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The Mediating Role of Motivation and Language Anxiety in Increasing EFL Learners' Working Memory

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Abstract

The present paper synthesizes the germane studies on English as a Foreign Language (EFL) learners' motivation and foreign language anxiety (FLA) and their role in working memory. Earlier investigations have proved that learner motivation accelerates the learning process in working memory. Literature shows that learners prioritize some typical information based on their learning motivation. Nonetheless, specific strategies can be employed in order to augment learner motivation, which per se speeds up cognitive processing. Furthermore, earlier studies indicate a negative relationship between learners' FLA and working memory. Learners' FLA limits the attentional control system, which negatively affects learners' working memory. Furthermore, the study offered some implications and future directions for the individuals like EFL teachers, teacher educators, and foreign language scholars. The postulations can improve their awareness of learner motivation and FLA and their role in working memory.

Keywords: foreign language anxiety, motivation, working memory, attentional control system, EFL teachers

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1. Introduction

According to Pessoa (2008), emotion and cognitive abilities are interrelated in numerous ways. Swain (2013) considered emotions as a fundamental component of cognition and they mentioned that the happenings of our lives have been affected by our emotions. Traditionally, learners' differences have been investigated with respect to emotional factors, including apprehension, frustration, anger, etc. (Kim et al., 2015; Zare et al., 2023). In earlier studies, psychologists have underscored the negative emotional states among students, and they have tried to reduce them (Derakhshan et al., 2021; Pawlak et al., 2021). MacIntyre and Gardner (1994) described a negative emotional construct called foreign language anxiety. He stated that this construct refers denotes to the feeling of pressure and nervousness in terms of foreign language skills, particularly related to second or foreign language environments. They also mentioned that FLA refers to the concern and negative feelings during education or communication in a foreign language. Nowadays, positive psychology has emerged as a new approach to foreign language learning (Derakhshan, 2022; Wang et al., 2021; Wang & Guan, 2020). It sheds light on the most favorable instructive conditions and procedures for the attainment of students and instructors (Jiang, 2020). Motivation, as a positive construct, is defined as students' inclination to be involved in performing tasks comprehensively (Zhou, 2012). Demotivated learners are not inclined to collaborate, assume responsibility, or be entirely engaged in instructive environments. However, very few investigations have been conducted about the interaction between three extensively researched constructs: motivation, FLA, and working memory. This review seeks to investigate the role of motivation and FLA, as two constructs of positive psychology and negative emotions, respectively, in expanding learners' working memory.

2. Literature Review

2.1 The Notion of Motivation

Williams and Burden (1997) characterized motivation as a state of provisional or protracted objective-oriented conduct in which persons vigorously desire to involve. Besides, Gredler et al. (2004) stated that motivation refers to the trait that triggers individuals to perform or avoid doing something. In effect, motivation invigorates human beings and paves the incoming challenging way (Gilakjani et al., 2012). It directs multiple educational behaviors in various instructive situations (Boo et al.,

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2015; Wang & Guan, 2020). Dörnyei and Ushioda (2011) considered motivation an element of enjoyment, and they asserted that motivation drives people to make a decision, involve in action, attempt, and perform tasks.

Two primary constituents of foreign language learning motivation are integrative and instrumental ones (Muslim et al., 2020; Ter et al., 2019). According to Gardner (2010), motivation is an integration of internal and external components that inspires learners to involve in the educational course. He also declared that students' integrative motivation indicates their predisposition to include themselves in a foreign language context. Furthermore, students' constructive perspectives toward the instructive environment affect their integrative motivation and educational fulfillment (Khodadad & Kaur, 2016). Furthermore, Pavelescu (2019) pointed out that instructors' enthusiasm, inspiration, and support have an influence on students' integrative motivation. In contrast, Gardner and Lambert (1972) indicated that instrumental orientation among learners is defined as the learners' aspiration to achieve social credit or financial benefits through foreign language learning success. Sallang and Ling (2019) found that instrumental motivation is significantly correlated with the delivery of positive feedback to learners in an educational environment as it improves students' motivation in doing activities. Safots and Tompte's (2018) investigation showed a meaningful positive association between students' instrumental motivation and their inclination in using a communicative approach in foreign language education.

Concerning the influence of motivation on learners' cognitive performance, Sedighfar and Khaleghizade's (2016) study showed that integratively motivated learners are more inclined to have attainment in their academic contexts. However, their investigation did not verify the significant relationship between students' instrumental motivation and foreign language success. Samad et al. (2012), in their study, also argued that integrative and instrumental motivations are significantly correlated with language learning scores. However, Samad et al. (2012) demonstrate that learners with higher integrative motivation outperform in the IELTS exam. However, Dörnyei (2001) showed that some variables, including learners' language proficiency and linguistic backgrounds, mediate the correlation between motivation and language learning success. Nevertheless, he asserted that some troubles in educational contexts have discouraged them. Alrabai and Moskovsky (2016) also mentioned that learners' motivation, self-sufficiency, attitude, anxiety, and self-assurance significantly affected their language proficiency. Moreover, Cocca and

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Cocca (2019) stated the positive relationship between learners' integrative motivation and their educational attainment in foreign language contexts since integrative motivation inspires students to employ language efficiently in different contexts. They also declared that learners' integrative motivation is significantly correlated with their culture. Cheng et al. (2014) indicated that test results are negatively affected by instrumental motivation. Gardner (2001) stated that learners' reflection and memory are significantly affected by their constructive viewpoints toward the learning context, instrumental, and integrative-oriented motivations. In effect, Shiri (2015) stated that motivation is a significant construct that builds up learning and, therefore, operates as an influential factor that contributes to learners continuing the extended procedure of language learning and knowledge retention. This study reviews the literature concerning the relationship between motivation and working and long-term memory.

2.2 Foreign Language Anxiety

Gardner and MacIntyre (1993) conceptualized anxiety as a fear or apprehension occurring during the language performance of the student in a language context. They connected anxiety to the incitement of the autonomic nervous system. MacIntyre (1999) declared that FLA indicates the provoked negative feeling during foreign language education. Three constituents of FLA, including test anxiety, fear of negative evaluation, and communication apprehension, were studied by Horwitz and Cope (1986). Cakici (2016) declared that students' fear of facing disappointment in educational appraisal in testing environments is considered as test anxiety. however, he mentioned that negative evaluation is related to being concerned about individuals' discouraging judgments. Horwitz et al. (1986) also mentioned that communication apprehension is a distinctive multifaceted emotional and behavioral construct in language learning contexts rising from the uncertainty of the language-learning process. Darmawangsa et al. (2020) also asserted that communication apprehension is a significant component in restricting the obtained comprehensible input, and it acts as a significant variable in specifying achievement in learning milieus.

Some investigations have determined numerous reasons for FLA including insufficient self-assurance (Tridinanti, 2018), deficiency of self-efficacy (Bensalem, 2018), insufficient grittiness (Liu, & Wang, 2021), inadequate rehearsal (Bárkányi, 2018), inadequate foreign language knowledge (Teimouri et al., 2019), inadequate emotional intelligence (Chen et al., 2021), apprehension of experiencing mistakes (Suparlan, 2021), inadequate comprehensible input, extreme use of the first language,

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cultural circumstances (Shan et al., 2020), socio-economic situation (Ali et al., 2021), and instructors' negative impression about students' educational outcome (Liu, & Wu, 2021). Matthews and Wells (1996) asserted that FLA can result from insufficient control over distressing views and attentional and cognitive dispositions. The investigation has demonstrated that anxiety is negatively correlated with academic performance (Zheng & Cheng, 2018). In another study, Horwitz (2017), pinpointed that anxiety, willingness to communicate, and learners' motivation are negatively correlated with self-esteem.

It should be noted that input, processing, and output as the stages of cognitive processing are negatively affected by anxiety (MacIntyre & Gardner, 1994). Fallah and Movahed (2014) investigated the effect of FLA on cognitive skills, and their study revealed that language anxiety negatively influences foreign language learners' linguistic skills and learning achievement. In the same vein, Hu et al. (2021) reported a negative association between learners' FLA and linguistic skills.

2.3 The Concept of Working Memory

Memory, as a system of acquiring knowledge and modification of successive behavior, is regarded as a prominent issue in the process of education (Van Abswoude et al., 2020). May et al. (2013) classified memory systems into declarative and non-declarative. They mentioned that declarative memory is deliberately, purposefully, and compliantly regulated, and it demands effort and consciousness. They proposed some strategies such as memory-aid strategies to improve declarative memory and recall information. On the other hand, they stated that non-declarative memory refers to the system which affects one's existing insights unconsciously. They classified it into working memory and episodic memory. Miyake and Shah (1999) defined working memory as a cognitive system devoted to the sequential storing, concurrent operation, and control of needed and limited data to fulfill numerous intricate activities, such as discussions, mathematics, problem-solving, reasoning, foreign language processing, etc. According to Engle (2002), working memory is defined as a person's ability to handle attention, which is limited and shared via all procedures involved in work. Baddeley (2003) called working memory as a short-term memory system that controls the storage and the immediate process of restricted knowledge. Kondo (2021) argued that individual differences among learners' working memory can be justified by the different performances of language

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learners in classroom contexts.

According to Baddeley et al. (2019), Baddeley's (2000) multicomponent model is a prevailing model of working memory. They mentioned that the multicomponent model includes components, including attentional control system of limited capacity and the central executive system supported by the phonological loop, the visuospatial sketchpad, and the episodic buffer. Baddeley (2012) argued that the task of the central executive is to regulate attention through focusing, dividing, and switching in concurrent storing and sorting out information. To retrieve information, it acts as an interface with long-term memory. He argued that the phonological loop is concerned with storing linguistic materials, and it acts with the interaction of phonological store and sub-vocal articulation. Rudner et al. (2007) stated that the visuospatial sketchpad is related to the storing of visual and spatial meanings. They also mentioned that the episodic model functions as a holder of multidimensional incentives, and it is responsible for connecting data from various parts of the working memory construct. Truscott (2017) introduced several components to the visuospatial sketchpad, including the haptic construct for processing tactile information and visual features for processing shape and color. He also mentioned that the phonological loop stores the data of music, lip reading, and signs.

Numerous methods have been used to measure individuals' working memory. Juffs and Harrington (2011) argued that the storage and processing elements of working memory can be evaluated in a separate or integrative way. Colom et al. (2006) indicated that working memory is generally gauged by recalling distinct numbers. They also mentioned that processing competence is measured by means of activities that make concurrent demands on storing and processing. Lesaux et al. (2006) also provided some measures that involve individuals to replicate expressions or statements of cumulative difficulty. Lipka and Siegel (2011) also developed another measure of short-term memory, which includes some sentences with missing terms in the final parts. In this measurement, the individuals are required to complete the missing terms in each sentence and reiterate each missing word to show their capability in saving data in short-term memory.

Some investigations have been done on the role of working memory in cognitive processes such as reading comprehension (Shin et al., 2019; Davidson et al., 2018), writing performance (Michel et al., 2019; Mavrou, 2020), listening performance (Jiang & Farquharson, 2018; Namaziandost et al., 2018), speaking performance (Hyun, & Lee, 2018, Han, 2020), vocabulary development (Ansarin &

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Kazemipour Khabbazi, 2021), grammar learning (Sagarra, 2017), and input processing (Suzuki et al., 2020). Few investigations have been done on the effect of working memory on emotional constructs. The study by Orzechowski et al. (2020) revealed that working memory has a significant effect on learners' emotional intelligence. They argued that working memory update denotes individual differences in complex tasks, and is significantly correlated with fluid intelligence. However, this review ponders the role of motivation and FLA in working memory.

2.3.1 The Role of Foreign Language Anxiety in EFL Learners' Working Memory

Less research has been done on the relationship between FLA and working memory. The study of Eysenck et al. (2007) revealed that foreign language state anxiety worsens the learners' performance in cognitive tasks by limiting learners' attentional system. They justified their outcomes by using the attentional control theory. Eysenck and Derakshan (2011), in a study, revealed that anxiety disrupts the effectiveness of the inhibition and shifting functions as two executive elements of working memory. They contended that anxious students can demonstrate higher levels of processing ineffectiveness in educational environments. They mentioned that anxious learners frequently employ compensatory strategies in their communication, and they try to put more effort and enjoy the processing resources to accomplish complex tasks. They maintained that processing inadequacy can be depicted by ineffectiveness in performance. Christopher and MacDonald (2005), in their study on dual-task performance, argued that the second task can lessen highly anxious learners' performance if it demands greater executive control. Righi et al. (2009) found that learners' performances in working memory tasks are significantly correlated with FLA. They discussed their results by contending that anxious learners underperform in everyday cognitive tasks since they are not able to utilize attentional control systems rather than employing them ineffectually. Bishop (2009) also found that ineffectiveness in the use of attentional control systems can result in high anxiety among learners, which affects the dorsolateral prefrontal cortex. Gustavson and Miyake (2016) found that students with higher levels of communication apprehension suffer from updating their working memory. Moran (2016) also revealed that learners' level of FLA is significantly correlated with degraded performance on working memory tasks. They argued that anxiety affects learners' working memory by demanding attention, using phonological resources, or competing with storage-related

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processes.

Sheen (2008), in another study, stated that students with lower anxiety levels in foreign languages correct their errors more efficiently following recasts. They contended that FLA has a weakening influence on students' working memory when they process language input. Mackey and Sachs (2012), in an investigation on the relationship between working memory and recast, found that working memory is significantly correlated with recast. They also found out that recast lowers learners FLA which helps learners store information in their working memory. In contrast with Mackey and Sachs (2012), Kim and Cho (2017) found that working memory and recast are not significantly correlated. They mentioned that recast alone significantly predicts EFL learners' grammatical accuracy.

In a study by Namaziandost et al. (2018), it was revealed that FLA has a negative relationship with working memory and listening comprehension. Lukasik et al. (2019) highlighted the weakening influence of anxiety on learners' working memory. They found out that anxiety has a negative relationship between oral and visuospatial performance in working memory tasks. Chow et al. (2021) studied the link between ESL learners' reading anxiety, reading comprehension , and working memory. They found out that reading anxiety, as a type of communication apprehension, and working memory were significantly correlated with EFL learners' scores in reading comprehension. Moreover, their study showed that reading anxiety acts as a mediator in the correlation between reading comprehension and working memory. Regarding the corelation between test anxiety and working memory, Nelson et al. (2013) verified that learners' language test anxiety is negatively correlated with their working memory, cognitive intelligence, and non-verbal aptitude. However, they found working memory as a significant contributor to the test anxiety score. Estaji and Safari (2020) suggested dynamic assessment in order to increase learners' working memory span. They mentioned that dynamic assessment reduces FLA which facilitates the process of information in working memory.

2.3.2 The Role of Motivation in EFL Learners' Working Memory

Very few investigations have been conducted on the role of motivation in working memory. The study of Brooks and Shell (2006) showed a meaningful correlation between working memory and motivation. having used They used an interactive compensatory model of learning in which learning is regarded as the outcome of

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communication, motivation, and background knowledge. They suggested that learners should have positive self-talk or use motivational strategies in dealing with complicated tasks that need to be processed. Allen and Ueno (2018), in their study, revealed that motivated learners typically prioritize one piece of data in working memory. This process degrades the memorization of other non-highlighted data. Hitch et al. (2018) also argue that learners, based on their learning motivation, can give precedence to more than one item at a time. Therefore, according to Hickey et al. (2015), selective attention depends on learner motivation. They mentioned that learners will notice and differentiate items meticulously, and accelerate their process when motivated. Summerfield et al. (2011) found out that working memory mediates the correlation between motivation and attention span. They argued that the processing of visual material saved in working and long-term memory can be affected by learner motivation in the visual cortex with the purpose of drawing attention to certain details.

Cihak and Castle (2011) used special techniques to improve learners' visual memory, and they examined the effect of these techniques on learners' motivation to read. They found significant effects of these techniques on learners' motivation to read. In line with Cihak and Castle (2011), Almekhlafy and Alqahtani (2020), pinpointed the unsatisfying and perplexing features of reading comprehension to the number of learners who do not have fundamental skills since they frequently have problems in the description of information and organization of opinions. Therefore, learners are not able to understand readings, and do not engage in educational contexts. Eventually, this incapability negatively influences learner motivation. In addition, they used visual memory techniques in order to expand learners' working memory and increase learners' self-efficacy and motivation to engage in instructive environments. These techniques provide opportunities for learners to observe reading texts before they start reading them. Bautista-Vallejo et al. (2020) found out that educational technology is useful for enhancing working memory and motivation. They mentioned that motivation facilitates the cognitive procedure. They argued that technology provides opportunities to the learners to engage educational contexts, and improves motivational components. Consequently instructors are not needed to use other strategies to motivate students.

[DOR: 20.1001.1.23223081.1401.0.0.276.8]

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3. Conclusion and Implications

This conceptual review inspected the earlier investigations on the role of motivation and FLA in learners' working memory. It raises the awareness of researchers who are keen on learner motivation, FLA, and working memory. Concerning the earlier studies on the negative effect of FLA and the positive effect of motivation on working memory, it should keep in mind that students should be assisted to deal with their emotions in pedagogical environments. Students are able to enhance their motivation and reduce their anxiety by choosing easy-to-difficult valid materials consistent with their language proficiency level. Instructors are able to engender an exciting and encouraging educational environment for students to stimulate their motivation for learning. Instructors are also able to improve learner motivation and reduce anxiety with supportive interaction and comments to assist students to process the learning materials in their minds. Likewise, having awareness of students' personality behaviors may inspire instructors to make an attempt to intensify learner motivation in instructive environments. So, foreign language instructors are required to communicate with students about their internal and external motivations to foster their positive perspectives on educational environments. Also, taking learners' needs into account is recommended to be one of the primary principles of instruction to foster learning performances and reduce anxiety levels. Therefore, instructors are required to revise the educational materials taking into account students' competence. They try to lessen learners' cognitive load and FLA. This can also raise the awareness of learners, and develop learner motivation and constructive viewpoints toward educational contexts. Teachers can employ fairly-challenging tasks, which can encourage demotivated students. The tasks ought not to be demanding to restrain students' motivation in accomplishment. Teacher support (Shakki, 2022), allocating adequate time, decomposing problematic activities into easy segments, and explaining the challenging tasks are significant for the improvement of learner motivation and the reduction of anxiety. Admiring and providing feedback (Al-Obaydi et al., 2023), mostly recast, to students are also essential for reducing anxiety among foreign language learners. Furthermore, instructors do not have to compare the accomplishments of learners with their peers. Furthermore, instructors can provide a collaborative environment, instead of a competitive one, to improve learner motivation. They can also require students to inscribe some remarks about their emotions and developments in learning environments to lessen their anxiety and enhance their engagement (Dai & Wang, 2023). They may incorporate motivation and anxiety into their instructional method. They can provide warming-up activities

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for instructive milieus to foster motivation and cognitive processing in working memory. The projects, lectures, conferences, and workshops may increase learner anxiety and decrease their motivation in educational environments. To decrease students' FLA, teachers can acquaint students with test questions. Planning for having a viable instructive environment through tests amplifies learner motivation. Also, unexpected quizzes are mainly significant for inspiring demotivated students.

Teachers can employ video files like TED videos, and they can debate over the influence of motivation on improving performance and memory enhancement. The provision of visualizing tasks can be helpful to increase learners' visualization skills. Asking learners to come to the front of the class and explain the content of educational materials as teachers can also be useful for language learners. Teachers can also provide some strategies, such as sentence swap, thinking backward, and summarization to language learners to improve their working memory. The enhancement of working memory and sche\mata is essential to make a vigorous and flourishing educational context; therefore, it is better\ not to forget to use these strategies in educational contexts. Teachers can spend a few minu\tes of each session on the development of learners' working-memory through the provision of\ working-memory based tasks. These tasks can assist learners in processing language smoothly. \

This review provides numerous broad implications for teacher educators, policymakers, and counselors. To enhance motivation, teacher educators can increase teacher motivation. Holding workshops for pre-service and in-service instructors to \inspire them to employ technological tools in learning to develop learner motivation. Teacher educators can underline technological tools, like web-based applications, which inspire instructors and students to communicate and scaffold that develop motivation and reduce anxiety. They should boost self-assurance among instructors to motivate students in the educational course. Educational policymakers should employ qualified instructors, as teaching qualifications can be a vital issue for developing motivation among learners. As blended instruction is effective in the development of learner motivation, didactic policymakers should make available some computer\ labs for teachers and students. They can demand students and instructors to perform appropriately within various instructive environments. The importance of motivation and anxiety can inspire advisors to develop their prospects to recognize learners' internal and external motivation and decrease FLA among learners.

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4. Suggestions for Further Research

In future studies, investigating learner motivation, anxiety, and their roles in working memory in blended learning environments can be helpful. The influence of instructor motivation on learner motivation should also be studied in conventional and flipped classrooms. Additionally, the role of teachers' language proficiency in learners' motivation and f FLA in instructive settings should be investigated in the upcoming studies. Also, case and phenomenological studies are needed for future studies to realize the reasons for the correlation between learner motivation and anxiety. It will be important that future research investigate the effect of engagement, enjoyment, positive affectivity, grit, and resilience as other positive psychological constructs and working memory. Additionally, upcoming studies should inspect the relationship between boredom, burnout, irritation, frustration, and working memory. Future investigations are necessary to scrutinize the role of learners long-term memory and motivation in FLA.

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