functions as required.

Q20: When many ideas are said at the same time, I forget what I was planning to write.

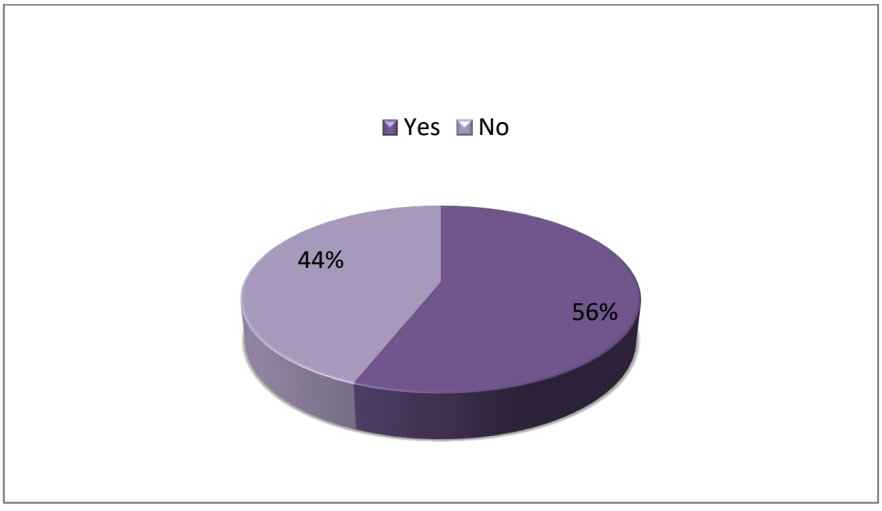

Diagram 20: Students' forgetting of noting ideas when said at once.

As shown in the diagram above, 56% of the students are able to remember what they were planning to write when several ideas re said at the same time. In contrast, 44% of them say that they have a difficulty in remembering what to note when many sentences are said simultaneously.

Q21: I have a difficulty in organizing ideas that need to be noted separately.

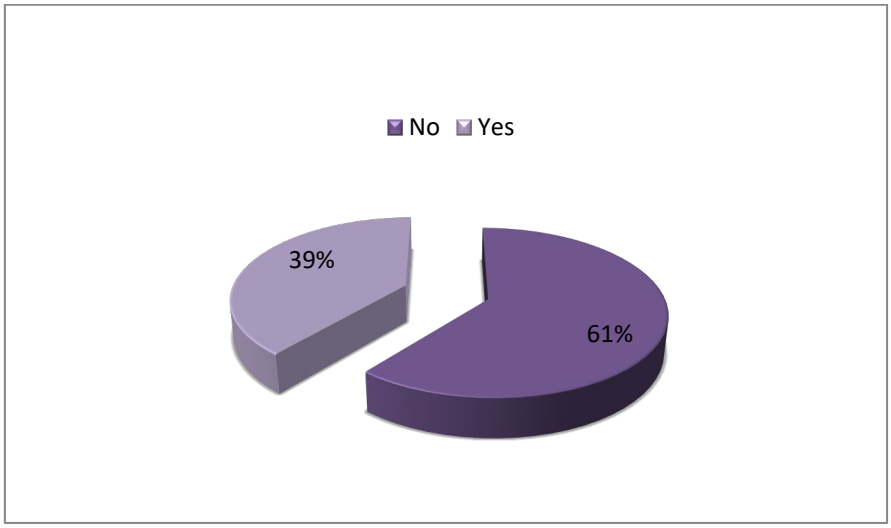

Diagram 21: Student's ability of organizing notes that need to be written separately

The findings show, in one hand, that 61% of the learners which represent the majority, are able to organize normally all the ideas that need to be noted separately. On the other hand, 39% said that they cannot manage this.

Conclusion

To conclude, this chapter has been devoted to the research methodology we used in our research. We presented the research tools and instruments we used for data collection using the classroom observation of first-year classes, in addition to the questionnaire we distributed to students. This has been followed by relevant instruments for the data analysis, where the two research methods are used; the qualitative and quantitative. Therefore, the purpose is to get answers to our research questions. Then, we provided a presentation of the findings, we illustrated the collected data from the classroom observation and the questionnaire by using graphs and tables.

Chapter Four

Discussion of the Major Findings, Implications, and Limitations of the Study

Introduction

Our study aims at investigating different individual differences and cognitive abilities of learners that are involved in note-taking, hence, shedding light on the relationship between gender, learning styles, and motivation to multitasking attention, bottom-up processing, and working memory. This chapter is devoted to provide an analysis of the collected data from the classroom observation and questionnaire and discuss the findings to come up with answers to our research questions. This chapter consists of two parts; it opens with the discussion of the results of the classroom observation, and then the discussion of the students' questionnaire.

1. Discussion of the Results of Classroom Observation

1.1. Attention

First of all, we made a random selection of males and females from two different groups of first-year English students for a classroom observation. We used classroom observation to gather qualitative data to measure their multitasking attention during lectures. Through the observation, we see from students' behavior whether they can manage their attention and keep multitasking; this is, whether they can focus on the teacher's explanation and take notes at the same time. A total of thirteen (13) observation sessions of eighteen and a half hours (18h30) have been conducted with three (3) different groups of first-year students in the department of English at the University of Béjaia, during two different subjects: linguistics and literature. For this, we designed a checklist of five (5) items, relying on the aspects of Mirsky's Four Factors Model of Attention.

The results show that most students do not get easily distracted during classroom lectures, and they can keep focused all over the session, and keep up with the teacher's explanation. We noticed that the majority of the learners who do not get distracted are the ones who are motivated to accomplish any kind of task. According to Mirsky's four-factor Model of Attention, there is a slight difference between males and females, as we can see in tables 1 and 2, only 3 females and 2 males from the selected ones have difficulty sustaining. Additionally, when checking the fourth statement (from the checklist), we noticed that few students can shift their attention back to what they were doing before getting distracted, especially females, in contrast to males who cannot do the same.

When it comes to shifting attention, females are better than males, as we can see in Tables 1 and 2. Females are better because they are very competent in managing their multitasking attention between different tasks, this is, they can listen to the teacher's explanation and stop for a while to look for a pen or answer a mate's question, and then shift back their attention to

listen to the teacher. In contrast, a minority of males cannot shift easily. We noticed that when they stop listening to the teacher for a while, they lose control of managing their attention. But the majority is good at shifting attention and multitasking. From this, we come to say that the majority of students can maintain continuous auditory and visual attention over a lecture session, after identifying the stimulus to focus on. Additionally, we noted that they can simultaneously alternate between listening to the teacher and take notes.

1.2. Perception

The evaluation of their teacher of literature and the provided percentages demonstrate that males perceive better than females in group 12. As we could see in the presentation section, the percentages were arranged between 35% and 90% for males, and 40% and 80% for females, and by this we come up to say that the average for males is 62.5% and for females it is 60%. This is strongly linked to the student's motivation and multitasking attention during lectures, because when students can manage their attention when multitasking, they equally perceive rightly. For linguistics, the teacher's evaluation has shown that females perceive better than males since the lowest percentage was 10% and the highest was 80% for males, while females' perception was evaluated between 10% and 90%.

According to the teachers' conclusions, there is a remarkable difference between males' and females' perceptions among different groups. In addition, most of the male students are not punctual, and they do not attend sessions regularly. Moreover, male students do not give importance to note-taking, since we noticed that two of them do not take notes all over the sessions. For females, only a minority of them were not regular especially during the two last sessions, when it was almost the end of the teaching sessions. However, females are more organized when it comes to note-taking; even their discipline and participation during workshops reflect a better perception.

2. Discussion of the Results of the Students' Questionnaire

2.1. Students' Motivation towards Note-taking

The results displayed in diagrams 2, 3, 4, and 5 show that the majority of participants affirm that note-taking is an important skill during lectures since it provides them with a better understanding of the information they want to acquire. They show through their answers the extent to which they consider note-taking as a fundamental task of learning. In contrast, the remaining minority do not regard this skill as important for learning, which is why they do not take notes.

According to diagram 7, 65% of the participants do not take notes only because they believe that it is a way of getting better marks, but it is because they are convinced that it is important and regard it as radical (see diagram 9).

Concerning the students' reliance on others, diagram 8 shows clearly that 70% of the participants represent the students that can do things by themselves without being dependent on others. From the results, we can affirm that they have a high degree of self-reliance, which means that they permit themselves to feel satisfied with their performance. In contrast, 52% of the participants do not decide to take notes by themselves, as we can see in diagram 6, only a minority which represents 48% are independent when it comes to deciding to write down notes, without being asked to do so.

The illustrated findings of the work go hand in hand with the Self-Determination Theory of Motivation which categorized two kinds of motivation: intrinsic and extrinsic. Accordingly, the questionnaire demonstrates positive results concerning students' motivation towards note-taking. The results have strongly shown that the majority of students are intrinsically motivated to take notes during lectures; they do not feel obliged to take notes when required. However, this majority is represented more by females more than males, and this is a reason why intrinsically motivated students are mainly the ones who improve their skills and

knowledge, which means that females are more successful than males. Consequently, being intrinsically motivated leads to better achievements, since it is a factor of satisfying inherent needs and innate contentment.

2.2. Learning Styles

For our questionnaire, we designed nine (9) questions dealing with students' learning styles. We used a general statement at the beginning to have a general view of their learning styles and discover if they are global or analytical learners. As we can see in table 3, 52,2% of learners perceive information better globally; they can see that knowledge as a big picture and understand, and they like to take their time and make interpersonal connections to make conclusions. In contrast, 47,8% of them perceive knowledge better in an analytical manner, which means that they learn through experiences and examining details.

In diagram 10, more than 50% of the participants are independent and do not prefer working in groups. These kinds of learners prefer working alone and revise or accomplish any task without any collaboration with others. The remaining category answered by a yes, and this reflects their preference of working with others and collaborate to fulfill any kind of task. When analyzing the findings in diagram 11, we notice that the same category of independent learners is the one that does not rely on other's support, whereas the other category that prefers group works, represents the learners whose performance depends on the teacher's or classmate' support.

Regarding the learning environment, 83% of learners prefer a casual environment far from distractions, since learning in a quiet sitting helps to keep focused. The remaining 17% of learners do not give much importance to learn far from distractions (see diagram 12). Followed by students' reliance on guidelines and explicit assignments, 91,3% of the participants answered yes. Learners who prefer directions and guidelines are less independent than others, and their understanding is more dependent on explicit structure (see diagram 13).

Accordingly, diagrams 10 and 11 demonstrate that the majority of the participants are field-independent learners, since they are characterized by their analytical approach, and they depend on internal clues. In addition, they can structure a better understanding through their relative extrinsic structures. In contrast, diagram 12 and 13 demonstrate that the majority is field-dependent learners; they shape their learning based on external clues. Besides, they prefer learning far from distractions since they have a short attention extension.

The study also reported that 74% of students are interested in details, they write down detailed information when taking notes, unlike 26% of them (see diagram 14). As known in the previous chapter, field-independent learners are analytical thus; they are interested in details, in contrast to field-dependent ones. In addition, diagram 16 shows that the majority (56,6%) do not enjoy getting a lot of instruction, this majority concerns males the most. Moreover, this kind of learner does not give much importance to getting rewards for their works (diagram 15), because they depend on internal cues and they are intrinsically motivated. Along these lines, we come out to say that they are field-independent learners. In the same vein, the results of the last statement demonstrate that 91,3% of the participants say that they tend to use logic and facts to make their decisions, especially males, opposed to 8,7% of them. Based on Witkin's Learning Styles Theory, these results lead us to sum up that the majority of the participants are field-independent learners, including both genders.

2.3. Working Memory

The results of the questionnaire reveal that 100% of the participants do not face trouble in remembering many facts (see diagram 19). When they are exposed to memorize many ideas in a given period of time, they perform well. However, we notice in the illustrated results in diagram 18, 56,5% of the participants are not consistent in remembering long sentences when they are said in several steps, for example when dictating a work assignment, or telling a story that contains many events. In another hand, 43,5% of the participants responded by no,

because they think they can keep remembering several ideas at once.

Although the students may be able to remember many facts at once, the majority of them (56%) cannot remember what they were planning to write down when many ideas are said at the same time, they may mix words and sentences, and this leads to a misunderstanding of information. Diagram 20 reported that 44% of the students do not face problems remembering many facts at once. When it comes to writing down notes separately, 61% of students do not have difficulty in organizing their ideas, whereas 39% of them have difficulty; this is due to their working memory. These results show that the participants' working memory operates as required, and it follows the four phases including screening, registration, encoding, and retrieval. Without any doubt, when it comes to screening and registration, they have the ability to temporarily store and manipulate information. However, they may face a problem when it comes to encoding, which means that they cannot recall information immediately when required, which leads equally to problems in the retention of the needed information within a delayed period of time, and this concerns both males and females.

3. Implications and Limitations of the Study

During the conduction of our study, we met different issues that hindered our research to be done easily. The problems that we met were related to the collection of data. First, we would prefer to have more time for the classroom observation, but unfortunately, we could not have more than five (5) sessions, due to sanitary measures that imposed a very limited number of teaching sessions. Second, we planned to use more tools for data collection, such as teachers' interviews to have several chances to explore and measure the research variables; however, we did not have enough time to do that. Then, the limitations of this study include the difficulty to find the required number of males in EFL first-year classes. In fact, the number of males was very limited, and they were not regularly present during our observation sessions, and this is a reason for having some unreliable data, but still valid. Besides, the time

and absence of students did not allow us to use experiments for WM measurement; instead, we used a questionnaire. The results achieved are related to a limited time span and may have been different if the study was conducted earlier or later.

4. Suggestions for Further Research

We conducted this research on first-year LMD students of English at Abderrahmane Mira University. We investigated the connections that link between the individual characteristics and the cognitive skills of learners during note-taking as a process. This study can be conducted using a different methodology, with a different sample, and in a more pertinent situation.

1. Select a different population: for further research, the sample can be selected from another population, in other words, the study focuses on students at university level, and thus, other researchers can select students from any other faculty and department.

2. Select a different sample: This study can be replicated on English students at the Master level at the same university since they are not provided handouts of the majority of lectures and consequently rely heavily on note taking.

3. Select a larger sample: certainly, the data collection tools can be used on a larger sample by selecting a representative number of either males or females, or both.

4. Data collection tools: future research may consider using another data collection tool that is designing a checklist for interviewing teachers about note-taking including its usage, its benefits,

5. Data analysis: this research may be conducted using experimental methods. Memory and perception can be exercised through the use of puzzles. Moreover, IDs can be explored through classroom observation as a surrogate for questionnaires.

6. Future studies may focus on exploring the listening skill in note-taking method.

Conclusion:

To end up, the analysis section discusses the results of the two research techniques: classroom observation and student's questionnaire. They both provided solid arguments which helped to find answers to the research questions. We came to a conclusion that individual differences work together with the cognitive styles of a learner to shape his achievement as an EFL student. In fact, gender, motivation, learning styles, working memory, bottom-up perception and multitasking attention are all interrelated. Furthermore, these components play a role in student's performance. Therefore, EFL teachers should be experts in the way they should provide explanations during classroom lectures, since it is a factor that plays a role in students' motivation and attention.

General Conclusion

This dissertation is concerned with the relation of individual differences to the cognitive skills involved in note-taking as a learning strategy. It is intended to determine the relationship that links between gender, motivation, and learning styles as IDs and bottom-up processing, multitasking attention, and working memory as cognitive abilities. The investigation in this area is quite important since it leads to discovering the reasons why students' performances may decrease or increase.

This study stated three main objectives. The first one was meant to determine the importance of first-year learners' psychological characteristics and their role in learning. The second objective was to discover and determine the role of bottom-up processing, multitasking attention, and working memory when taking notes during classroom lectures. The last objective aimed to explain the role of motivation and learning styles in note-taking as a process.

For the sake of answering the research questions in the general introduction, a mixed-method approach is adopted and used, thus, quantitative and qualitative methods are joined together to analyze the data. Indeed, the data are gathered from two research instruments. Twenty-three (23) first-year students are randomly selected from the department of English at the University of Béjaia. Besides, a classroom observation is conducted to gather data about the students' attention when multitasking, through the use of a checklist which was inspired from Mirsky's Attention Model, in addition to their perception. For the data analysis, we used Microsoft Office Excel to analyze the quantitative data gathered from the questionnaire, and the qualitative method to analyze the qualitative data gathered from the classroom observation.

The findings of the current study have provided answers to the fundamental research questions. The outcomes from the classroom observation and the questionnaire have shown

that note-taking as a learning strategy is totally maintained by the psychological characteristics and the cognitive abilities of the learners. The results of the questionnaire revealed positive answers about learners' motivation towards note-taking during classroom lectures, since the majority of learners are highly intrinsically motivated to take notes, and this is considered as a factor that enhances their perception. Concerning gender, females are characterized by intrinsic motivation, whereas males are extrinsically motivated.

Also, we discovered through the results of the questionnaire that the majority of learners tend to be field-independent, according to Witkin's Learning Style Theory. We noticed that most students are more independent, due to their preference of working individually and their self-reliance. The remaining minority of learners are field-dependent, since they are more dependent on others' support, and they prefer teamwork. Besides this, the results revealed that there is a slight difference between males and females in terms of dependency; it was found that males are more dependent than females. For the learner's working memory, we discovered through the analysis of the results that both males and females have the capacity to temporarily store and manipulate information; in contrast, they may face difficulty when it comes to the immediate recall of information.

The classroom observation was carried out using thirteen (13) observation sessions that have been conducted within first-year EFL classrooms. We collected data to measure students' attention through the use of a checklist. We concluded that the majority can manage their attention when multitasking; in addition, they can direct and shift their attention whenever needed. We noticed a slight difference between males and females. After all, we outlined a strong relationship that links attention to motivation, and we concluded that intrinsic motivation is an individual component that directs students' behavior, in other words, motivation is what drives EFL students to satisfactory attention management when multitasking. As a result of righteous interaction between motivation and attention, learners'

performances and achievements enhance, which leads to successful EFL students.

We obtained very precious results that clearly show that IDs and cognitive abilities are interrelated, and they both shape the characteristics of a successful learner. Nevertheless, our corpus of study is limited on first year students, in the department of English at the University of Béjaia. Therefore, further research can be conducted n the other levels. It is hoped that our research will be beneficial to open opportunities for more research in this area of study. This research can be replicated by using another methodological investigation, like the use of interviews to study more about the learners' personalities and cognitive styles.

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Appendices

Appendix A: student's questionnaires

The present questionnaire is designed to measure students' motivation and learning styles as individual differences, in addition to the working memory. It is divided into three sections for each element. Please answer all the questions honestly.

Student's e-mail:

I am a:

- Male
- Female

Section one: Motivation

1. Taking notes during lectures is important for me.
    - Yes
    - No

2. I take notes during lectures because it is a fundamental task for learning.
    - Yes
    - No

3. I am satisfied if I take as much notes as possible in my studies.
    - Yes
    - No

4. I take notes because it is a task that provides me with a better understanding of the information I want to acquire.
    - Yes
    - No

5. During lectures, I take notes when the teacher asks me to do so.
    - Yes
    - No
6. I take notes only if it helps get better marks.
    - Yes
    - No
7. I rely on others to get things done (copying from others, sharing/ exchanging ideas with others etc).
    - Yes
    - No
8. I take notes during lectures because that's the rule.
    - Yes
    - No

Section two: Learning styles

9. I better perceive information :
    - Analytically
    - Globally
10. I acquire more knowledge when working in groups.
    - Yes
    - No
11. I rely more on my teacher's and classmates' support.
    - Yes
    - No

12. I prefer a casual learning environment far from distractions.
    - Yes
    - No

13. I rely on explicit structure, directions, assignments and guidelines.
    - Yes
    - No
14. When taking notes, I write down detailed information.
    - Yes
    - No

15. I don’t really care about getting rewards (certificates or stamps) for my works.
    - Yes
    - No

16. I don’t enjoy getting a lot of instructions.
    - Yes
    - No

17. I tend to use logic and facts to take my decisions rather than my emotions and intuitions.
    - Yes
    - No

Section three: Working Memory

18. I have difficulty remembering long sentences given in several steps. (For example when following work assignments or following a chronological order).

    - Yes
    - No
19. I am consistent in remembering many facts.
    - Yes
    - No

20. When many ideas are said at the same time, I forget what I was planning to write.
    - Yes
    - No

21. I have a difficulty in organizing ideas that need to be noted separately.
    - Yes
    - No

Appendix B: Classroom Observation checklist.

	Yes	**No**
• When taking notes; the student gets easily distracted and cannot keep up with the teacher's explanation.		
• The student can easily and quickly switch from one task to another.		
• It is difficult for the student to coordinate his attention between listening to teacher and taking-notes during the lecture.		
• The student can easily shift his attention back to what he was doing before being distracted.		
• It is easy for the student to alternate between 2 different tasks.		

Résumé

La recherche actuelle porte sur l'étude de la façon dont les étudiants apprennent par la prise de notes en tant que stratégie ; en tenant compte des caractéristiques psychologiques des étudiants et de leur rôle dans le processus d'apprentissage. Les étudiants de première année du Département d'anglais de l'Université d'Abderrahman Mira ont été pris comme cas pour cette étude. Elle vise à explorer le rôle de la mémoire de travail, du traitement ascendant et de l'attention multitâche, de la motivation, du style d'apprentissage et du genre lors de l'apprentissage par la prise de notes. Cette étude s'appuie sur la théorie des styles d'apprentissage de Witkin pour mesurer les styles d'apprentissage indépendant et dépendant du champ, la théorie de l'autodétermination de la motivation, l'échelle de mémoire de Wechsler et la mesure du modèle d'attention à quatre facteurs de Mirsky. Cette étude est basée sur la recherche de méthodes mixtes. Elle regroupe à la fois des méthodes qualitatives et quantitatives. Par conséquent, deux instruments de recherche différents sont utilisés. Un questionnaire en ligne a été envoyé à vingt-trois étudiants de trois groupes différents, en plus des séances d'observation en classe. Des graphiques ont été utilisés pour l'analyse des données numériques; une méthode qualitative d'analyse des données est utilisée pour analyser les données recueillies à partir de l'observation en classe. Les résultats ont montré qu'il existe une relation très étroite entre les différences individuelles et les capacités cognitives. Les caractéristiques cognitives et psychologiques maintiennent la prise de notes comme stratégie d'apprentissage. Ils forment les caractéristiques d'un apprenant qui réussit.

Les mots clés: Différences Individuelles, Capacités Cognitives, Prise de notes, Etudiants EFL, Styles d'apprentissage, Genre, Motivation, Attention multitâche, Traitement ascendant, Mémoire de travail.