The Effect of Metacognitive Strategies on Self-Efficacy, Motivation and Academic Achievement of University Students

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Abstract

In this study, the effects of university students' metacognitive strategies on university students' self-efficacy, motivation and academic achievement were examined. In the 2019-2020 academic year, 354 university students who received preparatory education at Gazi University School of Foreign Languages participated in the study. Demographic information form, general self-efficacy scale and metacognition scale-30 were used as data collection tools. A path analysis model was developed and tested to examine the relationships between the variables in the study. In the tested model, it was observed that self-efficacy affects academic achievement in reading classes both directly and indirectly in a positive way. It has been observed that motivation indirectly affects the academic performance of students positively through metacognition. It was determined that the most influential variable on academic achievement was self-efficacy, followed by the metacognitive variable. In addition, the results obtained based on theoretical explanations were discussed and some suggestions were presented to improve the academic performance of university students.

Keywords: Metacognition, Strategy, Self-efficacy, Motivation, Foreign Language Teaching

Introduction

Over the past few decades, scientific and technological developments in the field of education have caused radical changes in traditional education understandings. In this direction, it has become inevitable for teachers and students to develop themselves in every field. The rapidly changing conditions of life have caused written communication to gain importance instead of verbal communication in the development of societies. The fact that reading skill is very important in the human model created by the modern world has been noticed immediately, especially in developed countries, and more importance has been given to this issue in education systems.

According to Chamot (2004), strategy learning is required for content-based and academic activities that reflect the philosophy in language learning and teaching. Teachers and students always have the option to revisit previous teaching stages as needed, and it is beneficial for language learners of different levels, which is considered a guide for applying

a full language or cross-curricular approach to teaching so that they are aligned with the curriculum in foreign language classes (Chamot, 2004).

The extent of progression in the learning process focuses on strategies for acquiring outstanding abilities to provide the ability to achieve expected educational goals. According to the subject area of the learner, self-efficacy, metacognition and motivation play an important role in the learning process (Burton et al., 2006; Mart 2011; Norman & Furnes, 2016; Questienne et al., 2018; Safari & Meskini, 2015; Schöber et al., 2018; Skaalvik et al., 2015; Tian, Fang & Li, 2018; Mart, 2022). The question of how students should be guided towards academic success has been the subject of many studies for decades. Many important psychological constructs have been proposed, such as standing on the shoulders of many previous successful psychological constructs. Self-efficacy and metacognition are powerful constructs that eliminate critical transitions in effective learning or the development of skills and abilities (Tian, Fang & Li, 2018; Tressel et al., 2018). In this context, the concepts of self-efficacy, metacognition, and motivation were first explained in the context of their relationship with success, and then the effects of these three variables on the reading skills of university students were examined.

In the age of information and technology, which is developing at a dizzying pace, access to information has accelerated so much that people can now exchange information instantly. It takes a lot of time for many people to read this information. Therefore, teaching reading skills in a foreign language, as a basic element of foreign language teaching, becomes important. In this direction, in parallel with the contemporary developments in the field of education, the necessity of studies focusing on the individual and the learning process emerges.

Knowing and using learning strategies autonomously will definitely contribute to the success and quality of the writing, as well as have positive effects on the student's attitude and the permanence of what has been learned. Students need certain behavioral and intellectual processes in order to realize learning. For instance, finding the main ideas of a reading material, summarizing it and taking notes. Their ability to successfully perform these tasks depends on the use of a few strategies best suited to the learning task. Learning strategies are the processes used by the student to learn on their own. Students should be active in the learning process rather than recording what the teacher presents or tells in class. Given that the studies on foreign language reading comprehension strategies in Turkish universities are insufficient, the effect of metacognitive strategies on students' self-efficacy, attitude and academic achievement in the foreign language process has been chosen as the subject of this study.

It is considered that the teaching and use of metacognitive strategies as a fundamental part of the learning process will contribute to the reading process in the teaching of reading skills in a foreign language, and will positively affect the permanence of what has been learned together with the success and attitudes of the students. Cognitive

learning theories emphasize the need for the learner to take responsibility for learning and participate actively in learning. For this reason, studies in this field have focused on learning strategies in recent years. Learning strategy is "behaviors and thoughts that the learner can realize during learning and that is expected to affect his/her coding process. Learning strategies are the behaviors and thinking processes used by the learner, affecting the learning of the learner, including cognitive strategies such as memory placement and retrieval, and metacognitive processes that direct cognitive strategies.

Researches show that students who use reading materials effectively in English classes also use learning strategies and the importance of student self-efficacy. Readers who use strategies while reading decide which strategy to use in the learning environment, apply them effectively and change these strategies if necessary. Studies of good and poor readers in using learning strategies show that good readers have more strategies. In order to understand the reading materials, readers will read more slowly by thinking more deeply, but their reading speed will improve over time in parallel with their reading comprehension level.

Bandura (1977) defined the structure of perceived self-efficacy that affects cognitive, motivational and emotional processes. Self-efficacy is a person's belief in their ability to successfully do what is necessary to produce results linked to goal attainment. Thus, efficacy beliefs affect motivation through goal choice, commitment to goals, and expectations for positive outcomes in achieving goals (Bandura, 2001).

A person's perception of self-efficacy affects motivation in terms of effort level, activity selection, and persistence in challenging tasks (Schunk, 1994). Those with a strong sense of self-efficacy are confident in their abilities, so they will hold on longer on tasks even when faced with difficulty or failure. If a person with self-efficacy is not successful, he will attribute it to effort, not talent. Efficacy beliefs create optimistic or pessimistic attitudes that can facilitate or hinder actions. Students with disabilities may feel anxious in academic situations where they doubt their abilities and feel a lack of control. Students with a strong sense of self-efficacy are confident in their abilities that enable them to cope with difficulties (Bandura, 2001).

The role of self-efficacy in academic settings has been studied by many researchers. Bandura and Cervone (1983) worked with university students in an introductory psychology course to examine the relationship between skill use, self-efficacy, and goal attainment. They found that when students practiced the skills in a challenging academic situation, their sense of self-efficacy increased and they continued their efforts to reach their goals. Shell, Murphy, and Bruning (1989) studied college students to determine the strength of relationships between self-efficacy belief systems and outcome expectancy and reading and writing performance. Their findings showed that there was a strong correlation with both reading and writing achievement domains and students' belief in their own abilities (self-efficacy) in these domains.

Zimmerman and Martinez-Pons (1990) examined the differences between average and gifted students in terms of the use of self-regulated learning strategies and perceptions of self-efficacy. Results indicated developmental effects on students' perceptions of academic self-efficacy; older students showed a stronger sense of efficacy than younger students. The results also showed that gifted students were more likely to use certain self-regulated learning strategies that represent the triple model of personal, behavioral and environmental aspects of self-regulated learning.

Metacognition

The meaning of the concept of metacognition is based on the word "meta", which is the root of the word. Meta is the name of one of the pillars in the square to mark the turning point of the race in the Roman period, and metacognition can be explained as the turning point of understanding in the mind (Fisher, 1998). Metacognition is the individual's being aware of himself (what he does, how he does it) and the process (what he does, in what order, what he achieves) (Çakıroğlu & Ataman, 2008), the individual's observing his own cognitive processes and thinking about the thinking process (Babbs & Moe, 1983). Based on the definitions, it can be concluded that metacognition is based on the individual's awareness of cognitive processes.

The term metacognition was first proposed by Flavel (1979). Metacognition is considered as knowledge or metacognitive processes that include the evaluation, monitoring and control of learning processes and activities (Flavel, 1979; Mart, 2022). Metacognition is also classified as high-level thinking (Lesh & Zawojewski, 2007) that prevents active control over cognitive processes related to the learning process (Hidayet et al., 2018). Metacognition can be found in learning models (Borkowski et al., 2000; Puustinen & Pulkkinen, 2001), numerical lessons (Desoete et al., 2001, 2003; Callan & Cleary, 2018), reading comprehension (Soodla et al., 2016), language learning (Wang & Han, 2017) and academic performance (Zohar & Peled, 2008; Harris, 2015).

Metacognition is the ability of learners to use certain learning strategies they adopt and to think about their own thinking. It is the individual's knowledge of his own cognitive processes. In general, metacognition is thought to have two basic elements. One of these elements is information about cognition, and the other is the mechanisms for controlling, monitoring and regulating cognition. Cognitive knowledge includes knowledge and understanding. It is the learner's understanding of the various learning strategies he or she uses in a particular learning situation and of his or her own learning process. For example, a visually oriented student knows that creating concept maps is a good way for them to understand and remember new information. The second element of executive cognition is cognition monitoring. Cognition monitoring is the ability of the individual to choose, use, monitor and evaluate, and rearrange the most appropriate strategy in learning the situation to be learned.

In educational settings, metacognition regulates study time, thus enabling students to learn more than they are responsible for (Metcalfe, 2009; Metcalfe & Finn, 2013). At the university level, it is essential to emphasize the significance of metacognitive skills during the teaching and learning process. University students with low metacognitive skills will encounter problems because they cannot determine the difficulty of the tasks, plan their actions, monitor their own performances, or use information displays (Dunlap, 2005; Hong et al., 2015). Several education theorists believe that the development of metacognitive knowledge begins at a young age and continues throughout adolescence (Schraw & Moshman, 1995). In contrast, some studies point to domain specificity of individual differences in metacognition. For example, Kelemen et al. (2000) found that metacognition is task-specific for university students. However, academics have unanimously associated metacognition with other constructs such as meta-learning, self-efficacy, critical thinking and motivation, regardless of the learning domain (Schneider & Lockl, 2002; Sönmez Ektem, 2012; Tian, Fang & Li, 2018).

Metacognitive control and experiences are generally accepted as metacognitive processes, also called online metacognition (Desoete, 2008). Metacognitive experiences include one's evaluation and judgment about the meaning of mental phenomena, and metacognitive control strategies are individuals' responses to how they control their cognitive activities (Wells, 2000). The relationship between these three components in academic performance may be in the form of having unrealistic information about a person's cognitive ability (metacognitive knowledge), and this uncertainty may arise as a result of the person's past metacognitive experiences or failures to deal with difficult problems. Inadequate metacognitive experiences can eventually lead to problems and a lack of confidence in how to solve them.

Readers' metacognitive knowledge of reading can be influenced and consciously triggered by a number of factors, such as previous experiences, beliefs, culture-specific teaching practices, and, in the case of non-native speakers, second language proficiency. or unconsciously, when the reader encounters a particular reading task. Readers' metacognitive knowledge of reading includes their awareness of various reading strategies and the fact that their cognitive attempt at reading is influenced by this metacognitive awareness of reading strategies. It is the combination of mindful awareness of reading, strategic reading processes, and the actual use of reading strategies that distinguish skilled readers from unskilled readers.

Metacognitive Strategies

Metacognition refers to the knowledge and control we have over our cognitive processes. As regards reading, it is common to talk about metacognitive awareness and metacognitive regulation or control. As a whole, we learn awareness of our understanding process. More specifically, we learn strategies that support our understanding and learn

how to apply those strategies effectively (control of strategies) (Baker, 2002, 2008; Pressley, 2002). In addition, Pressley, Snyder, and Cariglia-Bull (1987) argue that metacognition helps students become consciously aware of what they are learning, recognize situations in which it will be useful, and progress in using it.

Self-Efficacy

According to Bandura (1997), self-efficacy is an individual's belief in their ability to organize and execute the actions necessary to perform certain tasks. It has been stated that self-efficacy belief is effective on individuals' thoughts, feelings, motivations and behaviors. Individuals who strongly believe in their own efficacy can direct their own feelings, thoughts and behaviors. Individuals with self-doubt may experience experiences that can weaken their sense of efficacy and cognitive development. These individuals attribute their failures to different factors such as the immediate environment and social environment rather than their own competence (Bandura, 1993).

Self-efficacy also affects motivation through goal setting. Individuals with a low sense of efficacy may tend to avoid a task completely or stand back when difficulties arise (Bandura, 1993). People with a high sense of competence in a particular area set higher goals and fail less. These individuals develop new strategies when they fail. Self-efficacy is one of the most important motivational resources that affect individuals' efforts, persistence and performance (Schunk, 1990). Self-efficacy belief is one of the important predictors of the academic performance of individuals in social and science fields (Alhadabi & Karpinski, 2020; Choi, 2005; Sheu et al., 2018; Wilcox & Nordstokke, 2019; Yurt & Sünbül, 2014).

The main purpose of educational institutions is the learning of students, and learning requires the use of processes such as planning, application of knowledge, monitoring, regulation and reflection (Azavedo, 2009; Safari & Meskini, 2015), which are included in the field of metacognition as well as self-efficacy. In this context, the concept of metacognition, which is the second variable of our study, is mentioned below.

Motivation

Motivation is generally known as the process that initiates, guides, and maintains goal-oriented behaviors. Motivational variables determine the student's participation in the learning process; that is, the reasons why students do their duties significantly affect their degree of participation and academic achievement (Pan et al., 2013; Rodríguez et al., 2019). Data from past studies suggest including students' prior achievement and motivation as an important variable to understand their ability to fulfill their learning responsibilities (Cool & Keith, 1991; Trautwein et al., 2002; Zimmerman & Kitsantas, 2005; Fast et al., 2010; Chen et al., 2013; Garon-Carrier et al., 2016). In order to obtain a comprehensive

picture of the relationship between students' motivation and their academic achievement, it is also necessary to consider the achievement motivation theory (Steinmayr et al., 2019), which is a traditional motivational personality model. Therefore, in this article, students' self-efficacy and metacognition as well as their motivation for success on the basis of success are discussed.

The Relationship between Self-Efficacy, Metacognition and Motivation

Studies have revealed that self-efficacy, motivation, and metacognition have significant and multidimensional effects on academic performance at different levels and dimensions (Alvarez et al., 2016; Paris & Paris, 2001; Skaalvik et al., 2015). While some studies argue that promoting metacognitive and strategic knowledge will increase students' self-efficacy, others argue that reading is as much a metacognitive process as it is cognitive. Cognitive strategies refer to the deliberate actions that readers take in their efforts to understand texts, while metacognitive strategies emphasize the monitoring and editing mechanisms that readers consciously use to improve comprehension. When students use metacognition, they think about what they think while reading. The ability to think about their thoughts is critical to monitoring comprehension and correcting it when it breaks down. (Liu, 1998; Tian, Fang & Li, (2018). Efklides (2011) pointed out that metacognition is positively related to self-efficacy. Sang and Wang (2001) while describing the effect of metacognition on learning, suggested that metacognition mainly affects students' self-efficacy.

Further research has shown that the relationship between metacognition and performance is entirely mediated by self-efficacy (Coutinho, 2008), while the empirical study of Carr et al. (1994) revealed that metacognition and motivation are significantly positively related. Borkowski et al. (2000) showed a high mutual relationship and effects between metacognitive strategies and motivation, and studies have shown that metacognitive strategies play a positive role in students' academic motivation (Paris & Paris, 2001). Some contemporary theories incorporate intrinsic motivation into their formulations. For example, in Self-Determination Theory, intrinsic motivation is presented as a prototype of autonomous and self-determining behaviors (Deci & Ryan, 2000). In addition, it has been accepted that cognitive and metacognitive structures are eligible for understanding the potential mediating pathways underlying the relationship between cognitive activity and academic achievement (Alvarez et al., 2016).

According to the reasons stated above, the main purpose of this study is to examine the level of multifaceted relationships between motivation, self-efficacy and metacognition and learning outcomes (success) in university students in foreign language reading courses. In this context, the hypotheses are as follows:

Hypotheses

H1: Self-efficacy affects metacognition positively.

H2: Self-efficacy has a positive effect on academic success in a foreign language.

H3: Metacognition positively affects academic achievement.

H4: Metacognition positively affects academic success in a foreign language.

H5: Motivation has a positive effect on academic success in a foreign language.

Method

Measuring Tools

Demographic Information Form: A demographic information form was used to determine the diagnostic characteristics of the university students included in the study. In the form, variables such as gender, school type, class, age, department and overall success in the courses were included. The questions in the demographic information form are in the type of multiple choice questions. In general, students were asked to indicate their success in their courses by ticking one of the options low, medium and high. In this way, the perceived academic achievement variable was obtained.

Motivation Scale for University Students: The Motivation Scale for University Students, developed by Yılmaz (2018), was used to determine the motivation levels of the students included in the study. The measurement tool is based on self-report and consists of 26 items. The construct validity of the measurement tool was examined by exploratory factor analysis. It has three dimensions: intrinsic motivation, extrinsic motivation, and amotivation. Expressions in the scale are as follows: It fits me completely (4), fits me quite well (3), fits me a little (2), and doesn't suit me at all (1). High scores obtained from the scale indicate that the perception of motivation is high. In this study, the Cronbach's alpha internal consistency coefficient for the overall measurement tool was calculated as 0.90.

General Self-Efficacy Scale: The General Self-Efficacy Scale developed by Schwarzer and Jerusalem (1995) and adapted into Turkish by Apay (2010) was used to determine the participants' self-efficacy perceptions. The measurement tool is based on self-report and consists of 10 items. The measurement tool has two dimensions: effort and resistance, and competence and self-confidence. Expressions in the scale; completely true (4), moderately true (3), slightly east (2) and completely false (1). High scores obtained from the scale indicate that the general self-efficacy perception is high. In this study, the Cronbach's alpha internal consistency coefficient for the overall measurement tool was calculated as 0.91.

Metacognition Scale-30: The Metacognition Scale-30 Scale, which was developed by Wells and Cartwright-Hatton (2004) and adapted into Turkish by Tosun and Irak (2008), was used to examine the metacognition levels of the participants. The measurement tool is

based on self-report and consists of 30 items. The construct validity of the measurement tool was examined by exploratory and confirmatory factor analysis. measurement tool; It has five dimensions: positive beliefs, cognitive confidence, uncontrollability and danger, cognitive awareness, and the need to control thoughts. Expressions in the scale; strongly agree (4), agree (3), disagree (2) and strongly disagree (1). High scores from the scale indicate high metacognitive awareness. In this study, the Cronbach's alpha internal consistency coefficient for the overall measurement tool was calculated as 0.93.

Data Analysis

Within the scope of the research, skewness and kurtosis coefficients were used to examine the distribution of scores obtained from the Self-Efficacy, Motivation and Metacognition Scales. In order to meet the univariate normal distribution assumption, it is sufficient for the skewness and kurtosis coefficients to be in the range of ±1 (Hair et al., 2013).

Path analysis was used to examine the direct and indirect relationships between academic achievement, self-efficacy, motivation and metacognition. Prior to the analysis, Cook distance values were calculated to determine the multivariate extreme values. The multivariate normal distribution was examined by calculating the multivariate standardized kurtosis coefficient of Mardia. The fact that the Mardia multivariate standardized kurtosis value is less than 8 indicates that the data have a multivariate normal distribution (Yılmaz & Varol, 2015). The existence of a multicollinearity problem between the independent variables was examined by calculating the variance increase factor (VIF) values. In path analysis, in order to determine the significance level of direct effects, whether t values are significant at the 0.05 level; Bootstrap confidence intervals were taken into account to determine the significance level of the indirect and total effects. Path analysis was performed using the AMOS 24.0 statistical package program.

Study Group

The target population of this study consisted of 354 university students who received preparatory education at Gazi University School of Foreign Languages. Reaching all of the students in the target universe requires serious time and teamwork. For this reason, easily accessible sampling method was preferred in the study. In this direction, 354 university students studying at Gazi University School of Foreign Languages participated in the research. Participation in the study was based on volunteerism.

Table 1: Distribution of university students by demographic characteristics

		F	%
Gender	Female	252	69,5
	Male	102	30,5

When Table 1 is examined, the rate of male university students is 30,5 and the rate of female students is 69,5.

Findings

Table 2: Pearson correlation coefficients of the relationships between academic achievement, self-efficacy, motivation, and metacognition

Variables	Avr	Ss	1.	2.	3.	4.
1. Academic success	2,04	0,64	1			
2. Self-efficacy	3,07	0,59	0,49**	1		
3. Motivation	2,70	0,64	0,47**	0,53**	1	
4. Metacognition	24	0,58	0,48**	0,42**	0,55**	1

**p<0,01; N=354

When Table 2 is examined, it is understood that there are moderate positive relations between academic achievement and self-efficacy (r=0.49; p<0.01), motivation (r=0.38; p<0.01) and metacognition (r=0.48; p<0.01). Since bilateral relations are taken into account, academic achievement increases as self-efficacy, motivation and metacognition increase. It is seen that there are moderate positive correlations between self-efficacy and motivation (r=0.523; p<0.01) and Metacognition (r=0.43; p<0.01). As self-efficacy increases, motivation and metacognition also increase. There is a moderately positive correlation between motivation and metacognition (r=0.53; p<0.01). As motivation increases, metacognition also increases.

Path analysis was applied to test the research hypotheses. In the tested model, self-efficacy was the endogenous variable, motivation, metacognition and academic achievement were the exogenous variables.

Table 3: Standardized beta coefficients of direct, indirect and total effects in the path analysis model

Effect	β			R^2
	Self-efficacy	Motivation	Metacognition	
Direct effect				
Motivation	0,51	-	-	0,27
Metacognition	0,19	0,42	-	0,30
Academic success	0,32	0,03	0,35	0,33
Indirect effect				
Motivation	-	-	-	
Metacognition	0,22	-	-	
Academic success	0,16	0,15	-	
Total effect				
Motivation	0,52	-	-	
Metacognition	0,42	0,42	-	
Academic success	0,47	0,17	0,35	

When Table 3 is examined, the self-efficacy variable has a direct positive effect on motivation (β=0.51; t=12.01; LLCI=0.42; ULCI=0.62; p<0.01). Self-efficacy variable metacognition directly (β=0.19; t=3.80, LLCI=0.05; ULCI=0.32; p<0.01) and indirect (β=0.22; LCI=0.15; ULCI=0.30; p<0.01). Similarly, the self-efficacy variable affects academic achievement directly (β=0.32; t=6.29; LLCI=0.20; ULCI=0.44; p<0.01) and indirectly (β=0.16; LCI= 0.09; ULCI=0.23; p<0.01). As a result, the H1, H2 and H3 hypotheses were accepted.

Discussion

In this study, in which the relations between motivation, self-efficacy, metacognition and achievement of university students were examined by path analysis, the prominent variable is self-efficacy. It was found that the self-efficacy variable had a direct positive effect on motivation. It has been observed that university students with strong self-efficacy also have high motivation levels. Similarly, self-efficacy variable directly and indirectly affects metacognition positively. Finally, the variable of self-efficacy in university students directly and indirectly affected academic achievement positively. According to these findings, the H1, H2 and H3 hypotheses of the research were accepted. These findings of the study were reported by Alyami et al. (2017), Arslantaş (2021), Hayat, et al. (2020), Kaleli (2020), Kara (2020), Kim & Park (2001), Koyuncuoğlu (2021), Lee &

Jeon (2015), Nagengast et al. (2011), Sadi & Uyar (2013), and Yu, Chae & Chang (2016).

Previous research has also revealed significant direct effects of students' self-efficacy on academic expectations (Chemers et al., 2001; Lent et al., 2008). According to these authors, students with high self-efficacy have higher academic expectations and perform better academically than students with low self-efficacy. These findings are consistent with Bandura's which postulate that self-efficacy is dependent on individuals' judgments of how well the outcomes they expect are primarily capable of performing in a given situation. On the other hand, self-efficacy beliefs lead to excellent performance of individuals through increased commitment, effort and perseverance (Pintrich, 2003). In this respect, the importance of the relationship between the self-efficacy and motivation of university students emerges. In the study, it was seen that self-efficacy had high effects on metacognition and therefore on success. Some researchers point out that some of the relationship between self-efficacy and academic achievement can be attributed to metacognitive learning strategies (Pintrich & De Groot, 1990; Zimmerman, 1990). More specifically, the evidence shows that students with higher self-efficacy (as an expectation component) show greater effort and perseverance when faced with challenging situations (Schunk & Ertmer, 2000). Despite the positive effect of self-efficacy on the amount of initiative, the evidence shows that the quality of effort of students with self-efficacy is also different; such students use a variety of deeper cognitive and metacognitive processing strategies compared to their lower self-efficacy peers. This leads to better learning and academic success (Zimmerman, 2011; Ngwira et al, 2017). In contrast, students with low self-efficacy seek easier tasks to avoid failure and use superficial strategies while ignoring deep learning. Therefore, as shown in some studies, metacognitive learning strategies mediate the effect of self-efficacy on academic performance (Yang, 2005). Considering the total effect values in this study, it was seen that the most effective variable on academic achievement was self-efficacy.

The metacognition variable has a direct positive effect on academic achievement in university students. Similar to the findings of this study, Abdelrahman et al. (2020), Medine et al. (2017), Mokhtari et al. (2018), and Özsoy and Ataman (2017) revealed that higher-level metacognition is an important predictor of academic success among undergraduate students. According to Boekaerts and Corno (2005), students actively participate in the learning process with their metacognitive competencies and are active. In this context, students should be able to plan, monitor, regulate and control their cognitive procedures regarding their attitudes and behaviors. Thus, students need to have high metacognitive skills in order to actively participate in learning and achieve success. College-age students can take advantage of using strategies under metacognitive strategies. In addition, metacognitive skills can be understood by students to improve their learning (Fisher et al., 2015; Barenberg & Dutke, 2019). Pintrich suggested that students with strong metacognition would be more likely to use different types of strategies for learning,

problem solving, and thinking.

Conclusion

As to metacognitive learning theories, in addition to being aware of cognitive and metacognitive strategies, students should be motivated to enthusiastically use these strategies to be successful. In this context, three motivational components that can be associated with components of self-regulated learning such as the general expectation-value theory of motivation (Pintrich & De Groot, 2000), metacognitive strategies: (a) affective reactions including students' emotional reactions to the task (pride, anger, etc.). one component indicates importance, (b) an expectation component, which includes students' beliefs about their ability to perform a task (self-efficacy), and (c) a value component, which includes students' beliefs about the importance and relevance of the goal and task. In this respect, studies in the literature reveal that self-efficacy, metacognition and affective (motivation) components are positively related to self-regulated learning components and results (Aurah, 2013; Doménech-Betoret et al., 2017; Hayat et al., 2020). Since bilateral relations are taken into account, academic achievement increases as self-efficacy, motivation and metacognition increase.

The findings of this study showed that self-efficacy and metacognition are direct motivation and indirect and supportive factors in students' academic performance. Developing metacognition and self-efficacy in effective teaching processes and university teaching programs should be one of the main objectives. Considering the findings of this study, it seems useful to address the factors that increase self-efficacy, metacognition and motivation in the education of university students and encourage these variables. Besides, it is recommended to conduct qualitative studies that will provide in-depth information on the reasons that affect the motivation and academic achievement levels of university students.

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