Doctoral (PhD) Dissertation

"Language Learning Effort in Relation to Proficiency, Motivation, Critical Thinking, and Multilingualism"

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Language Learning Effort in Relation to Proficiency, Motivation, Critical Thinking, and Multilingualism

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List of abbreviations

AMTB	Attitude/motivation test battery
BDS	Bilingual dominance scale
CA	Contrastive analysis
CAT	Critical thinking assessment test
CCTT	Cornell critical thinking test
CT	Complexity theory
DIF	Differential item functioning
DMM	Dynamic model of multilingualism
DST	Dynamic systems theory
EA	Error analysis
EFL	English as a foreign language
ESL	English as a second language
FLLEB	Foreign language learning effort battery
FLLES	Foreign language learning effort scale
ID	Individual differences
L1	First language
L2	Second language
L2MSS	L2 motivational self-system
LEAP-Q	Language experience and proficiency questionnaire
LLS	Language learning strategies
MTP	Motivational teaching practice
SDT	Self-determination theory
SLA	Second language acquisition
SRCT	Self-report classification tool
TLA	Third language acquisition
TOEFL	Test of English as a foreign language
WGCTA	Watson-Glaser critical thinking appraisal

Abstract

This dissertation reintroduces the concept of effort. After defining the concept based on the literature from various perspectives, it aims to provide a validated tool to measure effort and relate it to other linguistic and non-linguistic concepts. For example, effort is often included in the notion of motivation, but it is not measured separately. By operationalizing effort separately, we want to investigate to what degree effort and other concepts are related. Our basic assumption is that effort has a positive correlation with motivation, proficiency, the degree of multilingualism and critical thinking. The data were collected from 100 students aged between 19 and 26, who enrolled in an English language and literature BA program. The results show that effort correlates positively with the other measures mentioned above and proves to be a valid and reliable tool. Based on the strong correlation to proficiency, r (.79), n=100, $p<0.05$, effort seems the most influential factor of language learning. The results indicate that there is a significant correlation between effort and motivation (r (.43), n=100, $p<0.05$) and that motivation is a valid predictor of effort. We conclude that effort may explain why some learners are more successful than others in the context of language learning. We recommend that effort be included to explain individual differences in Second Language Acquisition based on personal, psychological, and social variables influenced by effortful acts.

1. Introduction

In this chapter, we will be presenting a brief introduction to the main purpose of the study. We will discuss the general and the specific scope of the study; provide a brief introduction to the constructs of the study; present background information about the language learning context in Jordan; and present a brief introduction to the researchers motive to conduct the research as a result of research gap in previous studies.

1.1. The main objectives of the study

According to Saville-Troike and Barto (2016), the field of linguistics and applied linguistics offer various views on many language-related issues. These issues include real-life linguistic ones, such as machine translation and machine coding for language recognition, pedagogical issues including the teaching and learning of languages, clinical problems, such as language impairment in elderly individuals, sociological issues including when and how to use formal and informal forms of the language, linguistic concerns such as the phonetic, phonological, morphological, syntactic, semantic, and pragmatic properties of the language, etc. Within this general scope of linguistics and applied linguistics lies a theoretical framework that addresses the issue of individual differences. "Individual Differences" is a term used to define which characteristics distinguish one individual from another (ibid, 2016). In linguistic and pedagogical terms, individual differences refer to many things like how an individual expresses himself verbally in a given situation (Barbara, 2008), what forms of language an individual prefers (Angle, & Hesse-Biber, 1981; Gborsong, 2016), and why some learners are more successful than others in the context of language learning (Saville-Troike, & Barto, 2016). In sociological terms, individual differences refer to groups with common social characteristics such as gender, ethnicity, religion, culture, occupation, income, and power (sometimes associated with income) (ibid, 2016). In psychological terms, individual differences refer to groups with common psychological characteristics such as gender, age, attitude, and intellect (ibid, 2016). We infer from the previous arguments presented in the literature that individuals vary considerably when the linguistics, pedagogical, sociological, and psychological variations are taken into account. This variation results in limitless uniqueness for each individual case. In other words, individuals represent unique cases by themselves due to

the many different experiences gained and the many different acts and roles exercised in various situations.

Accordingly, our goals in this research are divided into four main categories. The first objective is to investigate the level of effort expenditure amongst the participants to put the study into perspective. We consider the levels of effort expenditure as strong indices for explaining success in the context of language learning (ibid, 2020). By considering effort as a valid tool, researchers can expand the area of studying individual differences on the one hand. On the other hand, it may aid teachers in the context of learning (in the general sense) by pointing out that effort expenditure is not possible without cognitive, social, and motivational assets (Malmberg, & Martin, 2019). In other words, teachers may motivate their students to engage in social activities that include interaction and exchanging ideas.

The second objective is to validate the measurement of effort as a new construct by relating it to other constructs based on implicit and explicit associations. The effort is a construct that bears cognitive and social acts on the one hand. On the other hand, researchers interested in motivation often associate motivation with effort (Dörnyei, 2006). The argument posits that motivated individuals will expend effort. However, researchers have conceptualized motivation thoroughly for measurement (see Dörnyei, 2001a; Dörnyei, 2002; Dörnyei, 2003; Gardner, 1985; Gardner, 2004; Gardner, 2007), yet effort is somewhat disregarded from the conceptualization and often treated as a component of motivational orientations (Özer, 2020; Karabiyik, & Mirici, 2018). According to Özer (2020), language learning effort is an understudied phenomenon in the literature. She states "When the literature was reviewed, it was observed that foreign language learning effort was generally examined as an output regarding generally motivation … or attitude … However, the literature lacks the studies scrutinizing foreign language learning effort itself" (p. 1353). We aim at presenting a valid instrument of detecting effort if it has significant relationships with motivation, critical thinking, multilingualism, and proficiency. To do so, we conducted a Cronbach's Alpha test of internal consistency on the new developed questionnaire to find it highly reliable.

The third objective is to justify the inclusion of energy restorative acts within a concept often considered to consist of energy consumptive acts. Our argument for the inclusion of

restorative acts in measuring effort is simple, you cannot spend it if you do not have it. We used Pearson product coefficients to investigate the relationship between restorative acts and consumptive acts in measuring effort. We present the results in chapter 5, and the discussion of the results is in chapter 6.

The fourth and final objective is to detect individual differences between male and female participants. If we find that the effort measure is a valid tool in detecting effort levels, researchers may investigate individual differences on a much broader scale. For example, future research could include other variables such as age or personality traits as predictors of effort expenditure in the context of language learning.

To sum up, we aim to validate the new construct, investigate the levels of effort expenditure, justify the inclusion of energy restorative acts in measuring effort, and investigate gender differences within the context of language learning.

1.2. Key concepts of the study

As mentioned earlier, the key concepts include a cognitive concept (i.e., critical thinking), a social concept (i.e., multilingualism), a psychological concept (i.e., motivation), and a reintroduced concept in a novel perspective (i.e., effort).

Critical thinking has been the subject of interest for researchers because of its relation to success in education and life in the general sense, in addition to its link to success in language learning in specific (see Fábián, 2015; Meiramova, 2017; Rezaei et al., 2011; Shirkhani, & Fahim, 2011). Critical thinking is crucial because it shapes the individuals' perceptions of the learning task. In other words, critical thinkers can think of better ways to learn. Accordingly, critical thinking relates to language learning and it might explain the reasons behind the success of an individual and the failure of another. However, critical thinking is not the only predictor of an individual’s success in learning a new language. We will discuss critical thinking and individual differences in chapter 2.

A social factor is also involved in predicting success in learning a new language. We will discuss the social factor in terms of language use in social settings. LEAP-Q (Language experience and proficiency questionnaire) measures language use in social settings (Marian, Blumenfeld & Kaushanskaya, 2007). LEAP-Q is designed to measure several

aspects of language-related phenomena such as language preference, language dominance, and language exposure. Accordingly, whenever we mention the construct of the multilingual level, it should be kept in mind that we are referring to language use in social settings by means of language preferences and language exposure. These aspects shape the individuals' identity as a result of language use and social interaction with others. We will discuss multilingualism in chapter 2.

Motivation, as a psychological concept, has been the main concern of many researchers in the field of linguistics and education (see Deci, & Ryan, 1991; Dörnyei, 2005; Dörnyei, 2009; Gardner, 1985). According to Seven (2020), the appeal of studying motivation comes from the sense of fulfillment that one usually reaches after accomplishing the desired internal or external goal. Motivation seems to play a major role in terms of explaining success in the context of language learning given that it introduces varied compositions from various researchers' perspectives (see Lee, & Oh, 2011; Lee & Lo, 2017). The appeal of motivation also comes from the difference of interests in humans as some of them strive to accomplish personal growth in many aspects of life including the attainment of high proficiency levels in second or internationally recognized languages (Ugur, Constantinescu, & Stevens, 2015). Even amongst interested individuals who want to learn a second language, motivation seems to vary considerably. Some people want to learn the language for purely practical reasons including growth in one's career, achieving high societal recognition or simply passing an exam (Seven, 2020). Within the practical reasons for learning a language, one can notice that some of these reasons can promote language learning, whereas others can demote language learning (Dörnyei, 2009). Other people want to learn the language for internal reasons that relate to the integration with the culture of the new language. Some people are very interested in the culture of the target language and want to be recognized as members of the society that speaks the language (ibid, 2009). To sum up, motivation seems to bear numerous facets that might explain why or how motivated people achieve their goals. We will discuss motivation in chapter 2.

Moreover, the modified concept of effort from our perspective considers many aspects that relate to individual differences. These aspects concern how often and how long an individual persists on the act, how the individual retains and expends his energy, and how

the individual presents his commitment to the task by handling mild stressors. We will present a thorough discussion concerning effort as a key construct in a chapter 3.

The concepts and constructs we aim to introduce in this study will all be discussed in relation to proficiency. To accomplish what this research aims to reveal, we will explore the relationship of all the related concepts of the study to the proficiency level of the learners as measured by the TOEFL test. Accordingly, critical thinking, the multilingual level, motivation, and effort will be the independent variables predicting proficiency as the dependent variable.

Numerous factors contribute to the success and failure of students (Saville-Troike & Barto, 2016; Yang, 2018; Yuan, 2018). The factors included in this study are best presented in a model based on a regression analysis. We will address the results of the regression test later in chapter 5. However, we chose to address the issue of predicting the students' scores using a multiple regression analysis because the analysis presents a predicted value based on combining more than one factor in a model suited for considering all the independent variables as one coherent unit that predicts the value of the dependent variable. The regression analysis shows how the independent variables fit the model and provides a statistical estimate of which null-hypothesis to reject and which null-hypothesis to confirm. In other words, the model excludes the independent variables that are less likely to predict the value of the dependent variable.

To conclude, the main concepts of the study are a cognitive concept (critical thiking), a social concept (multilingualism), a psychological non-linguistic concept (motivation and effort), and a linguistic one (proficiency). The inclusion of these concepts is required to test the most influential factors in the language learning context on the one hand. On the other hand, we need these concepts to validate the modified concept of effort.

1.3. The language learning context in Jordan

Few studies have been conducted with regard to the Jordanian students' proficiency level in English. Jaradat and Bakrin (2017), for instance, conducted a study to examine the association between Jordanian students' use of learning strategies and their level of proficiency in English. The findings of the study imply that the frequency of strategies

range from high-frequency use to medium-frequency use, and to low-frequency use. The findings of the study also show that there is a direct link between language learning strategies and proficiency levels. The students' levels of proficiency significantly correlated to their learning strategies' frequency of use suggesting that the students' proficiency level varied from high, to medium, to low as demonstrated in the scores, the multiple regression test, which is also confirmed in a previously conducted study by Abdo and Breen, (2010). Abdo and Breen (2010) present a range for Jordanian students' proficiency ranging from high, to medium, to low (pp. 44-46) with medium and low levels of proficiency being dominant.

Moreover, the students' diverse range in proficiency is attributed to several reasons including Jordanians' accommodation geographical distribution and the over-crowdedness of the Jordanian population (Abdo & Breen, 2010). The former reason contributes to the problem in terms of adding difficulty to use English in public. The latter reason contributes to the problem in terms of adding difficulty to dedicate time to individual cases by teachers in class. Teachers have limited resources such as money, time, and transportation, which makes it even more difficult to dedicate a fair amount of time to each individual case. As a result of the previously mentioned problems, students lose interest and motivation in most cases to learn English which, in turn, creates a block of interpersonal communication between teachers and students.

A further argument is presented by Abdo and Breen (2010) regarding the attitude of Jordanian students towards the English language. Students in Jordan feel that learning English is not a necessity, neither in communication nor in future career enhancement. This argument is supported with evidence from the capital city of Jordan (Amman), whose citizens are much more advanced in English competence due to their positive attitude to learning English. This attitude to learning English in Amman is attributed to the international businesses held there as the capital of the country. However, since the majority of the population does not live in the capital, their attitude is different.

Another argument is presented by Abdo and Breen (2010) that relates to the government's failure in the educational system. The government in Jordan has set the policy to fail those who do not reach the achievement standards only once. To make that

clear, if a student fails in English, he/she will retake the English language course the following year. After that, the teacher is obliged to pass the student even if he/she does not reach the achievement standards, which means that the student progresses and passes regardless of the quality of the student's achievement in the context of language learning. The argument presented by Abdo and Breen (2010) suggests failing students until they achieve what is required from them at a certain stage. However, neither English nor any other subjects are excluded from this policy that has been set by the government. Thus, students fail to achieve competence in many topics including language courses, scientific courses, and other courses in their curriculum. Additionally, students vary considerably in terms of interests. English could not be one of their interests despite the fact that it is necessary as an international form of communication. Thus, the government's English curriculum is designed to elicit basic language skills at all stages as a result of over-crowdedness. Accordingly, the policy prevents over-crowdedness on one hand and considers what is best for students on the other hand.

Furthermore, Al-Sawalha and Chow (2012) confirm the existence of the three levels of English proficiency amongst Jordanian students. The study was aimed at assessing students' proficiency in writing. The results show that writing was rarely done by the students of Al-Yarmouk University in Jordan in addition to the fact that the English proficiency level affected the writing proficiency. The findings also showed that the most dominant group in terms of proficiency was the low proficient students, followed by high proficient students, followed by mid proficient students. The author of the article states that the lack of knowledge regarding the significance of writing amongst Jordanian students is one of many reasons that could explain the low proficiency levels amongst Jordanian students. The author suggests rising interest in writing by emphasizing the significance of writing on proficiency and thus on future career enhancement.

Most studies, especially in the context of EFL in Jordan, have shown that there is an agreement regarding all language skills upon which students' weaknesses are defined (see Al-Khataybeh, 1992; AlKhuwaili & Al-Shoumali, 2000; Rababah, 2003; Zughoul, 1991). The findings of these studies showed that students had weaknesses in all aspects of the English language skills and especially in writing.

To sum up, based on recent research results, Jordanian students show weakness in English proficiency. The three levels of proficiency (i.e., high, mid, and low) are apparent in the context of EFL in Jordan with low and mid proficiency levels being dominant amongst these students. Jordanian students also have weaknesses in other domains of language including the four skills in which writing seems to be the major weakness exhibited by these students.

1.4. The gap in previous research

The language learning context in Jordan shows a great deal of variation amongst students. Our motive for conducting this study, in which many related concepts to individual differences are included, is driven by a long-lasting clash of results over the investigation of strategies (see Griffiths, 2013; Porte, 1988; Vann, & Abraham, 1990). The clash of results in some instances suggests that carrying out such research, despite having some control over some variables in some cases, needs to be refined and updated according to what the modern world provides on a regular basis. For example, people in the past used dictionaries to understand the meaning of a new word they encounter (Fan, 2020). Nowadays, people only need to pick up their phones and use a translation application to help them with any new words they encounter. The need for refinements and updates is required because topics, such as strategies, involve specific details on how one carries out the learning task based on factors such as age, proficiency levels, gender, language, and culture (Cohen, 2014). What we aspire to accomplish in this research involves introducing a topic that requires less updating due to the fixed pattern it presents in terms of persistent behavior in generalized tasks. In other words, whatever act is carried out by the individual to perform a certain task; what matters to us is persistence. For example, memorizing is a task performed by numerous activities such as repetition or using visual and auditory aids. We are interested in persisting on memorization, not how it is carried out. Studying is also an act that can be carried out in numerous ways, yet our interest concerns persisting on studying rather than the way it is carried out. We are also concerned with other topics in different domains including critical thinking, motivation, and the multilingual level based on language use in social settings in order to investigate how they relate to language learning compared to our modified effort concept, and how they relate to the reintroduced

concept itself due to the implicit and explicit relations amongst and between the topics (see Phan, 2009; Soodmand Afshar, Rahimi, & Rahimi, 2014; Ennis, *et al.*, 2013).

The introduction of a new topic arises to address a very crucial yet understudied issue related to individual differences regarding effort expenditure (Özer, 2020; Karabiyik, & Mirici, 2018). The previous literature discussed the topic with little information concerning the definition, the conceptualization, and the operationalization of the concept (Özer, 2020). As mentioned earlier, Dörnyei (2005; 2006) included effort to refer to it as the inevitable consequence of motivation. In other words, the more motivated the individuals are, the more effort expenditure they are likely to exhibit. Still, a proper definition and a proper conceptualization were lacking (Özer, 2020; Karabiyik, & Mirici, 2018). This study could be a reference for future attempts to introduce effort from different viewpoints emphasizing and magnifying the relevance of effort to the context of language learning. We do not challenge the relevance of motivation to the context of language learning, we are suggesting that the success of the learning task is a direct consequence of effort rather than motivation on the basis of the premise that motivation is the psychological force that enables action (Dörnyei, 2006). However, our assumptions can be challenged with future research concerning both constructs.

Moreover, distinct measurement methodologies can be applied to effort and motivation. While, according to Gosselin and Gagné (2011), we can measure effort objectively, we cannot measure motivation objectively because motivation is a concept that cannot be observed or recorded directly due to the mental state it represents in the mind of the individual (Seven, 2020). We will not take an objective approach to measure effort, however. Our view of effort as a concept is a subjective view of how individuals assess their level of effort expenditure. The fact that we can follow an objective approach to measure the concept opens up so many possibilities for more accurate future research concerning many topics related to effort expenditure such as effort in learning in general, effort in achieving better career enhancements, etc. However, measuring effort objectively can be a daunting task in certain fields due to the exhausting requirements to do so (Kreis, Moritz, & Pfuhl, 2020). The context of language learning is one of the fields that require a subjective view of the concept due to the feasibility issues of an objective approach to

measure effort. What concerns us in this discussion is that accuracy regarding the individuals' success in the context of language learning can better be achieved with effort rather than motivation (Bailey, & Kelly, 2011).

Additionally, motivation includes different associated dimensions of measures to which a distinction is required based on explanatory aspects other than motivation (Touré-Tillery, & Fishbach, 2014). An example of such a measure is speed. For example, motivation is not the only relevant aspect that explains why an individual carries out a task slowly. The reasons for carrying out a task slowly could be attributed to many factors including low motivation, detecting accuracy (do things right), satisfaction (e.g., savoring the task due to the enjoyable sensation of performing it). In other words, an individual might have a high level of motivation, yet carries out the task slowly for reasons concerning aspects that do not relate to motivation. On the other hand, effort from our perspective includes three dimensions concerning persistence, management, and commitment. These dimensions are less likely to be associated with other unexplainable dimensions of measures. This feature of the modified concept might lead to less clash of results in future research. Persistence is represented in the frequency and the time span of the act. Management is represented in managing energy resources in terms of gain and expenditure. Commitment is represented in handling mild stressors while carrying out the task.

To conclude, previous literature addresses the issue of effort with neither a clear definition nor a clear conceptualization. Additionally, the lack of literature on the associations between and amongst the concepts included in this research constitutes another gap in the literature that ought to be investigated.

1.5. Interrelatedness of the study area

In this part, we present a brief rationale for relating effort to motivation, critical thinking, multilingualism, and proficiency. We will discuss the relationship between the three concepts briefly to demonstrate how close and interconnected these concepts are to one another.

The three concepts including effort, critical thinking, and motivation are closely related (see Phan, 2009; Soodmand Afshar, Rahimi, & Rahimi, 2014; Ennis, *et al*., 2013).

However, we attribute the reason of including so many concepts in this research to the validation of the modified concept of effort. In order to validate the measurement of effort, it needs to correlate positively to the other concepts. We have set two conditions in which the fulfillment of one condition in this research will lead to the acceptance of the measurement of effort. The first condition is related to its relationship to proficiency. In other words, if effort holds the strongest positive correlation to proficiency, we will accept it. The second condition is related to the correlation of the measurement of effort to the other concepts in this research. If effort correlates positively to three of the four concepts (i.e., critical thinking, motivation, bilingualism, or proficiency), we will also accept it as a proper measurement for predicting the concept of effort itself.

We attribute relating the previously introduced concept to our beliefs concerning effort as a correlational concept. Effort holds implicit and explicit relationships to other concepts as shown in Tempelaar, Rienties, Giesbers, & Gijselaers, 2015. Thus, we will correlate language learning effort to a linguistic concept (i.e., proficiency), a non-linguistic concept (i.e., motivation), a social concept (i.e., multilingualism), and a cognitive concept (i.e., critical thinking). If effort has the strongest association with proficiency, the concept will be accepted as an influential correlational factor in the context of SLA, while keeping in mind that the concept requires minor refinements if it is not associated with the other concepts. If effort correlates positively with three of the four concepts, including proficiency, it will be accepted as an influential correlational concept with minor refinements required. If effort correlates positively to three out of the four concepts excluding proficiency, it will be accepted as a correlational concept. However, in this case, we will revise the concept of effort for major refinements. If both conditions for accepting the concept of effort are met, then the concept and the measurement of the concept would be accepted with neither minor nor major refinement needed.

Even though the effort is exclusive to the context of SLA, yet the mental and physical actions involved might lead to cognitive and social enhancements (Yeo & Neal, 2008; Contreras-Huerta, Pisauro, & Apps, 2020). The initiation of the effortful actions implicitly and explicitly provokes acts of cognition and social interaction (Contreras-Huerta, Pisauro,

& Apps, 2020). Thus, it is important to investigate how the modified concept of effort relates to the other constructs in the context of second language acquisition.

To conclude, we strongly believe that effort is related to cognitive, social, linguistics, and non-linguistics aspects. The validation of effort is further supported if it holds positive and significant relationship with the aforementioned aspects.

1.6. Concluding remarks

The gap in previous literature regarding the lack of studies on language learning efforts (see Özer, 2020; Karabiyik & Mirici, 2018) incented us to carry out this research to investigate individual differences. Efforts hold implicit and explicit associations to cognition, societal engagements, and motivation. Thus, our main objective in this research is to present a validated tool for detecting individual success in the context of language learning by associating effort to proficiency, critical thinking, multilingualism, and motivation.

We aspire to detect the levels of effort expenditure amongst language learners, to justify the inclusion of restorative acts, and to investigate gender differences concerning effort expenditure and motivation.

The main concepts presented in this research include language learning effort, language proficiency, critical thinking, the multilingual level, and motivation. The variables presented in this research include the previously mentioned concepts in addition to gender.

2. Literature review

In this chapter, we present a discussion of the background literature of second language acquisition, multilingualism as a social and a cognitive asset, the relationship of critical thinking to learning, and motivation as an influential psychological non-linguistic concept in the process of language learning. In 2.1, we discuss SLA theories briefly and ID thoroughly. In 2.2, we discuss the difference between ESL and EFL. In 2.3, we discuss multilingualism thoroughly in social and psychological terms. In 2.4, we discuss critical thinking and its association to language learning, motivation, and effort. In 2.5, we discuss the stages through which motivation theories undergone followed by a discussion of the association between motivation and effort.

2.1. Second language acquisition and individual differences

We attribute the reasons for presenting a historical background briefing of Second Language Acquisition (SLA hereafter) theories to our belief in the reintroduction of effort as a concept related to SLA in terms of explaining individual differences. We reintroduce the effort mainly to address the issue of why some learners are more successful than others in the context of SLA. We will present a brief historical overview concerning early theories of SLA followed by a thorough overview concerning recent studies of individual differences in the context of language learning.

The term SLA was originally used to refer to an individual's attempt to learn a new language regardless of the order, whether second, third, or fourth (Gass, & Selinker, 2008). Research in SLA has been conducted mainly to address three educational and linguistic issues: (1) what the L1 and L2 learner comes to know, (2) how the L1 and L2 learner acquires this knowledge, and (3) why some L2 learners are more successful than others (Saville-Troike & Barto, 2016). The interest in answering these questions led to the emergence of the main three schools of thought and their subbranches (ibid, 2016). The linguistic school of thought focuses on the differences between the languages to address the issue of linguistic competence and linguistic performance; the psycholinguistic domain focuses on the cognitive processes involved in acquiring a second language and the representation of the language in the brain; the sociolinguistic domain is concerned with linguistic performance related to communicative competence; and the social-psychological

domain is concerned with group-related phenomena (e.g. identity, motivation, interaction and the social context of learning) (ibid, 2016).

These approaches are classified under linguistic, psychological, and social frameworks (Saville-Troike & Barto, 2016). Linguistic approaches touched the linguistic aspects of SLA as mentioned earlier. The psychological approaches attended to the representation of the language(s) in the brain (see Ervin & Osgood, 1954; Obler & Gjerlow, 1999). This branch of the psychology of language is referred to as neurolinguistics which is mostly concerned with how independent the languages are in the brain, how language structures are organized in the brain, and how brain damage might impact the organization and structure of language(s) (Saville-Troike & Barto, 2016). The social approaches focus on the effect of society including cultural norms and context on the way language is used (ibid, 2016).

These schools of thought had different approaches due to the different concerns of each school. The differences between these approaches regarding which question to be answered led to great differences in the theoretical framework, and great differences in research methodology (ibid, 2016). These approaches include Contrastive Analysis (CA) (Lado, 1957), Error Analysis (EA) (Corder, 1967), morpheme order studies (Brown, 1973), and Krashen's monitor model (Krashen, 1978). One of the most recent approaches of SLA is Usage-Based Theory first introduced by Tomasello (2003) and posits that linguistic structure and usage have a profound relationship (Von Mengden & Coussé, 2014). Usage-based approaches also involve the investigation of individual differences (see Barlow,2013).

Regarding individual differences (ID), the term commonly refers to factors such as age of onset, gender, motivation, learning strategies, aptitudes, cognitive styles, and personalities, among others, that account for differences in learners' success concerning attaining language proficiency (Saville-Troike & Barto, 2016; Yang, 2018). Modern college students have distinct personality traits that influence their English acquisition. Clearly, non-intelligent factors in students cannot be ignored in English teaching (Yuan, 2018). As a result, researching college students' development through classified English instruction is innovative and forward-thinking (ibid, 2018). Since the 1960s, the emphasis

on English language teaching in the United States and other countries has shifted, and English teaching has gradually shifted to place students at the center of the teaching activities (ibid, 2018). As a result, studies have focused on individual differences and the learning process (ibid, 2018). Additionally, according to Loewen and Sato (2018), recent research has focused on five individual differences: cognitive abilities (including language aptitude and working memory), willingness to communicate, learner beliefs, anxiety, and age. Despite the fact that many variables that account for success in language learning have been identified, this knowledge has not resulted in a unified theory of second language acquisition (Grossman, 2011). As a result, scholars are increasingly arguing that successful learners combine these factors in novel ways during the self-regulated learning process (Yuan, 2018). Griffiths' (2013) work regarding individual differences, for instance, focused on why some learners are more successful than others. Griffiths argues that success in language learning is related to the strategies that learners employ to facilitate the learning process. She also argues that the type and the usage frequency of strategies are highly influential. According to Griffiths, learners who employed core and core-plus (metacognitive and cognitive) strategies very often were more successful at achieving higher levels of proficiency than those who only used basic (memory) strategies. Griffiths' (2013) research is influential because it is one of the many studies that have been conducted to address the issue of individual differences. Individual characteristics of learners have long been recognized as playing critical roles in shaping the learning process. Nonetheless, there are few studies that look at the roles of various individual differences (ID) variables in accordance (Csizér, Albert, & Piniel, 2021).

Starting with age, according to Saville-Troike & Barto (2016), the field of linguistics includes age as a factor that influences language learning by all means: including other variables meant to investigate individual differences. For instance, researchers consider age as a factor influencing the process of language learning itself, while other researchers consider the influence of age on an ID factor such as strategies or motivation (e.g., Chen, 2014; Celi, 2017). Concerning the learning process, early views of SLA discussed the Critical Period Hypothesis first introduced by Penfield and Roberts (1959). The critical period hypothesis has long been the subject of debate in language acquisition and linguistics concerning the extent to which age can determine the ability to acquire language

(Ramscar, & Gitcho, 2007). Concerning the effect of age on an ID factor such as strategies, a recent study conducted by Chen (2014) reported that age influences the selection of learning strategies. Chen's (2014) paper implies that learning strategies suitable for a certain age may not be suitable for another. Moreover, Celi (2017) reported a certain degree of motivation decrease amongst older learners suggesting that language learning motivation declines with age.

Regarding gender, there is a large body of empirical evidence indicating that the female brain is better suited to language learning from birth (Dionne, Dale, Boivin, & Plomin, 2003). Additionally, according to Wightman (2020), female learners are greater in terms of the number of females learning a specific language than males. She reports that the number of females attending a language class almost always surpasses the number of males. She presents an overall percentage provided by the "The National Center for Education Statistics" (NCES) that shows 69% females attended language classes, while the males' presence was only 31%. The views presented here are consistent with our own regarding gender differences in terms of effort expenditure.

Regarding motivation, the latest research proposed suggests that because motivation is more of a series of states than a stable trait, it is dynamic and changing over time (Dörnyei, 2009; Dörnyei, & Chan, 2013; Dörnyei, & Al-Hoorie, 2017). Dörnyei introduces three components of motivation, namely: the Ideal L2 Self, the Ought-to L2 Self, and the L2 learning Experience. The first refers to the attributes the individual wishes to possess. The second refers to the attributes the individual believes should exist to fulfill certain obligations. The last refers to the self-reflections practiced by individuals to evaluate their learning experience. Dörnyei's research puts Gardner's socio educational model (see Gardner & Lambert, 1959) in a new perspective. In other words, integrativeness in Gardner's model is a subset of the Ideal L2 Self, while instrumentality is a subset of the Ought-to L2 Self.

Despite the increased number of studies on the relationship between psychological individual differences and interaction, some gaps in the field remain. One example of these gaps is the relationship between motivation and interaction, which is still largely unexplored (Dörnyei, 2002). Researchers in the field have also overlooked one type of

motivation known as task motivation (see Dörnyei & Kormos, 2000). This type of motivation explains “why students behave as they do in a specific learning situation where they are performing a specific task” (Csizer, 2017: 424–425). Another construct that has been overlooked yet has the potential to influence learners' interaction behavior is willingness to communicate (WTC) (see MacIntyre, Burns & Jessome, 2011).

Concerning the language learning strategies (LLS), the literature defines strategies as the techniques or the skills that the learner uses to obtain knowledge of a second language (Wenden & Rubin, 1987, p. 7). According to Cohen and Griffiths (2015), researchers conceptualized Language learning strategies in terms of categorial skills. These skills are metacognitive skills, cognitive skills, affective skills, and social communication skills. Recent research on LLS use has been conducted to identify the most commonly used strategies by language learners (Alhaysony, 2017; Dawadi, 2017). We conclude that most students focus on cognitive, compensation, and metacognitive strategies. Some studies have incorporated the effects of age on the selection of the learning strategies (Gunning, & Oxford, 2014; Pfenninger, & Singleton, 2017). The conclusion of these studies indicates that age influences the learners’ choice regarding their selection of learning strategies. Additionally, research has also examined the relationship between strategy use and proficiency (Charoento, 2016; Rao, 2016). The findings of these studies show a significant positive relationship between strategy use and proficiency. What concerns us with language learning strategies is that many strategic acts can be classified under effortful acts. Moreover, strategies already bear cognitive and social categorizations closely related to our view of effortful acts being cognitive and social in explicit and implicit ways. Thus, a distinction is needed to protect the intellectual copywrites of both parties. This distinction is made clear in the concluding remarks of chapter 3.

Regarding aptitude, language learning aptitude has been defined as a set of cognitive abilities that are “predictive of how well an individual can learn a foreign language in comparison to other individuals” (Carroll & Sapon, 2002, p. 23). Carroll's conceptualization of aptitude and the instruments used to measure it have pedagogical value in both their primary prognostic function of predicting a learner's chances of success in meeting a criterion and their secondary diagnostic function of detecting learning

disabilities. This is a product-oriented, static view of language ability. However, only a few studies have been conducted from an interactionist standpoint (see Goo, 2012; Mackey, Abbuhl & Gass, 2012; Révész, 2012). According to these studies, higher aptitude may be beneficial for interaction.

Concerning cognitive styles, Cassidy (2004) uses three taxonomies to provide a clear review of style models in table 1. below (Cassidy, 2004, cited in Grossman, 2011).

Table 1. Cassidy's (2004) taxonomy of style models.

	Curry 1987				Riding and Chema 1991	Rayner and Riding 1997		
Model	Instructional preference	Social interaction	Information processing	Cognitive personality	Wholistic-analytic	Personality centered	Cognitive centered	Learning centered
Witkin (1962) Field-dependence-independence								
Kagan (1965) Impulsivity-reflexivity								
Holzman and Klein (1954) Leveller - sharpener								
Pask (1972) Holist - serialist								
Pavio (1971) Verbaliser-visualiser								
Gregorc (1982) Style delineator								
Kaiffmann (1979) Assimilator - explorer								
Kirton (1994) Adaptation - innovation								
Allison and Hayes (1996) Intuition - analysis								
Kolb (1984) ELM								
Honey and Mumford, (1992) LSQ								
Vermunt (1994) LSI								
Entwistle and Tait (1995) Surface-deep								
Biggs et al (2001) SPQ								
Scmeck et al (1991 ILP								
Hunt et al (1978) Conceptual level								
Dunn, Dunn and Price (1978) LSI								
Reichmann and Grasscha (1974) Styles of								
learning interaction model								
Remirez and Castenada (1974) Child rating form								
Reinert (1976) ELSIE								
Hill (1976) Cognitive Style Interest Inventory								
Letteri (1980) Learner types								
Keefe and Monks (1986) Learning style profile								

For example, Witkin., *et al.* (1977) introduced the concepts of field-dependence and field-independence cognitive styles. Witkin defines field-independence as "the degree to which a person perceives a portion of a field as distinct from the surrounding field as a whole" (p. 275). Whereas, field-dependence refers to "the degree to which a person perceives various aspects of a field analytically" (p. 275). Other researchers defined it as a group of mental

processes that include awareness, perception, reasoning, and judgment. (Lucas-Stannard, 2004, p.2).

Concerning personality traits, Fatma (2014) defines personality factors as "features or attributes that are thought to distinguish one student from another" (p.228). Personality traits include features such as attitude, acculturation, self-esteem, sociability, risk-taking, and perseverance, among other features (Karim, Nur, & Mohd, 2016).

Learners' beliefs are also strong indices for detecting individual differences. Concerning learner's beliefs, the hypothesis is that if learners perceive interaction as a beneficial activity, they will profit more from it (Aziez, 2021). On the other hand, if students perceived that grammatical and vocabulary drills should be used in place of interactional tasks in the classroom, they may not profit from interaction (ibid, 2021). According to Loewen and Sato (2018), teacher's instructional methods or strategies has the potential to change learner beliefs. Accordingly, researchers showed interest in changing the views and the beliefs of the learners in an attempt to have the learners adopt a positive attitude towards learning a new language. For instance, Dörnyei (2001b) developed a total of 102 motivational strategies, dubbed motivational teaching practice, based on his research on second/foreign language motivation (MTP). The motivational teaching practice organizes motivational application into a four-phase circular system including creating proper conditions for motivation followed by generating learners' motivation followed by maintaining and protecting motivation, and finally followed by a positive self-regulating evaluation.

Language use in social context, especially for multilingual people, is also a strong indicator of learners' success in learning a new language. According to Cenoz (2013), multilingualism is a multifaceted phenomenon that can be studied in individual or societal terms. Concerning individual multilingualism, it has significant differences in the experience of acquiring and using languages (Cenoz, 2013). However, what concerns us here is the debate revolving around the cognitive outcome of multilingualism (see Alladi, 2013; Bialystok *et al*, 2007; Bialystok *et al*, 2004; Kirk *et al*, 2013). In other words, multilingual speakers differ from monolingual speakers in cognitive terms indicating that

we can consider multilingualism as an asset for detecting differences in cognitive processing.

To conclude, studies in SLA aim to answer what the learner comes to know, how the learner acquires this knowledge, and why some learners show more success in language learning than others. Our research falls within the last category to answer the question of why some learners are better than others in terms of learning a new language. A new language can be regarded as either a foreign language or a second language depending on the context of learning. Both contexts entail advantages in certain areas on the expense of others.

2.2. English as a foreign language and English as a second language

The terms English as a foreign language (EFL) and English as a second language (ESL) have in common the simple fact that learners have an opportunity to learn another language. The term second language refers to learning another language in social settings (Punchihetti, 2013; Stefánsson, 2013) due to the language being dominant. In other words, the learner has an opportunity to practice his L2 in public when speaking or dealing with the people in that society as a result of living in that society for whatever purpose. The amount of exposure to L2 is tremendous, which means that the learner has a motive that directs him to the goal of communicating with people in another society with the use of another language.

Foreign language, on the other hand, refers to learning another language in classroom settings. In other words, the learner does not live in a society that speaks the L2 he or she is trying to learn. In this case, the learner doesn't have an opportunity to practice his L2 in public (Punchihetti, 2013; Stefánsson, 2013). This leads to little exposure to the L2 which might result in negative attitudes towards learning another language. English as a second language is much more immersive than English as a foreign language.

The other difference between the two is the cultural aspect of learning. Someone whose English is limited to the classroom might not hold conversations well with native speakers when the situation calls for a chance to communicate with them. People in ESL contexts are often immersed in real-life experiences with native speakers, whereas people in EFL

contexts lack the real-life experiences that account for effective understanding of the cultural norms behind using certain forms of language (Punchihetti, 2013; Stefánsson, 2013).

To conclude, the context of language learning has a significant impact on the process of learning. As mentioned above, learning a language in a multilingual context is engaging in the sense that it forces the learners to immerse themselves in real-life experiences with the L2 native speakers and other non-native speakers. In all cases, the learners end up enhancing their linguistic and social skills in a multilingual society.

Regardless of the different interpretations of learning another language, we will be discussing motivation and effort in the classroom environment where the only opportunity for learners to learn another language is through formal instruction without direct contact with the native speakers of English.

2.3. SLA, bilingualism, and multilingualism

We will discuss multilingualism in this part. Firstly, we will discuss the origins of multilingualism as a social construct. Secondly, we will discuss how SLA research relates to multilingualism. Thirdly, we will discuss multilingualism as a cognitive asset in terms of learning new languages in addition to cognitive functioning and cognitive abilities. Finally, we will discuss how the level of multilingualism is measured in this research.

2.3.1. Background briefing

The use of more than one language or dialect in multilingual societies is often referred to as diglossia (Montanari & Quay, 2019). According to Montanari & Quay (2019), diglossia occurs when a high variety (i.e., the standard or the official language) coexists with a low variety. The authors point out that A language is not a unified entity that is shared equally by all members of a speech community. Its appearance in terms of style and lexico-grammar often does not match. In a multilingual society, the various languages are linked by an intricate system of linguistic shapes and networks. We can conclude that individuals vary considerably in language use regardless of the languages or varieties they speak. In turn, individuals vary in terms of acquisition and learning. In other words, an individual

may have the choice to learn the high or low variety, or he/she may not have the advantage of making a choice.

As mentioned earlier, SLA used to refer to the learner's attempt to acquire a new language regardless of the order, whether a second language, a third, or a fourth. This view was based on biased research against bilingualism and multilingualism dating back to the early twentieth century that regarded the multilingual speakers as handicapped incompetent multiple monolinguals (Jespersen, 1922; Saer, 1923). According to Jespersen and Saer, multilingualism had a negative harmful effect on cognition. However, a study conducted by Peal and Lambert (1962) acknowledged the positive effects of multilingualism on cognition for the first time. According to Peal and Lambert's view, the ability to speak more than one language positively affected the cognitive abilities of the speaker. Furthermore, a distinction has been made clear between bilingualism and multilingualism based on the cognitive advantage gained from speaking more than one language (Kemp, 2009). Bilingualism refers to the ability to speak two languages with varying degrees of competence (Haugen, 1953). Multilingualism refers to the ability to speak three or more languages (De Groot, 2011; Kemp, 2009). In these definitions, contextual and personal experiences are disregarded because learning a third language is different from learning a second language (see Jessner, 1999; Jessner, 2008; Jessner, *et al.*, 2016).

According to Jessner (2008), SLA research is pedagogical, whereas bilingualism research stems from sociolinguistics. The two were kept apart. However, bilingualism seems to have an effect on Third Language Acquisition (TLA hereafter) as a consequence of a prior experience in language learning. Cook (1991) introduced the concept of multicompetence to refer to the knowledge of more than one language in the mind including the interlanguage and knowledge of L1 and L2 similarities and differences. This definition separates the bilingual mind from the monolingual mind. The bilingual mind develops meta and cross-linguistic awareness on the basis of linguistic similarities and differences amongst and between languages. In her studies, Ulrike Jessner follows Complexity Theory (CT hereafter) that derives from a Dynamic System Theory (DST hereafter) (Jessner, 2008). She justifies the use of CT by stating that investigating TLA using a DST framework arises from the need to address the issue of TLA in relation to

pedagogical, social, and psychological aspects of language learning and use. CT assumes that SLA differs from TLA due to the nature of learning that arises from multicompetence (metalinguistic and cross-linguistic awareness) for third language learners. For instance, Ringbom (1987) and Thomas (1988) reported an advantage in favor of multilinguals over monolinguals in learning a new language. In light of the previous discussion regarding the difference between bilingualism and multilingualism, the further distinction between SLA and TLA is now established and justified.

Cook (2003) introduced the concept multicompetent people to refer to L2 users instead of 'bilinguals'. According to Cook (2003), the multilingual learner cannot be described as multiple monolinguals because of the multicompetence that he/she develops that represents and extra knowledge in which the monolingual has no experience. The concept of multicompetent people was drawn from the extra and different knowledge that the bilinguals have of their L1 and L2, different knowledge of language awareness, and different language processing system. The different languages spoken by an individual are considered as one connected system rather than two separate systems. Since TLA research is aimed at bridging the gap between SLA and bilingualism, models have developed on the account of considering both fields. Most of these models have three stages, the semantic phase in which the speaker forms the concept, followed by the syntactic phase in which the speaker arranges the concepts in an acceptable form, followed by the articulatory phase in which the speaker utters the words that have been previously formatted (see de Bot, 1992; Green, 1986; Grosjean, 1998).

What concerns us here is the Dynamic Model of Multilingualism (DMM hereafter) by Herdina & Jessner (2002) which refers to a holistic model that emphasizes the dynamics of multilingualism as prerequisites for holism (i.e., understanding the language learning phenomena in terms of the relevant linguistic, psychological, and social aspects) which draws from a dynamic system theory (DST). DST is a recent theoretical approach to the study of development. DST is defined as a system of subcomponents in which a change in one of these subcomponents influences other subcomponents in varying degrees in a non-additive fashion. Its characteristics are variation, variability, interconnectedness, interchangeability, nonlinearity, and self-organizational patterns. In DMM, the concept of

multilingual proficiency is introduced and defined as the dynamic interaction between the psychological systems, cross-linguistic interaction, and the M-factor. The M-factor draws attention to the difference between the multilingual system (metalinguistic and cross-linguistic awareness) and the monolingual system.

To conclude the previous discussion, bilingualism differs from multilingualism as a result of the difference between SLA and TLA. Monolinguals learning a new language differ from bilinguals and multilinguals learning a new language due to the multicompetence complex system in which bilinguals and multilinguals are engaged as a result of a prior linguistic experience. Moreover, bilingual and multilingual speakers show advantages in areas other than language learning. These areas will be discussed in the next section and they include age of decline and executive functioning (see Bialystok *et al*, 2004; Bialystok *et al*, 2007).

2.3.2. The multilingual advantage

Research regarding the effect of multilingualism or bilingualism on the cognitive abilities of children has been carried out since the early '20s. Saer (1923), for instance, described multilingual children as mentally confused. Saer concluded that both monolingual adults and monolingual children showed superiority over bilingual adults and bilingual children accordingly after having them tested using the Binet scale of intelligence. Smith (1923) claims that multilingualism is responsible for lower reading test scores describing the process of learning two languages to be similar to the process of learning one language with the exception that learning two languages compromises the cognitive abilities of the child and requires a longer time in terms of the mastery of the linguistic skills and therefore, bilingual children learn to read more slowly than monolinguals. Klineberg (1935) described multilingual children as mentally conflicted. Smith (1939) described multilingual children as retarded in terms of language development. Smith claims that pidgin English is responsible for incorrect forms of English utterances and also claims that bilingualism is responsible for several linguistic issues including immature interrogative forms in terms of meaning, overuse of short sentences and interjections, and lack of complex sentences. These studies have been carried out in Africa, Europe, and the United States focusing mostly on racial differences (Duncan & De Avila, 1979). Duncan and De

Avila (1979) argue that the previous studies that viewed multilingualism as being cognitively harmful have methodological problems in the sense that they have used culturally and intellectually biased tests heavily. Duncan and De Avila also argue that those studies were inconsistent and inclusive due to many methodological-related issues including the material and the procedure they followed when the researchers tested their subjects.

Researchers differentiate between three types of bilingualism: compound bilingualism, coordinate bilingualism, and sub-coordinate (D'Acierno, 1990). Compound bilingualism refers to learning two languages where the individual acquires one semantic system with two linguistic codes (ibid, 1990). In other words, the person acquires one notion with two verbal expressions and learning the two languages takes place in one context. A coordinate bilingual is a person who acquires two semantic systems and two linguistic codes due to learning two languages in two separate contexts (ibid, 1990). An example of the two separate contexts is using one language at home and learning the other at school. In this case, the words of each language belong to independent and separate systems. A sub-coordinate bilingual is a person who has one dominant language (ibid, 1990). In other words, the individual makes use of the dominant language to interpret the weaker language.

Researchers also differentiate between two more types of bilingualism in terms of the order of acquisition. These types are referred to as simultaneous bilingualism and consecutive (or successive) bilingualism (The California Department of Education, 2009). Simultaneous bilingualism refers to the process of acquiring two languages at the same time in early childhood implying a bilingual parallel development in the mind of the child (ibid, 2009). Consecutive (or successive) bilingualism refers to the process of acquiring a new language after the child has acquired the first language or at least after demonstrating some form of mastery in the first language (ibid, 2009).

After Peal and Lambert's (1962) research about the positive influence of multilingualism on cognition, several studies have followed since then to test this claim including recent studies (see Alladi, 2013; Bialystok *et al*, 2007; Bialystok *et al*, 2004; Kirk *et al*, 2013). A study conducted by Bialystok (2007) showed interesting results regarding the onset age at which dementia developed. The study included over 180 subjects reporting their first

clinical visit to check for symptoms of dementia, 51% of whom were bilinguals. The overall results showed that bilinguals developed dementia 4 years later than monolinguals. Many factors can contribute to dementia such as genetic, neurological, and intellectual factors. The fact that bilingualism falls within intellectual factors provides evidence that a psychological factor can have an impact on a biological one as stated by Bialystok.

Another study conducted by Alladi (2013) showed similar results. Alladi (2013) sought to investigate the association between bilingualism and the onset age of dementia and its subtypes, considering other potentially confounding factors including the number of languages spoken, education, and occupation. The reference point for detecting the symptoms of dementia was the subjects' first clinical visit to check for cognitive impairment. The overall results indicated that bilinguals developed dementia 4.5 years later than monolinguals suggesting that bilingualism seems to have a protective function against cognitive decline. A significant difference in the onset age of dementia was found across Alzheimer's disease as well as vascular dementia, and frontotemporal dementia and was also observed in illiterate subjects. Speaking more than 2 languages had no further benefits. The bilingual effect on age at dementia onset was shown independently of other potential confounding factors such as education, occupation, gender, and urban vs rural states of subjects. The researchers had some control over some variables in order to support their claims further regarding the cognitive benefits of learning a second language.

On another scale for detecting the influence of multilingualism on cognition, Bialystok (2004) and Kirk (2013) conducted studies to examine the effect of bilingualism on executive functioning. The results of both studies are inconsistent. One study showed a cognitive advantage, whereas the other did not show statistical significance between bilinguals and monolinguals in executive functioning. Bialystok's research in executive functioning was specifically in controlled processing in adults. The overall results of Bialystok's study showed that bilingualism was associated with a smaller Simon effect costs for middle-aged and older-adults subjects. Bialystok concludes that bilingualism aids participants in retaining certain executive functions while aging and that bilinguals performed the controlled processing task more effectively. Kirk's study, on the other hand, examined the subjects' inhibitory control to show no advantage for any group. The study

included monolinguals, bilinguals, and bidialectals (i.e., speakers of two dialects of the same variety). The overall results indicate that bilingualism might not be the only factor related to the cognitive advantage. Kirk argues that in the previous literature that has been conducted to detect the multilingual advantage, immigration was the most apparent variable (see Bialystok *et al*, 2004; Bialystok *et al*, 2008). Kirk further argues that immigration is more related to the cognitive advantage than bilingualism since the cultural background differed between the subjects of these studies.

Regardless of the clashing and mixed results in the previous literature, we will be taking the investigation on the multilingual advantage one step further to detect this advantage in critical thinking. Critical thinking is part of cognition and thus it might prove to be a valuable tool in detecting any form of cognitive advantages amongst participants. Critical thinking is a form of higher-order skills that include analysis, interpretation, making inferences, making judgments, etc. Critical thinking will be discussed later in further details. However, we will be detecting the cognitive advantage associated with effort exertion in the context of language learning due to the implicit and explicit cognitive acts immersed in the act of effort exertion. Theoretically, those who exert effort should have better thinking ability skills. If this is the case, effort exertion (in the context of language learning) and critical thinking should have a strong positive relationship.

To conclude, multilingualism is a social construct given that it is the norm around the globe. In addition to its association with societies of multilingual speakers, it also has associations with cognition.

2.3.3. Language Experience and Proficiency Questionnaire: LEAP-Q

To detect the multilingual level of individuals, Marian, Blumenfeld, and Kaushanskaya (2007) designed and developed a survey to measure the language experience and proficiency in multilingual societies (LEAP-Q). The Language Experience and Proficiency Questionnaire (LEAP-Q) developed by Marian, Blumenfeld, and Kaushanskaya (2007) is a tool used to measure bilingualism based on exposure, proficiency, and usage. It is suitable for subjects aged over 13 (Kaushanskaya, Blumenfeld, & Marian, 2019). It consists of three parts: the first part consists of 10 items related to the participants' personal information including age, gender, number of spoken languages, how often these languages are used in

percentage, the cultural experience, the years of formal education, immigration status, and any form of impairment (e.g., in vision or hearing). The second and third parts of the questionnaire are the same, however, each part is used for a different language (e.g., one can answer questions about his native language in one part, and answer questions about his second language in the other part). These parts consist of seven subparts consisting of 27 items in which the participants should state the age at which they started the language acquisition; the years spent in the language environment; the level of proficiency in speaking, understanding, and reading; the contributing factors in the participants' learning; the contexts in which the participants use the language; and the level of the foreign accent as perceived by the participant himself and by others. It should be stated at this point that all the above information included in the LEAP-Q is answered subjectively by participants.

The LEAP-Q is a subjective reflection of the participant's perception of proficiency and the bilingual level according to use. We choose this tool because it includes self-assessing the individual's linguistic proficiency and experience in a single instrument. Maitreyee & Goswami (2009) argue that the measurement has been used in recent research and it has been reported that the LEAP-Q is a reliable assessment tool of language performance (see Kaushanskaya, Blumenfeld, & Marian, 2011; Kaushanskaya, Yoo, & Marian, 2011), however, they also argue that a full detailed history in childhood is not included and neither is the contributing direct and indirect factors to language acquisition and proficiency. It has not been designed to measure language dominance, rather, it is designed to measure the core skills of bilingual proficiency: understanding, speaking, and reading. It is related to our research in detecting the bilingual proficiency level since language dominance is not part of this study. Other instruments have been designed to detect language dominance such as the Bilingual Dominance Scale (BDS) (Dunn & Fox Tree, 2009) and Self-Report Classification tool (SRCT) (Lim et al, 2008). However, we are not interested in language dominance and hence, our lack of interest in these measures. The LEAP-Q has been referred to in the literature as an excellent tool for eliciting data because of its comprehensiveness and amenability to multilingual populations (Gertken, Amengual, & Birdsong, 2014). However, it has also been argued that in relation to the comprehensiveness of the LEAP-Q, some items were very long and complex (Gertken, Amengual, & Birdsong, 2014). The other reason for choosing the LEAP-Q is the existence

of an Arabic version of the questionnaire which might make the data collecting process a bit easier for the researchers of this study. Our sample consists of bilingual students whose native language is Arabic and their second language is English. Since monolinguals will be excluded from this study, the LEAP-Q is more suitable for the participants. The exclusion of monolinguals is attributed to the irrelevance of the concept of motivation to the acquisition of the native language (Dörnyei, 2001a). The fact that these participants are students of English language and literature does not mean that the questionnaire should be administered in English. The use of the official Arabic translated version of the LEAP-Q will probably eliminate any chances of ambiguity for the students.

Some studies used the LEAP-Q to report that the self-assessing proficiency questionnaire positively correlated to the actual linguistic performance. One such study was conducted by Kaushanskaya, Yoo, & Marian (2011) that included English-Spanish bilinguals and English-Mandarin bilinguals. The participants of the study were native speakers of English learning Spanish or Mandarin as a second language. The overall results of this study show that English-Spanish high self-report reading skills in Spanish were associated with higher self-reported English reading skills. However, the same was not true for the English-Mandarin group. The findings indicate that the writing system positively facilitates the learning process when it is similar in both languages (L1 and L2), whereas it slows down the learning process when no similarities are found in the writing system of the two languages (L1 and L2).

Other studies used the LEAP-Q to control some variables such as the mean age of acquisition, the age of first exposure, and the level of proficiency as a self-report assessment, amongst other variables (Dimitropoulou *et al*, 2011a; Dimitropoulou *et al*, 2011b). The participants in one of these studies were native speakers of Greek whose L2 was English. The study was aimed at investigating if the level of proficiency in the L2 was the critical variable in changing the asymmetric activation of translations into symmetric activation. The overall results of the study indicate that intermediate proficiency in L2 did not lead to symmetric activation of translations, and that native-like proficiency is required in L2 in order to activate symmetric translations. The participants in the other study were Greek native speakers whose L2 was Spanish. The research was aimed at investigating if

low proficient L2 speakers show symmetric masked translation priming effect. The overall results of the research showed no such effect reported in low proficient L2 speakers. Only asymmetric translation priming effects are found in low proficient users compared to the symmetric translation priming effects found in native-like L2 speakers. As noted in these studies, the research objectives in both studies were similar. The researchers used the Greek version of the LEAP-Q to test the degree of exposure and proficiency in each language due to their relevance to the research objectives. The LEAP-Q in these studies showed reliable and valid results by which the researchers proceeded. The reliability and validity of the LEAP-Q are shown in the results, as both studies ended with the same conclusion showing similar results to previous literature as stated by the researchers such as the results found in Basnight-Brown and Altarriba's (2007) research.

To summarize the above discussion, the LEAP-Q is a measure of the individual's multilingual level based on social attributes concerned with language exposure, dominance, and use. The questionnaire is suitable to explore levels of multilingualism amongst a group of multilingual speakers to detect individual differences in linguistic terms (i.e., proficiency) or cognitive domains (e.g., executive functioning, logic, reasoning, higher order skills, critical thinking, etc.).

2.4. Critical Thinking

In this part, we will review critical thinking. Firstly, we will discuss the definitions and components of critical thinking from different disciplines' views. Secondly, we will discuss the areas of agreement and disagreement amongst researchers regarding different topics in critical thinking. Thirdly, we will discuss the value of critical thinking in education in general, and language learning in specific. Fourthly, we will view the literature concerning the measure of critical thinking in this research. Finally, we will discuss how critical thinking relates to effort and motivation.

2.4.1. Background briefing

The roots of critical thinking are found in three disciplines: philosophy, cognitive psychology, and education (Lewis & Smith, 1993; Sternberg, 1986). The philosophical discipline, for instance, characterizes the qualities of critical thinkers and emphasizes the

description of critical thinkers rather than the actions, performance, and behaviors (Lewis & Smith, 1993; Thayer-Bacon, 2000). Facione (1990) describes critical thinkers as flexible, open-minded, have a desire to be well-informed, inquisitive, consider other perspectives, and willing to suspend the judgment to understand the diverse viewpoints' arguments. Bailin (2002) defines critical thinking as a cognitive ability that meets certain criteria and/or standards of adequacy and accuracy. This definition demonstrates that the philosophical approach also emphasizes the standards and qualities of thought. Ennis (1993) defines critical thinking as "reflective and reasonable thinking that is focused in on what to believe or do" (p. l80). This definition allows us to evaluate the thinking ability skills of individuals based on their own experiences which, in many cases, shows that each and every individual is a unique case by himself/herself. Facione (2000) defines critical thinking as "judging in a reflective way what to do or what to believe" (p. 61). However, Sternberg (1986) criticized the limitations of this approach for its incapability to present critical thinking in a way that meets reality.

The cognitive psychological approach, on the other hand, places a greater emphasis on critical thinkers' actions and behaviors. This approach's adherents have a tendency to list the set of skills used by critical thinkers (Lewis & Smith, 1993). Sternberg (1986), for instance, defines critical thinking as "the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts" (p. 3). Halpern (1998) defines critical thinking as "the use of those cognitive skills or strategies that increase the probability of a desirable outcome" (p. 450). The philosophical approach followers criticize the psychological approach followers as being reductionists who limit the complex cognitive abilities to a series of disassociated steps (Sternberg, 1986).

Furthermore, the educational approach is another school of thought that has a different perspective in which there is no definition for critical thinking. Rather, there is a hierarchical taxonomy that puts evaluation at the top and comprehension at the bottom (Bloom, 1956). The followers of the educational approach emphasize developing critical thinking skills based on classrooms observations. These observations are beneficial in terms of experience being a key aspect that introduces critical thinking as a set of skills that can be learnt through training (Sternberg, 1986). Moreover, there are certain areas of

agreement among the three schools of thought despite their differences regarding critical thinking. The three schools agree on the general abilities and skills employed by critical thinkers that are apparent in the definitions and often referred to as dispositions. These abilities and skills are listed below:

1- Analyzing arguments and evidence (Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992).
2- The use of inductive and deductive reasons to make inferences (Ennis, 1985; Facione, 1990; Paul, 1992; Willingham, 2007)
3- Evaluation and making judgments (Case, 2005; Ennis, 1985; Facione, 1990; Lipman, 1988; Tindal & Nolet, 1995)
4- Problem-solving and decision making (Ennis, 1985; Halpern, 1998; Willingham, 2007).

Furthermore, Ennis (1987) discussed the ability to reflect skepticism as another important and crucial disposition. Ennis argues that skepticism is what defines our meaningful thought. Ennis does not want people to constantly doubt everything they know or learn, but rather, keep in mind the possibility that what they know or learn might be a small part of the picture that needs to be further analyzed, discussed, logically addressed, and evaluated.

Researchers disagree on the role of dispositions. Some argue that dispositions have a merely laudatory role while others argue that dispositions have a normative role (Facione, 1990). Those who argue in favor of the normative role would consider those who think critically to have the ability and dispositions to do so. They also argue that critical thinking must fulfill ethical societal needs, otherwise even when critical thinking abilities and dispositions are applied, the person will not be regarded as a critical thinker if he/she does not fulfill the ethical standards. This argument draws our attention to the importance of background knowledge. McPeck (1990) and Bailin *et al.* (1999) argue that the role of background knowledge is apparent in the way critical thinkers apply their general abilities and skills to address an issue using their domain-specific knowledge to explain and evaluate. In other words, domain-specific knowledge serves as a mediating factor that affects critical thinking in other domains. Yet again, there is a disagreement on this issue.

On one hand, there are those who argue that critical thinking can be taught (based on their perspective regarding domain-specific knowledge) and generalized to other domains when applying critical thinking. On the other hand, there are those who argue that critical thinking cannot be taught (based on their perspective regarding domain-specific knowledge) because critical thinking cannot be generalized to other domains when applying critical thinking unless the person or the student is provided with an opportunity to practice critical thinking skills in different and various domains (Ennis, 1989). Bailin (2002) and Willingham (2007) argue in favor of domain-specificity as an easier domain in which critical thinking is applied than in generic settings. According to Bailin (2002), valid standards of critical thinking consisting of analysis, explanation, induction, deduction, and reasoning may vary across domains. McPeck (1990) also argues in favor of domain-specific thinking skills as being more useful than general thinking skills based on the limitations imposed by general thinking skills relying on the fact that general skills can only be applied in general settings in which most thinkers have a common set of limited skills that may vary a little. On the other hand, Halpern (2001), Lipman (1988), and Van Gelder (2005) argue in favor of general critical thinking skills rather than domain-specific skills because the latter depends on criteria. These criteria may vary across domains yet fundamentally, critical thinking is the same in the general sense of the concept. However, Facione (1990; 2000) is one of the researchers who acknowledge the importance of general and domain-specific skills and consider them both because of their applications in addressing real-life issues.

The implications of the disagreement among researchers concerning general and domain-specific skills extend to reach another form of disagreement concerning the transferability of critical thinking skills. On one hand, domain-specific supporters are skeptical about the transferability of the skills across domains (Ennis, 1989). On the other hand, there are those who argue in favor of critical thinking skills as general, are more optimistic regarding the transferability of the skills specifically when the person or the student is given the opportunity to learn critical thinking skills in multiple domains and then taught to transfer those skills (Kennedy *et al.*, 1991; McPeck, 1990). The literature on critical thinking transfer across domains exhibits both the successes and failures of transfer. Halpern (2001), for instance, in his study on critical thinking transfer concluded that the subjects of the

experiment successfully transferred their critical thinking abilities to another non-academic domain. Nickerson (1988), on the other hand, documented mixed results regarding critical thinking transfer. Nickerson concludes that the success of transfer depends on many factors such as the nature of what is being taught and the way in which it is being taught (namely the what and the how). However, according to other researchers, it also depends on the "distance" (Bailin, 2002; Ennis, 1989). The term "distance" refers to how close or far transfer is. In other words, transfer appears to be most dependent on the degree of similarities and differences between the tasks that involve transfer. Clearly "transfer" depends on many factors. Even the definition of the term "transfer" has an effect on its success. McPeck (1990) defined transfer as the ability to apply the learned skills within academic settings to problems encountered in real everyday life. The implications of this definition suggest that an individual is more likely to exhibit transfer success in the same domain that imposes new problems than it is in an entirely different domain.

The previous argument leads us to the fact that domain-specific thinking skills tend to vary a lot among the subjects. This variation is a desirable feature because it provides us with the many different ways in which issues and problems are addressed using the available thinking skills of the subjects. Generic thinking skills do not provide researchers with this kind of variation because of its limitations (Lai, 2011). However, Halpern (1998) states that in many cases, adult individuals fail to exhibit basic reasoning skills. She attributes this failure to the human nature that tends to look for cause-and-effect relationships even when they do not exist. This tendency in human beings explains why they jump to the first explanation that makes sense without careful thinking about the alternative possibilities. She also argues that instructional intervention does not aid people in developing their critical thinking abilities. The inability of instructional intervention to develop critical thinking is attributed to certain deficiencies in the educational system that tends to focus on recall (memorization) rather than higher-order skills. The focus on a low-order skill such as recall causes learners to memorize information without understanding the logic. Similarly, children often fail to exhibit critical thinking abilities despite the fact that they engage in many cognitive tasks much like adults (Gelman & Markman, 1986). Children's engagement in cognitive tasks implies that there is a place for critical thinking at a young age. Willingham (2007), for instance, states that some children showed critical

thinking capabilities compared to scientists who, sometimes, fell prey to errors in simple reasoning tasks. Kennedy *et al.* (1991), however, argue that higher-order skills seem to improve with age implying that children can benefit from critical thinking instruction. Bailin *et al.* (1999) argue that instruction can aid children to think critically by teaching them to respect others in discussions, see things from others' perspectives, value reason, value truth, use cognitive strategies, and use principles of critical thinking such as considering the alternatives before making a decision. The evidence that supports the view that children can think critically comes from research conducted by Koenig and Harris (2005) who showed that 4-year-old children preferred the judgment of those who had a history of being correct over those who had a history of being incorrect. Another evidence comes from the domain of expertise in which children judged the credibility of the argument. Lutz and Keil (2002), for instance, found that a mechanic's diagnosis of car trouble was more credible to children than that of a doctor diagnosing car trouble.

A further area of ambiguity can be defined in terms of the development of critical thinking over time. Very few longitudinal and cross-sectional researches have been conducted to test the way and the rate at which individuals develop their higher-order skills. O'Hare and McGuinness (2009), for instance, conducted a study to investigate the critical thinking of university students to find that third year students had significantly higher scores in critical thinking than first year students. This finding implies that critical thinking seems to develop in educational settings where students attend classes regularly. Even in a low-order skill such as recall, there has been evidence that senior students exceed beginner students in performance. Alkhrisheh and de Bot (2019), for instance, found that senior students significantly scored higher than beginner students in the verbal fluency task. The findings of the previously mentioned studies suggest that students' progress in college seems to affect other areas of cognition that do not relate to the curriculum. The theoretical framework of Kuhn (1999) provides empirical grounds for the development of critical thinking over time. She argues that metacognition (declarative knowledge) is divided into two stages in terms of development. The first stage is achieved between the ages 3 to 5 and is referred to as 'Realism'. The second stage involves the ability to distinguish between intuition and evidence to decide what is true and it is often achieved by the age of 6. Similarly, she argues that epistemological understanding (recognition of truth source) is

divided into three stages in terms of development. The first stage is called the 'Absolutist position' and refers to the objective evaluation of truth. The second stage is called the 'Multiplist Epistemological position' in which the individual starts to perceive the world subjectively. Kuhn argues that this stage is critical because thinking is not bound to development after this stage meaning that in many cases, individuals might remain stuck at this stage. The third stage is called 'Epistemological Metaknowing' in which the individual balances subjectivity and objectivity, and recognizes the multiple valid representations of reality.

The importance of critical thinking lies within the person's capacity to identify the problem as stated by Ennis (1993) in order to apply the proper strategies in solving the problem (Glevey, 2006). Critical thinking involves the use of many components. According to Facione (1998), these components include: analyzing, making comments, self-regulation, assumption, identification, explanation, and evaluation. Moreover, as mentioned earlier, Ennis (1985) argues that in order to be able to think critically, one must have the dispositions to do so. The common dispositions on which all schools of thought agree can be identified as flexibility, open-mindedness, fair-mindedness, the propensity to seek reason, inquisitiveness, the desire to be well-informed, and respect for, and willingness to entertain, others' viewpoints (Bailin *et al.*, 1999; Ennis, 1985; Facione 1990, 2000; Halpern, 1998; Paul, 1992). These dispositions represent how motivation relates to critical thinking (Lai, 2011). Motivation appears to be a supportive condition of critical thinking implying that unmotivated individuals are not likely to show cognitive abilities including critical thinking abilities.

A further area of disagreement can be identified between the philosophical school and the psychological school in terms of criteria (Lai, 2011). Lai (2011) states that while philosophers maintain criteria, psychologists ignore the issue. According to philosophers, criteria is an aspect that critical thinkers follow in order to support ideas; make judgments; and evaluate arguments, position of others, evidence, and one's own thoughts (Case 2005; Lipman, 1988). These criteria might come in the form of standards or in the form of laws depending on one's own domain of interest in a specific situation (Bailin *et al.*, 1999; Lipman, 1988). An example of this is Lipman's (1988) distinction between the criteria that

are used to evaluate a piece of architecture against the criteria used to assess the strength of a legal argument.

Furthermore, researchers such as Flavell (1979) and Kuhn (1999) agree that critical thinking is highly related to metacognition. On one hand, Kuhn (1999) argues that critical thinking is a form of metacognition that includes metacognitive knowing (i.e., declarative knowledge is the basis of thinking), meta-strategic knowing (i.e., procedural knowledge is the basis of thinking), and epistemological knowing (i.e., how knowledge is produced). Flavell (1979), on the other hand, argues that critical thinking is part of metacognition. Other researchers, however, argue that critical thinking and metacognition are separate unrelated constructs (Lipman, 1988; McPeck, 1990). Lipman (1988) argues that an individual might think about thinking in an unreflective way. On the other hand, McPeck (1990) argues that the ability to recognize the necessary skill and knowing how to deploy it is part of general intelligence skills rather than critical thinking skills. Regardless of the different perspectives on the relationship between critical thinking and metacognition, Lai (2011) argues that metacognition seems to be a supportive condition for critical thinking.

Creativity is another aspect with which critical thinking is usually associated. Bailin (2002) for instance, argues that critical thinkers attain a certain amount of creativity. Moreover, Paul and Elder (2006) argue that critical thinking and creativity are aspects of purposeful thinking. They state that "critical thinking without creativity reduces to mere skepticism and negativity, and creativity without critical thought reduces to mere novelty" (p. 35). Paul and Elder (2006) argue that creativity and critical thinking develop in parallel paths.

Moreover, recent research describes the critical thinker as a reflective, purposeful, efficient user of the intellectual tools, distinguishes thoughts from feelings, takes thinking apart, and evaluative (Elder & Paul, 2020; Muhammadiyeva, *et al*., 2020). Reflective refers to the individuals' ability to act upon their thinking based on observing their own thinking. Purposeful refers to knowing why one needs to act. Making use of intellectual tools refers to how available resources are employed by critical thinkers. Distinguishing thought from feelings refers to separating feelings from thought when making a decision or deciding

upon an act. Taking thinking apart refers to conscious learning through constant practice. Evaluative refers to determining the points of strengths and weaknesses of their thinking.

According to recent research, critical thinking is regarded as a core competency in almost all professional and academic fields. College graduates are now expected to have critical thinking skills more than ever before in response to the changing nature and increasing demands of available jobs in the twenty-first century, driven by the expansion of major economic forces such as technology, customer service, and globalization (Hart Research Associates 2016; Whorton, et al. 2017). Employees are also expected to make independent and sound judgments about the complex situation they face, or even challenge established theory and practice to advance new knowledge, in fields such as health care and engineering, where cutting-edge techniques today may become obsolete in a short period. As a result, critical thinking has become an important professional skill for today's workers in a competitive global economy (Shaw, et al. 2019). According to Shaw (2019), due to a lack of critical thinking measurement research and the shortcomings of existing assessments, institutions have found it difficult to investigate the effectiveness of their teaching strategies or instructional methods. As a result, there is an urgent need for an up-to-date, dependable, and scalable direct measure of critical thinking to aid in accreditation, accountability, and internal improvement. Accordingly, a brief overview will be discussed next concerning the measures that have been designed and developed over the years to measure the critical thinking abilities of individuals.

Many tools, in this regard, have been developed to assess the critical thinking abilities of individuals such as the Watson-Glaser II Critical Thinking Appraisal (WGCTA; Watson & Glaser, 2009), the Critical Thinking Assessment Test (CAT; Tennessee Technological University, 2010) and the Cornell Critical Thinking Test (CCTT; Ennis, Millman & Tomko, 2005). However, differential item functioning (DIF hereafter) can occur as a result of cultural differences among the subjects. It is important to take the cultural background of participants into account in order to eliminate any possibility of any form of bias. In order to engage in the assessment of critical thinking in cross-cultural settings where DIF is eliminated, three aspects must be examined carefully before doing so: item bias, construct validity, and the development of local norms (Byrne, Oakland, Leong, van de

Vijver, Hambleton, Cheung, & Bartram, 2009). Item bias refers to unclear item translation, inadequate formulation of the item/items (e.g., unclear wording), or differences in the extent to which items are considered appropriate (e.g., the use of a term that is not understood in one of the cultural groups). Construct validity refers to the societal qualities upon which the constructs are measured (e.g., symbolism differs in interpretation: meaning that a symbol represents one thing in a certain culture and represents another thing in a different culture). These qualities differ variably across societies and cultures. Local norms refer to societal behavioral acts, dress codes, and public expressions of emotions that develop over time. These norms must be addressed carefully in testing the critical thinking of individuals whose cultural backgrounds differ.

To conclude, critical thinking is a cognitive asset in real-life and in education. The dispute amongst researchers concerning several related issues to critical thinking such as dispositions or transferability implies that higher-order skills are embedded in every domain of life. The tools designed to measure critical thinking are no longer culturally biased and thus acceptable if used in their original language. However, caution must be exercised when the assessing tool is translated to another language.

2.4.2. The Watson and Glaser Critical Thinking Appraisal (W-GCTA)

The Watson-Glaser Thinking Appraisal (W-GCTA) is one of the main evaluating tools for cognitive abilities (Watson & Glaser, 1980; Watson & Glaser, 1991). The W-GCTA is a multiple-choice difficult test that requires high-level reasoning skills. It consists of 80 items to be answered in 60 minutes updated recently. Despite the time constraints, most candidates will finish the test within the time limit. The time limit is not meant to be an obstacle, but rather, an aspect that defines critical thinkers. There are five sections in the W-GCTA: (1) Drawing inferences from facts. (2) Recognition of assumptions. (3) Deductive reasoning. (4) Logical interpretation. (5) Evaluation of arguments. Each section in the test has its own rules to which understanding is crucial to complete the test in the best way possible by candidates. In section 1 (inference), the candidates are given a short text with a series of facts to be considered. Below the text, there are possible choices to choose from based on the supposed or observed facts. The added difficulty in the W-GCTA is the addition of gray areas such as ‘probably true’ and ‘probably false’ which can only be

drawn from a correct evaluation of probabilities. In Section 2 (recognizing assumptions), candidates are required to distinguish between what is taken for granted and what isn't based on what is presented in the text without justifications. Section 3 (deduction) is similar to the first section with a different format with which candidates are required to make conclusions based on given facts. Section 4 (interpretation) is similar to section 3 with no formal logic involved. Candidates are required to draw conclusions based on 'reasonable doubt' which is not a 100% clear cut, but rather a strong probability. In section 5 (evaluation of arguments), candidates are required to evaluate the strength of an argument based on a question followed by an argument. The degree of the strength of the argument is related to the degree of its association to the question (i.e., directly or indirectly related to the question).

The W-GCTA is one of the most common tests used in the literature to test critical thinking and high-level thinking skills. Ghaemi and Taherian (2011) conducted a study using the W-GCTA to test the critical thinking of EFL teachers to find that critical thinking abilities are significantly associated with students' scores and a questionnaire that evaluates teachers' success in EFL contexts. The participants of the study included 70 male and female teachers and their 779 students. The teachers' scores in the W-GCTA correlated significantly to their success in the EFL context, suggesting that teachers can benefit from critical thinking ability skills and implement these skills in real-life applicable teaching and learning situations. This study is related to our objective since our sample consists of English language and literature students at the university level. If successful teachers had better thinking ability skills, successful and proficient students might exhibit the same or similar thinking ability skills. Furthermore, the test might prove to be a valid instrument in detecting a form of cognitive abilities amongst the students.

Another study conducted by Alvandi *et al*. (2015) used the W-GCTA to associate EFL teachers' critical thinking to their emotional quotient and their students' engagement in the task. The overall results showed a significant relationship between the teachers' critical thinking and their students' engagement in the task. However, no significant relationship was found between teachers' critical thinking and their emotional quotient, nor a significant relationship was found between the emotional quotient and students' engagement in the

task. The findings indicate that critical thinking is a strong predictor of teachers' success in the context of language teaching and learning.

Despite the W-GCTA wide use mostly in business, marketing, and governmental and legal institutes for purposes of hiring and promotions; it has been criticized like all research tools in social sciences (Possin, 2014). Possin (2014) questions the construct's validity in assessing the critical thinking abilities of subjects on the basis that it has been developed by expert writers, psychologists, and psychometricians of over 15 years of experience; with no credentials for critical thinking experts. Possin also criticized the increased rate of lucky guesses since most of the test's items have two options from which participants can choose. The test has also been criticized for the unclarity of its instructions (Fisher & Scriven, 1997). For example, inferences are a mental process in which a conclusion is drawn based on the premise(s). Thus, inferences are presented as either valid or invalid, justified or unjustified; not presented as true or false much like section 1 of the test. Another criticism concerns the ambiguity of instructions in most of the test items (Possin, 2014). One aspect of ambiguity is identified in terms of reliance (i.e., if one should rely solely on the given facts or if one could rely on background knowledge to make the inferences). Possin (2014) further argues that common background knowledge is required to answer the test and the aforementioned problem concerning ambiguity could have been avoided with a statement in the test's initial instructions. Another aspect of ambiguity is defined in terms of the lack of implicit premises in some items. Possin (2014), for instance, argues that existential commitment is not necessarily made when we are required to make universal claims. This issue is related to aspects of technicality in which existential commitment should be made implicit in the test's items. A further aspect of ambiguity is defined in terms of labeling (Govier, 1987). Govier (1987) argues that W-GCTA fails to address inductive reasoning skills. The test does address inductive reasoning under the label "interpretation" in section 4. However, the instructions suggest that this section of the test should be dealt with deductively when it should be dealt with inductively and that is what probably caused the confusion for Govier. Possin (2014) argues that this problem could have been avoided by stating that candidates are required to move from specific premises to general conclusions (as opposed to moving from general premises to specific conclusions in deductive reasoning). Another aspect of ambiguity has been defined in terms of construct vagueness

(Possin, 2014). For example, it is not clear what constitutes a ‘strong’ or a ‘weak’ argument and what is ‘directly’ and ‘indirectly’ related to the question.

We will be using the updated version of the W-GCTA test (updated on 10th October 2019) in this study to investigate the cognitive skills amongst students of varying multilingual levels. The W-GCTA, as mentioned and referred to earlier, was originally developed by Goodwin Watson and Edward Glaser. The new W-GCTA assesses the essential abilities required for presenting (in a clear, organized, well-reasoned way) a particular point of view and persuading others of your argument. The test questions are directed at investigating the individual’s ability to make correct inferences, recognize assumptions, make deductions, come to conclusions, and interpret and evaluate arguments. We are not testing all of the aforementioned abilities; however, we will focus on assumptions, deductions, and interpreting information. The reasons for focusing on these three aspects of the test are attributed to the short forms of these aspects, the further ease of administration, and the further ease of scoring.

2.4.3. The relationship between critical thinking and effort

Paul (1992, p. 13) argues that perseverance is one of the main characteristics of critical thinkers. Perseverance is considered as one of the main dispositions that critical thinkers should possess in order to reflect proper critical thinking abilities and skills. Halpern (1998) argues that persistence and effort are two of the main dispositions that support critical thinking. In our view, the causal relationship between effort and critical thinking is never mutual. Rather, it goes in only one direction: the more effort one expends, the better critical thinker one becomes as indicated in Mahapoonyanont (2012) concerning personal factors such as the willingness to study. Effort and critical thinking are clearly related based on the previous argument. Effort is a necessary, but not an exclusive, predictor of critical thinking based on performing cognitive acts as found in a closely related study (Gurcay & Ferah, 2018). In an academic environment, research is needed to confirm or reject the claim. Phan (2009) presents a new conceptual model that incorporates the effects of deep processing strategies, effort, mastery, and performance-approach goals, reflection, and critical thinking on academic achievement. One hypothesis in the model particularly included

predicting the effect of effort on critical thinking. Another hypothesis included predicting the effect of effort on academic success.

2.4.4. The relationship between critical thinking and motivation

Critical thinking is closely related to motivation. Critical thinking is viewed as a concept that includes skills, abilities, and dispositions. Facione (2000, p. 65) defines dispositions as "consistent internal motivation to engage problems and make decisions by using critical thinking". Halonen (1995) argues that demonstrating high-order thinking abilities is related to motivation based on the person's dispositions. Based on the previous arguments, motivation is seen as a necessary, but not an exclusive, precondition for critical thinking. A few studies have examined the relationship between critical thinking and motivation. The literature focuses on cognition and motivation (Elliott & Dweck, 1988; Garcia & Pintrich, 1994; Graham & Golan, 1991). If the individual is more interested in the task, the task will require less mental demand yet the individual will expend effort to finish the task (Song, Kim, & Bong, 2019). Interest in the task suggests that the mental cost can vary according to whether the person enjoys or dislikes the task. And even so, there exists a limited number of studies on the subject. Critical thinking is considered as a part of cognition and cognitive abilities. One of these studies was conducted to test the hypothesis stating that there is a positive relationship between critical thinking, motivation and strategy use (Garcia & Pintrich, 1992). The results of this study confirm the hypothesis about the positive relationship between the three concepts. The findings show that high intrinsic goal orientation (high levels of motivation) enhances cognitive abilities. The findings also show that learning strategies such as rehearsal, metacognitive self-regulatory and elaboration strategies are also related to differences in critical thinking. The authors argue that the content domain has an effect on motivation which, in turn, has an effect on cognitive processing. They also argue that cognitive processing is enhanced by the high level of intrinsic goal orientation and as a consequence, motivation can be a successful predictor of critical thinking.

In another study, there is also an interest in examining the relationship between instrumental motivation, autonomy, and critical thinking among Iranian EFL learner (Soodmand Afshar, Rahimi, & Rahimi, 2014). The author argues that instrumental

motivation plays a crucial role in students' academic achievement as it proves to be more dominant than its counterpart known as integrative motivation. Autonomy, the author argues, is another factor that contributes to successful language learning when language instruction changes from teacher-centered to learner-centered approaches. The author also argues that this change in approach leads to enhanced autonomous students as a result of self-awareness about their responsibilities as learners. The findings of this research indicate that critical thinking is a successful predictor of academic achievement. However, instrumental motivation does not seem to be a successful predictor of critical thinking since no significant correlation was found between the two variables. The results of this study about the relationship between critical thinking and motivation contradict with the previous one (Garcia & Pintrich, 1992). The literature on this relationship is very limited and needs to be further investigated because the currently limited studies show both the successes and failures of motivation as a predictor of critical thinking.

2.5. Motivation

In this part, we will review the literature on motivation. Firstly, we will discuss the different views concerning the definitions and components of motivation. Secondly, we will discuss the stages through which motivation research have undergone. Thirdly, we will view the literature concerning the measure of motivation (L2MSS). Finally, we will discuss the relationship between motivation and effort.

2.5.1. Definitions

Educationists and researchers have little agreement with what the concept of motivation means (Bower, 2017). Researchers agree that motivation determines human behavior by fueling it in the desired direction. We will view the role of motivation and its effect on achievement in the context of second language learning in classroom settings in this review. Motivation is a key factor in determining a learner's level of success in an ESL context.

The first problem to overcome is to identify motivation. The association of motivation to the different psychological perspectives on human behavior makes it difficult to identify because learning a second language involves cognitive, personal, and social (culture-

related) dimensions (Zhang, De Zoysa, & Jagoda, 2021). Gardner (2007) points out the fact that motivation is a very complex construct with many facets. He stated the following:

> "I begin by making the obvious observation that motivation is a very complex phenomenon with many facets. In fact, in 1981, Kleinginna and Kleinginna presented 102 statements about the construct. It really isn't possible to give a simple definition of motivation, though one can list many characteristics of the motivated individual. For example, the motivated individual is goal directed, expends effort, is persistent, is attentive, has desires (wants), exhibits positive affect, is aroused, has expectancies, demonstrates self-confidence (self-efficacy), and has reasons (motives).
>
> As you can see some of these characteristics are cognitive in nature, some are affective, and some are behavioural. Motivation to learn a second language is not a simple construct. It cannot be measured by one scale; perhaps the whole range of motivation cannot be assessed by even three or four scales. It definitely cannot be assessed by merely asking individuals to give reasons for why they think learning a language is important to them."

Behaviorists define motivation as "the anticipation of reward (Brown, 2000, p. 160)". Moreover, the cognitivists perspective of motivation is viewed as being associated with the decisions of the learners. Keller (1983, p. 389) stated: "the choices people make as to what experiences or goals they will approach or avoid, and the degree of effort they exert in that respect". Furthermore, the constructivists perspective of motivation is viewed with emphasis on the individuals' decisions in relation to the social context (Williams & Burden, 1997).

However, all three perspectives of motivation agree on one concept, and that is the concept of "needs". "the fulfillment of needs is rewarding, requires choices, and in many cases must be interpreted in a social context" (Brown, 2000, p.161). This view gives researchers some insights into learners' needs when learning a foreign or a second language to make their learning process driven by an engine that directs them to their goals.

So, the concept of motivation must be used in the literature with reference to certain aspects of interest when writing about it. For example, to refer to it as a cognitive, an affective, or a behavioral aspect. And it doesn't stop there because there are many characteristics of the cognitive, affective, and behavioral nature of motivation.

According to Saville-Troike (2016), there are many social factors that affect the learners' level of success. These factors include age, gender, social class, and ethnic identity. Even

though these factors interact with each other as a complex dynamic system to influence the level of success, yet there are so many other factors involved as well. Such as the learning and teaching strategies, the classroom environment, the learning resources, factors related to the teacher, factors related to the learners, factors related to the cognitive processes involved in language teaching and learning, etc. One can discuss many factors that can affect the level of success. Still, there would be limited access to the answers we require for the questions of concern due to the lack of the mental and physical capability to investigate all these factors.

The first social factor that has received a lot of attention is age. Some researchers argue that children are better learners of L2 than adults (Ellis, 1994). This could be due to children's learning capacity at an early stage. However, this learning capacity is not only limited to language learning, but also other kinds of knowledge. Ellis (1994) states that the process of learning a second language is similar to acquiring the first language with children "Young learners acquire L2 much Like L1, but they lose this ability later on" (Ellis, 1994, p.201-202). Other researchers argue that adult learners have a meta-linguistic awareness that gives them an analytical advantage over young learners (Saville-Troike, 2016). It seems that age as a factor plays an important role given that young learners have certain advantages over adult learners and the opposite is also true. Some researchers claim that learners of L2 can acquire the second language before the age of 7 years old. If the learner has passed this age, it would be called learning the second language, not acquiring a second language. To some researchers, the pre-seven age is considered a critical period through which learners acquire the L2 in a much similar way to the L1 (Towell & Hawkins, 1994).

The second factor that has received attention is gender. Ellis (1994:202-204) stated that women almost always surpass men in their (standardness of speech and) use of prestige forms. The prestige forms of a language are basically the high standard forms of that language (i.e., the form which is typically used by the media and government institutions). The reason behind this could be due to women's mental, physical, psychological, and emotional build-up that makes them focus on little details, and hence being more open to using different and various forms of the language. So, it seems that many researchers claim

that women are better learners of L2 than men because of their open nature that makes them adopt a positive attitude towards learning a second language which leads to the use of different forms to aid their prestigious quest in social contexts. So, the differences between men and women lie in the different stereotypes (women talk more than men and men are more humoristic) they both display (Haas, 1979). However, as far as motivation theories are concerned, the difference between males and females should be present either in terms of the type of motivation or in terms of the level of motivation displayed by males and females.

A further factor that was considered, the one concerned with the social class of individuals. Social class involves grouping people according to status within their status-related group. Ellis (1994:204-206) claims that social classes are usually based on level of education, income, and occupation. So, it seems social class learners of middle-class homes usually outperform learners of lower-class homes. This could be due to school drop-outs of the lower-class learners. These individuals usually tend to drop out of school at a young age to look for a job in order to support themselves or their families in their pursuit of making a decent living. This issue could be subject to investigation because there could be other reasons for these learners to drop out of school at a young age. It should be mentioned that it's male individuals who often drop out of school.

There are many variables related to social class that ought to be investigated such as power, wealth, and prestige. Power relates to the person's influence and control over other people (Greiner, & Schein, 1989). Wealth involves the valuable objects or symbols owned by a person or people. And prestige refers to the degree to which members of a society are well respected and favored in accordance with social importance (Shichor, 1970). One example of examining language in relation to social class can be done in a store to determine what kind of language variation would a salesman and a customer display. A salesman in the highest rank store, for example, would exhibit most (r)'s in postvocalic words like first, third, fourth, and floor, whereas a salesman in the lowest rank store would exhibit the least. From the review above, one might ask how can motivation be influenced, evaluated, or even ranked (as being high level or low level of motivation) for learners of the same social class in classroom setting. When it comes to investigating motivation with

reference to social class, one might investigate the type of motivation associated with a social factor. An example of this would be the association of the high level of instrumental motivation to obtain more power or prestige in society. One might ask what are the variables responsible for this difference in motivation and attitude. Is it the social factors discussed above? Is it other variables that are related to language learning or language teaching strategies? Or even put simply, what is it that changes their motivation and attitude?

2.5.2. Motivation: background briefing

The linguistic aspects of teaching are primarily concerned with maintaining and improving the learners' ability to use a language in its speech form and its written form (Aljohani, 2016; Bastías, *et al*. 2011). Speech-based forms and written-based forms of language are assessable (i.e., to use tests to assess the four skills of any given language: reading, writing, listening, and speaking). Non-linguistic domains, however, are concerned with aspects such as impressions about the speech community of the L2, desire to learn a second language, or an interest in learning many other languages. Therefore, the non-linguistic domains are difficult to assess because of the constructs and concepts they bring that are considered abstract and ambiguous (Edmonds & Gudmestad, 2018). People use these concepts in daily life conversations, but only with reference to their general meaning that conveys little about the term yet enough for common conversations. In scientific terms, these abstract concepts must be measured, and hence, the term operationalization comes to the literature of scientific research to provide researchers with what it means to make the concepts measurable. The concept of motivation, for instance, is an abstract term that requires a clear, descriptive, and demonstrative definition to make it measurable.

According to Dörnyei (2003), the theories concerned with motivation and motivational orientations underwent three stages: the first stage is the social-psychological period in which Gardner's socio-educational model of SLA seems to play the major role of this stage (Gardner, & Lambert, 1959). The second stage is the cognitive-situated period represented by Self-determination theory (Deci & Ryan, 1985), the attribution theory (Weiner, 1995), and the social constructivist model (Williams, & Burden, 1997). The third stage is the process-oriented period represented by Dörnyei's process model (Dörnyei, 2009).

2.5.3. The social psychological period

Gardner (1985) developed the Attitude/Motivation Test Battery (AMTB hereafter). The concept of motivation is operationalized for the purpose of measurement in this format of Gardner's definition of the concept. According to Gardner, the concept of motivation is divided into two types commonly known as instrumental and integrative (Gardner, 2004). The model focuses on the "affective variables" (Gardner, 1985). The affective variables which are discussed by Gardner are a goal, a desire to achieve a goal, positive attitudes, and effort. Gardner also makes a clear distinction between these variables and other cognitive variables associated with language learning such as aptitude and intelligence. Gardner's work falls within the psychological framework that focuses on individual differences to explain why some students are more successful than others. The theory of motivation in Gardner's model seeks to explain success in SLA in terms of individual differences in the level and type of motivation.

The model presents two individual differences variables associated with success in SLA namely: ability and motivation (Gardner, 1985). Ability refers to intelligence and language aptitude. Gardner argues that students with higher abilities will be more successful in language learning. He also argues that students with high levels of motivation will also expend effort to meet their goals associated with language learning. However, the interesting part of his argument is the part about formal and informal contexts of language learning. Gardner believes that in the formal context of SLA, where language is learned in a classroom, ability and motivation will be equally involved in the learning process. The informal context of SLA, on the other hand, is only determined and bound by motivation. In other words, in the informal context of SLA, if one is not motivated, he/she will not learn the language even if he/she lives amongst those who speak it.

Moreover, Gardner (1985) introduces the concept of social milieu as the first concept to refer to the learners' cultural environment which seems to have a great influence on the learners' affective and cognitive aspects related to language learning. The second concept Gardner introduces is individual differences which are divided into two cognitive variables (i.e., intelligence and aptitude) and two affective factors (i.e., anxiety and motivation). Gardner argues that high levels of anxiety have a negative influence on learning whereas

high levels of motivation have a positive influence. According to Gardner, high levels of motivation are associated with how much hard work and effort the learner will put into the learning of a language (even though it should be pointed out at this stage that motivation and effort were never separated as two distinct concepts). The third concept that Gardner introduces is the learning context which can be identified as formal, informal, or a combination of both. Each of these contexts has its own advantages and disadvantages in terms of learning. Formal language learning, for instance, is more comprehensive, structured, planned, involves a set course, set times, and progress reports; while informal language learning is often more adaptable, letting you test your new linguistic dexterity out in the real world through learning from one's own experiences (Ellis, 1984). The fourth concept Gardner introduces is the language learning outcome which he divides into two outcomes: the first outcome is related to the linguistic knowledge and language skills such as vocabulary knowledge, grammar, pronunciation, fluency, etc. The second is related to non-linguistic skills represented in the attitudes and values about the culture and beliefs of the target language community.

2.5.4. The cognitive situated period

Cognitive psychologists argue that the way one thinks about his or her abilities, possibilities, potentials, limitations, and past performances has major influences on motivation (Dörnyei, 2005). Thus, a shift in L2 motivation models has emerged from the broad social psychological perspectives to a narrow-viewed micro-perspective. This shift emerged in the late 1980s and 1990s and reflected the cognitive revolution taking place at that time (ibid, 2005). Even though long before the 1980s Self-determination theory was introduced, yet it was not recognized and acknowledged as an empirical theory until the mid-1980s.

The first model of this stage is Self-Determination Theory (SDT). SDT research arose from studies that introduced and compared intrinsic and extrinsic motives, as well as from an increasing awareness of the dominant role intrinsic motives played in individuals' behavior (Lepper, Greene, & Nisbett, 1973). Intrinsic motivation refers to motivation that is prompted and initiated by personal enjoyment, pleasure, or interest, and usually contrasts with extrinsic motivation, which is manipulated by reinforcement contingencies (Guay et

al., 2010). Extrinsic motivation is initiated by external motives that come from tangible (e.g., money, points, fear of punishment, etc.) and intangible (e.g., praise and appreciation) rewards (ibid, 2010). In SDT, there are two types of motivation that correspond to intrinsic and extrinsic motivations, namely and respectively integrated regulation and external regulation (ibid, 2010). The first type represents the highest level of self-determination correspondence to which self-identity is highly valued and highly associated with the individual's needs. The second type represents the lowest level of self-determination correspondence in which behavior is driven by either introjected regulation (internal pressures such as obligation or guilt), or identified regulation (personal reasons for performing a task). Typically, intrinsic motivation is considered to be more desirable than extrinsic motivation because research has shown that intrinsic motivation leads to better results than extrinsic motivation (Ryan, Connell, & Plant, 1990). In a later stage of SDT, Deci and Ryan expanded the early work of SDT that mainly involved making distinctions between intrinsic and extrinsic motivation and proposed three main intrinsic needs associated with self-determination (Deci, & Ryan, 1991; Deci, & Ryan, 1995). According to Deci and Ryan, the three psychological needs are competence, autonomy, and relatedness (Ryan, & Deci, 2000). Competence refers to the mastery of a skill, autonomy refers to the individual's desire to take charge of the learning process to be a causal agent in achievement, and relatedness refers to the individual's will to contact and communicate with others in order to maximize the social experience.

The second influential theory of this stage is Weiner's attribution theory (Weiner, 1972). This theory seeks to explain the causes of behavior and "why people do what they do?". Attribution, locus of control, stability, and controllability are the key concepts and terminology underpinning this theory. The theory involves three stages to determine the causes of behavior: (1) observing the behavior, (2) determining the intentions behind the behavior, and (3) attribute behavior to internal or external causes. According to Weiner, achievement is attributed to affecting factors summarized in ability, effort, task difficulty, and situational factors. Furthermore, attributions are classified under three causal dimensions: (1) locus of control which involves internal attribution and external attribution. The former refers to attributing behavior to an internal cause such as ability, and this type is often associated with permanent factorial causes. The latter refers to attributing behavior

to a situational cause such as learning conditions, and this type is often associated with temporary factorial causes. (2) stability which refers to the stability of the cause. The theory seeks to investigate whether causes do or do not change over time. (3) controllability refers to the causes that individuals can control (e.g., skill) measured against the causes that they cannot control (e.g., situational changes).

The third and final influential theory of this stage is the social constructivist model that emphasizes the contextual and interactional influences on motivations (Williams, & Burden, 1997). This model focuses on the classroom practices associated with motivation. Palmer (2005) argues that the constructivist model of motivation views learners as active participants in the learning process because they apply a set of strategies that either maximize or minimize the learning experience according to the level of motivation. As a result of this view, "constructivist-informed teaching" was developed to guide L2 learners and teachers to the proper tools in learning as presented by social constructivists. And, like many theories of motivation, social constructivist models attribute motivation to internal and external factors. One key concept in social constructivist theory is the reconstruction of conceptual schemes. Jean Piaget, for instance, emphasizes the cognitive processes involved in learning and attributes the gain of experience to physical, mental, or social triggers (Driver & Erikson, 1983; Piaget, 1978). Physical in the sense that learners interact with objects in their immediate environment, mental in the sense that learners think about what they observe, and social in the sense that learners interact with others in social settings. Jean Piaget's view is more cognitive than social. On the other hand, Lev Vygotsky emphasizes the social aspects of learning (Lemke, 2001; Vygotsky, 1978). Vygotsky argues that society, culture, and language are the main prompts for learning and gaining knowledge and experience. According to this view, social interaction is seen as the tool that provides learners with what they need to interpret the world as they become encultured in a way that makes them use the common thinking practices in a specific community. Moreover, teachers are seen as guides and supporters to learners as they gradually build and develop the learners' knowledge in a way similar to scaffolding. The one common area agreed upon by all social constructivists is that learners are active rather than passive. Learners are responsible for their own progress by acting upon their decisions rather than simply receive and comply.

2.5.5. The process-oriented period

Motivational psychologists attempted to incorporate cognitive concepts and variables in their theories (Dörnyei, 2005). Their attempt involves considering motivation as an action based on thoughts and beliefs. This view introduces motivation as a mental process that leads to the initiation and maintenance of action (Dörnyei. *et al.* 2014). This view of motivation that presents the concept as a process goes in line with the work of Larsen-Freeman who introduced complexity theory and dynamic systems to view language learning as a complex dynamic process (Larsen-Freeman, 1997). The dynamic and complexity of language learning depends on many factors, as stated by Larsen-Freeman, starting from individual differences and extending to linguistic and nonlinguistic (e.g., motivation and effort) factors. It is best explained in a nonlinear fashion in which all these factors interact with one another to either maintain or reverse the language learning process. Dörnyei's process model presents motivation as a complex dynamic process that changes according to state by having a number of factors interacting with each other in a complex, dynamic, and nonlinear fashion to influence motivation (Dörnyei. *et al*. 2014). Dörnyei (2014) introduces many factors by which motivation can vary. These factors include interest, boredom, and anxiety introduced as attractor states. Among the influential and affecting factors that might have an impact on motivation as suggested by Dörnyei, we can notice that these are related to other factors such as the learning environment, the teaching and learning strategies, and the nature of the material being presented. Interest, boredom, and anxiety can vary according to the interaction between the learning environment, the teaching and learning strategies, and the material.

Dörnyei and Ushioda (2013, p.5) define motivation as a process whereby a certain amount of instigation force arises, initiates action, and persists as long as no other force comes into play to weaken it and thereby terminate action, or until the planned outcome has been reached. The definition introduces three distinct chronological stages related to action: (1) the pre-actional stage, (2) the actional stage, and (3) the post-actional stage. According to Dörnyei and Ushioda (2013), in the first stage, the individual sets the goals, forms intentions, and launches actions to initiate the choice to begin learning a second language. During this stage, the major influences on motivation are the values associated

with L2 learning, attitudes towards the L2 speaking community, learners' expectations and beliefs, and environmental support. In the second stage, the individual sustains the level of motivation throughout the language learning process by carrying out tasks and subtasks, appraising one's achievement, and regulate one's self by taking charge of one's own learning. In this stage, the major influences on motivation are the quality of the L2 learning experience, the sense of autonomy as an L2 learner, the teachers' and parents' influence, and the usage of self-regulatory strategies. In the third stage, there is retrospection and self-reflection on the language learning experience and the language learning outcomes. In this stage, the individual forms causal attributions, elaborates standards and strategies, and dismisses the intention and further planning. In this stage, the major influences on motivation are the learners' attributional styles and biases, self-concept beliefs, and received feedback during the L2 learning process.

The process model was further updated with the motivational self-system in which individuals link the self-system to future conceptualizations of themselves (see Dörnyei, & Ushioda, 2009; Dörnyei, 2009). There are three components defining the motivational self-system: (1) the ideal L2 self in which the individual imagines his/her future self as a speaker of a second language. This component of the motivational self-system is mostly linked to either integrative or internalized instrumental motivation (i.e., internalized instrumental is close to integrative motivation). (2) the ought-to L2 self in which the individual imagines what should be done to meet the desired expectations and avoid negative outcomes in the future. This component of the motivational self-system is mostly linked to extrinsic motivation. (3) the L2 learning experience in which motivation as a dynamic system is still investigated in order to detect the effect of situational and environmental aspects of learning on the learning process and on the subjective view of learning (i.e., whether individuals consider the learning experience positive or negative).

2.5.6. The motivational self-system

The L2 motivational self-system (L2MSS hereafter) developed by Zoltan Dörnyei (2009) assumes that the gap between the learner's end-desired state in L2 and the learner's current state in L2 can be bridged when the learner consciously perceives a reflection on certain contradictions between his/her current state and his/her future self-image. Several studies

used L2MSS questionnaire in an attempt to evaluate its efficacy in predicting the learners' differences (see Al-Hoorie, 2018; Eusafzai, 2013). Al-Hoorie (2018) reported that the components of Dörnyei's L2MSS model are better predictors of intended effort than it is for achievement. The research tool is relevant to our research in terms of predicting the new presented measurement of the effort construct in the learners' perceived amount of effort in their current state instead of predicting the intended effort. Al-Hoorie (2018) also reported that the strong association between the L2 learning experience and the intended effort is attributable to the lack of discrimination between the two constructs. In this study, the L2MSS questionnaire is related to our research in the sense that we will be using two different tools to discriminate between the two constructs in order to further explain learners' differences by associating effort to motivation on one hand and associating effort to achievement on the other hand. Even though Al-Hoorie (2018) reported that the questionnaire is a better predictor of intended effort than it is for proficiency, yet the questionnaire is also a good predictor of language proficiency and achievement as reported in Tort Calvo (2015). Tort Calvo (2015) reported a strong significant correlation between the Ideal L2 self and achievement scores; though another correlation was reported insignificant between the Ought-to L2 self and achievement scores. The study also reported that the three components or dimensions of the L2MSS have an impact on achievement in varying degrees starting with the Ideal L2 self as the most contributing factor influencing achievement; followed by the L2 learning experience; while reporting no impact of the Ought-to L2 self on language achievement. The study also reported the questionnaire's usefulness in investigating motivation based on learner types in terms of self-image.

Moreover, Eusafzai (2013) justifies the use of L2MSS questionnaire in his study by stating that other theories of motivation have not considered the multicultural identities the modern globalized world brings to individuals. Theories such as Gardner's (1983) socio-educational model were criticized for not being able to capture the conceptualization of social identity because the theory was centered on the concept of integrativeness. The factors discussed in Eusafzai's (2013) article included criterion measures, ideal L2 self, ought to L2 self, parental encouragement, instrumentality-promotion, instrumentality-prevention, linguistic self-confidence, attitude towards learning English, travel orientation, fear of assimilation, ethnocentrism, English anxiety, integrativeness, cultural interest and

attitude towards L2 community. He reported that there are seven successful predictors of learners' motivation in L2MSS: attitude towards learning English, attitude towards L2 people and culture, instrumentality-promotion, linguistics self-confidence, instrumentality-prevention, parental encouragement, and anxiety. The strongest predictor of students' motivation was the attitude towards learning English. These findings support the efficacy of the L2MSS questionnaire in predicting the learners' motivation and its impact on language proficiency and language achievement.

Furthermore, L2MSS questionnaire can be used as a framework for both research designs (i.e., cross-sectional studies and longitudinal studies). You and Chan (2015) stated that possible selves can be regarded to undergo certain changes impacting the overall self-image. The previous statement suggests that the future self-image is not a stable state, rather, it is dynamic, variable, changing, etc. The dynamic nature of the construct can only be detected in longitudinal research. On one hand, Henry (2009) in a longitudinal study reported a statistical significance of the self-concept strength amongst boys and girls. Girls' self-concept was stronger than that of the boys. On the other hand, Azarnoosh and Birjandi (2012) conducted a cross-sectional study in which over 1400 students were administered through a questionnaire of L2MSS in which females were reported to have a significant strength of the L2 ideal self over males. L2MSS seems to hold reliable and valid measures for both research designs as the findings reported in both studies (Henry, 2009; Azarnoosh and Birjandi, 2012) are similar.

The reasons behind choosing Dörnyei's (2009) L2MSS questionnaire are mainly shown in its simplicity and comprehensibility. The items of both statements and questions are clear, easy to comprehend, and each part is self-explanatory (i.e., each part is given a title such as instrumental items in parts 5 and 6 or integrative items in part 14 of the questionnaire). We are choosing only items and questions concerned with instrumentality (related to the promotion of learning), integrativeness, cultural interest, and attitude because we are not interested in the self-system or the long- or short-term changes of motivation. We are not interested in certain parts of L2MSS, such as the language learning experience, because the three parts of the self-system (i.e., the ideal L2 self, the ought-to L2 self, and the L2 learning experience) are designed to detect the individuals' image of

themselves in the future, which is irrelevant to our research because we are mostly concerned with how internal and external motives relate to the other concepts of our research (especially the new effort construct). We are not interested in the dynamic changes of motivation either. Our lack of interest in the long- or short-term changes of motivation comes from our cross-sectional research design which contradicts with longitudinal research in which long-term and short-term changes of motivation can be detected (e.g., a month or a year). Moreover, the classification of each part of the questionnaire can be easily recognized as part of internal or external motives for language learning.

To sum up, Dörnyei's (2009) L2MSS questionnaire is a valid, comprehensible, reliable instrument in detecting motivation (see Al-Hoorie, 2018; Tort Calvo, 2015); suitable for cross-sectional and longitudinal research designs (see Henry, 2009; Azarnoosh & Birjandi, 2012); easy to administer and easy to score (Dörnyei, & Taguchi, 2009); and considers the multicultural identities of the modern globalized world (Eusafzai, 2013). Moreover, the questionnaire can be used in diverse learning contexts where there is little or no contact with the L2 speakers to explain the motivational set-up (Tort Calvo, 2015). In other words, the L2 speakers do not aim to learn English only to address native speakers of English, but also to address people from around the globe due to the globalization of English. The globalization of English leads to different kinds of learners who wish to learn the language based on different motivational orientations based on their view of the goals they want to achieve, the learning experience, and the Ideal L2 self.

2.5.7. The relationship between motivation and effort

Very little has been discussed in the literature regarding the association of motivation to effort because the two concepts have been often considered an undivided unit that relates to motivation (see Gardner, 1985). However, as we have mentioned earlier, the separation of the two concepts is necessary from our perspective because motivation should be a successful but not an exclusive predictor of effort. One research that has investigated this separation is presented by Ennis, *et al.* (2013). In this research, age and motivation have been used as variables to detect cognitive effort. The results of this study show that older adults' engagement in the task given to them was more sensitive to their interest in the task compared to younger adults whose engagement was less associated with interest. The

results also show that increased costs in older adults is negatively associated with their intrinsic motivation (i.e., the less motivation exhibited the more effort required). The results are consistent with the hypothesis stating that costs of cognitive activity increase with age. The results imply that motivation is necessary for older adults to maintain effort until the task is completed; otherwise, older adults will show disengagement (i.e., effort withdrawal) from the task. The implication that less motivation leads to more effortful engagement due to the lack of interest is consistent with our view regarding the separation of the two concepts (i.e., effort and motivation) because motivated individuals will have to exhibit maintained effort.

Even though motivation was less significant for younger adults' engagement in the task, yet it is considered important for maintaining engagement in the cognitive effort task. Thus, the separation of the two concepts is not a criticism of the theory of motivation, rather, it is an addition that might aid researchers in detecting individual differences more thoroughly.

2.6. Concluding remarks

Explaining individual differences has been the main concern of many theoretical frameworks in the past and the present (see Saville-Troike & Barto, 2016; Yang, 2018; Yuan, 2018). We aspire to present a valid instrument for detecting individual differences by testing its dimensional aspects represented by cognition, interaction, and motivation.

Previous research suggests that critical thinking, motivation, and effort are strongly related (see Ennis, *et al.* 2013; Gurcay & Ferah, 2018; Halpern, 1998; Mahapoonyanont, 2012; Paul, 1992; Song, Kim, & Bong, 2019). Accordingly, we will investigate the dimensional aspects of effort as indicated by effortful acts.

3. Effort

In this chapter, we aim to provide a proper presentation in terms of defining and conceptualizing effort based on previous literature and readings. Proper definition and proper conceptualization are required to provide the proper measurement tool for measuring the concept. Our presentation of the concept will be thoroughly discussed in this chapter as part of the operationalization process.

3.1. Introducing the concept of effort

The field of education related to second language acquisition usually deals with abstract terms and concepts that require proper definitions and proper operationalizations for measurement purposes (Saville-Troike, & Barto, 2016). These terms, constructs, and concepts usually include nonlinguistic aspects of language learning such as critical thinking, motivation, attitude, beliefs, learning and teaching strategies, and effort as proposed in this study. Researchers in the field of linguistics and education have been investigating the relationship between these constructs and the level of success (proficiency) in the academic context (ibid, 2016). The present work is no exception as it addresses the relationship between effort and the other constructs. This work presents a proper definition of effort for the sake of operationalizing the new construct in the educational context despite the fact that many researchers conducted studies to address this issue. The difference between the previous work and this one is the new perspective that addresses the exertion of hard work. In other words, the previous literature, for instance, incorporates items in questionnaires that only provide statements such as “I work very hard”. The real issue that needs to be addressed is ‘how hard’ does one need to work to reach the desired level of success. This work presents a new, subjective, battery for measuring effort in the educational context and namely second language acquisition with a questionnaire that demonstrates how much hard work the learners would exert in order to fulfill their educational and academic goals.

Dewey (1913) in his forgotten book discussed interest in the educational context as a guarantee for directing the student’s energy towards facts and ideas. Interest refers to rising the child’s (or person’s) awareness of the aforementioned facts and ideas to secure their attention and direct their efforts to master the skills related to the facts and ideas (ibid,

1913, p.1). The question to be asked after this introduction to the concept of interest is whether effort compensates for the lack of interest given the fact that Dewey states that the theory of effort contradicts itself by having the concept of interest as a condition for effort, but at the same time calls for attentional effort for uninteresting tasks. One way to get around that dilemma is to assume that there is a small amount of interest in the task to be performed, otherwise, according to Dewey, effortful acts won't be initiated. The theory of effort states that unwilling attention should proceed spontaneous attention (ibid, 1913), yet building interest is a daunting task given the fact that students differ greatly in almost everything. In terms of individual differences students vary greatly in learning strategies, learning styles, motivation, attitude, aptitude, and other variables (see Ehrman, & Oxford 1990; Oxford, 2003; Skehan, 1991). In learning styles, for instance, some students prefer auditory material, others prefer visual materials, and others prefer to do certain tasks to have a better understanding of whatever is being learnt (Reid, 1995). These differences in terms of individuality create problems for teachers and educators as it requires teachers to pay attention to each and every student. This attention is time-consuming even in classrooms where few students are present. The idea of building interest to direct effort is appealing, but again, individual differences are to be taken into account when doing so.

So, what is the alternative to building interest? It doesn't seem to just students who always excel even if they are not interested. So, it seems that the previously mentioned theory of effort does not address the issue of these students. Instead of building interest to detect effort, we need to detect the amount of effort itself disregarding the concept of interest as it raises more problems than it solves considering the fact that effort is a variable that presents individual differences in itself because individuals differ in the amount of effort they expend to achieve their goals. Mulder (1986) wrote a very interesting paper about measuring mental effort. The paper discusses the definition, the role, and the measurement of the concept. The author of the paper emphasizes the role of effort in detecting individual differences by quoting Spearman (1927) who argued that there are two factors related to intellectual behavior: namely the 'general factor' and the 'specific factor' in which variability between individuals might be explained in the amount of mental effort that individuals employ to perform a task. According to the paper, the general factor refers to the commonly shared features of individuals, while specific factors refer to

distinguishable features between individuals. The general factors are presented in all intellectual tasks, whereas specific factors are presented in single tasks. The author also states that effort plays a very important role in theories of achievement and motivation in which effort is highly linked to motivation in terms of speed and persistence to do a task (Atkinson & Birch, 1970; Locke, 1968; Weiner, 1965). The author also states that even though mental effort does not necessarily require physical demands yet it seems to be exhausting and stressful which is an important point to be discussed later. However, the author's discussion about how physical effort is measured is very interesting. He argues that physical effort is measured by detecting the ability to reach high levels of oxygen consumption and the ability to tolerate high oxygen debt (Kalsbeek & Ettema, 1963). We are not interested in physical effort -at least not in that way – but the author continues to argue that the maximum rate of oxygen consumption and glucose utilization puts constraints on mental performance. This point brings us to argue against pushing oneself too hard. If the individual spends a certain amount of time resting, he/she will restore the energy he/she needs to continue later on. Our interest in physical effort does not exceed a subjective view because we want to detect how much energy one needs to sustain a mental act of effort. In other words, if the individual chooses to rest in order to regain energy, then one is making an effort to have better achievements in the context of language learning and achieving high levels of proficiency.

Even though our measurement of the concept of effort is subjective, yet it is one of the wider range of measurements to detect individual differences in the context of second or foreign language learning. It is also one that might explain the clash of results in the previous literature on individual differences. Much of the previous work seems to have mixed results in detecting these individual differences especially in learning strategies (see Griffiths, 2013; Porte, 1988; Vann, & Abraham, 1990). We are concerned with the similarities between efforts and strategies because we want to make a clear distinction between the concept of strategies and our new modified concept of effort. On one hand, the present work might explain this mix up because the new measurement considers the frequency and the length of the action. On the other hand, the integration of the aspects of frequency and length might prove to be strong indices to detect individual differences.

Mulder (1986) in his paper continues to argue that attention is a very important part of mental effort mainly because -as he states- attention-demanding tasks are more effortful. The author cited Baddeley's & Hitch's (1974) working memory model that consists of three components: the phonological loop, the visuo-spatial sketchpad, and the episodic buffer (all three are part of short-term memory). The phonological loop refers to the information heard, the visuo-spatial sketchpad refers to the information seen, and the episodic buffer refers to the faculty that links visual, spatial, and verbal information with a sense of chronological ordering. The three components of working memory in short-term memory are very important to the concept or idea of attention. Mulder states that central executive is a pure attentional system. In simpler terms, this might be viewed as a business office with a supervisor (central executive) who is in constant and continual contact with the three components who each have a different function. In this scenario, the supervisor continually coordinates the activities of the three components to create a cohesive whole. What interests us from the previous argument is how students might benefit from the auditory or visual information, which results in more effective learning, which is associated with better results in processing or memorization, and which is associated with less stressful situations.

Another argument in Mulder's (1986) paper is concerned with the physiological and the psychological stressors on achievement in order to check for indices sensitive to the amount of mental effort required to perform certain tasks. However, this argument is related to oxygen consumption and the ability to tolerate oxygen debt in performing mental effortful acts when stressors are involved. Even so, we are interested in how certain stressors such as noise might affect effort. In our measurement of the concept of effort, we might include items in the questionnaire that relate to stressors to investigate their impact on attention and other related concepts. The kind of stressors we are discussing in this work are mostly environmental such as noise, heat, or cold; psychological such as mild sickness and mild sleep debt; and emotional such as anxiety and boredom (Bryant, 2017; Roster, & Ferrari, 2020).

3.2. Effort: Previous literature and definitions

Effort in the educational context, and namely in the second language acquisition context, hasn't been investigated thoroughly in previous literature (Özer, 2020). One reason behind this might be related to the concept of effort itself as it is abstract, difficult to define, and bears many meanings. Another reason is related to the association of the concept of effort to motivation (Vroom, 1964). Behavioral scientists like Vroom discussed motivation as a behavior and this is why they linked effort to motivation. However, this consideration of the concept of motivation by behavioral scientists makes it difficult to differentiate between motivational acts and effortful acts. In fact, the three schools of thought (Behaviorism, Cognitivism, and Constructivism) view motivation as a concept that reflects a few acts, but much more states that reflect the fulfillment of a desire or a need (Brown, 2000; Keller, 1983). This desire or need can only be fulfilled by an effortful act. The first step in understanding the concept of effort is by providing a proper definition of the concept, and based on the definition, we can draw proper measurements to the concept. Psychologists, for instance, define effort as "the activation of mental or physical power to do a task" (Nugent, 2013). The definition provides two components of effort here 'mental' and 'physical'. The definition also provides the exertion of work 'power to do'. And finally, it provides the word 'task' to refer to the goals that are worthy of expending effort. Behavioral scientists discuss motivation in terms of three effort related components (Cofer and Appley, 1964; Campbell and Pritchard, 1976; Jones, 1955; Vroom, 1964):

1- The direction of effort refers to the behaviors that the person chooses to do and how often the person does it. Our new perspective here on effort is in the questions 'how often' and 'how long' the action is done.

2- The effort level of behaviors refers to how hard the behavior is carried out by the individual to reach the desired goals.

3- Persistence, which refers to the sustainability of effortful behavior. In other words, will the individual persist in doing the act until the goal is reached?

Carbonaro (2005) defined effort as the "amount of time and energy that students expend in meeting the formal academic requirements established by their teacher and/or school" (Carbonaro 2005, p. 28). The definition reveals two aspects of effort, namely "time" and

"energy". The first question is: how can students incorporate time in their attempts to expend effort? The second question is: what is meant by energy and how can students expend and gain energy to meet the required academic standards? The answers to these questions lie in the activities that students display in order to meet the academic standards. Time, for instance, could refer to the amount of time that students spend in their acts of readings, such as the time they spend studying or the time they spend doing a homework or an assignment and so on. Or, time could refer to the preferred time of the act. Some individuals prefer to study in the morning, for instance. Others prefer to study in the evening. Time could also refer to the frequency of the act and how often the individual persists in the task. Energy, on the other hand, refers to the source of sustainability to do an action (Mulder, 1986). This source is exhaustible, meaning that at some point, this energy is doomed to run out. The basic claim here is that in order to expend energy, one needs to have energy. If one does not have the energy, one cannot perform energy-consuming acts. There are two types of energetic acts: energy-consuming acts and energy-restoration acts (Allen, *et al.*, 2000). The former refers to the acts that require energy, the latter refers to the acts that renew and restore the energy of the subject. For example, Studying is an act that requires and consumes energy, while sleeping is an act that restores energy. Human beings perform both acts (regarding energy consumption and energy gain). Some do these acts as part of their daily routine that requires effort expenditure in areas other than work or learning/teaching, others do these acts for purposeful utilization. By purposeful utilization, we are referring to the activities that represent effortful acts to maintain or increase productivity and one such area that concerns us here in terms of productivity is the increase in efficiency and proficiency in the educational context of language learning such as studying, attending, participating in the class, and so on (i.e., energy-consuming acts). The basic idea here is that if the individual chooses to do an energy-restoration act in order to maintain the stamina for an energy-consuming act later that is related to learning, then the individual is making an effort even if he/she is resting or sleeping.

We come to the conclusion that the act, the frequency of the act, and the time of the act are all considered when measuring the concept of effort. However, the literature on effort does not document all of these aspects when effort was investigated. Furthermore, the

literature focuses on energy-consuming acts only. Our perspective on the concept of effort also includes acts of energy-restoration because these acts are as important as energy-consuming acts in the sense that these acts provide the subjects with the energy they need to continue doing their purposeful acts to achieve their goals. In other words, the endurance level of the act (whether sustaining a mental or a physical act) depends on the level of energy that the individual has.

A study conducted by Peng and Wright (1994) demonstrates a positive relationship between effort and academic achievement. The findings of the study demonstrate that Asian American students tended to expend more effort in their studies (e.g., spent more time studying and working on their assignments, attended more classes and lessons inside and outside the school environment) and, as a result, academically, they achieved better when compared to students of other minorities. The measurement of the concept of effort in this study focuses on energy-consuming acts as mentioned above. If the energy-consuming acts are taken alone in the measurement of the concept of effort, it would be difficult to define the level of hard work. Even professional athletes, for instance, cannot maintain their level of success without taking enough rest to restore their energy.

In another study conducted by Chassie et al. (2004) in which effort was investigated to predict performance. The results of the study indicated that effort failed to predict the academic performance of the students. What was interesting about this article is the way effort was measured. The researcher measured effort by the mean of time that students spend learning. The measurement of effort in this study focuses only on the aspect of 'time' (the length of the act), in addition to the act. Time alone does not predict effort. Effort is also represented in the frequency of the activities of hard work and commitment. The educational context provides a wide range of subjects and based on one's interests, he/she chooses to expend effort in one field of knowledge of his/her preference. In this study, the energy-consuming act failed to predict success. The reason behind this could relate to the lack of a proper definition, the lack of proper measurement tools, or the lack of other aspects of energy intake and outtake measurements (energy restoration and consumption acts).

Another study was conducted to examine the relationship between science-related attitudes and effort (see Center for Educational Technologies, 2007) in which the results indicated that attitude can be regarded as a reliable predictor of effort. The results of the study showed that attitude and effort are significantly correlated. The interesting part was the measurements used for effort. In this study, effort was measured by an evaluation sheet developed by COTF (Howard, 1997 cited in Center for Educational Technologies, 2007) in which seven statements of contributions were used to measure effort (e.g., helped to develop ideas). In this study, the focus was also on energy-consuming acts. Attitude can be seen as a directive tool towards effort, however, even individuals with the highest levels of attitude still need to rest and restore energy to sustain their energy-consuming acts to reach the desired level of success. One of the strongest points of this study is the association of effort to attitude. The investigation of such associations is highly recommended because it may provide the proper tools to validate the reliability of the measurement of the concepts at hand. This study provided the measurements of attitude and effort with somewhat better reliability and validity (for both attitude and effort).

Effort in education, and namely in SLA, should not be investigated in isolation from other concepts such as motivation, attitude, and critical thinking. Motivation, for instance, should be investigated in relation to effort because the motivated individual might not expend effort (Inzlicht, Shenhav, & Olivola, 2018, p. 2). In other words, the existence of high levels of motivation doesn't necessarily mean that the individual is willing to make an effort. For example, one could be highly motivated but doesn't have the time to expend effort to achieve his/her goals. Even so, motivation should be a successful, but not an exclusive, predictor of effort (Wright, 2008). In other words, if the individual is highly motivated, then he/she will probably, but not necessarily, make an effort. Critical thinking, on the other hand, doesn't exhibit an association similar to motivation in the sense that if the individual actually expends effort, the individual is more likely to develop better thinking skills and thinking abilities (Simbolon, Surya, & Syahputra, 2017). In other words, motivation is neither a necessary predictor of effort or cognitive enhancement, however, effort is a necessary predictor of cognitive enhancement in which critical thinking is considered part of cognitive abilities.

Recent studies discussed effort more thoroughly in terms of categorization. For instance, Carbonaro (2005) categorizes learning effort into three types: rule-oriented, procedural, and intellectual. Attending classes and behaving appropriately are examples of rule-oriented effort, which indicates adherence to the norms and rules of the classroom and school. Procedural effort entails meeting specific class requirements and demonstrates active participation in classes, completion of assignments, and timely submission of assignments. Intellectual effort entails critically thinking about and understanding the curriculum or course content, as well as devoting time and energy to studying and reviewing (Carbonaro, 2005). Bozick and Dempsey (2010), on the other hand, categorized learning effort as procedural, substantive, or non-compliance. Procedural effort entails completing tasks, following school and classroom rules, and exerting the bare minimum of effort required for functioning and progressing in school, and it denotes homework completion, in-class attentiveness, and punctuality. Substantive effort entails active participation in learning and indicates spending extra time preparing for or studying for exams, as well as working hard at school. Non-compliance refers to behaviors that inhibit learning effort and includes misbehaviors such as failing to complete homework, arriving late to class, and daydreaming in class (Bozick & Dempsey, 2010). A recent study conducted by Özer (2020) focused on non-compliance levels of the students, procedural effort levels of the students, substantive effort levels of the students, and focal effort levels of the students. The findings indicate that procedural, substantive, and focal effort levels are the most reliable in detecting individual differences.

Özer (2020) uses a new developed measure referred to as the Foreign Language Learning Effort Scale (FLLES), designed by Karabıyık and Mirici (2018). It is a five-point Likert scale, with responses ranging from “never,” “rarely,” “sometimes,” “often,” and “always.” According to Karabıyık and Mirici (2018), the scale had four factors: non-compliance (3 items), procedural (3 items), substantial (9 items), and focal (3 items). Our perspective on the scale is focused on the non-compliance items. These items refer to the students’ demoting behavior inside the classroom that compromises learning and compliance to regulations. First, we believe that the individuals are often dishonest about admitting faulty behavior whether anonymized or not. Second, modern teaching methods punish non-compliant students in numerous ways and accordingly, students cannot choose to

misbehave in class. Thus, from our perspective, non-compliance items are an unnecessary scale of measuring language learning effort.

Additionally, effort and demand are two distinct concepts (Inzlicht, Shenhav, & Olivola, 2018, p. 3). An effort is a volitional, intentional process that organisms employ, and as such, it corresponds to what organisms actively do rather than what happens to them passively. Effort differs from demand or difficulty in that effort corresponds to the amount of mental or physical work that organisms apply toward achieving a goal, whereas demand or difficulty refers to a property of the task itself, particularly how error-prone it is. We conclude that effort exertion corresponds with the level of the demand. However, our main idea is to devote the appropriate amount of time and energy to each task based on the demand.

Moreover, our new perspective regarding the learner's progress is focused on the learner's own responsibility in progressing in the educational context to reach the desired level of success. Thus, it is important to take into account the students' attempts to expend effort and relate it to their level of success. We believe that it is the student who is responsible for making his/her own progress in the educational context. This responsibility doesn't mean that the teacher is relieved of his responsibilities. Teachers have to make their own effort to facilitate students' progress. The teachers' responsibilities are limited to providing the information, guide and motivate the students. If the student chooses not to make an effort, then all the teacher's efforts are lost.

However, many of the questionnaire items that will be used to investigate the level of effort among learners are similar to those used to investigate strategies. Even so, the measurement is strictly meant to measure effort based on the sustainability, length, and frequency of the act which will show a great deal of difference between measuring effort and strategies.

3.3. The possible effect of stressors on effort

Stressors are defined as a biological or chemical cause, an external stimulus, an environmental condition, or an event that causes stress to an organism (Sato, et al. 2006, p. 248). Psychologically speaking, a stressor can be an environment or an event that an

individual considers demanding, challenging, or threatening to the individual's safety (Deckers, 2018). These stressors can take many forms including (1) environmental stressors such as extreme heat or over-crowdedness. (2) daily stress events such as traffic and the lack of money. (3) workplace stressors such as high job demands measured against low job control. (4) life changes such as divorce or unexpected pregnancy. (5) social stressors such as family demands. (6) chemical stressors such as drugs and alcohol. (7) physical stressors such as injuries.

The early discussion about stressors by Mulder (1986) strongly suggests that stressors have a negative impact on mental abilities. Another study that confirms this assumption is the research conducted by Bliss, et al. (1956) and Harvey, et al. (1984) in which stress affects mental performance by a mechanism that involves the stimulation of the hypothalamus (i.e., corticotropin release factor) that prompts the pituitary gland to release the adrenocorticotropic hormone that gives prompts to the adrenal cortex to secrete various stress hormones into the bloodstream. After that, the released hormones travel through the bloodstream to the relevant organs such as the intestines or the heart. This mechanism affects the entire nervous system which, in turn, affects behavior. The practice of measuring life change events has led to the emergence of many scales composed of these events that are tailored to certain life circumstances or situations, such as social readjustment and college demands for students (Deckers, 2018).

The negative impact of stressors on cognition was further investigated with a study conducted by King, Schumacher, & Sipes, (2015). This study investigated the impact of sleep Deprivation on Memory, Problem Solving, and Critical Thinking. The study failed to support the hypothesis which assumed that students who receive 7 to 8 hours of sleep will gain higher scores than those who receive less or more sleep. The problem of this study is that the type of stress in this study is minor tiredness. Such mild stress might not have a significant impact on cognition as much as severe stress. However, we will investigate the effect of multiple mild stressors on effort to detect the maximum level of effort that learners might expend in the L2 educational context. Mild stressors such as mild sickness or illness, slight tiredness, slight noise, slight boredom, slight heat or cold, and slight emotional

anxiety might prove to be strong indices to the learners' maximum willingness to make an effort or to the learners' commitment to the task of learning.

Another stressful act found in the literature is related to multitasking. Human beings' limited capacity does not allow for much multitasking because the human brain seems to bear a processing bottleneck that prevents it from working more than one task at once (Gladstones, Regan, & Lee, 1989). The psychological refractory period is a period during which the response to a second stimulus significantly slowed down the processing time because the first task is still being processed (Pashler, 1994). Even in specific domains such as learning, multitasking has proven to be a stressful activity that impairs performance (see Junco, & Cotten, 2011; Junco, & Cotten, 2012; Mayer, & Moreno, 2003). To sum up, multitasking is a stressful activity that results from the limited capacity of the human brain to process more than one task at once and even if multitasking is performed it would slow down the processing time for each task.

To conclude, stressors in the context of language learning seem to be strong indices of the learners' attempt to commit to the task of learning. One cannot simply ask a question regarding the degree of commitment to a certain task in a certain context. As a result, we included stressors in order to measure the degree of commitment to the task of learning a new language. In other words, the learners' management of mild stressors in the context of language learning shows how much commitment they dedicate to the task of learning. The concept of commitment is included in order to complement the effort construct we aim to introduce. Accordingly, our inclusion of handling stressors in the measure of effort as a construct is justified. Despite the seemingly plausible contradiction between energy restorative acts and handling stressors, energy restorative acts are necessary to handle stressors in our perspective. The contradiction can be acknowledged in the definition of the word commitment which refers to an obligation that restricts freedom of action. However, performing energy restorative acts is a necessary action to relieve oneself from stress on one hand, and for coping with new forms of stress in the future. In other words, energy restorative acts do not contradict with the learners' attempts to handle stressors. Relieving oneself from stress is a form of handling stress.

3.4. The components of effort

we define effort as follows: effort is the amount of frequency and length of mental or physical work that students expend to achieve their educational goals represented in the amount of energy expenditure and energy gain, in the amount of time dedicated for the task, in the amount and type of activity dedicated to the task (mental and physical activities represented in the rate of attendance, participation, studying and interaction, etc.) and commitment to the task inside and outside the school environment. In this definition, task refers to the goals to which the individuals aspire whether educational or otherwise. In other words, your goal can be as simple as passing an exam or as widely as using the language proficiently and efficiently in order to communicate with others at an international level. In the light of the previous discussion, effort is represented in actions rather than states.

According to our definition of Effort, it consists of the following components and subcomponents included in the concept map shown in figure (1.1):

1- The act:

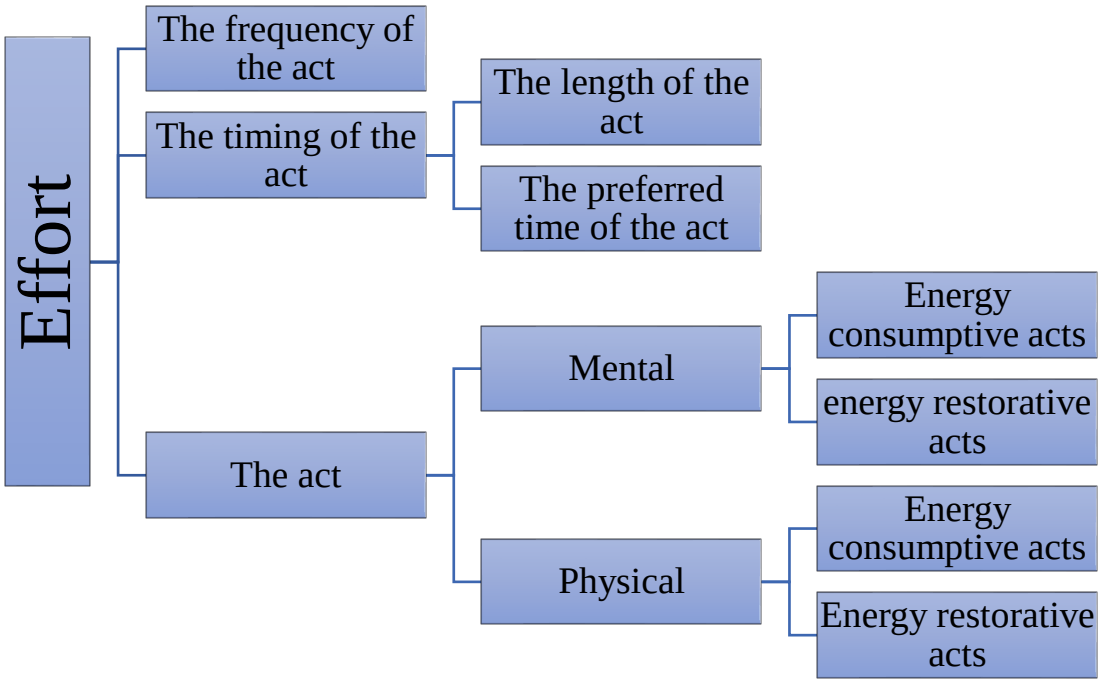
- a- Mental act:
  - 1- Mental energy consumptive acts.
  - 2- Mental energy restorative acts.
- b- Physical act:
  - 1- Physical energy consumptive acts.
  - 2- physical energy restorative acts.

2- The timing of the act:

- a- The length of the act “How long”.
- b- The preferred time of the act “When”. In terms of “larks” and “owls”.

3- The frequency of the act.

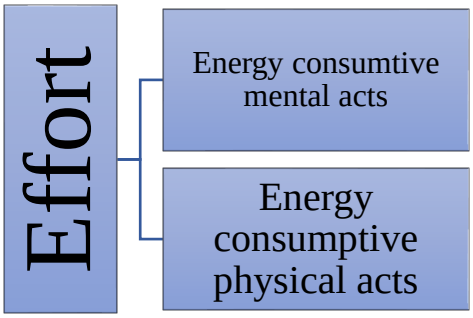
Figure 1.1. The concept map of the components of effort



As can be seen from figure (1.1) above, the concept map shows that effort is a hierarchical concept. Hierarchical concepts are simple enough to understand because the components of the hierarchical concept are ranked in terms of importance mostly in a pyramid-like shape. An example of a hierarchical structure is the organizational layout of employees in a company. Each employee -except one who is usually the CEO of the company- is subordinate to someone else. The subordinates are usually employees with similar authorial ranks who have to report to the same superior.

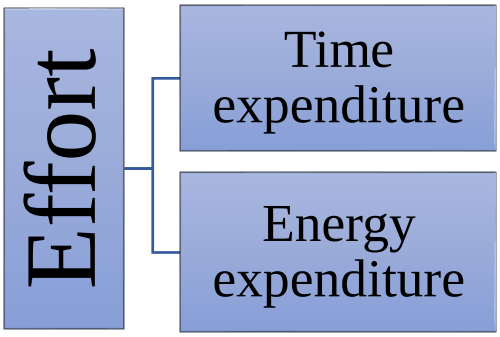
Moreover, comparing the new perspective represented in figure (1.1) to the previous perspectives shows fewer components presented by the previous perspectives. For example, as pointed out earlier, psychologists defined effort as “the activation of mental or physical power to do a task” (Nugent, 2013). According to this definition, effort consists of mental and physical energy consumptive acts represented in the concept map below in figure (1.2):

Figure 1.2. The components of effort according to psychologists



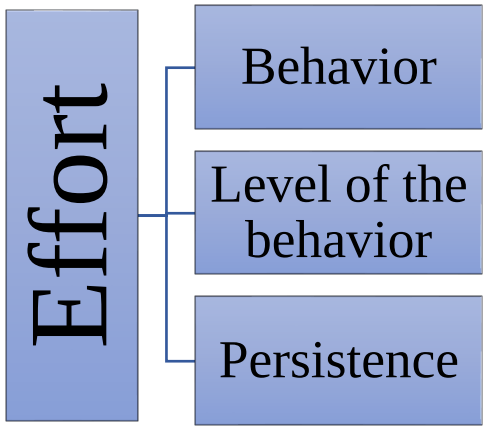
Carbonaro defined effort as "the amount of time and energy that students expend in meeting the formal academic requirements established by their teacher and/or school" (Carbonaro 2005, p. 28). According to this definition, effort consists of time and energy expenditure presented in figure (1.3) below:

Figure 1.3. The components of effort according to Carbonaro



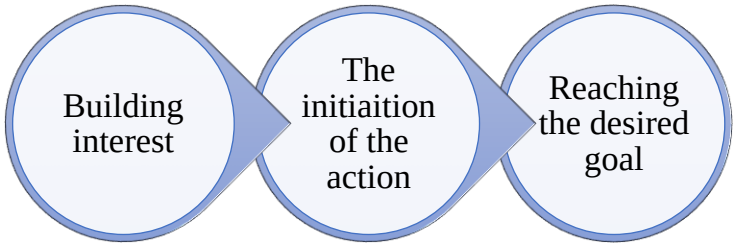
Campbell and Pritchard (1976), Cofer and Appley (1964), Jones (1955), and Vroom (1964) are behaviorist scientists who viewed effort as an aspect related to motivation that consisted of the following components: (1) the direction of effort (i.e., the behavior). (2) the level of the behavior (i.e., how much hard work). (3) Persistence (i.e., how often the behavior is carried out). This view is presented in figure (1.4).

Figure 1.4. The components of effort according to behavioral scientists



The concept of effort is a hierarchical concept as can be seen from all the previous perspectives and the new modified one. However, only one perspective views effort as a process. As mentioned earlier, Dewey (1913) viewed effort as a process that begins with building interest to direct attention towards initiating the action in order to reach the desired goals. This view is presented in figure (1.5) below.

Figure 1.5. Effort as a process according to Dewey



3.5. The measurement of effort

The modified effort concept is measured with a questionnaire that has been developed based on participants' responses in a previously published article (see Alkhrisheh, Aziez,

& Alkhrisheh, 2019). The article was aimed at investigating gender and language differences in written texts. However, the participants of the research were asked to write about their efforts to achieve better scores in their courses and better scores in English proficiency tests. The participants of the research were forty students aged between 18 and 23 years old. Most of the answers provided by the students were considered when the questionnaire was being developed.

As expected from the students, their efforts were reflected by using verbs to describe their acts. Most students used verbs such as study, attend, pay (attention), practice, etc. The use of verbs indicates that the concept is closely related to the psychological school more than the other schools because behavior plays a very major role in the concept of effort. Behavior is reflected in what individuals do (i.e., acts often reflected by verbs). The questionnaire consists of three parts. The first part is labeled "Consumptive acts". The second part is labeled "Restorative acts". And the third and final part is labeled "handling stressors" or can be equally labeled as "commitment".

In the first part, the aspects of frequency and length were integrated into each item. The example below demonstrates how frequency and length were integrated:

e.g.

1- (A) a week, I spend a (B) time studying.

2- (A) a month, I spend a (B) time preparing for my upcoming exams.

3- (A) a year, I spend a (B) time planning, organizing, reorganizing, and/or redoing my schedule.

The first part includes a subpart (A) which is filled with an answer that indicates the frequency of the act on the basis of the given choices (i.e., *Once, Twice, Three times, Four times,* and *More than four times*). The second subpart (B) is filled with an answer that indicates the length of the act on the basis of the given choices (i.e., *very short, short, moderate amount of, long*, and *very long*). The second subpart corresponds to the quantity expression *enough. Very short* corresponds to *not enough*, *short* corresponds to *barely enough*, *moderate amount of* corresponds to *moderately enough*, *long* corresponds to *enough*, and *very long* corresponds to *more than enough*.

The second and third parts of the questionnaire consist of items that require an answer with a simple range based on the given choices. The answers range from strongly disagree to strongly agree. The second part consists of five items concerning the level of energy gain. The third part consists of eighteen items concerning the level of willingness to expend effort alongside the existence of stressors. In other words, the third part is about how the individuals handle stressors in the context of language learning to show commitment. The total number of items in the questionnaire is 51 items. The questionnaire is presented in appendices I, II, and III. We shall refer to the new measure as Foreign Language Learning Effort Battery (FLLEB).

3.6. Concluding remarks

Based on the previous discussion, we provided a clear definition as the first step and a clear conceptualization of the concept as the second step. The third step was to develop a measurement tool that could detect effort expenditure. Furthermore, we differentiate between efforts and strategies based on the following points that are based on the observations we made in the previous literature (see chapter 2) regarding effort and strategies:

1- Strategies are teachable and learnable. Efforts are prompts that arise from within the individual.
2- Strategies tend to develop because the learning process develops. Efforts depend on the task which tends to develop depending on the learner's level. Efforts also depend on the learning experience (i.e., if the learning experience is positive, learners will enjoy doing tasks that lead to less stressful situations, which in turn, might lead to a decreased effect of stressors on effort).
3- Strategies focus only on the frequency of the act. Efforts focus on the frequency and the length of the act.
4- Strategies are exclusive to mental acts. Efforts include both: mental and physical acts.
5- Strategies are subcategories of a much wider activity. An example of a wider activity is the studying activity during which the learners use sub-categorical studying strategies to enhance the studying experience. Efforts are wide acts under which many subcategories diverge which include strategic activities along with persistence

represented in the frequency and the length of the act (i.e., the more frequent and longer the act is, the more persistence exhibited).

6- Strategies are task-specific. Efforts apply to all tasks by means of persistence which results from the source of sustainability (i.e., energy).

In conclusion, our current work differs greatly from previous perspectives in terms of conceptualizing and operationalizing effort. We considered the learners' view when the concept was still under development. We also considered the addition of a new dimension that was often neglected (i.e., restorative acts). Finally, our thorough and detailed definition and conceptualization aided us in forming the new measure for detecting effort expenditure in language learning classrooms.

4. Research methodology

In this chapter, we present the gap in previous research and the incentive for carrying out this study. We also present a description of how the research was carried out by presenting a brief description of participants, a brief description of the instruments used to measure the included research concepts, the ethical standards we followed in the procedure, a brief description of how the data was collected, a brief description of the research design, and finally, the research questions and research hypotheses.

4.1. Statement of the problem

The previous literature on motivation often relates the motivation of individuals to their willingness to expend effort in the context of SLA (e.g., Dörnyei, 2002; 2005; 2009; Gardner 1985; 2007; 2011). Thus, motivation is defined and reviewed abundantly for the purpose of operationalization. As it has been discussed in the literature review, the process of operationalizing motivation consisted of classifying the types of motivation (i.e., intrinsic, extrinsic, integrative, instrumental) as well as the level of motivation (i.e., what constitutes a high or a low level of motivation). However, the concept of effort, to which motivation was often associated, has not been operationalized and neither has it been defined properly (Özer, 2020; Karabiyik, & Mirici, 2018). Dörnyei *et al.* (2006), for instance, has discussed the matter of effort with the inclusion of the "intended effort" in his model. However, Dörnyei barely scratched the surface of the concept by considering it as a subcomponent of the future self-image within the motivated individual. In other words, the "intended effort" was merely a subcomponent used in modeling motivational orientations. This disregard for the concept of effort means that researchers in the previous literature linked motivation to effort based on mere assumptions without an actual or a perceptual measure of effort. In other words, researchers in the field of non-linguistic aspects of language learning, and specifically motivation, assumed that the motivated individual will expend effort. This study presents a clear definition for the modified concept of effort that reveals what components the concept has, and it presents an operationalization of the concept to provide a proper tool for measuring the concept. The new measurement is developed to further investigate individual differences in the context of SLA to explain why some students are more successful than others. The measurement

is also developed in an attempt to associate effort to motivation and other related concepts for validation purposes as mentioned earlier in chapter 3.

4.2. Participants

We used a convenience sampling method. Convenience sampling is the simplest method of recruiting participants because the research sample is chosen based on the availability and willingness of participants to contribute to the study. Although we can obtain meaningful results here, they are subject to significant bias because those who volunteer to participate may differ from those who do not (volunteer bias), and the sample may not be representative of other characteristics such as age or gender. Volunteer bias is a risk of all non-probability sampling methods. In other words, the individuals volunteering may share common characteristics that may compromise the findings of research that depends on a probability sampling like investigating the effectiveness and side effects of vaccination or a drug amongst a large population. In probability sampling, each respondent is chosen entirely at random, and every member of the population has an equal chance, or probability, of being chosen.

The study's sample included 100 Jordanian undergraduate students. For the questionnaires and tests, 50 male students and 50 female students were chosen. The students were 19 to 26 years old and ranged from freshmen to seniors. Gender will be taken into account in this study. We excluded age as an independent variable from this study because the sampling method caused a violation in the sample distribution. All of the participants were English as a second language learners, which means they were non-native English speakers. Arabic is the native language of the students. The new developed language learning effort measure is limited to non-native speakers because they will remain learners until their demise.

The measurement was created specifically to assess the language learning effort of university students, both graduate and undergraduate. The students came from various parts of Jordan and were studying at the university. The students were from a variety of urban and rural backgrounds. However, in terms of the number of participants, the selection process still has limitations. A sample of 100 participants is sufficient for an academic paper. However, more participants represent a more accurate representation of the

population. So, in terms of the number of participants, we recommend that future duplicate studies have a larger number of participants.

4.3. Research Methods and instruments

In this part, we present the research instruments that we used to measure motivation, multilingualism, critical thinking, proficiency, and effort. For motivation, we used L2MSS developed by Dörnyei's (2009). For multilingualism, we used LEAO-Q developed by Blumenfeld and Kaushanskaya (2007). For critical thinking, we used W-GCTA developed by Watson and Glaser (1980; 1991). For proficiency, we used the test of English as a foreign language (TOEFL). For effort, we used our new modified instrument we referred to as the foreign language learning effort battery (FLLEB). This part also includes the description and the scaling system of each measure.

4.3.1. The motivational self-system: L2MSS

We adopted a format of Zoltan Dörnyei's (2009) L2MSS questionnaire. It consists of the items related to four aspects of motivational orientations in Dörnyei's model: Instrumentality (promotion), attitude, integrativeness, and cultural interest. The questionnaire is graded with a Likert scale consisting of six points. Instrumentality is the only scale based on statements, whereas attitude, integrativeness, and cultural interest are question-based items. Accordingly, the mean scores of students' responses varied across the scale. The adopted items from the questionnaire scored .815 on the Cronbach scale of internal consistency, which is considered a high score for reliability. A detailed description of adapted measures is provided in appendix IV.

4.3.2. Language Experience and Proficiency Questionnaire: LEAP-Q

The Language Experience and Proficiency Questionnaire (LEAP-Q) (Blumenfeld & Kaushanskaya, 2007) consist of 27 items. We adopted 17 items based on a Cronbach's reliability analysis. The selected items scored .749 on the Cronbach scale of internal consistency, which is considered an acceptable score for reliability. We utilized the LEAP-Q to measure the language exposure and use in social occurrences and daily events to account for its utilization as a social construct. A detailed description of adapted measures is provided in appendix IV.

4.3.3. The Watson and Glaser Critical Thinking Appraisal: W-GCTA

We used 18 items from the Watson-Glaser Thinking Appraisal (W-GCTA) to assess participants' cognitive abilities (Watson & Glaser, 1980; Watson & Glaser, 1991). The test is divided into five sections that assess the participants' reasoning abilities and skills in a multiple-choice format: inferences, assumptions, deductions, interpreting information, and arguments. We used the updated version of the test (updated 2019). The items chosen included evaluating only three aspects of reasoning: assumptions, deductions, and information interpretation. The scoring system is straightforward, with one point awarded for each correct answer. As a result, 18 items have a maximum score of 18 points. A detailed description of adapted measures is provided in appendix IV.

4.3.4. Test Of English as a Foreign Language: TOEFL

To assess the participants' English proficiency, we used "The Test of English as a Foreign Language" (TOEFL). The exam evaluates the four major language skills: reading, listening, writing, and speaking. However, we used 19 test items to assess the participants' reading and listening abilities in a multiple-choice format. The scoring system is simple: one point is awarded for each correct answer. As a result, each of the 19 items has a maximum score of 19 points. A detailed description of adapted measures is provided in appendix IV.

4.3.5. The effort questionnaire: FLLEB

Finally, as mentioned in Chapter 3, we developed a new measure to assess the participants' level of effort expenditure. The new developed questionnaire is divided into four sections. Part 1 evaluates the frequency with which effortful acts are used. Part 2 evaluates the time span of effortful acts. Part 3 evaluates the participants' use of energy restorative acts. Part 4 assesses participants' commitment to effortful acts based on managing stressors. Parts 1 and 2 are intertwined, treated separately, and graded using a Likert scale ranging from 1 to 5. Parts 3 and 4 are graded using a Likert scale ranging from 1 to 6. As a result, the maximum score of the questionnaire is 5.5. Part 1 is awarded as follows:

1- “Once” is given a 1 in the scoring system.

2- “Twice” is given a 2 in the scoring system.
3- “Three times” is given a 3 in the scoring system.
4- “Four times” is given a 4 in the scoring system.
5- “More than 4 times” is given a 5 in the scoring system.

Part 2 is awarded as follows:

1- “very short” is given a 1 in the scoring system.
2- “short” is given a 2 in the scoring system.
3- “moderate amount of” is given a 3 in the scoring system.
4- “long” is given a 4 in the scoring system.
5- “very long” is given a 5 in the scoring system.

Parts 3 and 4 are awarded as follows:

1- “Strongly disagree” is given a 1 in the scoring system.
2- “Disagree” is given a 2 in the scoring system.
3- “Slightly disagree” is given a 3 in the scoring system.
4- “Slightly agree” is given a 4 in the scoring system.
5- “Agree” is given a 5 in the scoring system.
6- “Strongly agree” is given a 6 in the scoring system.

A full and detailed description of the new measure is provided in appendix V.

4.4. Procedure

4.4.1. Ethical considerations

For ethical considerations, we anonymized the research site and the research participants. We also ensured the confidentiality of personal information of the participants. We announced that participating in the study is voluntary. Furthermore, we fully informed the participants about the evaluation being conducted.

To volunteer for participation in our study, we applied to the institution that requires participation. The institution's board members agreed in the form of a formal consent letter to provide the necessary facilities and equipment for data collection and informed the subjects that volunteering is a personal choice.

Furthermore, we kept the evaluation as simple as possible by considering and obtaining only the information we needed for the study. As a result, our description of the research participants did not exceed how many males and females were involved, taking into account the participants' age, nationality, and academic level.

4.4.2. Data collection and data analysis

The collected data is quantitative due to the deductive method employed to interpret the results. As we mentioned earlier, this research focuses on presenting and validating the concept of effort through implicit and explicit relationships between effort and other variables on one hand, and explaining individual differences on the other hand. Taking all the variables into account, data collection involves six variables: effort, critical thinking, motivation, multilingualism, proficiency, and gender. The data consists of three questionnaires (i.e., effort, motivation, and multilingualism) and two tests (i.e., critical thinking and proficiency). Given that five of the variables are given a score means that they can be either dependent or independent in terms of testing the hypotheses depending on the research objectives. For instance, motivation is an independent variable that relates to a dependent variable like proficiency and effort. Likewise, effort is an independent variable that relates to proficiency and critical thinking.

The new developed effort measurement, as well as the other measures, were all completed on an excel sheet for quick scoring using formulas. The sheet indicates where students can provide answers based on color. We used yellow to color the cells that would be used to provide an answer. It doesn't matter what color it is as long as you can read through it and each response received a score. For instance, the second subpart of the first part of the effort questionnaire concerned with the time span of the effortful acts contained *very short* as one of the choices. It has been assigned as 1 in the scoring system, whereas *very long* has been assigned as 5. The choices included *very short (1), short (2), moderate amount of (3), long (4),* and *very long (5)*. The excel formula used to score the questionnaire items as they are being answered is the *if* formula. The advantage of having an automated scoring system is that we only had to copy and paste the results from the excel sheet to the SPSS software. The tests were also scored automatically using the *if* formula. In all the questionnaires and tests, the scores were hidden from the students using the “hide” function

and the sheet was protected. The protection of the sheet limited the students access to the excel sheet to the colored cells only. They could not do anything including editing and formatting the cells. The excel sheets contained the original instructions of the questionnaires and tests including the measure for motivation, the critical thinking test, and the TOEFL test. The only measure excluded from the excel quick scoring system is the LEAP-Q because it was carried out, by the original developers, using a Microsoft word sheet that can be easily transported to an excel sheet after following a few instructional steps included with the questionnaire.

Nowadays, most researchers carry out their research measures using google forms. However, for the modified concept of effort, the first part of the questionnaire, where there was an integration, is difficult and almost impossible to be assessed on google forms due to its complex nature on one hand. On the other hand, carrying out the questionnaire on paper requires the separation of the integrated parts. The separation means that we have to present 28 items for the first part instead of 14 (14 items for representing frequency and 14 items for representing the time span). The integration is an easier method for students as it gives the feeling of answering one item when in fact the participant is providing two. In other words, the items in the first part of the questionnaire require two answers each of which is considered as an item in its own rights.

The participants of the study completed the questionnaires online. However, the tests were completed at the university in two different sessions in one day. Both tests are multiple choice questions. The university provided the facility needed to complete the tests because both tests were computerized. Once all tests and surveys were completed, data was imported to SPSS. A multiple linear regression test was conducted to investigate how the independent variables of this research can predict proficiency. In other words, proficiency is the dependent variable, whereas effort, critical thinking, the LEAP-Q, and motivation are independent variables. The regression test also shows Pearson's product coefficients between variables needed for confirming or rejecting the hypotheses of this study.

Regarding the new effort questionnaire, Cronbach's Alpha test was conducted on the 100 students' sample to check its reliability. The effort subscale consisting of 51 items was found to be highly reliable ($\alpha = .908$). The effort questionnaire has also been piloted before

conducting the study on 17 students from the University of Pannonia. The results of the piloted group are close to the results of the sample from the university in Jordan. The 100 sample students' mean score was 3.59 whereas Pannonia's students' mean score was 3.90. The indications of the results led us to conclude that the questionnaire is accurate and reliable in measuring effort.

Moreover, the reason for not conducting a factor analysis is attributed to the sample size. According to Tabachnick and Fidell (2001) it takes 300 subjects, but it can be done with fewer if the correlations between variables are strong. Cronbach's alpha, on the other hand, requires a minimum sample size of 100 students (Bujang, Omar, & Baharum, 2018).

4.5. Research Design

This study is a correlational explanatory cross-sectional study aimed at discovering how the variables in this research correlate to one another on the one hand (i.e., the *how* is associated with the correlational part of the research design) and explaining why some students are more successful than others in the context of language learning on the other hand. We presented a summary of the study variables that have the most influential effect on second language learning (i.e., the *why* and *what* are associated with the explanatory part of the research design). We used regression analysis to determine *how* variables interact with one another and *what* variables are influential. To explain *why* some students are more successful than others, we used an independent sample t-test.

Moreover, in terms of qualitative and quantitative research methods, most studies and research fall somewhere between the two ends of the continuum with varying degrees (Perry Jr, 2011). This study is situated between the two ends of the continuum, with qualitative input data gathered from tests and questionnaires on the one hand and quantitative output statistical analysis to interpret the results and make sense of the input data on the other. To be accurate, this study is closer to a quantitative method than a qualitative method because the interpretation of the data depends entirely on the statistical analysis. This conclusion regarding which methods the study follows is based on the degree of subjectivity. In other words, the quantitative statistical analysis reduces the chances for subjectivity compared to qualitative research, which seems to have varying degrees of high subjectivity. Nonetheless, the qualitative part of this study also had its share of subjectivity

while choosing which measurement tools (concerning the other related constructs in this study including critical thinking, multilingualism, motivation, and proficiency) are suitable for this research. It even had its share of subjectivity when the new measurement tool for the new concept of effort was being developed based on subjective answers provided by the students.

4.6. Research questions

In this section, we present the research questions related to our research objectives concerning the effort expenditure in the context of second and foreign language learning.

1- What is the level of effort that students expend in the context of second language learning?
2- What is the relationship between effort and the other related concepts in this research including proficiency, multilingualism, motivation, and critical thinking? Does effort exhibit a strong, a moderate, or a weak correlation to proficiency compared to the other related variables in the study?
3- How do restorative acts relate to mental acts and to handling the stressors affecting the willingness to make an effort?
4- What is the difference between males and females in terms of effort expenditure and motivational orientations?

4.7. Hypotheses

In this section, we present our assumptions related to the research questions that must be either confirmed or refuted based on the statistical data and the statistical analysis we conducted to answer the research questions and address the hypotheses.

Hypothesis 1: We hypothesize that students will exhibit variable levels of effort expenditure that range from low to high getting to a mean score that represents a moderate effort exertion level.

Hypothesis 2:

a- We hypothesize that effort will positively and significantly correlate to proficiency.

b- We hypothesize that effort will positively and significantly correlate to the multilingual level.
c- We hypothesize that effort will positively and significantly correlate to motivation.
d- We hypothesize that effort will positively and significantly correlate to critical thinking.
e- We hypothesize that effort will have the strongest correlation to proficiency.

Hypothesis 3:

a- We hypothesize that energy restorative acts will positively and significantly correlate to mental consumptive acts.
b- We hypothesize that energy restorative acts will positively and significantly correlate to handling stressors.

Hypothesis 4: we hypothesize that female participants will exhibit more effort expenditure than male participants.

5. Results

Multiple linear regression tests on SPSS are commonly used in order to investigate the correlations. The test also goes one step further from a simple correlation analysis to demonstrate how a certain value can be predicted based on another value(s). The multiple linear regression shows how much a one-unit increase in a certain value of the related variables (i.e., effort, multilingual level, motivations, and critical thinking) predicts another (in this case, the value being predicted is proficiency).

Table 2.1 below shows the descriptive statistics for all the variables in the study excluding gender and age followed by table 2.2 that shows the mean score of consumptive acts, restorative acts, and managing stressors. For instance, if we take the first measure (i.e., effort) in table 2.1, we find that the mean score is 3.59 out of 5.5. The range between the lowest and the highest score is 3.32 with a minimum of 1.94 and a maximum of 5.26. Table 2.2 shows that the mean score of consumptive acts is 2.70 out of 5. The mean score of restorative acts is 4.41 out of 6. Finally, the mean score of managing stressors is 3.66 out of 6.

Table 2.1 Descriptive interpretation of the research variables

	Mean / max	Standard dev.	range	minimum	maximum
Effort	3.59 / 5.5	.55	3.32	1.94	5.26
The multilingual level	5.62 / 10	.78	3.58	3.88	7.47
Critical thinking score	9.72 / 18	2.82	13	4	17
Motivation score	4.39 / 6	.63	3.15	2.64	5.79
TOEFL test score	12.38 / 19	2.55	12	7	19

Table 2.2 Descriptive statistics of parts 1, 2, and 3 of FLLEB

	Mean / Max	Standard deviation
Consumptive acts	2.70 / 5	.57
Restorative acts	4.41 / 6	.85
Stressors	3.66 / 6	.74

We can conclude from the mean score of effort that the students' level of effort expenditure in the context of language learning is moderate. Table 2.1 and 2.2 relate to research question 1.

Table 2.3 below shows a cross-sectional item scale frequencies of part 1 of the new effort questionnaire in percentages (FQ is the Frequency of the act). The pattern presented in the table shows that the students' answers are mostly below average. For instance, if we look at the first item, we find that "once" (given a score of 1) has been the answer of 12 students. The same goes for "twice" (given a score of 2) as it has been the answer of 34 students. The number of answers to a question always add up to 100 (the number of participants).

Table 2.3. Scale frequencies of FLLEB part 1 in percentages

Cross-sectional item scale frequencies for the frequency of the act					
	Scale frequencies in percentage				
	Once	Twice	3 times	4 times	More than 4 times
FQ Item 1	12	34	30	17	7
FQ Item 2	29	29	20	13	9
FQ Item 3	11	13	13	10	53
FQ Item 4	35	22	21	13	9
FQ Item 5	15	35	14	9	27
FQ Item 6	22	24	18	10	26
FQ Item 7	39	23	15	6	17
FQ Item 8	33	27	15	4	21
FQ Item 9	23	27	36	7	7
FQ Item 10	29	36	19	6	10
FQ Item 11	26	45	12	4	12
FQ Item 12	23	32	28	6	10
FQ Item 13	24	37	16	10	12
FQ Item 14	53	20	13	5	8
Average	26.71429	28.85714	19.28571	8.571429	16.28571

Table 2.4 below shows a cross-sectional item scale frequencies of part 2 of the new effort questionnaire in percentages (TS is the Time Span or length of the act). The pattern presented in the table shows that the students' answers are mostly average and below average. For instance, if we look at the first item, we find that "very short" (given a score of 1) has been the answer of 4 students. The same goes for "short" (given a score of 2) as it has been the answer of 15 students. The number of answers to a particular question always add up to 100 (the number of participants).

Table 2.4. Scale frequencies of FLLEB part 2 in percentages

Cross-sectional item scale frequencies for the time span					
	Scale frequencies in percentage				
	very short	short	moderate amount of	long	very long
TS item 1	4	15	42	27	12
TS item 2	16	22	34	13	15
TS item 3	2	11	19	32	36
TS item 4	16	33	39	10	2
TS item 5	11	10	31	25	23
TS item 6	3	16	25	32	24
TS item 7	21	21	39	16	2
TS item 8	29	28	26	11	6
TS item 9	21	37	30	5	7
TS item 10	8	45	26	15	6
TS item 11	29	28	17	18	8
TS item 12	37	24	17	13	9
TS item 13	25	15	30	14	16
TS item 14	30	17	24	22	6
Average	18	23	28.5	18.07143	12.28571

Table 2.5 below shows a cross-sectional item scale frequencies of part 3 of the new effort questionnaire in percentages (RA is Restorative Acts). The pattern presented in the table shows that the students' answers are mostly above average. For instance, if we look at the first item, we find that "strongly disagree" (given a score of 1) has been the answer of 3 students. The same goes for "disagree" (given a score of 2) as it has been the answer of 6 students. The number of answers to a particular question always add up to 100 (the number of participants).

Table 2.5. Scale frequencies of FLLEB part 3 in percentages

Cross-sectional item scale frequencies for restorative acts						
	Scale frequencies in percentage					
	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
RA1	3	6	7	29	29	26
RA2	5	3	4	19	49	20
RA3	10	22	20	16	23	9
RA4	1	6	12	18	47	16
RA5	1	2	2	27	37	31
Average	4	7.8	9	21.8	37	20.4

Table 2.6 below shows a cross-sectional item scale frequencies of part 4 of the new effort questionnaire in percentages (MS is Managing Stressors to show commitment). The pattern presented in the table shows that the students' answers are mostly around average and above average. For instance, if we look at the first item, we find that "strongly disagree" (given a score of 1) has been the answer of 3 students. The same goes for "disagree" (given a score of 2) as it has been the answer of 6 students. The number of answers to a particular question always add up to 100 (the number of participants).

Table 2.6. Scale frequencies of FLLEB part 4 in percentages

Cross-sectional item scale frequencies for managing stressors						
	Scale frequencies in percentage					
	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
MS1	9	18	17	27	26	3
MS2	9	23	13	22	30	3
MS3	11	22	19	23	23	2
MS4	1	11	9	25	35	19
MS5	3	8	8	55	21	5
MS6	16	15	11	29	21	8
MS7	5	27	14	25	26	3
MS8	15	22	9	31	17	6
MS9	4	10	19	36	30	1
MS10	3	11	13	37	28	8
MS11	2	20	9	37	28	4
MS12	0	16	8	26	43	7
MS13	3	12	21	26	28	10
MS14	17	8	9	33	29	4
MS15	1	3	7	51	27	11

MS16	9	21	19	30	17	4
MS17	5	18	24	27	23	3
MS18	21	41	19	17	2	0
Average	7.444444444	17	13.77777778	30.9444444	25.22	5.611111111

A multiple linear regression test was conducted to predict proficiency based on effort, motivation, critical thinking, and the LEAP-Q (multilingual level). A significant regression equation was found (F (4, 95) = 48.962, p<.05), with an R^2 of .673. Participants' predicted proficiency is equal to .298+ 2.911 score when effort was measured. Participants' predicted proficiency is equal to .298+-.226 score when motivation was measured. Participants' predicted proficiency is equal to .298+ .238 score when critical thinking was measured. Participants' predicted proficiency is equal to .298+ .054 score when the LEAP-Q (multilingual level) was measured. Participants' proficiency increased 2.911 for each score of effort. Participants' proficiency increased -.226 for each score of motivation. Participants' proficiency increased .238 for each score of critical thinking. And finally, Participants' proficiency increased .054 for each score of the LEAP-Q (multilingual level). Figure 2.1 below shows the best fit of the model regarding the relationship between proficiency and effort.

Figure 2.1. Effort to proficiency line fit plot

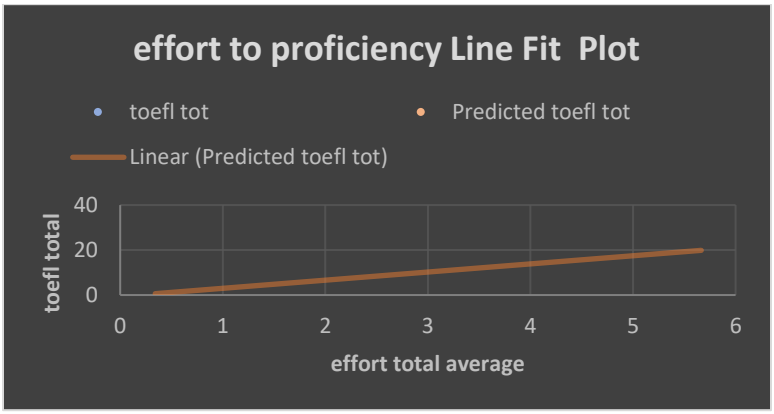


Figure 2.2 below shows the best fit of the model regarding the relationship between proficiency and motivation.

Figure 2.2. Motivation to proficiency line fit plot

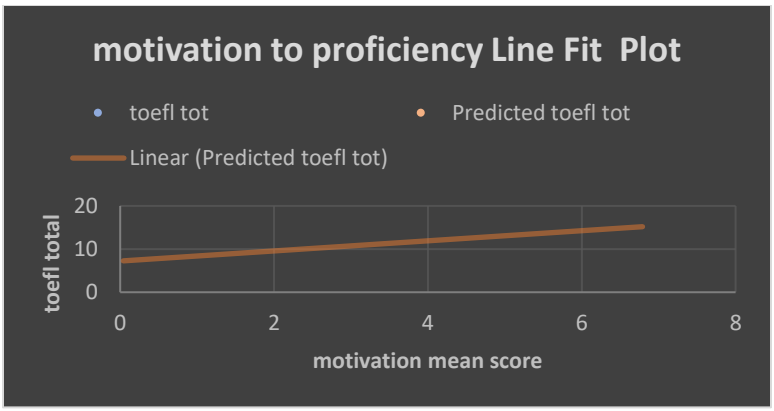
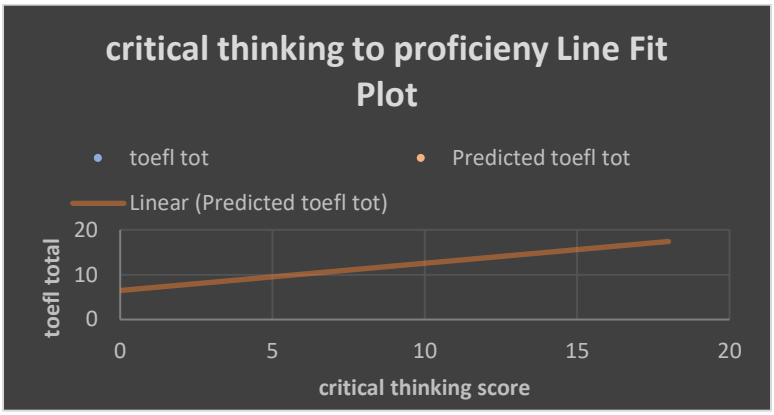


Figure 2.3 below shows the best fit of the model regarding the relationship between proficiency and critical thinking.

Figure 2.3. Critical thinking to proficiency line fit plot



Finally, figure 2.4 below shows the best fit of the model regarding the relationship between proficiency and the multilingual level measured by the LEAP-Q.

Figure 2.4 The multilingual level to proficiency line fit plot

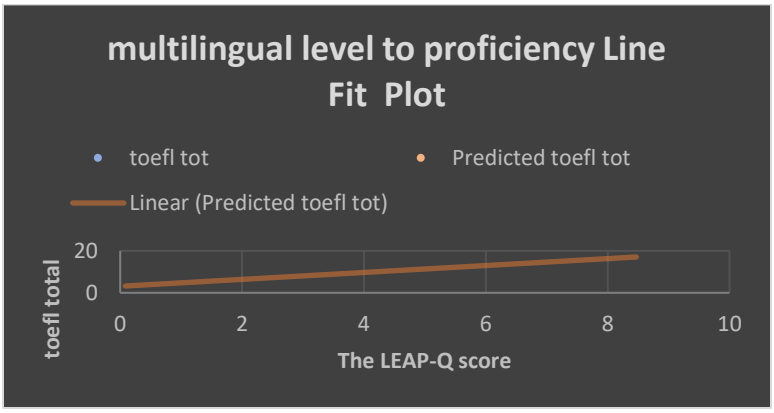


Table 2.7 below shows the correlations between effort and the related concepts in the study. The strength of the correlation is determined by its closeness to 1, meaning that the highest correlation is between effort and TOEFL (.793), followed by the correlation between effort and critical thinking (.649), etc.

Table 2.7. Multiple correlations between effort and the related concepts of the study

	TOEFL score	LEAP-Q	motivation	Critical thinking
Effort	.793	.556	.430	.649

There was a positive correlation between effort and the TOEFL score, $r = .793$, n = 100, $p < .05$. There was a positive correlation between effort and the LEAP-Q, $r = .556$, n = 100, $p < .05$. There was a positive correlation between effort and motivation, $r = .430$, n = 100, $p < .05$. There was a positive correlation between effort and critical thinking, $r = .649$, n = 100, $p < .05$. Table 2.8 below shows the correlation between the TOEFL test scores and the other related concepts in the study.

Table 2.8. Multiple correlations between proficiency and the related concepts of the study

	Effort	LEAP-Q	Motivation	Critical thinking
TOEFL score	.793	.510	.294	.671

There was a positive correlation between the TOEFL score and the LEAP-Q, $r = .510$, n = 100, $p < .05$. There was a positive correlation found between the TOEFL score and motivation, $r = .294$, n = 100, $p < .05$. There was a positive correlation between the TOEFL score and critical thinking, $r = .671$, n = 100, $p < .05$. We have also tested the correlation between effort and the four parts of motivation (i.e., instrumentality, integrativeness, cultural interest, and attitude) separately as shown in table 2.9 below.

Table 2.9. Multiple correlations between effort and subtypes of motivation

	Instrumentality	Attitude	integrativeness	Cultural interest
Effort	.362	.397	.220	.341

There was a positive correlation between effort and instrumentality, $r = .362$, n = 100, $p < .05$. There was a positive correlation between effort and attitude, $r = .397$, n = 100, $p < .05$. There was a positive correlation between effort and integrativeness, $r = .220$, n = 100, $p < .05$. There was a positive correlation between effort and cultural interest, $r = .341$, n = 100, $p < .05$. Figures 1.6, 1.7, 1.8, 1.9, tables 2.7, 2.8, and 2.9 relate to research question 2.

Table 3.1 below shows the relationship of energy restorative acts to consumptive acts and dealing with stressors.

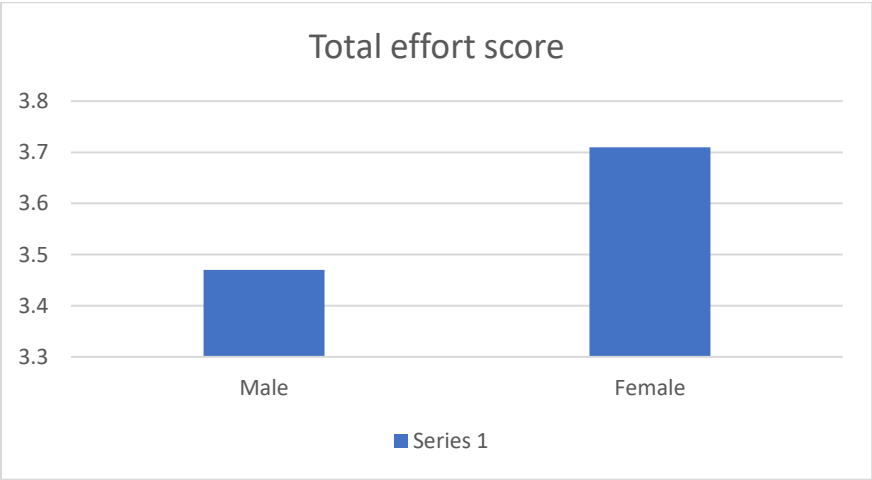
Table 3.1. The relationship of restorative acts to consumptive acts and dealing with stressors

	Consumptive acts	**Stressors**
Energy restorative acts	.408	.322

There was a positive correlation between energy restorative acts and mental acts, $r = .408$, n = 100, $p < .05$. There was a positive correlation between energy restorative acts and handling stressors, $r = .322$, n = 100, $p < .05$. Table 3.1 relate to research question 3.

Chart 1.1 below shows the difference between males and females regarding effort expenditure in the context of language learning. Males' effort score (3.47) is less than females' effort score (3.71).

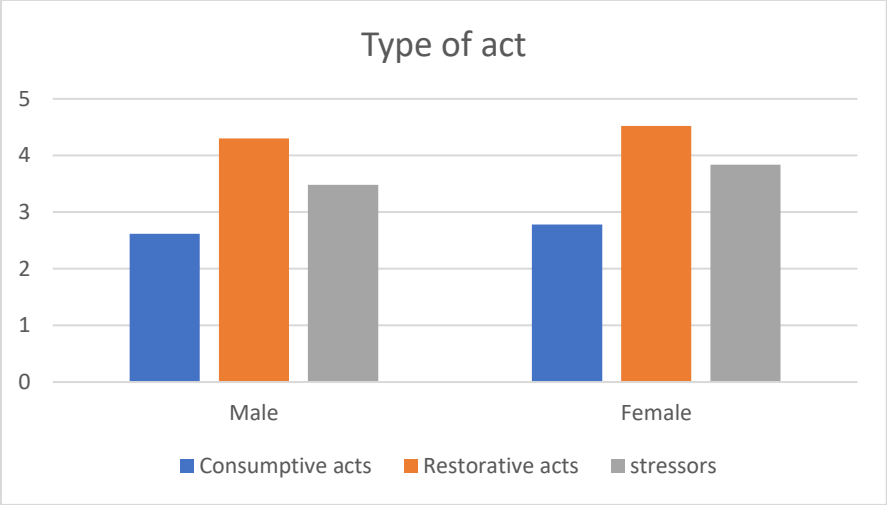
Chart 1.1 Effort expenditure in males and females



An independent-samples t-test was conducted to compare effort expenditure in males and females. There was a significant difference in the scores of effort expenditure in females (M=3.71, SD=.50) and males (M=3.47, SD=.58); t (98) = -2.236, $p < .05$. Furthermore, males were compared to females in the three parts of the effort questionnaire separately. The above chart shows the total score of effort expenditure.

Chart 1.2 below shows the difference between males and females in consumptive acts, energy restorative acts, and stressors (i.e., handling stressors) separately. Females had a higher score than males in all three parts.

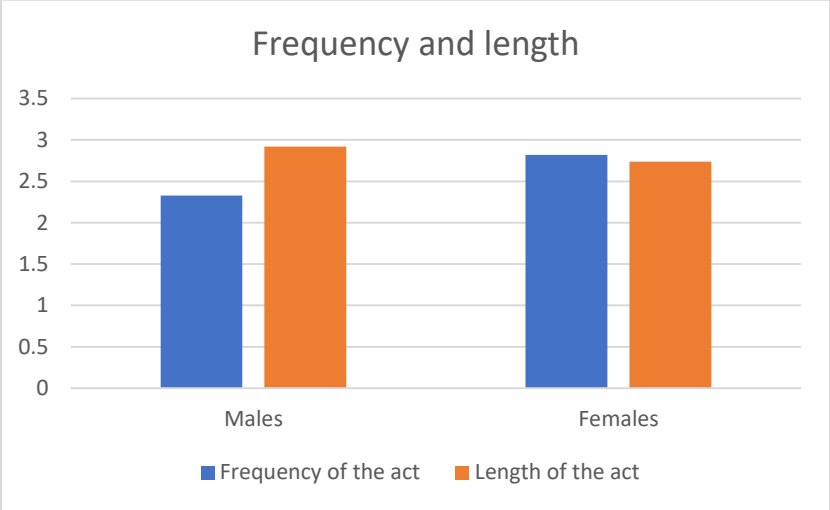
Chart 1.2 Mental acts, restorative acts, and managing stressors in males and females



There was no significant difference in the score of mental acts in females (M=2.78, SD=.50) and males (M=2.62, SD=.63); t (98) = -1.371, $p = .174$. There was no significant difference in the score of restorative acts in females (M=4.52, SD=.81) and males (M=4.30, SD=.88); t (98) = -1.273, $p = .206$. There was a significant difference in the score of stressors in females (M=3.84, SD=.71) and males (M=3.48, SD=.74); t (98) = -2.488, $p < .05$.

Even further, males were compared to females in the two subparts of the first part of the questionnaire in chart 1.3. The two subparts are mainly about the frequency and the time span (i.e., length) of the act. The results show that females had a higher score than males in the frequency of the act, and a lower score than males in the length of the act.

Chart 1.3 The frequency and the length of the act in males and females



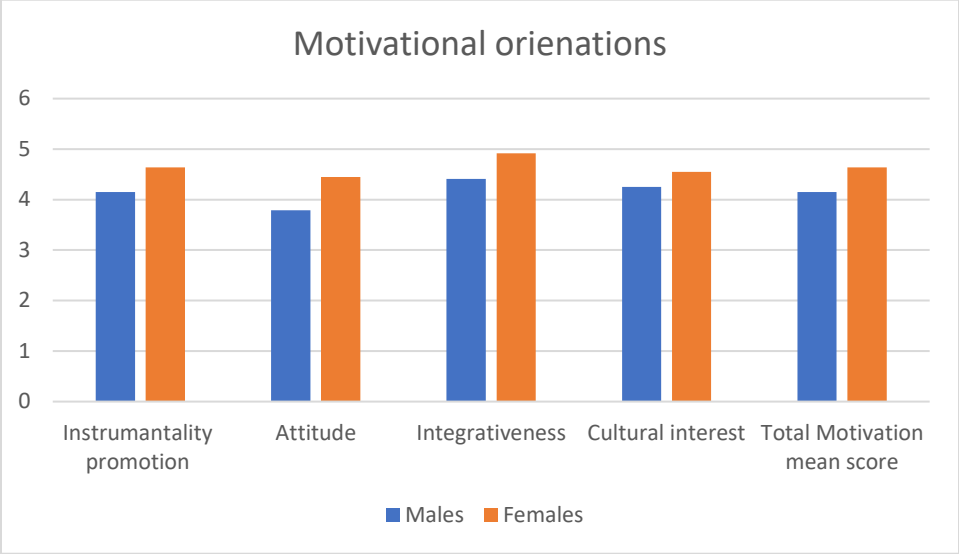
There was a significant difference in the score of the frequency of the act in females (M=2.82, SD=.75) and males (M=2.33, SD=.75); t (98) = -3.257, $p < .05$. There was no significant difference in the score of the length of the act in females (M=2.74, SD=.57) and males (M=2.92, SD=.73); t (98) = 1.329, $p = .187$. The results are shown in table 3.2 below.

Table 3.2. Independent sample T-Test results of effort expenditure in males and females

Group Statistics						
	Gender	N	Mean	SD	t	p
Effort-FQ	Male	50	2.33	0.75	-3.257	0.002*
	Female	50	2.82	0.75		
Effort-TS (length)	Male	50	2.92	0.73	1.329	0.187
	Female	50	2.74	0.57		
Effort-RA	Male	50	4.3	0.88	-1.273	0.206
	Female	50	4.52	0.81		
Effort-MS	Male	50	3.48	0.74	-2.488	0.015*
	Female	50	3.84	0.71		
Total average	Male	50	3.47	0.58	-2.236	0.028*
	Female	50	3.71	0.5		

Chart 1.4 below shows the difference between males and females concerning their motivational orientations included in the study.

Chart 1.4 Motivational orientations in males and females



There was a significant difference in the score of instrumentality -promotion- in females (M=4.64, SD=.84) and males (M=4.15, SD=.94); t (98) = -2.731, p < .05. There was a significant difference in the score of Attitude in females (M=4.45, SD=.81) and males (M=3.79, SD=.71); t (98) = -4.266, p < .05. There was a significant difference in the score of integrativeness in females (M=4.92, SD=.76) and males (M=4.41, SD=.71); t (98) = -3.466, p < .05. There was no significant difference in the score of cultural interest in females (M=4.55, SD=.79) and males (M=4.25, SD=.73); t (98) = -1.957, p = .053. There was a significant difference in the total score of motivation in females (M=4.64, SD=.58) and males (M=4.15, SD=.60); t (98) = -4.121, p < .05. The results are shown in table 3.3 below. Charts 1.1, 1.2, 1.3, 1.4, and tables 3.2, 3.3 relate to research question 4.

Table 3.3. Independent sample T-Test results of motivation in males and females

Group Statistics						
	Gender	N	Mean	SD	t	p
Instrumentality Promotion	Male	50	4.15	0.94	-2.731	0.007*
	Female	50	4.64	0.84		
Attitude	Male	50	3.79	0.71	-4.266	0.000*
	Female	50	4.45	0.81		
Integrativeness	Male	50	4.41	0.71	-3.466	0.001*
	Female	50	4.92	0.76		
Cultural interest	Male	50	4.25	0.73	-1.957	0.053
	Female	50	4.55	0.79		
Total average	Male	50	4.15	0.6	-4.121	0.000*
	Female	50	4.64	0.58		

6. Discussion

As previously stated, the current study aimed to (1) investigate effort in the context of language learning, (2) investigate the relationship between effort and other related concepts of cognitive, social, and non-linguistic nature, (3) investigate the role of energy restorative acts, and (4) investigate the differences in effort expenditure and motivation between males and females. According to the findings of the study, effort expenditure is a significant contributor to success in the context of language learning.

6.1. Research question 1

Our first question was the following: "What is the level of effort that students expend in the context of second language learning?". The mean score of the FLLEB questionnaire in table 2.1 indicates that the levels of effort expenditure amongst the undergraduate students are moderate. Other variables in table 2.1 also show moderate scores in the other related aspects such as proficiency (measured by the TOEFL test), the multilingual level (measured by the LEAP-Q), and critical thinking. The mean motivation score, on the other hand, indicates that students are highly motivated. In reference to consumptive acts (the first part of the questionnaire), students seem to have the lowest score as shown in table 2.2. In reference to restorative acts (the second part of the questionnaire), students have the highest scores. In reference to stressors (the third part of the questionnaire), students have exhibited a moderate level of handling stressors in effort expenditure. The domination of the restorative acts over the other two parts of the questionnaire shows how important these acts are for students. The results justify our inclusion of energy restorative acts as part of the tools to measure the modified effort concept in its fresh perspective. Students perform restorative acts in order to gain the required energy that sustains their consumptive acts when needed to be performed.

In reference to consumptive acts, the low score indicates that the majority of the students probably performed these acts upon need. The mentioned need is probably passing an exam or a quiz, meeting an assignment's deadline, or having to present to the class. None of these needs are optional. They have been probably forced on students. The variation and variability amongst the students' levels of effort expenditure are attributable to their goals. Those who look for long-term accomplishments, such as reaching high levels of

proficiency, will probably exhibit more instances of effort exertion than those who look for short-term accomplishments such as passing an exam. However, we cannot assume that those needs have been forced on students because they haven't been asked about those needs. We do know that students are asked to fulfill those needs to pass the class. Teachers usually use exams, assignments, and other methods to evaluate the students' progress. The students' progress cannot be achieved without effort expenditure. As a result, we can conclude that the teachers' use of evaluative methods is justified and also evaluates the students' willingness to expend the necessary effort to develop the necessary L2 skills. The entire process involved in evaluating students explains the differences between them in terms of success in language learning. Effort expenditure is another variable that might explain why some students are more successful than others in the context of language learning.

In reference to stressors (i.e., how learners handle stressors), the mean score indicates a moderate perceived view for handling stressors. Students seem to adapt to the existence of daily stressors moderately. Overcoming stressors is very important because they exist in our everyday life. The students have shown willingness to expend effort despite the existence and occurrence of stressors. Stressors can be classified as chronic (i.e., Chronic stressors are cases of prolonged stress caused by persistent and extended events) or acute (i.e., a brief and sometimes a sudden event that causes stress) (Cohen, Janicki-Deverts, & Miller, 2007). However, we cannot include traumatic events in our discussion because we choose to discuss mild stressors as mentioned earlier. On one hand, traumatic events have much more severe consequences and are much more difficult to handle. On the other hand, traumatic events do not relate to the way in which students can handle stressors in the context of language learning. The kind of stressors discussed in this study is mostly chronic stressors and acute mild stressors such as falling and breaking an arm or a leg. The moderate score for handling stressors can be attributed to acute stressors. In other words, sudden stressors are more difficult to handle than extended stressors. If we were to investigate chronic stressors only, the students could have exhibited higher tolerance for stressors.

6.2. Research question 2

Our second question was the following: “What is the relationship between effort and the other related concepts in this research including proficiency, multilingualism, motivation, and critical thinking? Does effort exhibit a strong, a moderate, or a weak correlation to proficiency compared to the other related variables in the study?”. The linear regression test results shown in figures 2.1 to 2.4 along with the multiple correlations in tables 2.7 and 2.8 show that the highest association is between effort and proficiency compared to the other concepts of this study. The *R Square* of 0.67 means that the independent variables account for 67% of the population’s scores in the dependent variable. The linear regression result estimates that an increase of a one scale in effort positively affects proficiency to also increase by 2.911. The number that followed was .238 increase in proficiency for a one scale increase in the critical thinking score. Additionally, the correlation score between proficiency and effort is very high .793. When the association of effort to proficiency is compared to the highest association that follows, which is between proficiency and critical thinking .671. The difference between the two associations suggests that effort is an efficient and reliable predictor of the students’ success in the context of language learning. However, the difference of these scores regarding the prediction of proficiency based on a one unit increase in each variable cannot be taken into account due to the different scaling systems. The measurement of effort consisted of low scale that ranges between 1 and 6, whereas other constructs such as critical thinking, had a higher measure scale of 0 to 18 points. This means that the prediction of proficiency based on a one unit increase in an 18-point scale is bound to be less than the prediction of proficiency based on a one unit increase in a 6-point scale. However, critical thinking and effort are both considered strong indices of proficiency as shown in the finding of this study. To sum up, effort has the highest score in terms of correlation to proficiency suggesting a stronger association between proficiency and effort than other associations including the interrelationships amongst the constructs of proficiency, motivation, the multilingual level, and critical thinking. However, the premise of our accounts can be challenged by including other latent variables of a psychological nature such as personality traits to see which variables act as first-order, second-order, or even third-order latent variables. We are not suggesting that psychological variables such as personality traits can influence proficiency directly,

however, they may influence the exertion of effort -which in turn- may influence proficiency. Latent variables, from our point of view, serve as mediating factors that do not have a direct association to proficiency. Our view regarding latent variables can either be confirmed or rejected in future research.

Effort also correlates significantly to the other related concepts of the study. Table 2.3 shows that the next strong association following the association between effort and proficiency exists between effort and critical thinking with a correlation of .649. The results show a high association between effort and higher order skills (i.e., critical thinking) as representatives of cognitive abilities in this study. As mentioned in the literature review of critical thinking, the cognitive psychological approach emphasizes the actions and behaviors of critical thinkers. The followers of this approach tend to list the set of skills employed by critical thinkers (Lewis & Smith, 1993). Mental acts involved in language learning including basic cognitive acts such as memorizing seem to have a positive impact on cognition by aiding to promote the cognitive abilities of the individuals who expend effort. This could be true for making effort in general, and not only in the context of language learning. However, the extent to which effort in the context language learning impacts cognition is something left for future research. Moreover, we argue that many aspects of cognition are the result of the exertion of mental effort, thus variability in effort exertion should lead to variability in cognitive abilities. In other words, those who exhibit high levels of effort exertion should have high mental abilities. Furthermore, as discussed in the previous literature, perseverance is regarded as one of the most important characteristics that critical thinkers should exhibit in order to demonstrate effective critical thinking talents and capabilities. As mentioned in the literature review, according to Halpern (1998), persistence and effort are two of the most important dispositions that support critical thinking. The causal link between effort and critical thinking, in our opinion, is never mutual. Rather, it is a one-way direction: the more effort one expends, the better one's critical thinking gets. We suggest that individual differences can further be investigated by including effortful acts and the exertion of mental and physical effort to the list of individual differences.

Moreover, the association that follows the one between effort and critical thinking in terms of strength is the one between effort and the LEAP-Q. The LEAP-Q measures the multilingual level of the individuals based on their use of the languages they speak. The multilingual level of the individual in this study is included as a social construct that is based on language use in social settings. The correlation between effort and the LEAP-Q is .556 as shown in table 2.3. Our assumptions regarding effortful acts being implicitly and explicitly inclusive to social acts (as well as cognitive acts discussed in the previous paragraph) are significantly supported. The correlations are high enough to support the premises of our accounts. Parts of our questionnaire to measure the effort construct included items that provoke social acts (e.g., the frequency and length of practicing speaking, listening, and pronunciation). Despite the fact that most of the items are associated to cognitive acts, yet the inclusion of social acts -regardless of how little- still accounts for including the LEAP-Q as a variable in this study. The positive and significant correlation between effort and the LEAP-Q directs us to conclude that effort is a strong predictor of the individual's success to learn how to use the language in social settings.

Furthermore, effort correlates significantly to motivation (both effort and motivation being non-linguistics aspects of language learning). The results are consistent with previous research indicating that individuals are energized by autonomous motivation to initiate and sustain engagement with a task (Deci & Ryan, 2008). The correlation between effort and motivation is .430 as seen in table 2.3 The assumption that motivated individuals exert effort is supported by the correlation result despite the fact that compared to the other constructs, effort and motivation have the weakest correlation. In psychological terms, motivation is a desire that requires a fulfilment as discussed in the literature review. The desire mentioned in the literature refers to a goal. When the goal is reached, the individual gets a sense of achievement and satisfaction. The goal can only be reached through the exertion of hard work and effort. The association between motivation and effort is very important because one cannot reach out for the goal if motivation is absent, and in turn won't exert effort. Jensen (2013) argues that motivational effort-building strategies seem to increase both effort and energy by encouraging students to participate and engage actively in classroom activities, encouraging students to take risks, awakening the students' enthusiasm and curiosity to learn, and making the learning process relevant to the

understanding of the world around them as they experience new things on a regular basis. Our argument does not include motivational effort-building strategies. Jensen's argument, on the other hand, shows how closely the two constructs (i.e., effort and motivation) are related and further supports our argument about the relationship between effort and motivation. Even when one looks at the separate correlations between effort and the four orientations of motivation in table 2.9, one can see significant positive correlations that links effort to attitude, instrumentality, cultural interest, and integrativeness. The strongest association can be observed to be between effort and attitude. Even though attitude seems to be a mental state rather than an action, yet its relationship to effortful acts suggests that actions are often based on a mental state of positiveness that leads to readiness. Attitude seems to play one of the major roles in the context of language learning and possibly learning in general. Furthermore, the association between effort and instrumentality suggests that the learners' desire to fulfill their practical goals can successfully predict effort exertion. It seems instrumentality also plays an important role in the context of language learning. However, despite the assumptions that practical goals are often short-term goals such passing exams, yet the part of instrumentality taken from Dörnyei's (2009) questionnaire is entitled "instrumentality-promotion". This part of the questionnaire refers to long-term practical goals. Another part in Dörnyei's model is entitled "instrumentality-prevention" that refers to short-term practical goals. However, "instrumentality-prevention" was not included in our adopted format of Dörnyei's model due to reasons related to the measurements' length. We assume that instrumentality "Promotion" is a more successful predictor of perceived effort than "Prevention" because long term goals require constant hard work. In contrast, short-term goals often require effort exertion in a specific period of time that is often not frequent nor long enough for reaching the desired goal. Instrumentality "prevention" might not have a relationship with our modified concept of perceived effort. In light of the previous discussion, we recommend to not include that part of Dörnyei's questionnaire when investigating the relationship between motivation and effort. Moreover, the fact that cultural interest and integrativeness came third and fourth respectively in terms of the correlation strength suggests that maintaining one's identity seems more important to the learners than to be integrated with the second language culture. Learners know that familiarizing themselves to the culture of the target language

should aid them in learning the language. Learners do have a wholistic view of the culture of the target language, however, integrating oneself in another culture seems to threaten the identity of the learner. To conclude, Attitude and instrumentality (promotion) seem to have a great deal of influence on the learners' willingness to expend effort. Integrativeness is not a desirable outcome in the context of language learning, and cultural interest only manifests when learners need to promote their learning further than their current state or level of proficiency.

In reference to the association of proficiency to critical thinking, the multilingual level, and motivation; the results show varying correlations displayed in table 2.4. The correlation between proficiency and critical thinking is .671, which indicates a very high correlation. The correlation between proficiency and the multilingual level is .510, which shows a moderate correlation. The correlation between proficiency and motivation is .294, which shows the weakest correlation compared to the other constructs. Regarding proficiency and critical thinking, the previous literature suggests that critical thinking is a very important aspect of language learning. Educational psychologists like Huitt (1998), Thomas and Smoot (1994) argue that critical thinking is a crucial aspect of schooling. Huitt argue that standardized tests of basic skills are not the only criterion upon which students' performance should be measured for academic success or failure. He went on to say that the information age in which we live, demands thinking as a crucial part of success in real life. However, the effect of language learning on critical thinking has not been investigated thoroughly. The need to investigate the impact of language learning on thinking arises from the fact that the studies that investigated the relationship between critical thinking and language learning are mostly correlational studies. In correlational studies, the direction of causality is unknown. Accordingly, few studies have been conducted to investigate the significance of critical thinking in education in general and in language learning in specific and also to investigate how language learning relates to fostering thinking (see Nikoopour, *et al.,* 2011; Rezaei, *et al.,* 2011). The results of these studies suggest that critical thinking is indeed related significantly to language learning and schooling in general. Nikoopour, *et al.* (2011), for instance, found that critical thinking significantly relates to direct and indirect learning strategies such as cognitive, metacognitive, and social strategies. On one hand, Nikoopour argues for the teaching of critical thinking to foster language learning. On

the other hand, Rezaei, *et al.* (2011) argues that classroom techniques such as debates, problem-solving tasks, self and peer-assessment, and analysis tasks are likely to foster critical thinking skills in language classrooms.

In reference to the relationship between proficiency and the multilingual level of the students, it is a significant positive relationship. The multilingual measure is based on language use in social or classroom settings. This association between proficiency and multilingualism is an immediate consequence of language use. In other words, if you use the language more often, you will become more proficient in that language achieving higher proficiency scores. Accordingly, this consequence matches the one when the individual doesn't use the language for whatever reason. In other words, if the individual does not use the language, language attrition is more likely to occur and the loss of one's own linguistic competence begins to surface. Students in foreign settings are often encouraged to speak the second language outside the school environment. Hall and Verplaetse (2000) stated that language learning and language use are two distinct phenomena as cited in previous literature. The premise of Hall and Verplaetse's accounts is that building and sustaining classroom interactional practices will improve the language learning experience resulting in a greater acquired set of linguistic and non-linguistic (e.g., social or cognitive) skills. Despite the fact that language learning and language use are two different phenomena as stated earlier, yet they seem closely related to one another. The relationship between proficiency and the multilingual level of the participants is apparent in much the same way that language learning and language use are related. The relationship between proficiency and the multilingual level seems to go in one direction. Accordingly, we think it is safe to assume that language use is the influential variable, whereas proficiency is the affected variable. Furthermore, our view also matches Usage-Based Theory, one of the most current approaches to SLA and first articulated by Tomasello (2003), positing that linguistic structure and usage have a significant link (Von Mengden & Coussé, 2014). Linguistic information is expressed through context-sensitive mental processing and mental representations that are cognitively capable of accounting for the complexity of actual language use at all levels.

Regarding the relationship between proficiency and motivation, the relationship is positively significant yet weak compared to the previously discussed constructs. As stated in the literature review, what has been agreed upon regarding motivation is that it is the fulfillment of a desire. According to the results, the desire and its fulfillment do not match well probably as a result of having motivated and unmotivated individuals who do not exert effort accordingly. As a consequence, as far as this study is concerned, motivation is not as successful as effort in predicting students' success in the context of language learning. This consequence suggests that motivated individuals might not exert effort on one hand. On the other hand, it also suggests that unmotivated individuals might exert effort. It seems that motivation is not an exclusive condition for effort exertion in the context of language learning. Motivation and proficiency do not seem to go directly hand in hand either given that in most previous studies, little had been mentioned about the investigation of latent variables. As far as research is concerned, effort could act as a first-order latent variable that affects proficiency while keeping in mind that the correlation between proficiency and motivation is weaker than the correlation between effort and motivation. In other studies, motivation and second language learning did not correlate at all (Al-Tamimi & Shuib, 2009; Vaezi, 2008). The discrepancy in some instances when there was no correlation between motivation and second language learning can be attributed to the learning context. This debate is supported by the notion of the "best method" in which there isn't an actual best method that fits all learning contexts. What seems appropriate in one learning context might not demonstrate the same appropriateness in another learning context. In other words, context is what seems to determine which method is the best. Moreover, the learning context includes many factors including linguistic and non-linguistic ones such as cultural factors, social, political, economic, etc. These factors combined with other factors such as personality traits, learning styles, and the learning strategies employed by learners constitute a major latent variables reservoir. We should keep in mind that motivation is a much closer notion to cultural and social factors than other factors. This suggests the inclusion of motivation to political, economic, and educational orientations as a bigger part of the picture that constitutes motivation. Despite the fact that effort is a better predictor of proficiency in this study, motivation still stands as a notion in educational settings due to its relevance to the involvement of personal satisfaction with everyone in the classroom

including the teachers. For instance, it has been previously argued that effort is a prompt that arises from within the individual and that teachers cannot teach someone to make an effort. However, when it comes to motivation, teachers -especially motivated teachers- can use many motivational strategies to increase their students' motivational levels and orientations. When it comes to effort, teachers can raise interest in order to motivate the students to exert effort. Accordingly, this study concludes that effort is a first-order influential variable on proficiency, whereas motivation is a first-order influential variable on effort in the context of language learning.

We associate the previous discussion to Herdina and Jessner's (2002) and Dörnyei (2014) discussion of a holistic model that emphasizes the dynamics of multilingualism as prerequisites for holism. The discussion emphasizes understanding the language learning phenomena in terms of the relevant and dynamic linguistic, psychological, and social aspects. The association of the variables amongst and between the topics is an indication of the great variations that account for success or failure.

6.3. Research question 3

Our third question was the following: "How do restorative acts relate to mental acts and to handling the stressors affecting the willingness to make an effort?". The relationship of energy restorative acts to energy consumptive acts and handling stressors suggests that restorative acts contribute to learning. Table 3.1 shows how restorative acts relate to consumptive acts and handling stressors as an indication of their importance in maintaining energy. Sleeping, for instance, is required on a daily basis not only to sustain one's physical energy, yet also required to sustain one's mental capabilities. Research has shown that chronic sleep deprivation negatively affects the cognitive functions of the brain and impairs judgment (Alhola & Polo-Kantola, 2007). Such results suggest that energy restorative acts are as significant as consumptive acts in learning in general. The impairment of cognitive abilities can be attributed to energy loss. Losing energy means that the students won't be able to focus or concentrate on whatever tasks they are to fulfill, hence the justification for including energy restorative acts. However, Schumacher and Sipes (2015) in a study conducted to investigate the impact of sleep deprivation on cognition found that the results do not support their claims. Their experiment did not deprive the participants completely

of sleep. However, they did reduce the amount of time to less than 7 hours in various trials of different times to see if less sleeping time means less performance. The fact that less sleep did not affect the cognitive performance of the participants suggests that the ideal sleeping time of 7 to 8 hours is no longer supported. However, subjects need sleep on a regular basis for certain periods of time regardless of how long because it seems to vary considerably from one person to another suggesting that for some people; a few hours of sleep could be enough, while for some; long hours of sleep are required. Moreover, the stronger relationship between energy restorative acts and energy consumptive acts (i.e., the second part and the first part of the questionnaire respectively) suggests that the mental and physical consumptive acts can be sustained with the proper amount of energy. Regarding handling stressors, the moderate association between energy restorative acts and handling stressors (i.e., the second part and the third part of the questionnaire respectively) suggests that the proper amount of energy is also required to handle stressors. Our assumptions regarding energy restorative acts are significantly supported and their inclusion in the concept is statistically justified.

6.4. Research question 4

Our fourth and final research question was the following: "What is the difference between males and females in terms of effort expenditure and motivational orientations?". Males and females significantly differ from one another in terms of effort expenditure. The independent sample t-test results show a statistically significant difference between males and females in the total average of the construct (chart 1.1), a difference in each part of the questionnaire separately (chart 1.2), and a difference in one of the two subparts of the first part of the questionnaire (chart 1.3). It is often assumed that females are better language learners than males (Dionne, *et al.*, 2003). The perception regarding female success in language learning is further explained in terms of effort expenditure. It seems that females tend to exert more effort than males in the context of language learning despite the fact that the results show a moderate level of effort expenditure exhibited by both genders. As discussed earlier, motivation seems to be a successful predictor of effort for both genders as well. Effort exertion in females could be attributed to motivation. In order to support our claims, we found that females also surpass males in all four motivational orientations we

included in this paper. For instance, females had a score of 4.64 in instrumentality promotion, whereas males had a score of 4.15 as seen in chart 1.4. It seems that females had more interest in language learning than males considering that they are career-driven, they had a more positive attitude towards the L2, they engage themselves more often in social conversation with others, and they are more interested in the culture of the target language speakers. The results indicate that females have a higher level of perceptual realization regarding the "ought to L2 self" and the "ideal L2 self". The higher levels amongst the females suggests that they have higher expectations for future career and social advancement. we can see realistic desired students' future selves. The findings support Dornyei's (2005) theory of the Motivational-Self System. However, the fact that motivation had a stronger correlation to effort than to proficiency in this paper suggests that motivation is a mediating factor that does not influence proficiency directly. This conclusion could be considered as an explanation to the clash of results in some correlational research that links motivation to proficiency in previous readings (see Alamer & Almulhim, 2021).

7. Conclusion

In this chapter, we will provide a brief summary of the findings of our research. Second, we will present the implications of the findings of our research. Third, we will provide suggestions for future research based on the implications and the limitations of our research. Finally, we will discuss the limitations of the current work.

7.1. Summary of findings

To summarize the discussion's findings, we discovered that the level of effort exerted in language learning is moderate. The students scored poorly in energy-consumptive activities like studying, memorizing, and revising. They scored well in energy-restorative activities including resting and undertaking leisure activities. Finally, they scored moderately when it came to dealing with stressors like minor illness and anxiety.

The moderate level of effort exertion explains the moderate scores in all the other variables excluding motivation. The participants of the study showed a high-level score in motivation suggesting that the mental and cognitive states, in addition to the psychological preparedness, are perceived differently when left to self-evaluation. Effort exertion, on the other hand, can be investigated more accurately because participants are aware of what they have accomplished based on their actions.

In terms of associating effort to the other concepts included in this research, effort correlates significantly to proficiency, critical thinking, the multilingual level, and finally, motivation. Effort as a non-linguistic aspect of language learning relates strongly and significantly to proficiency as the scores in this study show suggesting that the concept is more relevant to the context of language learning and the measurement tool is reliable. Our accounts regarding effortful acts to implicitly and explicitly include cognitive and social acts are confirmed as we found that effort to positively and significantly correlate to critical thinking and the multilingual level of the students.

In reference to the role of energy restorative acts, it was found that the inclusion of these acts in this study is necessary given that they positively and significantly influence the individuals' ability to perform energy consumptive acts and handle stressors. However, the perceived view regarding performing energy restorative acts does not show a stable

frequency or a stable time span because individuals vary considerably in terms of how often and how long they need to perform these acts. Our inclusion of energy restorative acts is justified in terms of compensation. In other and simple words, energy loss caused by energy consumptive acts is compensated for by energy gain obtained from performing energy restorative acts.

In reference to the differences between males and females, it is established that females' level of effort exertion is higher than males. Females also exhibited higher scores in each part of the questionnaire. The new modified effort concept appears to explain individual differences and provide an answer to the question of why some students show better success rates more than others. The justification for using another variable that explains individual differences arises from the variation regarding the role of individual differences demonstrated by previous research concerning many topics including motivation, strategies, aptitude, anxiety, beliefs, etc. (Fillmore, 1979). Fillmore (1979) concluded his discussion with the idea that some differences between learners do not even relate to the cognitive aspects of learning. Some learners' success was explained by their intellectual and cognitive capacity, while other learners' success was explained by their social preferences. Fillmore's (1979) discussion of individual variations includes both cognition and socialization, which further validates the inclusion of the effort notion, which is somewhat wholesome in its approach to understanding differences amongst learners because it encompasses both cognitive and social activities.

To conclude, we present effort in this paper as an accepted measure for detecting individual differences in language learning due to its positive and significant correlation to proficiency. As a result, the effort concept does not require any major refinements. Additionally, we also present effort as an accepted measure for detecting individual differences in a more general sense due to its positive and significant correlations to the following aspects: 1- critical thinking representing the cognitive aspect of the study, 2- the multilingual level of the learners as the social aspect of the study, and 3- motivation as the additional non-linguistic aspect of the study. As a result, the effort concept does not require any minor refinements.

7.2. Implications

The most obvious implications of this study concern the pedagogical, cognitive, social, and non-linguistic aspects related to effort exertion. Effort exertion does not only improve one's language skills (at least the receptive skills included in this study) but also improves their cognitive abilities including analyzing information, deductive and inductive abilities, etc. Additionally, effort exertion seems to relate to social skills given that language use in social contexts is part of the individuals' attempt to overcome the conversational linguistic challenges imposed by native speakers or other non-native speakers in social settings. This attempt to overcome the challenges ends up with the individual improving his linguistic, cognitive, and social skills.

However, when it comes to motivation, it seems that motivated students are the ones who exert effort. In other words, motivation seems to improve effort exertion. It has been implied previously that two non-linguistic aspects of language learning cannot both relate strongly and directly to success in the context of language learning in each and every study since one of them has an influence on the other. And even though our work is a correlational study that does not show the direction of causality, yet we believe it is safe to assume that it is motivation that influences effort exertion and not the other way around. The implication inferred when we understand that one of them influences the other is that one of them is a mediating factor that does not influence success directly in the context of language learning. In other words, we conclude that motivation directly influences effort exertion, whereas effort exertion directly influences success in language learning.

Another aspect that can be fairly noted is the influence of non-linguistic, cognitive, and social dimensions on proficiency. Non-linguistic constructs such as motivation and effort reveal that the individuals' success in language learning is related to their internal or external motives and how much work they are willing to invest in order to achieve what the internal or external motive has set to achieve. Cognitive aspects such as critical thinking aid learners in the way they think and learn, which in turn, is reflected in deciding what is the best way for them to learn. Social encounters shape the individuals' understanding of the norms of societal engagements in terms of doing what is acceptable in accordance with context including what to say and how to say it.

Furthermore, motivation has been investigated in cross-sectional and longitudinal research designs implying that motivation can be examined as a fixed state or a dynamic process. Effort cannot be treated as a process because whatever changes the individual goes through should not -theoretically- have an impact on effort exertion. In other words, the learning process might develop to include harder tasks, the cognitive demands of learning might raise the need for better strategies, the social conduct might require improving social skills, and motivation might change over time. However, all these demands, needs, and changes should not influence effort exertion because it follows a fixed pattern regardless of the changes in other domains. The fixed pattern of effort is explained in terms of relativity. In other words, if we take a word such as "enough" (included in the questionnaire to measure effort) we notice that "enough" is a relative concept that varies from one person to another. If someone says that they exert enough effort, that means that whatever time they spend is relative. For instance, two hours of studying could be enough for someone, whereas, for another, three hours would be considered as enough. Another example is the word "slightly" (also included in the measurement tool of effort). A stressor such as the flu can also be considered variable in terms of severity. To some people, flu is a slight stressor that does not impact their willingness to perform whatever task is required from them. For other people, flu is a severe illness that prevents them from performing any task efficiently. Even within the same individual, flu can vary considerably given that in some instances, an individual catches mild flu, whereas, in other instances, the same individual catches severe flu. Thus, words like "enough" and "slightly" are left for the participants of the study to be subjectively determined because such words imply variability in their own rights. In other words, the individual himself/herself decides what is enough and what is slight regardless of the implied variability exhibited by each individual. However, it should be mentioned that higher levels of effort exertion might lead to the desired results earlier. In other words, the higher the level of effort exertion, the better achievements one can accomplish and the more goals one can fulfill.

7.3. Future directions

The fact that effort cannot be treated as a process does not prevent us from conducting new longitudinal research on effort. The main issue would be *how* and *what* motivational

techniques are required to raise interest regarding the topics in the language learning context in order to get the learners to exert more effort. We conclude that the only case in which effort can be seen as a dynamic changeable concept is when teachers do their share of effort to motivate their learners. This means that researchers can conduct future studies to match the teachers' level of effort to learners' level of effort.

The previous paragraph implies introducing new product research that can be done to examine the teachers' efforts to facilitate learning. This can be accomplished both qualitatively and quantitatively by doing interviews for an inductive conclusion or having surveys analyzed for a deductive conclusion. This can also be done by having longitudinal and cross-sectional research designs to test the teachers' changeable nature due to the changeable tasks required from them. The changeable tasks of the teachers differ from the learners' tasks because the teachers' role is to guide, whereas the learners' role is to learn. Guiding includes overcoming many problematic aspects inside and outside the classroom such as dealing with individual differences in the classroom, proper presentation of the material in the classroom, and handling the job demands. In this sense, the ability or inability to adapt to the various changes and challenges inside and outside the classroom makes teachers either better or worse at planning a class in which teachers' efforts can be regarded as a dynamic changeable process that can either be promoted or demoted according to the changeable tasks required from them every once in a while and according to the teaching materials that require different teaching strategies in which the teacher is struggling with one or more of these strategies.

Another research that can be conducted concerns the difference between male and female teachers in terms of effort exertion to promote learning or enhance the learning experience followed by a comparison between their students' proficiency. If male teachers differed from female teachers in terms of effort exertion, it would be plausible to hypothesize that their students' success in language learning would vary accordingly. If this is indeed the case, effort would prove to be a much more reliable measure and much more related to language learning than motivation.

Furthermore, the premise of our accounts can further be challenged by conducting research in which there is no variability within certain notions such as "enough" and

"slight". A researcher might conduct a study that presents a fixated time span of effortful acts to investigate individual differences and compare the results against a variable time span such as ours. If the fixated time span proves to provide more reliable and more valid results, the premise of our accounts can be dismissed. The same can be said about "slight" stressors but with a different method that includes an objective view such as doing clinical tests to check the severity of the illness for someone who caught the flu for instance.

Moreover, the effect of certain variables on effort can also be investigated in future research. These variables include psychological ones such as personality traits and sociological factors such as social status. The variability exhibited by individuals is attributed to many influential factors each of which shapes the individual in a unique case by itself. Effort exertion is a variable that can be influential, yet it can also be affected. Effort can be considered as a dependent variable in future studies as opposed to this study. In this paper, effort has been viewed as an independent variable that holds an effect on proficiency. Future studies might view the concept as a variable affected by other psychological and social variables.

Effort can also be investigated as a dependent variable in relation to different motivational models including the full questionnaires of Dörnyei's models to investigate the influence of the different motivational orientations on the willingness to expend effort. Gardner's socio-educational model (2004) and self-determination theory of the cognitive situated period as proposed by Ryan and Deci (2000) can also be investigated in relation to effort exertion. The inclusion of different theories of motivation should bring insights as to whether effort, as a new concept, holds strong relationships with these different theoretical frameworks. The advantage of such research relates to the validation of the construct as a new one in the field of language learning and language teaching. Future research should focus extensively on validating the new measure of effort as an influential and impressionable variable.

Finally, researchers can also conduct studies to determine the extent to which effort relates to other fields including scientific and social sciences fields. In other words, the effort construct can also be applied to investigate learning in the general sense. Moreover, effort also relates to how much work one is willing to invest to be promoted in his/her own

career suggesting that the concept can also be used in work environments to assess the employers' worth to the institution. However, measuring employers' efforts should be done objectively based on the product they deliver in terms of the quality and the quantity of the product in closed or supervised open sessions where the employers are submitted under various trials or degrees of job demands and pressure to see if they can deliver the required product properly.

7.4. Limitations of the study

The empirical findings presented here should be viewed in the context of some limitations concerning the sample size, previous studies, access, and time.

Regarding the sample size, our 100 participants represent a sufficient sample. However, a larger sample size provides researchers with better results in terms of accuracy especially in defining relationships between and amongst variables. In other words, the larger the sample size, the more accurate results one can report. Furthermore, given that we carried out this research using a quantitative method of data interpretation, the sample size is dependent on the type of problem we have chosen. In other words, the importance of larger samples is greater in quantitative research than in qualitative studies. Moreover, the sample size prevented us from conducting a factor analysis as mentioned in chapter 4 due to the larger numbers required to conduct the analysis (around 300 participants required).

Concerning the limitations of previous studies, the literature review for a thesis or a study is built on citing and referencing earlier research studies, and these prior studies grant the theoretical underpinnings for the research subject one is studying. Prior research studies that are relevant to the thesis may be limited, depending on the extent of the study topic. Since our topic is somewhat novel, we encountered many instances in which finding a study that matches the scope of our review and discussion was very difficult. However, the lack of studies and previous research can be considered as an advantage by identifying new research gaps and pitfalls for future research to investigate thoroughly for the purpose of presenting the need for additional research in the field of study.

Concerning access, we have run into the problem of having limited access to our respondents given that this study was carried out during the Covid-19 pandemic. Because

of the restricted access, we needed to rethink how data should be collected especially when it came to administering the tests. Fortunately, the university agreed to provide us with the facilities and the people to administer the tests at the university during the pandemic with restricting students to wearing masks and maintaining social distancing. We were allowed to observe the administration of the tests online by sending the tests to the respondents at the time of their arrival to the test session.

In terms of time constraints, we chose to conduct a cross-sectional study because tracking student's development over a period of time is difficult due to the researcher's limited access during the Covid-19 pandemic. Both access and time constraints emerged mostly because of the pandemic. In order to meet the deadline, our research took a direction rather than the other. The limitations imposed on the research design because of the time and access restrictions could be pointed out in future studies as a gap that ought to be investigated in upcoming research and studies.

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Appendices

Appendix I. Part 1: Energy consumptive acts

1-		a week, I spend a		time studying.
2-		a week, I spend a		time working on my assignments and projects.
3-		a week, I spend a		time using the internet to help me in my studies, projects, and assignments.
4-		a week, I spend a		time practicing the pronunciation and use of newly acquired words (if there is any).
5-		a month, I spend a		time preparing for my upcoming exams.
6-		a month, I spend a		time revising the material and the courses that I have already taken.
7-		a month, I spend a		time practicing my listening skills (e.g. by watching movies or listening to music in English).
8-		a month, I spend a		time practicing my reading skills (e.g. by reading literary work or the newspaper in English).
9-		a month, I spend a		time practicing my writing skills (e.g. by writing mail or typing emails, or by writing assignments for extra credit in English).
10-		a month, I spend a		time practicing my speaking skills (e.g. by conversing with friends in real-everyday life or friends in the social media such as Faceboo
11-		a month, I practice pronouncing sentences like native speakers for a		time.
12-		a year, I read books, novels, or other works of literature in English for a		time (i.e. outside the school curricula and not related to the literature cours
13-		a year, I spend a		time planning, organizing, reorganizing, and/or redoing my schedule.
14-		a year, I initiate or particpate in a new project such as presentations or research papers and I spend a		time working on these projects.

Appendix II. Part 2: Energy restorative acts

Part 2		
1-	I have enough sleep on a daily basis to restore or regain my energy.	
2-	I take enough breaks whenever I feel tired from studying.	
3-	I follow a healthy diet.	
4-	I rest whenever I feel tired.	
5-	I do leisure activities (e.g. play sports or play video games) to relief myself from stress.	

Appendix III. Part3: The level of commitment based on managing stressors

Part 3		
1-	I pay attention to the lecturer even when I am slightly sick.	
2-	I pay attention to the lecturer even when I am slightly bored.	
3-	I pay attention to the lecturer even when I have a slight emotional anxiety.	
4-	I pay attention to the lecturer even when the weather is hot or cold.	
5-	I pay attention to the lecturer even when there is a slight noise (an apparent but not a distracting noise).	
6-	I study even when I am slightly sick.	
7-	I study even when I am slightly bored.	
8-	I study even when I have a slight emotional anxiety.	
9-	I study even when the weather is hot or cold.	
10-	I study even when there is a slight noise (an apparent but not a distracting noise).	
11-	I work on my assignments even when I am slightly sick.	
12-	I work on my assignments even when I am slightly bored.	
13-	I work on my assignments even when I have a slight emotional anxiety.	
14-	I work on my assignments even when the weather is hot or cold.	
15-	I work on my assignments even when there is a slight noise (an apparent but not a distracting noise).	
16-	I can study even in my less favorable time of the day.	
17-	I can do my assignments in my less favorable time of the day.	
18-	I can attend to more than one task at the same time.	

Appendix IV. A detailed description of adapted measures

	Original number of items	Adapted number of items	Adapted formats of the measures	The Maximum score	Cronbach's alpha score (only for measures with a scale)
Critical thinking (W-GCTA)	8o items	18	1- Assumptions 2- Deductions 3- Interpreting information	18	-
Motivation (L2MSS)	76 items	17	1- Instrumentality 2- Attitude 3- Integrativeness 4- Cultural interest	6	.815 (high reliability score)
Multilingualism (LEAP-Q)	27 (for each spoken language)	17	1- Language use in social context 2- Self-reflections of language proficiency	10	.749 (acceptable reliability score)
Proficiency (TOEFL)	120 questions	19	1- Listening 2- Reading	19	-

Appendix V. A detailed description of the new measure (FLLEB)

	Number of items	Likert scale	Cronbach's alpha score for the total 51 items
Frequency (FQ)	14	5	-
Time span (TS)	14	5	-
Restorative acts (RA)	5	6	-
Managing stressors (MS) to show commitment	18	6	-
Measure's totals	51	5.5	.908 (very high score)