

A STRUCTURAL EQUATION MODEL ON LANGUAGE ACHIEVEMENT OF
EFL LEARNERS: THE ANALYSIS OF COGNITIVE FLEXIBILITY,
METACOGNITIVE SKILLS AND ACADEMIC BUOYANCY



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BY

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PLAGIARISM

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

The present study was an attempt to test a hypothesized language achievement model, investigating the relationship between cognitive flexibility, metacognitive skills, and academic buoyancy among Turkish EFL (English as a Foreign Language) learners. Specifically, the study examined to what extent cognitive flexibility, metacognitive skills, and academic buoyancy predict language achievement of EFL learners. To this end, a study group of 685 EFL learners was asked to complete the demographic information form, cognitive flexibility inventory, metacognitive skills scale and academic buoyancy scale. IBM SPSS 24 was used for tabulating the data and running descriptive statistics, and confirmatory factor analysis (CFA) was conducted to assure the construct validity of the questionnaires used. Within the scope of the research, the Academic Buoyancy Scale (ABS) was developed. Exploratory and confirmatory factor analyses were performed for the ABS. To check the CFA of the cognitive flexibility inventory and metacognitive skills scale, partial least squares structural equation modeling (PLS-SEM) was performed in conjunction with the SmartPLS tool. The hypothesized path model was tested through the IBM AMOS 24 program with maximum likelihood estimation. The results of the path analysis indicated some insignificant paths, and thus these paths were eliminated from the proposed model and a suggested path was added to the model. The final model accounted for 73% of the variance in language achievement. The analysis indicated that the final model had an acceptable fit to the data set. When model fit indices are explored, the model has accepted and perfect fit indices ($\chi^2 / df = 5.41$, RMSEA = .08, SRMR = .03, GFI = .97, NFI = .97, CFI = .98, TLI = .96). The findings of the study revealed that cognitive flexibility has a medium positive direct effect on metacognitive skills; metacognitive skills have a positive, direct, and significant

impact on academic buoyancy; and a significant, positive indirect effect on language achievement. Based on the results, there is no direct effect of cognitive flexibility on academic buoyancy and academic achievement of EFL learners. Moreover, metacognitive skills did not impact academic achievement directly. The study concludes with a discussion of its potential contributions to the scholars, instructors and practitioners in the field and an explanation of its implications.

Keywords: Academic buoyancy, cognitive flexibility, metacognition, metacognitive skills, academic achievement, structural equation modelling, path analysis



ÖZET

Bu çalışmanın amacı İngilizceyi yabancı dil olarak öğrenenler arasında bilişsel esneklik ve üstbilişsel becerilerin, akademik engelleri yönetme becerisi aracılığıyla akademik başarıyı ne kadar açıkladığını modellemektir. Bu amaçla, 685 üniversite İngilizce hazırlık okulu öğrencisi araştırmanın çalışma grubunu oluşturmuştur. Çalışma grubundan demografik bilgi formu, bilişsel esneklik envanteri, üstbilişsel beceriler ölçeği ve akademik engelleri yönetme becerileri ölçeğini doldurmaları istenmiştir. Çalışmanın tanımlayıcı istatistikleri için IBM SPSS 24 programından yararlanılmış ve kullanılan ölçeklerin yapı geçerliliğini sağlamak için doğrulayıcı faktör analizi yapılmıştır. Araştırma kapsamında öncelikle Akademik Engelleri Yönetme Becerisi Ölçeği geliştirilmiştir. Geliştirilen ölçek için açımlayıcı faktör analizi ve doğrulayıcı faktör analizi yapılmıştır. Akademik başarı modelini test etmek için bir Yapısal Eşitlik Modeli (YEM) hipotezi oluşturulmuş ve maksimum olabilirlik tahmini ile IBM AMOS 24 programında analizler yapılmıştır. Yapılan yol analizi sonucunda model içinde bazı yollar etkisiz olarak değerlendirilmiş ve bu yollar modelden çıkarılmış, ayrıca modele önerilen bir yol eklenerek model yeniden test edilmiştir. Nihai model, dil başarısındaki varyansın %73'ünü açıklamıştır. Araştırmanın bulgularına göre, bilişsel esnekliğin üstbilişsel beceriler üzerinde orta düzeyde olumlu doğrudan etkisi vardır. Üstbilişsel becerilerin akademik engelleri yönetme becerisi üzerinde olumlu ve anlamlı bir etkisi ve dil başarısı üzerinde olumlu ve dolaylı bir etkisi vardır. Bilişsel esnekliğin akademik başarı ve akademik engelleri yönetme becerisi üzerinde doğrudan bir etkisi olmadığı saptanmıştır. Ayrıca çalışmada üstbiliş becerilerinin akademik başarı üzerinde doğrudan bir etkisi olmadığı sonucuna ulaşılmıştır. YEM analizi, nihai modelin veri seti için kabul edilebilir bir uyuma sahip olduğunu göstermiştir. Model uyum indekslerine göre, modelin kabul

edilebilir ve mükemmel uyum indekslerinde olduđu gözlenmiştir ($X^2/sd = 5.41$, RMSEA = .08, SRMR= .03, GFI =.97, NFI = .97, CFI = .98, TLI= .96, IFI=.98).

Araştırma bulguları tartışılmış ve gelecekteki araştırmalar için öneriler sunulmuştur.

Anahtar Kelimeler: Akademik engelleri yönetme becerisi, bilişsel esneklik, üstbiliş, üstbilişsel beceriler, akademik başarı, yapısal eşitlik modellemesi (YEM), yol analizi





*to the BIRTH of my precious daughter Cemre
and to the LOSS of my one and only brother Mehmet...*

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LIST OF ABBREVIATIONS

EFL: English as a Foreign Language

ESL: English as a Second Language

ABS: Academic Buoyancy Scale

CFI: Cognitive Flexibility Inventory

MSS: Metacognitive Skills Scale

GPA: Grade Point Average

L1: First Language

L2: Second Language

SEM: Structural Equation Model

EFL: English as a Foreign Language

CEFR: The Common European Framework of Reference for Languages

EFA: Exploratory Factor Analysis

CFA: Confirmatory Factor Analysis

1. INTRODUCTION

This chapter introduces the research area and background of the study in order to provide a better understanding of the research. After the problem is presented, the purpose, importance, research question, and hypotheses of the study are given. Finally, some assumptions, limitations, and definitions of key concepts are presented to make the study more comprehensible for any reader.

1.1. Statement of the Problem

Education at the university level is often regarded as the most important degree. Higher education is a crucial and life-altering experience that, for the majority of students, entails a substantial investment of time and money. In addition, the beginning of college is a period of adjustment for students. Consequently, it requires settling into a fundamentally new learning environment, obtaining a great deal of independence and autonomy, and experiencing a change in their social milieu. Higher education students in Turkey who are not skilled in English are expected to take English preparation lessons if they are enrolled in universities that provide English medium instruction. Consequently, not only must these students adapt to a new academic environment, but also a new language. In many contexts, language learning is a daily reality characterized by ups and downs, obstacles, and frequent setbacks. In addition to the difficulties inherent in studying such as the syntax, punctuation, spelling, and pronunciation of a foreign language, among others, students may encounter academic challenges. They may have obstacles while beginning to study anything new. In English preparatory schools, students make the transition from high school to the real world; as a result, in addition to the challenges inherent to learning a new language, pupils may have trouble adjusting to their new surroundings. As a

result, students are expected to cope with the challenges that arise daily in an academic setting. Additionally, in order to meet the requirements of a new language and location, individuals must exercise control over and adapt to their surroundings; they must be adaptable to adjust to their new lives.

During their first year of college, students must have the fortitude to respond appropriately to the everyday academic demands and obstacles they face (Martin & Marsh, 2006; 2009). The ability of students to adjust to college is critical to their educational achievement in their first year and throughout their college career (Pittman & Richmond, 2008). Academic success has a significant influence on deciding students' future opportunities (Laidra et al., 2007). Some students find academic issues stimulating, while others find them debilitating (Yeager & Dweck, 2012). Such changes, if not managed properly, can result in a great deal of stress, poor marks, and even dropping out (Yorke & Longden, 2004).

It is critical to reveal how learning will transpire throughout the planning of the learning-teaching process. Literature offers a variety of viewpoints on this topic (Senemoğlu, 2013; Erden & Akman, 2015). Educators who are aware of the aspects that contribute to good learning-teaching will be able to make appropriate plans. Multiple elements contribute to student learning. To demonstrate, academic buoyancy has become one of the characteristics that affect how students respond to academic life. It comprises how students respond to academic dangers and difficulties (Putwain et al., 2012). Martin and Marsh (2008) described academic buoyancy as a student's capacity to overcome routine educational obstacles and hurdles. In the face of adversity, it motivates students to overcome their problems and continue forward (Martin & Marsh, 2003). According to Barnett (2012), the greatest grades were gained by students who were deemed to be the most academically buoyant.

Numerous motivational elements have been tentatively recognized as being significantly connected with students' academic buoyancy. Confidence, coordination, commitment, composure, and control have been recognized as the 5Cs of academic buoyancy (Martin et al., 2010). It has been demonstrated that a high sense of efficacy (confidence) correlates favorably with foreign language proficiency (Hsieh & Kang, 2010). Commitment (persistence) may also be viewed as a crucial component of language learning motivation, as it pertains to a learner's capacity to continuously persevere in the face of various challenges or ups and downs associated with this academic path (Dörnyei et al., 2016). Composure can be interpreted as low anxiety. Anxiety is a normal part of language acquisition and is present in most courses (Horwitz, 2010). Research reveals a negative correlation between anxiety and language proficiency (Gregersen & MacIntyre, 2014). Literature has often emphasized the need to lessen the influence of anxiety on pupils' language learning processes (Huang, 2012). Yun et al. (2018) concluded that the more positive language learners are, the more successful they would be at language acquisition. The control component of academic buoyancy occurs when a student cannot find out a way out of an unpleasant scenario. In the event of uncertainty over control, s/he may be required to seek out means to overcome and avoid failure. Coordination necessitates that student set their goals, plan and manage their strategies, and manage their time successfully (Martin, 2020).

When learning a new language, metacognitive skills are an additional crucial talent to acquire (Ahmadi et al., 2013). Individuals must exhibit metacognitive skills in order to grasp the rules of a new language and how they might learn more efficiently. Effective application of metacognitive skills may also contribute to academic achievement. According to Gourgey (2001), metacognition is the capacity

to define a task, select an appropriate mental and physical representation, select the optimal strategy for completing the task, allocate resources, activate pertinent prior knowledge, attach importance to feedback on the task's progress, and translate reviews into improved performance. Metacognition enables an individual to utilize information strategically in order to enhance productivity. Metacognitive skills involve specific cognitive control behaviors and capacities such as planning, monitoring, regulating, and modifying task performance, which is also crucial in language development (Veenman & Elshout, 1999; Schraw & Moshman 1995). In the research on language learning, Wey (1998) asserted that metacognition might be responsible for the success of language learners in terms of writing skills and effort. Ahmadi et al. (2013) argued for the application of metacognitive skills in an English reading course for sophomores at a public university, claiming that these students earned higher grades than the control group.

Cognitive flexibility, a component of executive functioning, is pivotal for decision-making because it enables the use of numerous techniques and the need to adapt to the requirements of a variety of issues, tasks, and situations (Gnaedinger, 2015), which may aid language learners in the language learning process. Cognitive flexibility, as described by Cox (1987), is the capacity of an individual to modify their thinking style in response to a given task. According to Toraman et al. (2020), there seems to be a correlation between motivation for foreign language learning and cognitive flexibility. It is widely acknowledged that cognitive flexibility in the face of social challenges significantly contributes to individuals' problem-solving abilities (Stevens, 2009), and that, individuals with greater cognitive flexibility use more active coping approaches and fewer negative coping strategies (Bedel & Ulubey,

2015); therefore, cognitive flexibility may be required for adapting to a new level of academic life.

In spite of the fact that several research have looked at the variables influencing university students' academic achievement, none of them have combined the ideas of academic buoyancy, cognitive flexibility, metacognitive skills, and language achievement. As a result, the objective of this research is to provide a theoretical framework that embraces these notions. At this point, the research problem is summarized as follows: "To what extent do academic buoyancy, cognitive flexibility and metacognitive skills explain academic achievement of EFL learners?".

1.2. Purpose of the Study

The primary objective of this study is to provide a novel conceptual model of language academic achievement that combines academic buoyancy, cognitive flexibility, and metacognitive skills in light of the existing literature on the elements that determine academic achievement.

Academic achievement is the achievement of a goal in a structured learning environment, such as a university or school, with an adequate degree of competence and proficiency as performance outcomes (Steinmayr et al., 2014; Aduke, 2015). In this study, academic achievement refers to EFL learners' English language proficiency. Numerous studies have been undertaken to investigate the factors that influence the academic achievement of students. Academic achievement is impacted by a multitude of variables. As an example, research shows that students who are more engaged in positive behavioral engagement are more likely to succeed in school (Collie et al., 2016; Liem & Martin, 2012).

Cognitive flexibility is associated with academic achievement. Cognitive flexibility is a significant predictor of academic performance (Stad et al., 2018; Lehto & Elorinne, 2003; Dong et al., 2016). Individuals with higher cognitive flexibility often do better in learning activities. Martin (2008) argued that academic buoyancy, a student's capacity to overcome typical academic obstacles and failures, is also a predictor of academic accomplishment. According to Flavell (1979), students gain from enhanced learning when they learn to reflect on their thoughts and consciously utilize tactics to improve their reasoning and problem-solving abilities. Metacognitive skills stimulate one's mental processes and can lead to enhanced learning and performance (Peng, 2012). However, no research has been uncovered that combines academic buoyancy, cognitive flexibility, metacognitive skills, and academic achievement. In this scope, the focus of this research is to develop a new conceptual model that analyses academic buoyancy, cognitive flexibility, and metacognitive skills, in the frame of reference of the literature on the factors that influence university students' language achievement.

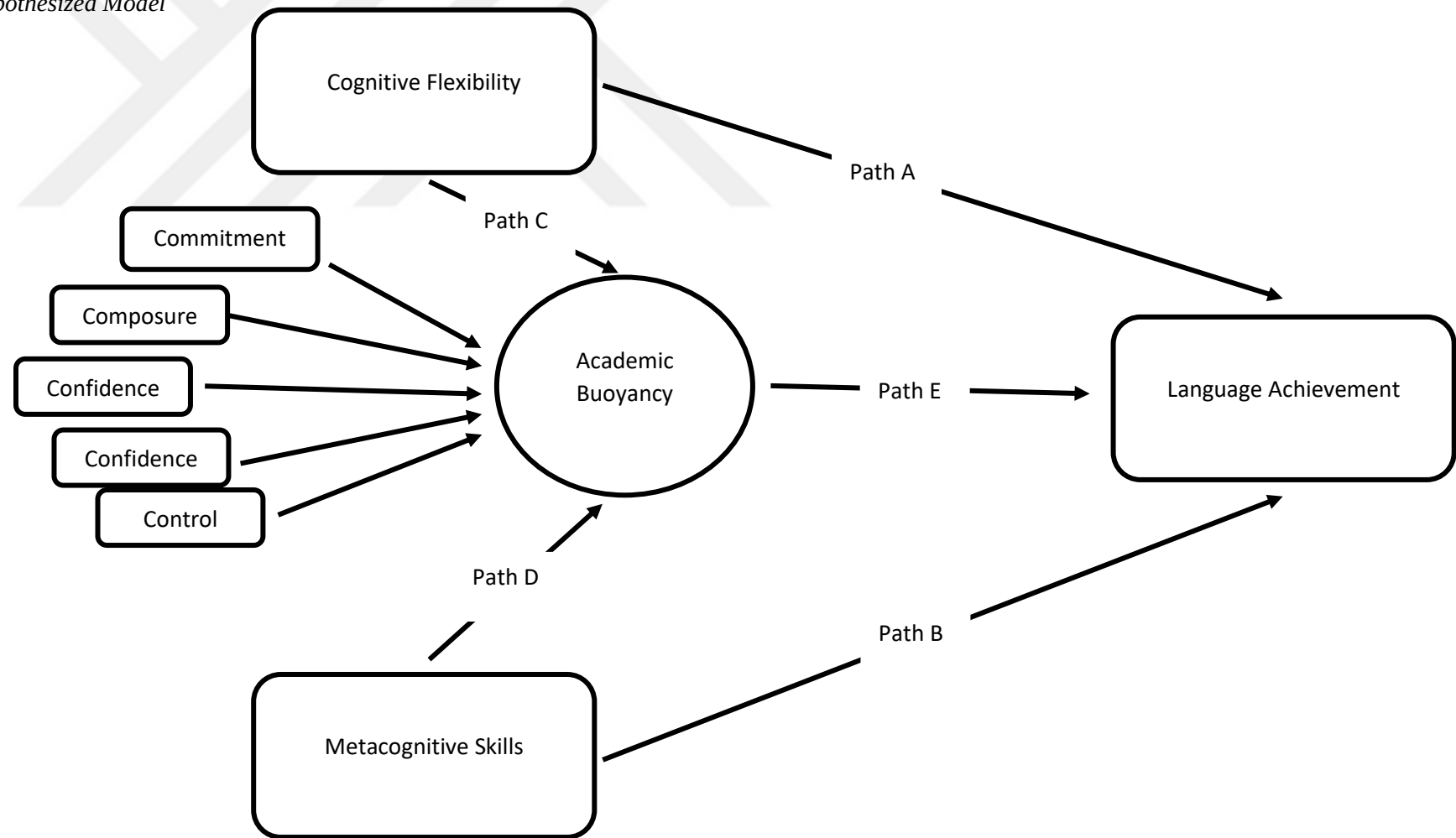
To answer the research question, a structural model (see Figure 1.1) was presented based on the relevant literature about these four variables (see Figure 1.1). Cognitive flexibility, metacognitive skills, and academic buoyancy were exogenous variables in the hypothesized path model, while academic buoyancy and academic achievement were endogenous variables. As seen in Figure 1.1, there are several links between these variables that are illustrated with single-headed arrows. The most probable path goes from cognitive flexibility directly to academic achievement. Cognitive flexibility, as defined by Cañas et al. (2003), is the capacity to adjust information processing processes in response to novel and unexpected environmental circumstances. Cognitive flexibility must be utilized not only at certain events or

times, but also in every part of daily life that demands problem-solving, communication, or creativity (Martin & Anderson, 2001; Martin et al., 1998).

Academic buoyancy, on the other hand, is described as a student's capacity to respond competently to everyday learning obstacles and is viewed as a crucial factor in determining how well students succeed in school. As a result, cognitive flexibility is believed to have a direct effect on students' academic buoyancy by enabling them to modify and alter their behavior in response to daily academic obstacles. Indirectly, cognitive flexibility may also have an effect on a student's performance. In particular, academic buoyancy will be explored as a mediator between cognitive flexibility and academic achievement in this hypothesized path model. It is expected that academic buoyancy will mediate the relationship between cognitive flexibility and academic achievement, given that cognitive flexibility will positively contribute to the academic buoyancy of students and assist them in bouncing back. Academic buoyancy will serve as a mediator between cognitive flexibility and accomplishment, allowing students with greater cognitive adaptability to enjoy greater success indirectly. The relationship between metacognitive skills and academic achievement is the next theoretically supported path (Peng, 2012; Hattie, 2009). As previously stated, metacognitive skills include specific behaviors and capacities for cognitive control, such as planning, monitoring, controlling, and adjusting task performance (Veenman & Elshout, 1999; Schraw & Moshman, 1995). Therefore, it is assumed in this study that when students utilize their metacognitive skills, it will positively affect their academic achievement. Thus, learners with metacognitive abilities will attain more success. Concerning the relationship between metacognitive skills and academic buoyancy, it is expected that metacognitive skills will have a direct favorable impact on academic buoyancy. Metacognitive reasoning is required to identify the most

effective techniques for overcoming daily obstacles. If students are able to successfully employ their metacognitive skills, this will have a direct impact on their ability to adapt to the challenges of everyday academic life, which is directly tied to academic buoyancy. In addition, an indirect relationship has been postulated between metacognitive skills and academic achievement. Specifically, it has been hypothesized that utilizing a range of metacognitive skills can increase students' academic achievement through academic buoyancy. Theoretically, it is therefore conceivable for metacognitive skills to lead to academic achievement indirectly. The last direct path is assumed to be going from academic buoyancy to academic achievement. When pupils are academically buoyant, they will do better. That is, the capacity of learners to respond effectively to daily learning obstacles is a crucial factor in determining how well students perform academically. Overall, this model will be tested by conducting path analysis on the data of the present study to determine which paths are stronger to stay.

Figure 1

Hypothesized Model

1.3. Research Question

The present study addresses the following research question:

“To what extent the language achievement of EFL learners is predicted by the hypothesized path analysis model that compromised cognitive flexibility, metacognitive skills and academic buoyancy?”

1.4. The Hypothesized Paths

The hypothesized paths including direct and indirect effects are given below.

Hypothesis 1: Cognitive flexibility is directly and positively associated with academic achievement (Path A).

Hypothesis 2: Metacognitive skills are directly and positively associated with academic achievement (Path B).

Hypothesis 3: Cognitive flexibility is directly and positively associated with academic buoyancy (Path C).

Hypothesis 4: Metacognitive skills are directly and positively associated with academic buoyancy (Path D).

Hypothesis 5: Academic buoyancy is directly and positively associated with academic achievement (Path E).

Hypothesis 6: Cognitive flexibility is positively associated with academic buoyancy, which in turn, is positively associated with academic achievement (Path C and Path E).

Hypothesis 7: Metacognitive skills are positively associated with academic buoyancy, which in turn, is positively associated with their academic achievement (Path B and Path E).

1.5. Significance of the Study

It is hoped that the findings to be obtained as a result of this study will contribute to:

1. the testing of a new theoretical model in which the relationships explaining academic achievement are determined,
2. the understanding of the factors (cognitive flexibility, metacognitive skills, and academic buoyancy) affecting academic achievement and the relations between them.

1.6. Assumptions

The findings of this research are based on some assumptions.

1. In this study, preparatory school students who made up the study group gave sincere answers to the data collection tools.
2. It is assumed that the data collection tools in the research are valid and reliable.

1.7. Limitations

This research has limitations in terms of the study group. The study group is limited to a single institution, which may limit the generalizability of these findings to other university student populations.

1.8. Definitions

1.8.1. Academic achievement: For the purposes of this study, academic achievement is the total grade point average (GPA) of students.

1.8.2. Cognitive flexibility: The total of the scores that students get from the cognitive flexibility inventory.

1.8.3. Metacognitive skills: The total scores that students get from the metacognitive skills scale utilized for the research.

1.8.4. Academic buoyancy: The scores that students get from the subscales of the academic buoyancy scale.

2. LITERATURE REVIEW

This chapter, a review of literature, is assigned to discuss the theoretical background on the concepts of academic achievement, cognitive flexibility, academic buoyancy, and metacognitive skills, respectively. After the theoretical framework, research on related concepts is mentioned with the aim of underlying the current situation in the field.

2.1. Academic Achievement

Academic achievement is described as an individual's goal attainment in a structured learning environment, such as a university or school, at the appropriate level of competence and proficiency as performance results (Steinmayr et al., 2014; Aduke, 2015). It is an important notion in educational process design and execution because it allows for many comparisons between education systems at the national and worldwide levels, as well as the evaluation of educational system outcomes (Aduke, 2015).

Academic achievement is determined by a multitude of factors, both personal and external (Atik & Özer, 2020). According to prior research, academic achievement is influenced by both students' approach to learning and their experiences with teaching-learning (Richardson, 2006). In terms of positive behavioral engagement, research indicates that persistence, planning, and task management are connected with increased academic achievement (Collie et al., 2016; Liem & Martin, 2012; Miller et al., 2013). There is no doubt about the significance of academic accomplishment in student life and later life (Kell et al., 2013), and thus educational psychology has yielded a plethora of research concerning factors that influence and correlate with academic achievement.

Cognitive flexibility, or the ability to choose between numerous representations of an item, different techniques, or multiple tasks in the face of unique or changing circumstances (Jacques & Zelazo, 2005), is linked to academic achievement (Kercood et al., 2017; Toraman et al., 2020). In a study, it was concluded that cognitive flexibility predicts the reading achievement of children in the first years of elementary school (Barnes, et al., 2022). Academic achievement is also correlated with academic buoyancy, which is described as a student's capacity to successfully manage the setbacks and obstacles common to academic life (Martin 2008; 2012, 2010). Academic buoyancy increased reading and mathematics achievement in Australian youngsters (Colmar et al., 2019). According to Flavell (1979), learning is improved when students learn to reflect on their thought processes and intentionally employ strategies to hone their reasoning and problem-solving skills. Metacognitive skills stimulate one's thinking and can lead to enhanced learning and performance (Eluemuno & Azuka, 2013; Peng, 2012). There is sufficient evidence in the literature to establish that the variables covered here have an effect on certain qualities, most notably achievement.

2.2. Executive Function and Cognitive Flexibility

Executive function (EF) is a cognitive psychology term that comprises cognitive flexibility, working memory, and inhibitory control, allowing people to plan, organize and problem-solve while also managing their impulses (Best & Miller, 2010; Anderson, 2002; Blair et al., 2005; Hughes, 2002; Miyake et al., 2000; Zelazo & Carlson, 2012). As all these cognitive functions and many more, are included in executive function, it is an umbrella term that refers to a variety of intricate cognitive processes and is most closely associated with the frontal lobe and prefrontal cortex activities in the brain (Sue-Baron, 2004). EF is the exertion of control on self,

thoughts, and others, and is highly required when confronted with new challenges, changes, and unknown information (Dick et al., 2005). It paves the way for various thoughts, feelings, and behavior including three aspects namely, inhibition, working memory, and cognitive flexibility. As for inhibition, it is the urge to go along despite hardships while working memory as the second aspect is the ability to store the necessary information to use that information in new contexts. Lastly, cognitive flexibility leads to attaining long-term goals and comprises the focus of this research (Keith et al., 2015). Both cognitive flexibility and working memory predict creative thinking (Figueroa, 2017), which is supposed to be an indicator of shifting smoothly in case of new problems and setbacks.

Executive functions and cognitive processes coexist. Flexibility in this notion is defined as the capacity to develop thoughts and reactions and adjust them as needed (Lezak et al., 2004), and it is at the heart of executive processes (Carlson, 2005). Cognitive flexibility is one of the characteristics of EF. According to Deak (2004), flexible cognition is the process through which cognitive processes are activated and modified in response to changing task demands and contextual circumstances. It encompasses our capacity to divert our attention and choose acceptable replies. According to Bakos et al. (2008), executive functioning is critical at all stages of life (Pureza et al., 2011). Individuals who possess this ability can substitute more balanced and flexible thinking with persuasive and inconsistent thinking; they can generate alternative answers and create challenges to be better equipped to cope with them (Gülüm & Dağ, 2012).

2.2.1. Definition of cognitive flexibility

Cognitive flexibility was initially defined by Spiro and Jehng (1990) as the capacity to adaptably reassemble diverse informational components to satisfy the precise requirements of a given comprehension or problem-solving scenario. Several other conceptualizations of cognitive flexibility have been offered since then.

Cognitive flexibility is a person's (a) awareness that there are choices and alternatives in a given situation, (b) willingness or ability to adapt to the new environment, and (c) belief or expectation of competence (perceived self-efficacy) regarding flexibility (Martin & Anderson, 1998). It is defined by Ciairano et al., (2006) as the capacity of a person to resist automaticity and to imagine the future while remaining in the present. According to Burgess (2011), cognitive flexibility is the capacity to regulate individuals' ideas and behaviors in response to situational demands. Dennis and Vander Wal (2009) asserted that cognitive flexibility could be predicated on the following:

1. Assuring the individual's control in the face of a problem
2. Life is not routine, and each scenario necessitates a unique search.
3. Capacity to generate solutions in the face of adversity.

Rende (2000) provided the most exhaustive understanding of cognitive flexibility by recognizing two forms of cognitive flexibility as reactive and spontaneous. The former is the capacity to adapt cognition or behavior freely in response to a change in task or contextual demand, while the latter is fluency. Fluency refers to the capacity to develop multiple sets of ideas, to explore the diverse range of replies in each event and adapt mental processes to translate responses into actions. To be cognitively flexible, one must be able to flip back and forth between two

distinct conceptions or to think about numerous concepts concurrently (Scott, 1962). Another way to define cognitive flexibility is the capacity to select between numerous representations of an item, different techniques, or multiple activities in response to specific or changing circumstances (Jacques & Zelazo, 2005). According to Dreisbach and Goschke (2004), cognitive flexibility enables adaptation to novel conditions.

Cognitive flexibility as a crucial part of executive functioning plays a huge role in terms of decision making and allows using several strategies and the need to adapt based on the requirements of various problems and tasks as well as contexts (Jaffe, 1995; Gnaedinger, 2015). It may also ensure certainty in novel situations (Güvenç, 2019). Cox (1980) asserted that cognitive flexibility is whether an individual can shift their way of thinking when confronted with a task. That is, cognitive flexibility allows flexible thinking and making changes easily. In addition, cognitive flexibility has to do with problem-solving and going back and forth regarding the steps to be taken during the process of problem-solving. As argued by Bilgiç (2015), youngsters can also develop cognitive flexibility, as those with a good level of flexibility are adept at decision-making processes. All exemplify that flexibility in thinking is achieved via cognitive flexibility. Three major perspectives on cognitive flexibility can be summarized as follows:

- Cognitive flexibility is a talent that explains how people learn.
 - It is the result of a mix of cognitive processing methods and flexibility.
- Individual behavioral adaptations and modifications are referred to as behavioral changes.
- Experience may teach you how to adjust to continually changing conditions.

This suggests that cognitive flexibility may be achieved through education (Cañas et al., 2006).

Well-functioning of cognitive flexibility has been favored; however, the opposite may bring out some issues. That is, malfunctioning of cognitive flexibility brings forward some problems, one of which is depression unlike anxiety levels of individuals (Delano-Wood, 2002; Güler et al., 2015). Cognitive flexibility has to do with controlling emotions and self-regulation as Atasoy and Baki (2020) proposed. Happiness is also associated with the proper functioning of cognitive flexibility of young adults regarding the emotions of individuals (Balta, 2020). The results of Doğan- Laçın and Yalçın's (2019) study revealed that the level of self-efficacy and self-confidence and searching for ways for social support refer to cognitive flexibility. There is also a statistical significance in terms of the relationship between cognitive flexibility and resilience as a component of the well-being of individuals (Bozkurt, 2019).

2.2.2. Measuring cognitive flexibility

Cognitive flexibility is assessed using a variety of approaches, including paper and pencil exams, card matching, sequencing, and anagrams, as well as numerous assessment technologies, including computer applications. The most extensively used self-report assessments to assess cognitive flexibility are the Cognitive Flexibility Scale (Martin & Rubin, 1995) and the Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010). Martin and Rubin (1995) developed the Cognitive Flexibility Scale, a 12-item 6-point Likert type questionnaire. This scale examines communication abilities, specifically the link between effective communication and adaptability. Three characteristics are evaluated: sensitivity to communication elements, willingness to adjust to new conditions, and adaptability. Altunkol (2011) conducted the Turkish language adaptation research of Martin and Rubin's (1995) Cognitive Flexibility Scale. Dennis and Vander Wal (2010) created a 20-item; two-

dimensional cognitive flexibility inventory based on self-reports to assess cognitive flexibility. As mentioned, this inventory was subdivided into two categories: alternatives and control. The alternatives subscale assesses the capacity to envision alternative outcomes to events and human behaviors encountered in daily life, as well as the capacity to generate a large number of solutions to challenging problems. The control subscale assesses an individual's proclivity for perceiving challenging events as controllable. Gülüm and Dağ (2012) tested the Turkish adaption of Cognitive Flexibility Inventory (Dennis & Vander Wal, 2010) on a sample of university students. 20-item Cognitive Flexibility Scale which comprises adjective pairs is one of the methods used to assess cognitive flexibility (Bilgin, 2009).

The Wisconsin Card Sorting Exam is the most often used neuropsychological test for evaluating cognitive flexibility (Johnco et al., 2014). Participants are asked to sort the cards according to their color, shape, or number, and then modify the ordering system to accommodate the new variation.

The Stroop Test is another often-used assessment method for cognitive flexibility. Participants are provided with color names written in a variety of various ink hues and asked to read them quickly. Performance is assessed by substituting the color of the ink for the word or by increasing the duration of the color statement (Çuhadaroglu, 2011; Dennis & Vander Wal, 2010) The purpose of this experiment is to determine an individual's ability to suppress a habitual behavioral pattern and its capacity to generate a new behavioral pattern.

2.2.3. Characteristics of cognitively flexible individuals

Cognitively flexible individuals exhibit a few features. First, they are good at communication. These individuals regard themselves as competent in interpersonal

relationships. They believe that they are forceful and responsible, have an interest in mutual experiences, and can make sense of them. Additionally, people with cognitive flexibility believe they can communicate well in a variety of scenarios; they are willing to adapt and experiment with new modes of communication to satisfy their demands when confronted with unexpected situations. Simultaneously, cognitive flexibility encompasses an individual's capacity for flexibility. When confronted with novel conditions, cognitively flexible individuals are willing to experiment with new modes of communication and change their behavior to fulfill their demands (Martin & Anderson, 1998).

Secondly, cognitively flexible individuals can be regarded as problem-solvers. Spiro describes cognitive flexibility as the capacity to recombine disparate pieces of the information correctly in a problem-solving situation or to restructure one's spontaneous knowledge to meet changing demands (Swain et al. 2001). It is well established that cognitive flexibility in the face of social challenges contributes significantly to individuals problem-solving ability (Stevens, 2009) and they employ more active coping techniques and less negative coping strategies (Bedel & Ulubey, 2015).

Thirdly, cognitively flexible people are adjustable. While performing a complicated task, an individual is required to adjust his behavior to the conditions of the activity. However, because external factors change throughout the activity, the individual must continually examine them to maintain flexibility. At this moment, the individual's knowledge must be restructured to adjust his actions to new circumstances and appropriately comprehend the new scenario. As a result, cognitive flexibility is highly dependent on the attention processes and knowledge representation of the person (Cañas et al., 2006).

Finally, cognitively flexible individuals are open to changes (Anderson, 2002; Gündüz, 2013). Others who are able to consider alternative responses to life situations are more intellectually flexible than individuals with a greater level of cognitive flexibility (Bilgin, 2009; Diril, 2011).

As was said before, people who are cognitively flexible not only have many excellent features for education, but they also have a number of positive characteristics for life.

2.2.4. Cognitive flexibility in education

As for the studies conducted in educational settings, Kömür (2018) expresses that learners' cognitive flexibility and the way they deal with stress varies according to gender, educational level of parents, level of income, GPA, and psychological counseling received. Additionally, once learners were exposed to the cognitive flexibility program as suggested by Altunkol (2017), it was found that learners had less stress, and they made use of their coping strategies. Apart from that, it was revealed that the level of cognitive flexibility significantly predicted the level of emotional autonomy of learners (S. Öztürk, 2019). In line with the studies mentioned, according to gender and academic level, the decision-making techniques and cognitive flexibility of secondary and higher education students varied (Bilgiç, 2015). In addition, the age variable was not a predictor of cognitive flexibility for high school and university students (Güler et al., 2015). Bertiz (2018) further demonstrated learner cognitive flexibility correlated with learner motivation with respect to distance education. Moreover, cognitive flexibility predicted the reading achievement of children in the first years of elementary school (Barnes et al., 2020). Lastly, learners' parents' level of education and their children's cognitive flexibility contributed to the number sense of children (Gökdağ, 2020).

Cognitive flexibility may vary concerning gender and school type but not necessarily on age and income level as stated by Kabataş (2020). However, Yaşar (2019) suggested cognitive flexibility varies concerning personal interest, age, and majors. Tutuş (2019) also mentioned gender, age, and the level of income were not the predictors of cognitive flexibility while adopting a self-confident attitude correlates with cognitive flexibility. In Sucu (2020), how male and female students deal with new situations and produce alternatives did not vary while students with cognitive flexibility were more capable to solve problems ahead. Güvenç (2019) proposed that while the cognitive flexibility levels of university students meaningfully differentiate according to gender, their intolerance of uncertainty levels did not.

Regarding teachers, Akyüz (2020) indicated that the relationship between cognitive awareness, flexibility, and self-efficacy differs for the reading and academic achievement of pre-service teachers. Likewise, Başpınar (2019) stated cognitive flexibility predicts better teaching qualifications for teachers. S.Öztürk (2019) also suggested that emotional autonomy and cognitive flexibility are related. Kaptanbaş-Gürbüz (2018) further implied teachers' cognitive flexibility and self-efficacy correlate.

Bicultural individuals possess high levels of cognitive flexibility, as they are to cope with novel instances more in various settings (Shimogori, 2013). When one lives in a different setting and speaks other languages, the comparison of monolinguals and bilinguals comes to the fore. Among several studies, monolinguals compared to bilinguals scored higher with respect to the tests including measures of cognitive flexibility (Lemmon & Goggin, 1989). As opposed to it, Climie (2008) proposed that there are variations in executive functioning of monolingual and bilingual children, and bilingual children were advantageous in some measures in line with Karsli and

Karakelle (2018) who suggested bilingual learners perform better in terms of cognitive flexibility and accurate judgments as opposed to monolingual learners. Foreign language learning motivation and cognitive flexibility seemed to correlate in Çetin (2020).

2.3. Academic Buoyancy

Buoyancy is described as an upward force exerted on an item in a fluid that determines whether the object rises, sinks, or remains stationary in the fluid (Young & Freedman, 2012). As a starting point for a fresh line of investigation into these crucial student behaviors, the buoyancy construct is given. In the context of education, buoyancy is referred to as a student's academic buoyancy. According to Martin and Marsh (2008), buoyancy is students' capacity to overcome everyday setbacks and obstacles.

Martin and Marsh (2008) characterized the students' capacity to cope with the daily obstacles and stressful events that they face in school (Martin et al. 2010). Martin and Marsh (2009) established the notion of academic buoyancy as a method of investigating constructive and positive reactions to a range of hurdles encountered by students in the current academic year or schools, such as high-risk test stress, bad marks, and so on. One of the most important elements behind academic buoyancy is the need of capitalizing on one's strengths and taking a proactive rather than a reactive response to setbacks or problems (Martin, 2008).

There is a dearth of research on how students react to classroom expectations and obstacles (Martin 2002; 2008; 2012; 2013). Academic buoyancy is identified as an adaptive concept that has both positive and negative correlates (Martin & Marsh 2006; 2008; 2009). When confronted with the obstacles of rigorous academic

programs, students can experience a range of emotions that are related to their ability to face and achieve their academic objectives (Putwain & Daly, 2013). As opposed to some students who appear to sail through their coursework, others may find themselves struggling in their academic performance when they are faced with academic adversity. Thus, students who are good at school are called academic buoyant meaning they can deal with the challenges and stress of everyday school life (Martin & Marsh, 2006; Martin et al., 2010; Martin, 2013).

The phrase "academic buoyancy" refers to a crucial quality that helps pupils manage academic risk (Martin & Marsh, 2009; Putwain et al., 2012). Academic buoyancy is associated with a range of adaptive educational outcomes, such as school engagement, academic self-efficacy, planning, persistence, and self-control, as well as low levels of test and academic anxiety (Martin, 2013; Martin et al., 2010; Putwain & Daly, 2013). Therefore, academic buoyancy has been recognized as a trait that practitioners should promote in order to assist students in navigating academic hurdles successfully (Collie et al., 2017).

2.3.1. Academic buoyancy vs. academic resilience

Martin (2002) analyzed buoyancy, a motivation and engagement model that serves as the concept's foundation. Martin first interchanged the words academic resilience and academic buoyancy. Since 2008, academic buoyancy most commonly refers to students' ability to recover from failures, challenges, and barriers experienced in daily academic life (Martin, 2008). Martin argued that academic buoyancy, in addition to motivation and engagement, was equally crucial to academic achievement. According to Martin and Marsh (2008), buoyancy is a condition of resilience, but it is not the same as resiliency itself. On a practical level, students must first be able to

manage their daily lives (buoyancy) before they can be expected to deal with more significant challenges later (resilience) (Martin & Marsh, 2008; 2009).

The distinction between the two perspectives has been demonstrated scientifically. For instance, buoyancy is more highly related to low-level adverse consequences such as academic anxiety, uncertain control, and failure avoidance, whereas resilience is more strongly related to severe adverse consequences such as school abandonment (Martin, 2013). Academic resilience has advantages in the face of persistent underachievement, whereas academic buoyancy has advantages in the face of intermittent low grades and lapses in performance. Academic resilience is advantageous when confronted with the debilitating effects of frequent failure or anxiety, whereas academic buoyancy is advantageous when confronted with confidence concerns resulting from a low grade. Academic resilience is necessary for managing chronic symptoms such as anxiety and depression, whereas academic buoyancy is necessary for managing low-level stress and insecurity. Academic resilience is important when dealing with absenteeism and school dislike or disdain, but academic buoyancy is important when motivation and engagement levels fall. Academic resilience is favorable when confronted with broad and prolonged alienation or dislike for instructors, but academic buoyancy is good when dealing with minor encounters such as poor coursework feedback (Martin & Marsh, 2008; Smith, 2020). When one considers the degree of divergence between the two, one might see academic buoyancy as a necessary but insufficient requirement for academic resilience (Martin & Marsh, 2008).

2.3.2. Academic buoyancy and motivation

Motivation is a phrase commonly employed to describe what gets people started, keeps them going, and enables them to complete tasks (Pintrich & Schunk,

2002). Thus, at its most fundamental level, motivation resonates with the core and substance of academic buoyancy, which seeks to explain students' ability and tries to persevere in the face of academic difficulties and failure. In this regard, one may hypothesize that motivation is indicative of academic success. According to Pintrich (2003), motivation influences four major outcomes: the selection of activities, the degree of engagement, the persistence throughout an activity, and the performance of an individual in that activity. Consequently, it is hypothesized that motivation will determine students' choice of reaction to academic difficulties, the level to which they trigger this behavior, and the extent to which they retain this reaction in connection to academic buoyancy.

Pintrich (2003) discovered important components of motivation that are transferable across theories and predict the aforementioned motivation outcomes. These three elements are expectancy, value, and emotion. Expectancy components, which include self-efficacy and control beliefs, are focused on students' conviction in their capacity to achieve the goals they set for themselves. Self-efficacy is also linked to self-regulating actions such as planning (Pintrich, 2003). Individuals that display a high level of intrinsic motivation are more likely to engage in and stay with a particular task or activity (Ryan & Deci, 2000). Affective components of motivation focus on how individuals feel prior to, during, and after completing a task, with anxiety garnering the greatest conceptual and empirical attention (Pintrich, 2003).

The 5Cs of academic buoyancy identified in a study by Martin and Marsh (2006) constitute a motivational set when these three core components of motivation and some specific factors that subsume them are considered (Martin et al., 2010).

2.3.3. Motivational predictors of academic buoyancy: the 5Cs

Numerous motivational theories and notions theoretically support academic buoyancy. Broadly speaking, such derived motivational theories seek to explain both the basic causes for students' conduct and their belief in their capacity to recover from setbacks (Martin 2002; 2012). Martin (2002) argued that while motivation is essential for academic achievement, academic growth may be jeopardized if students are not also robust to the everyday demands, stress, and failures associated with academic contexts. Students must constantly be self-motivated and resilient, which demands buoyancy. Martin and Marsh (2006) initially investigated the connections between academic buoyancy and several motivating variables. In the study conducted by Martin and Marsh (2006), 402 Australian high school students filled out an academic buoyancy survey and a multidimensional motivation instrument. Diverse motivational factors have been provisionally identified as having a strong relationship with the academic buoyancy of students. "Confidence (high self-efficacy), coordination (high planning), commitment (high persistence), composure (low anxiety), and control (low uncertain control)" were identified as the "5Cs" of academic buoyancy (Martin et al., 2010).

Furthermore, Martin et al. (2010), conducted longitudinal research to see whether the 5Cs are stable over time, building on previous work (Martin & Marsh, 2006) that identified five motivating drivers of academic buoyancy in the high school context. In the study that was conducted by Martin et al. (2010), a total of 1,866 high school students from six different schools in Australia were observed over the course of two years. Utilizing the Academic Buoyancy Scale, this study measured academic buoyancy at two distinct time intervals. The 5Cs, motivating determinants of academic buoyancy were all evaluated with the "Motivation and Engagement Scale-

High School” (Martin, 2008), a multidimensional motivation evaluation tool. Each component had four items that were graded on a scale from 1 to 7 (strongly disagree to strongly agree). The analysis demonstrated that the 5Cs are significant predictors of academic buoyancy and partially mediated the effects of earlier academic buoyancy on subsequent academic buoyancy.

It has been the goal of academic buoyancy to uncover the critical factors for students to successfully navigate and conquer academic difficulties. The five components of the “Motivation and Engagement Wheel” were shown to be extremely essential in helping students recover from setbacks. On the wheel;

Confidence –is self-belief.

Coordination –is the process of planning and monitoring.

Commitment – is persistence.

Composure – is low anxiety.

Control – is low uncertain control.

2.3.4. The 5Cs: Confidence, coordination, commitment, composure, control

2.3.4.1 Confidence

Confidence is students' belief in their ability to grasp or do well in schoolwork, meet problems they face, and perform to the best of their abilities is referred to as self-belief. Students who have strong self-belief are more likely to achieve higher academic outcomes, tackle challenging tasks with confidence, be optimistic, work hard, and enjoy school (Martin, 2010; Martin, 2020). It is the students' confidence in their ability to complete the tasks they set for themselves in homework and study.

Alternatively, the degree to which students believe in themselves in their academic lives (Martin, 2020).

2.3.4.2 Coordination

Coordination refers to planning and coordination based on Motivation and Engagement Wheel (Martin, 2008). The amount to which students manage their assignments, homework, or studies, as well as the extent to which they maintain track of their progress while doing these things, are referred to as planning and monitoring, respectively. To illustrate, coordination, in this context, refers to developing objectives or ideas for the near term, the upcoming year, or even for the remainder of a student's school career. Students need to have immediate short-term plans to achieve their long-term goals. Proximal, or immediate short-term plans, are necessary for students to achieve their long-term goals. Students who plan and monitor their schoolwork are more likely to feel in control of their schoolwork, persevere in tough schoolwork, and make good use of their time and abilities (Martin, 2020).

2.3.4.3 Control

Control, or uncertain control, is when a sense of powerlessness can enter students' academic lives, and they may feel they are not in control. Students who believe they are falling behind academically have a more difficult time dealing with setbacks (Martin, 2020). Control is a term that alludes to a student's sense of having a voice in decisions. Students believe that there is little or nothing they can do to avoid failure, repeat failure, or achieve success if they are uncertain about their control. It is easier for students to feel in command of their academic performance if they understand how to do well or avoid doing poorly. Students who have a strong sense of control believe that they can have an impact on the outcomes of their school life activities. For instance, if a student makes an effort, he or she can affect change and

achieve a result. That is, they can prevent failure or achieve success by exerting the necessary amount and quality of effort. Martin (2010) and Collie et al. (2015) found that prior academic buoyancy predicts future academic buoyancy and accomplishment thru the mediating role of a sense of control. The control component refers to students' perceptions of their drive and influence in achieving success or avoiding failure (Weiner, 2010). In comparison, an unclear feeling of control reveals a lack of confidence in one's ability to succeed or avoid failure (Patrick et al., 1993).

2.3.4.4 Commitment

Commitment is the degree to which learners attempt to solve or comprehend an issue, even when it is tough. It is what a student does when they encounter a roadblock, when they do not get an answer correctly the first time, or when chores are large or multi-part. It will play a significant role in their journey through and out of that. Persistent students are more likely to accomplish goals, are determined to succeed, and are adept at problem-solving (Martin, 2020). Schoolwork can be strenuous and demanding. Hence, students must demonstrate a degree of commitment that will enable them to overcome obstacles. Commitment is what separates learners who become academically trapped from those who persevere to excel. Commitment teaches learners to think in terms of solutions and motivates them to approach challenging circumstances in novel and effective ways (Martin, 2010; 2020).

2.3.4.5 Composure

Composure in 5C refers to academic anxiety, which refers to feeling nervous and worried in the academic context (Martin, 2008; Collie et al., 2017). Anxiety and composure are frequently divided into two components. The first component is the thinking component, which we commonly refer to as worry. The second component

of anxiety is the feeling component, sometimes known as nerves or nervousness, which may include some additional physiological symptoms. Nervousness is unpleasant and ill-feeling that students get while they consider or complete coursework, tasks, or tests. What concerns them is their dread of not performing adequately on their coursework, assignments, or tests. When students are worried, they often struggle to concentrate, pay attention, recall information, and complete high-quality coursework. In terms of education, the most prevalent sort of anxiety that children face is test anxiety (Martin, 2010). Composure may benefit academic achievement (Cassady & Johnson, 2002). Students who are composed are better equipped to handle their anxieties and are more likely to recover from academic setbacks (Martin, 2020).

2.4. Metacognition

Metacognition has evolved as a critical topic of cognitive-developmental research over the last four decades. Metacognition research began with John Flavell, who is often recognized as the field's creator, and there has been a substantial amount of empirical and theoretical research on the issue since then. Flavell (1979) defined metacognition as "knowledge and cognition about cognitive processes" (p.906). Although the term metacognition is imprecise, certain meanings in education are universally accepted. For instance, Schunk (2016) and Ormrod (2019) defined metacognition as knowledge about one's learning. Additionally, Wilson (1999) has described metacognition as consciousness and understanding of thought processes and tactics, as well as the capacity to examine and regulate thought processes. According to Senemoğlu (2013), metacognition is the individual's comprehension of the cognitive system, its structure, and its function; in other words, the individual's ability to monitor and alter his or her cognitive structure, learning characteristics, and

cognitive processes. Martinez (2006) defines metacognition as the monitoring and management of thought.

Gourgey (2001) asserted that metacognition allows individuals to define the nature of a task or problem, choose an appropriate mental and physical representation, choose the best way to do the task, divide up resources like time, use relevant prior knowledge, pay attention to feedback on how the task is going, and use feedback to improve performance, either while doing the task or in a plan. Metacognition allows a person to use information in a strategic way to get the most out of it.

Metacognition, as defined by Flavell (1979), is the capacity to plan, monitor, and assess one's learning and it is actively monitoring and regulating cognitive processes in order to achieve a specific purpose. Thus, metacognition refers to the awareness of all cognitive activity performed during a certain action. It aids in cognitive activity management by assisting with task selection, monitoring, and evaluation. Flavell (1979) notes that monitoring a wide variety of cognitive activities is performed by the actions and interactions of four separate categories of occurrences:

1. metacognitive knowledge,
2. metacognitive experiences,
3. metacognitive goals (or tasks),
4. metacognitive strategies (or actions).

2.4.1. Metacognitive knowledge

Metacognitive knowledge is a person's bundle of beliefs and facts regarding cognition and learning. Metacognitive knowledge is divided into three categories: person knowledge, task knowledge, and strategy knowledge. Person knowledge is the

understanding of an individual's or another's intellectual processes, self-efficacy, motivation, or interests (Flavell, 1979). The second is task knowledge, which is concerned with information about the context of a task, such as its purpose, nature, types, available information, and work requirements (Flavell, 1979; Vandergrift et al., 2006). To illustrate, a student may believe that s/he cannot readily learn something while listening to music. The task variable specifies the type of task that will be transformed into a cognitive enterprise. For instance, a student may be aware that reading and comprehending a science text will take longer than reading and comprehending a fiction (Livingston, 2003). The final element is strategy knowledge, which entails an understanding of which tactics are effective for completing particular tasks. Knowledge of strategies can be beneficial in assisting learners in making strategy selections. Because students can acquire metacognitive knowledge, it can evolve over time and with new learning opportunities (Flavell, 1979; van Velzen, 2016). For example, a learner may assume that the most effective method of learning is to select key themes and write them in his or her own words. Alternatively, a learner may believe that it is preferable to use strategy X (instead of strategy Y) during his/her English course (instead of geography course). Flavell (1979) noted that metacognitive knowledge is comprised of the interactions between these three variables.

Metacognitive knowledge is utilized to control thought and learning (Nelson 1996; Schraw & Moshman, 1995). The three important regulatory skills of planning, monitoring, and evaluation are frequently referred to as metacognitive strategies. Schraw & Moshman (1995) described planning as the process of identifying appropriate strategies and allocating resources to achieve desired results. As regulatory planning abilities, assessing the nature of the task, the objective, the

required methods, the time frame, and other sorts of resources are described (Schraw, 1998). Monitoring is defined as the dynamic knowledge of an individual's process of processing content and accomplishing a task (Schraw & Moshman, 1995). Monitoring abilities include detecting whether someone fully understands a task, discussing whether the activity is meaningful, calculating whether one is on track to meet goals, and determining whether a change is necessary (Schraw, 1998). The term evaluation refers to both the process of judging a thing's worth and the regulating process of instruction (Schraw & Moshman, 1995). Evaluation involves judging whether a goal has been accomplished, analyzing both operational and non-operational components, and selecting the next course of action (Schraw, 1998).

2.4.2. Metacognitive experience

Metacognitive experiences are conscious intellectual ventures that typically occur in highly conscious thinking conditions and aid an individual in acquiring information or assuring the occurrence of the regulation (Flavell, 1979). What distinguishes these experiences as metacognitive is their cognitive effort. They are systems that contribute to the activation of cognitive enterprise strategies by adding, removing, and modifying metacognitive knowledge. A person may have a metacognitive experience if he or she believes the task is difficult to comprehend, remember, or solve and believes that achieving the cognitive goal would require considerable effort (Flavell, 1976; Flavell, 1979). Metacognitive experiences can occur prior to, during, and after cognitive tasks. When a person realizes that s/he does not comprehend a text they have read, they may strive to fix the issue by rereading, reflecting on what they have understood, continuing to read in order to find information that will help in their comprehension, seeking assistance, or altering their objective for the learning unit (Altındağ, 2008). Another instance of metacognitive

experience is when, while dealing with a problem, one suddenly recalls having encountered and resolved a similar issue previously. Metacognitive experiences aid in the revision of cognition, the establishment of new objectives, and the modification of existing goals or tactics. Thus, metacognitive experiences are critical for revising and managing metacognitive knowledge (Flavell, 1979).

2.4.3. Metacognitive goals (tasks)

Metacognitive goals and tasks are the third concept in the model. It refers to the results or goals of a certain cognitive endeavor. Examples of objectives and tasks include comprehending, memorizing knowledge, generating something, such as producing writing or a solution to a mathematical equation, or simply increasing one's comprehension of a subject. Achieving a goal requires a significant quantity of metacognitive knowledge and experience (Flavell, 1979). Metacognitive experiences can activate both cognitive and metacognitive goal-directed processes. As an example of the former, suppose a person discovers that s/he does not understand a certain subject well enough to pass the exam the next day and rereads it. In this case, the goal of metacognition is to evaluate one's knowledge.

2.4.4. Metacognitive strategies (actions)

Metacognitive strategies refer to cognitive actions and other systematic procedures to ensure that a cognitive goal has been reached. They are targeted at the metacognitive goal of evaluating one's knowledge, which results in successive metacognitive experiences. In her examination of Flavell's argument, Livingston (2003) acknowledged that metacognitive and cognitive strategies crossover in that the same approach may be characterized as either cognitive or metacognitive, based on the goals. Metacognitive methods are essentially self-assessments for evaluating learning; they are intended to track cognitive development. A person with strong

metacognitive skills and awareness uses these processes to oversee his learning, organize and monitor ongoing cognitive tasks, and compare his/her cognitive results to norms from within or outside himself/herself. Cognitive procedures are employed to make cognitive progress, whereas metacognitive strategies are used to keep track of progress. Flavell (1979) highlights that in cognitive or metacognitive domains; only one technique may be used to achieve a goal. He cited the example of asking oneself questions at the conclusion of a learning unit to increase understanding of the content or to check retention and appraisal of newly acquired information.

2.4.5. Metacognitive skills

Despite the fact that numerous research studies have demonstrated the role of metacognitive competencies in learning, it is commonly acknowledged that metacognitive knowledge or regulation is insufficient to increase student accomplishment (Whitebread, 1999). Individuals may struggle to master skills and tactics even when they possess metacognitive knowledge about their learning and performance (Schraw, 1995). It is commonly acknowledged that metacognitive knowledge or regulation is insufficient to increase student accomplishment (Whitebread, 1999). Students must also be inspired to use their metacognitive skills (Zimmerman, 1990; Bandura et al., 1996).

Coordination of metacognitive regulation and knowledge is essential for the successful execution of a cognitive task (A.L. Brown, 1978). Metacognitive skills encompass specific behaviors and capacities for cognitive control, such as planning, monitoring, controlling, and adjusting task performance (Veenman & Elshout, 1999; Schraw & Moshman 1995).

To put metacognitive skills to work, a student must be well knowledgeable about learning processes. Student behavior and thought processes that govern cognitive strategies such as storage and retrieval, as well as metacognitive processes, and ultimately influence student learning are referred to as learning strategies. (Senemoğlu, 2013). The metacognitive skills of a student who efficiently manages his or her study time employ the appropriate learning strategies and can forecast the grade to receive on an exam or which questions to correctly answer; all contribute to the student's learning improvement (Erden & Akman, 2015).

According to Efklides (2009), metacognitive abilities are the control function of metacognition, or things that an individual does actively to control cognition. Consequently, they focus on action control and strategy use, in which learners comprehend the techniques and how to employ them, and then employ the strategies as necessary (Efklides, 2008; Veenman et al., 2004). These are analogous to cognitive regulation in that they include activity-based control of students' learning (Schraw, 1998). They are related to metacognitive knowledge since one cannot verify the result of a calculation without comparing it to an estimate or recalculating the result in a different method without metacognitive strategy knowledge (Veenman et al., 2006).

In Efklides (2006; 2009) it was asserted that metacognitive skills can be used as a predetermined element of a deliberately defined course of action, or they can be activated once cognitive processing fails, requiring control of the failed action, or when metacognitive experiences display a lack of fluency in cognitive processing and necessitate control decisions. Metacognitive skills include the basic types of strategies listed below:

1. "Orientation strategies

2. Planning strategies
3. Strategies for regulating cognitive processing
4. Strategies for checking (monitoring) the implementation of the planned action.
5. Strategies for the evaluation of the outcome of the task
6. Strategies for recapitulation and self-regulation” (Efklides, 2009, pp. 79-80).

2.5. Related Research

2.5.1. Research on academic achievement

The exploration of academic achievement has led to numerous empirical studies and fundamental progress. Affective factors such as motivation and self-regulation have been the subject of many studies. For instance, in a study by Yumuşak (2006), the role of motivational beliefs in cognitive and metacognitive strategy use in Turkish high school students' biology achievement was examined. Both extrinsic goal orientation and task value significantly impacted students' achievement. In contrast, intrinsic goal orientation, control of learning attitudes, self-efficacy for learning and performance, and test anxiety did not significantly predict academic achievement.

G.Aydın (2012) examined the relationship between academic achievement and motivation, attitudes, and perceptions of 310 university preparatory school students in her master's thesis. To begin, she discovered that students lacked integrative motivation but possessed a high level of instrumental motivation. Additionally, she discovered that, of the students' attitudes and perceptions, motivation was the least predictive of achievement. Another variable that attracted attention in the literature is concerned with self-regulation and academic achievement. Yeniçikan (2020) did research to determine the association between self-regulation tactics used by university students and their academic achievement. This study also aimed to identify whether there is a substantial difference in students' self-regulation tactics and

academic performance based on gender, high school history, and department.

According to the study's findings, the academic performance of university students varies depending on their employment of self-regulation tactics. This indicates that the more pupils who utilize self-regulation skills, the more academically successful they are. Female students were also shown to employ more self-regulation skills and to be more successful in their language learning process. Students in the law and psychology disciplines were also found to be more academically successful. Budak (2016) intended to identify fourth-grade kids' academic performance in math class, as well as the interplay between their self-regulating methods, metacognitive skills, and motivations, and the impacts of self-regulating learning techniques, metacognitive skills, and mathematics motivational activities on primary school children's mathematical successes. The findings indicate that the academic achievement of students was excellent, as were their motivation and self-regulation skills, as well as their metacognitive abilities. Furthermore, there were no significant differences in fourth-grade students' academic success, self-regulating learning techniques, mathematical motivation, or metacognitive skill levels depending on gender, parental education level, or attendance at preschool. Finally, there was a link between students' self-regulation strategies, mathematical motivation and metacognitive skill levels, and academic accomplishment.

Academic achievement has been studied in language learning settings and it was out that academic achievement is a predictor of language achievement (Aydın, 2012). Baklacioğlu (2011) evaluated the influence of English teaching styles on many dimensions of academic achievement. Findings revealed that there was a favorable association between academic achievement and the use of learning strategies repeatedly. Students with the highest accomplishment levels made

considerable use of metacognitive strategies. Similarly, Aydın (2012) examined the role of demographic variables, English proficiency levels, as well as personal and affective factors, in predicting academic success for language preparatory school students. According to the findings, English proficiency level, classroom communication, stress and time pressure, and English self-concept were identified as significant predictors of language achievement. The findings indicated that students who demonstrated a high proficiency level, improved communication skills within the classroom, a positive self-concept in English, and experienced greater stress during the studies earned higher scores on English proficiency exams. It is clear from the literature that academic achievement has been studied not only in language learning but also in other subjects.

2.5.2. Research on cognitive flexibility

2.5.2.1 Research in Turkey

In Turkey, cognitive flexibility research often focuses on achievement, demographics, and certain emotional aspects. There was no substantial influence of cognitive flexibility on performance (Alper, 2003). When investigating the link between cognitive flexibility and student accomplishment, retention, and attitudes in web-mediated problem-based learning, it became evident that cognitive flexibility did not produce any significant variations in students' achievement, retention, or attitudes (Alper, 2003). While some research found no link between cognitive flexibility and academic performance, others found a positive linear link (Yücel, 2011).

Cognitive flexibility research focused on affective factors such as stress, happiness, and self-efficacy. Altunkol (2017) sought to evaluate the association between cognitive flexibility and reported stress levels among university students.

Consequently, a strong negative association between felt stress and cognitive flexibility was discovered in university students. In research done by Çuhadaroğlu (2011), cognitive flexibility was proven to be a predictor of coping with stress and avoiding dealing with difficulties. Self-efficacy and stress-coping mechanisms were found to substantially predict the cognitive flexibility of university students, as well as gender variations in cognitive flexibility (Doğan-Laçın & Yalçın, 2019). Çelikkaleli (2014) also examined cognitive flexibility and self-efficacy levels in adolescents in terms of social, intellectual, and emotional domains. The findings of the study indicated that there is no statistically significant association between cognitive flexibility and academic, social, or emotional self-efficacy by gender. By contrast, a strong positive association was discovered between academic, social, and emotional self-efficacy and cognitive flexibility.

Regarding the relationship between certain demographics, factors and cognitive flexibility, different variables were studied in various research. For instance, self-regulation and perceived stress vary according to some demographics. Yücel (2011) revealed that there is no statistically significant difference in self-regulation abilities and cognitive flexibility concerning gender or class categories. The perceived stress and cognitive flexibility of pupils varied considerably by gender. Male students exhibited greater cognitive flexibility than female pupils did. A favorable link was established between students' age and cognitive flexibility (Altunkol, 2017). Another study investigated the association between cognitive flexibility, anxiety, and adaption scores of teenagers according to their gender, socioeconomic status, and education level. It was established that there was no difference in anxiety levels based on the gender variable. There was a difference in terms of gender-related adaptation levels, and as the degree of adjustment grew, so did the cognitive flexibility scores. However,

the cognitive flexibility scores were solely impacted by the gender variable in terms of personal adjustment level. However, it was discovered that socioeconomic and education levels did not affect cognitive flexibility. In terms of the educational level variable, it was found that there was a difference based on the state and continuity anxiety levels; when the anxiety level dropped, the cognitive flexibility scores increased (Öz, 2012).

When it comes to gender, in terms of the association between cognitive flexibility and happiness, males have greater cognitive flexibility than women (Asıcı & İkiz, 2015) do. In another study, Güzeltepe (2017) examined the cognitive flexibility of 299 public employees in terms of psychological contract roles. It was discovered that males scored better on the control sub-dimension of cognitive flexibility than women. Whereas there exists a relationship between cognitive flexibility and gender in several research, Üzümcü and Muezzin (2018) claimed the opposite. They conducted a study to ascertain teachers' cognitive flexibility and work satisfaction. There was no significant difference in cognitive flexibility scores and gender in the study, which included 529 teachers. Karayol and Doğar (2020) did another study to ascertain instructors' cognitive flexibility and social appearance anxiety, which discovered no significant relationship between cognitive flexibility and the gender variable. In young individuals, Balta (2020) discovered a favorable and substantial link between cognitive flexibility and happiness levels. It was revealed that cognitive flexibility and death anxiety levels had a positive and substantial association. When young adults were tested according to their gender, it was shown that women had greater cognitive flexibility and death anxiety than males, but men had the greater pleasure. As seen, the results concerning gender vary as well.

The relationship between cognitive flexibility and reflective thinking skills when it came to problem-solving was sought as well (Orman, 2021). According to the findings, middle school kids' grades, parents' educational attainment levels, and family income levels all had a substantial impact on their cognitive flexibility levels. Despite this, there were no statistically significant differences based on gender or number of siblings. Similarly, Sücüllü (2022) conducted a study to determine the link between the cognitive flexibility, emotional self-efficacy, and interpersonal problem-solving abilities of university students. A substantial association was discovered in the correlation study between university students' cognitive flexibility, emotional self-efficacy, and interpersonal problem-solving abilities. When the association between the cognitive flexibility and demographic factors were explored, there was no significant difference in the cognitive flexibility levels of university students by gender, grade level, parent's education level, program type, or age.

Cognitive flexibility has been the subject of some studies in teacher training. Related to the demographics and teachers, Başpınar (2019) examined the links between primary school teacher candidates' metacognitive and cognitive flexibility skills and their teaching professional competencies. The metacognitive skills and cognitive flexibility of primary school teacher candidates, as well as their professional teaching competencies, varied significantly by year of study and university. Akyüz (2020) conducted a study to determine the association between pre-service teachers' cognitive awareness, cognitive flexibility, and self-efficacy. When the study's findings were analyzed, it was discovered that there was a positive and substantial association between cognitive awareness, cognitive flexibility, and self-efficacy levels. Ak (2022) carried out research to evaluate science instructors' cognitive flexibility and classroom management abilities, as well as the link between cognitive flexibility and

classroom management skills. To ascertain the cognitive flexibility levels of science instructors, alternative and control sub-dimensions were calculated, as well as the overall average, and it was determined those science teachers possessed a high level of cognitive flexibility. While there was a positive and substantial association between the alternatives dimension of cognitive flexibility and classroom management abilities, there was no such correlation for the control dimension.

2.5.2.2. *Research abroad*

The international literature on cognitive flexibility focuses more on communication compared to other factors. From the findings, communication and cognitive flexibility are positively related. To illustrate, Martin and Anderson (1998) examined the association between participants' cognitive flexibility and their impression of communication competence in their study to determine the validity of the cognitive flexibility scale. The study group consisted of 101 individuals. The cognitive flexibility level was shown to have strong and positive connections with the characteristics of self-confidence in class discussions, communicating with strangers, and group engagement. Martin et al., (1998) also discovered a favorable association between cognitive flexibility and communication, but a negative relationship between verbal aggression and cognitive flexibility. Leadership can be seen as a way of communication as well. Reiter-Palmon (2003) conducted a study to see if behavioral and cognitive flexibility were determinants of students' leadership abilities. According to the findings, cognitive and behavioral flexibility were two distinct categories that were both good predictors of leadership traits. Cayanus (2005) discovered a significant relationship between cognitive flexibility and students' questioning tendencies in his study, which looked at the relationship between students' questioning tendencies in the classroom and the concepts of cognitive flexibility,

teacher self-disclosure, and emotional learning. Students with cognitive flexibility were more likely to raise questions in class because they had self-efficacy and excellent communication skills. Additionally, Ciairano et al., (2006) discovered that the greater cognitive flexibility, the greater the capacity for cooperation.

Some scholars were interested in examining cognitive flexibility related to demographic factors. The most frequent variable in literature seems to be related to age. Fleming (2007) investigated the relationship between eloquence and cognitive flexibility in young and old individuals. For this study, 40 participants aged 18 to 89 were placed into two equal groups. Both groups received instruction in speaking skills, and it was discovered that age had no effect on cognitive flexibility, and speaking capacity did not decline with age, however, employing verbal fluency and body language did. Stevens (2009) investigated children's social problem-solving abilities and cognitive flexibility, as well as their problem behavior and instructors' understanding of children's social abilities. This research enrolled 82 youngsters between the ages of four and six. According to the findings, as cognitive flexibility increased, so did the ability to solve social difficulties and develop social skills. Hung and Loh (2020) examined the role of cognitive flexibility in meta-language abilities and reading comprehension during the elementary school years. It was reported that there was no discernible relationship between the pupils' cognitive flexibility and their age. Apart from age, other demographics have been studied as well. For instance, Khasawneh (2021) examined the cognitive flexibility of students with learning difficulties in the English language and its connection to gender and grade level characteristics. The findings indicated that there were statistically significant differences in cognitive flexibility between boys and females with learning problems

due to the gender variable favoring males and the school grade variable favoring the second primary grade.

There exists a correlation between academic performance and cognitive flexibility. Y.W.Lin (2013) conducted research with 770 university students on the relationship between cognitive flexibility and openness to change, as well as its effect on academic achievement. The study found a clear positive correlation between cognitive flexibility, openness to change, and academic success. According to the research conducted by Timarova and Salaets (2011) with college students, greater cognitive flexibility is associated with less anxiety, enhanced motivation, and enhanced performance in educational programs. Moreover, cognitive flexibility is associated with attention self-regulation and mindfulness (Moore, 2013).

To summarize, both international and national research indicates that cognitive flexibility may have a significant role in education and many various areas. However, given the scarcity of studies on cognitive flexibility, further research is needed to elucidate the direct and indirect effects of cognitive flexibility on academic achievement and academic buoyancy.

2.5.3. Research on academic buoyancy

2.5.3.1 Research in Turkey

There is a scarcity of studies carried out in the Turkish setting. It can be concluded from the literature that the researchers in Turkey are most interested in the association between academic buoyancy and achievement. Furthermore, all the studies were carried out at higher education levels. For example, Aydın and Michou (2019) conducted research on the relationship between self-determined motivation, academic buoyancy, and achievement among tertiary-level EFL learners. Their first

conclusion is that there is a significant correlation between high need satisfaction in the prep school curriculum and growing academic buoyancy. Negative elements such as need frustration had a negative impact. Furthermore, self-motivation is an important aspect in dealing with academic setbacks. Toprak-Çelen (2020) examined the association between academic buoyancy, academic resilience, a reconceptualized second language (L2) motivational self-system, and the academic achievement of tertiary-level students. The findings indicated that there were strong correlations between participants' academic buoyancy and their midterm average scores, as well as between academic buoyancy and the feared L2 self. Aydın (2021) examined the relationship between motivational factors and English language learning in higher education using a sample of 486 Turkish students. The findings indicated that autonomous and regulated motivation were the mechanisms via which initial need dissatisfaction contributed to academic buoyancy.

2.5.3.2 Research abroad

Academic buoyancy research has primarily been carried out in Australia (Collie et al., 2017; Martin, 2013; Martin et al., 2010), the United States of America (Carrington 2013; Fong & Kim, 2019), the United Kingdom (Putwain & Daly, 2013; Symes et al., 2015), and Asia (Jahedizadeh et al., 2019; Reisy et al., 2014, Panjwani & Aqil, 2020; Kumar & Sharma, 2020). The bulk of these studies demonstrated the helpful role that academic buoyancy plays in assisting students in overcoming typical academic obstacles.

Many studies have shown that academic buoyancy affects both educational and psychological outcomes, like how much students like school and how much they participate in class. Psychological outcomes include things like general self-esteem

and self-efficacy, to name a few (Martin et al., 2010, Martin & Marsh, 2006). Yu et al. (2019) and Martin (2019) found that research from the past has shown a strong link between personal best goals and academic success, engagement, and student motivation. When mapping the engagement and buoyancy component, it was found that personal best goals were more important. The findings of Comerford et al. (2015) indicated that buoyant children have an outstanding aptitude for evaluating their own experiences and comparing them to those of others

Academic achievement has been thought to be predicted by academic buoyancy (Strickland, 2015). According to research that has begun to show this relationship there is a weak positive correlation between academic buoyancy and performance on English, arithmetic, math, and literacy exams in primary and secondary school students as well as performance on standardized tests in other areas. (Miller et al., 2013; Martin, 2013; Collie et al., 2015). Regarding language learning, Yun et al., (2018) commented on the importance of buoyancy for teaching second language education in their study on learners' everyday resilience for language students. The data indicated that students' academic achievement and grade points were all significant predictors of buoyancy. Miller et al. (2013) examined the association between students' well-being and academic accomplishment and discovered that the presence of an underlying well-being element is associated with achievement and influences academic buoyancy. Likewise, Holliman et al. (2018) discovered relationships between students' flexibility, motivation, academic performance, and academic buoyancy. It was determined that learners require self-directed effort to perceive course pleasure and academic progress. The relationship between academic buoyancy and academic motivating features and accomplishment were explored, and the findings indicated that intrinsic motivation served as a possible

structure for academic achievement and academic buoyancy to be correlated (Datu & Yang, 2016). Colmar et al. (2019) also conducted a correlation study to determine the relationship between academic achievement, self-concept, and academic buoyancy. It was discovered that buoyancy predisposed one to self-perception, and self-perception predisposed one to execution.

By manipulating self-regulatory processes, academic buoyancy, so the argument goes, enables greater test performance and prevents students from perceiving exams as intimidating. According to research, academic buoyancy mitigates students' perceptions of exams as stressful by influencing self-regulation systems and facilitating enhanced examination performance. The statistics show a link between anxiety and academic buoyancy that is unfavorable. To put it another way, highly buoyant students showed better motivation, higher levels of positive self-esteem, and more adaptable reactions to failures, all of which are linked to poor test anxiety (Putwain et al., 2012; 2015). Academic buoyancy is an essential skill, and low academic buoyancy is a robust predictor of high exam anxiety (d'Entremont et al., 2019).

Self-efficacy and academic buoyancy were found to have a favorable association. Reisy et al. (2014) examined the mediating role of academic buoyancy in the relationship between self-efficacy and family communication patterns. The findings indicated that self-efficacy operated entirely as a mediator between conformity and academic buoyancy. Olendo (2020) examined the relationship between academic buoyancy and self-efficacy and discovered that self-efficacy predicts academic buoyancy. There was no substantial variation in either concept between genders. Happiness and hope were found to be predictive of academic buoyancy mediated by self-efficacy. Sadoughi and Hesampour (2016) studied

whether happiness acted as a mediator between academic self-efficacy and hope, on the one hand, and academic buoyancy on the other among high school students. It was believed that optimism and academic self-efficacy contribute to happiness, which in turn contributed to students' academic buoyancy and their ability to demonstrate solutions to issues and hurdles encountered in educational environments.

It is critical that students have a good view of their learning environment in order to help them achieve their full potential academically. Ursin et al. (2020) focused on school involvement, which is critical for learning and achievement. It was concluded that stress may be avoided by fostering a conducive atmosphere and social support from the school and peer group. Academic buoyancy was positively connected with both the perception of the learning environment and psychological toughness (Damirchi et al., 2017). Rahmani et al. (2020) emphasized the critical nature of students' perceptions of their learning environment. It was discovered that an understanding of the educational atmosphere has a critical role in elucidating academic buoyancy.

Literature favors the training and interventions based on academic buoyancy as academic buoyancy training aided in increasing academic achievement and self-efficacy (Fouladi et al., 2018). It was also discovered that activities aimed at promoting students' academic buoyancy reduced their perception of academic stress. Emotional-social skills training has an effect on academic resilience, academic buoyancy, and academic engagement. Ahmadi et al. (2022) found that motivational self-monitoring skills instruction influenced academic engagement and buoyancy.

Academic buoyancy was found to have a direct association with emotional disaffection and emotional engagement. Thomas and Allen (2020) addressed the

relationship between academic buoyancy and the learners' emotional intelligence. Academic buoyancy acted as connective tissue between student engagement and emotional intelligence.

Academic buoyancy provided adaptive coping behaviors. Vinter (2019) explored three distinct levels of academic burnout and their associated coping methods, concluding that buoyancy was the most protective factor against burnout. In line with these, Hirvonen et al. (2019) sought to determine the role of academic buoyancy for factors such as preventative behavior, students' disappointment expectancies, and task-oriented preparation in educational contexts. It was discovered that those with more academic buoyancy exhibit less evasive behavior and a more optimistic attitude toward failure. Simultaneously, they exhibit a high level of task-oriented planning mediated by academic emotions. The cooperative learning strategy was successful in enhancing students' academic buoyancy, and this strategy assisted in increasing academic buoyancy (Salimi et al., 2016).

Findings related to the demographics and academic buoyancy vary in the literature. For instance, in Collie et al. (2017), the effect of demographic parameters (age, gender, and linguistic background) on the link between academic outcomes, academic buoyancy, academic adversity, and academic support was studied to gain a better understanding of the relationship. The study indicated that there was a substantial difference in adaptive drive results across the groups, but no difference in impeding or maladaptive drive outcomes. All factors had a positive correlation. Datu and Yang (2016) conducted a study on students in the Philippines, identifying gender differences and validating the academic buoyancy measure. There was a considerable difference in academic buoyancy across genders, with male students scoring higher than female students do. Mawarni et al. (2019) did a study to determine the academic

buoyancy of high school science students. A comparison of gendered students was made in this study, and it was discovered that science students had a higher level of academic buoyancy than other students did. The same was true for male pupils.

From the studies regarding academic buoyancy, it is obvious that in Turkey the number of research is limited. International literature prominently depicts the research by Martin and his colleagues; however, there are other studies that have contributed to academic buoyancy literature as well.

2.5.4. Research on metacognition

2.5.4.1 Research in Turkey

Metacognition appears to be associated with a variety of distinct ideas, including academic performance, self-efficacy, self-regulated learning, motivation, problem-solving and intellect according to the studies. To illustrate, the relationships between metacognitive awareness, intellect, perceived problem solving, and need for cognition, as well as the impacts of these characteristics on metacognition, were examined. The results demonstrated that metacognition, problem solving, and the need for cognition were all highly connected, although intelligence and each variable were not (Saraç et al., 2014).

To be able to use metacognitive skills, individuals should be taught how to make use of them (Senemoğlu, 2013). All learners with varying degrees of proficiency use strategies while these learners use more strategies in their L2 rather than their native language, and learners require direct strategy instruction for their success (Demiröz, 2008). It is obvious from the literature that there is a need for classroom instruction on the use of metacognitive skills. Odabaş (2016) exemplified the use of metacognitive skills in language classes by instructors varying according to

their learners' language levels. Similarly, Ayseven (2016) indicated that language learners used metacognitive strategies and compensation strategies more as opposed to cognitive and social strategies while learning a language. In T.S.Yılmaz (2019), metacognitive listening instruction helped learners develop metacognitive awareness and more positive attitudes towards this type of instruction. Çalışkanel (2013) showed a correlation between academic achievement and working memory capacity in L2 among teenage learners. Likewise, Ülke (2014) favors the use of metacognitive strategy use in L2. All these issues considered, classroom practices as mentioned may entail making use of metacognitive strategy instruction as instructors' use of these strategies vary to a great extent (N.Öztürk, 2017).

Strategy training has been found effective by researchers. For students, strategy instruction by instructors proved useful for low-level English language learners as suggested by Kurt (2012). Alshehri (2020) proposed that the instructors who employed strategies that tapped on metacognition resulted in successful reading comprehension levels. That is, strategy instruction of metacognition works for L2 education. As for other studies considering the use of strategy instruction in reading, G.Öztürk (2014) asserted that there was a correlation between English language proficiency success and the use of metacognitive skills by learners. As for writing in L2, to illustrate, Aydoğdu (2020) favored strategy training in writing as it helped the use of metacognitive strategies. In addition, strategy-based instruction helped develop linguistic skills as well as metacognitive awareness in university students, and L2 learners were found to have a high amount of metacognitive awareness that they were able to account for their failure in L2 (Şan 2020; Güneş, 2018).

Metacognitive skills played a great role in listening in the first and second language and their use of metacognitive skills correlates, which can account for why

these skills play a great role in listening (Katrancı, 2012; Öztekin, 2016). Moreover, training in interpreting strategies had positive effects on their executive functioning and working memory as in Ünlü and Sağın Şimşek (2018). In parallel to this, Arsuk (2019) suggested training on metacognitive strategies supported learners in their problem-solving skills of seventh-grade learners.

Motivation, metacognition, and academic achievement all have a statistically significant positive association (Talayhan, 2018). Ceylan (2016) investigated the association between different motivational styles, metacognition, and English language listening competency. Her research discovered a statistically significant positive association between learners' metacognitive awareness ratings and their listening performance. Additionally, listening ability was found to be positively connected with both internal and external motivation. Topaç (2019) pointed out that metacognitive strategy instruction contributed to success in listening and overall problem-solving abilities. As in line with this study, Utku (2019) asserted that metacognitive instruction and the resulting outcome predict better reading comprehension.

Apart from language learning, metacognition has been studied in different subjects. With respect to mathematics, Elitaş (2015) encourages the use of problem-solving metacognition in the classroom as these are inextricably linked to problem-solving abilities. As for young learners, Ayvaz (2018) explained that metacognitive awareness might predict mathematical ability and self-regulatory skills and discusses that young learners demonstrate numerous subcomponents in their practices, such as planning, monitoring, and control. T.Yılmaz (2017) suggested learners possess a high number of metacognitive skills, and as opposed to the general view, there was a low correlation between the mathematical skills of learners and their metacognition level.

Metacognition studies have been influential on teacher training studies as well. Altındağ (2008) sought to ascertain the level of metacognitive skills attained in the first and fourth grades of the prospective primary school and secondary mathematics teachers. The findings indicated that the level of metacognitive skills developed by groups was medium. There was no significant difference in the metacognition ratings of 1st year in both teacher groups but significant differences between the 4th year metacognition scores in favor of the 4th year prospective primary school teachers. There were significant differences between genders in metacognition. Both teacher candidate groups differed in terms of relationships between metacognition scores and academic achievement. Even for professionals, there is a need for direct instruction on metacognition as in Duman (2013). In other words, instruction in metacognition has a place in professional development for academics and professionals in educational settings. There is a strong link between in-service and pre-service English teacher self-efficacy and metacognitive awareness as Üstünbaş (2021) suggested.

2.5.4.2 Research abroad

Metacognition can be tapped more to increase the rate of learner reflection to go beyond their existing knowledge and skills, which might help build on learner self-reflection and pave the way towards improvement (Buitrago, 2020). Likewise, learner metacognition has a lot to do with developing goals for the self and prospective studies rather than product-oriented outcomes as in Wey (1998). Amplifying the level of metacognition provided fruitful results as in Hashimoto (2012), who showed struggling learners would benefit more from using metacognitive strategies in educational contexts. Based on this issue, there are numerous benefits for instruction-based training in language skills of learners, namely, reading, writing, listening, and vocabulary. In parallel to that, Shin (2020) suggested that the working memory of

learners as well as being familiar with the selected content may account for success in L2 reading; hence, working more on working memory may lead to proficiency in reading skills. Bruno (2001) even referred to trilingual learners on their use of metacognition in their reading practices, the use of these strategies differed in L2, and the learners discussed mostly monitored comprehension as well as anticipating potential problems and providing solutions that hindered their reading comprehension. Proficient learners used various reading strategies as well as employing metacognitive strategies in L2 (Zarrabi, 2017), and likewise, Iwai (2009) contemplated that adult English as a second language (ESL) learners reported using metacognitive skills, and the study also listed the benefits of using these strategies in various academic contexts and with varying age levels in academic reading classes.

ESL learners' frequent use of metacognitive strategies may be linked to the idea that as Li and Munby (1996) suggested reading in L2 was a highly demanding and difficult process that learners were in need of engaging in realizing various strategies, unlike in their first language. L2 proficient learners also employ metacognitive strategies and reading strategies online when they have goals as in usual classroom settings (Kim, 2011). Ahmadi et al. (2013) supported using metacognitive skills in English reading class at a public university for sophomore learners and reported these learners got higher grades compared with the control group. Additionally, Wang (2015) put forward that instruction in the use of metacognition while reading helps EFL high school learners with varying levels of proficiency.

Studies are available in the literature with varying results. C.Y. Lin (2011) proposed learners used several reading strategies along with metacognitive ones as successful reading is linked to the use of strategies and engagement. Hsu (2016)

revealed that when learners encounter topic unfamiliarity, they may make use of metacognitive strategies that assist in reading and compensate for the interruption of learners while reading, which proved that strategy instruction and raising awareness of learners to use their metacognitive skills result in successful attempts and outcomes in reading as well as other skills. Descalzo (2019) investigated elementary-level Spanish learners' use of metacognitive knowledge and their performance in writing, and it was found out learners use metacognitive strategies, but learners are reluctant to mention their writing effort. Kim (2013) reflected on the issue that when assessment in L2 writing was modified, this resulted in ineffective results for learners' metacognitive knowledge; additionally, previous knowledge of learners in both their L1 and L2 writing influences their existing metacognitive knowledge. Wey (1998) also proposed metacognition might account for success in the writing ability of learners and their effort. Metacognitive awareness in L2 in reading strategies could be explained by already having metacognitive awareness in L1 while not being the sole factor for task completion, and the use of metacognition did not differ significantly for successful or unsuccessful students in reading (Guo, 2008).

In terms of studies comparing L2 learners coming from several cultural backgrounds, Peymanfar (2010) demonstrated Turkish and Iranian learners in the use of cognitive and metacognitive skills. Both groups were likely to use cognitive and metacognitive and support skills. Furthermore, Ghasemi (2010) discusses the impact of culture when using strategies by referring to Turkish and Iranian university students related to their selection and the use of cognitive and metacognitive skills, and how they applied these to their reading practices. Alluhaydan (2019) found out that Arabic learners who were learning English as a second or foreign language did not differ much regarding their use of metacognitive skills, and female and male

learners did not differ concerning their use of metacognitive skills in reading practices.

Lyons-Bowman (2020) also supported the idea of using metacognitive strategies while training instructors and making them use more self-reflection questions along with other learning strategies. Similarly, Garcia et al. (2016) examined the variations in metacognitive skills and executive functioning between two groups of students with varying levels of metacognition. Their study discovered that participants who possessed advanced metacognitive knowledge were more adept at utilizing their metacognitive skills and exhibited higher levels of executive functioning than those who lacked advanced metacognitive knowledge.

Metacognition has adaptive educational outcomes. The researchers discovered a statistically significant positive link between metacognition, motivation, self-efficacy, and academic accomplishment (Landine & Stewart, 1998). Moreover, metacognition, improved academic performance according to Coutinho (2007) who investigated the association between metacognition, goal orientation, and academic success. Metacognitive skills appear to develop and contribute to learning success in a manner that is partially independent of intellect (Veenman et al., 2004).

3. METHODOLOGY

This chapter details the methodological approach with regard to the design of the study, participants, data collection instruments, and data analysis.

3.1. Design of the Study

The primary focus of this research is to explore the relationships between cognitive flexibility, metacognitive skills, academic buoyancy, and language achievement in a sample of EFL learners. To do so, quantitative inquiry with a correlational design was used in this study. Predictive correlational research, a subset of correlational research, identifies changes in the dependent variable as a function of the independent variables (Büyüköztürk et al., 2019). Predictive correlational studies are classified into two categories based on the number of variables they contain: single-factor and multi-factor predictive designs. This study is structured on a multi-factor predictive design. The multi-factor predictive design is a technique that enables the examination of both direct and indirect correlations between variables (Büyüköztürk et al., 2019).

3.2. Participants

To gain a better understanding of the participants of the study, one must be acquainted with the setting and status of English as a foreign language (EFL) students at the tertiary level in the Turkish context. Prior to beginning their undergraduate studies in Turkey, university students who are not fluent in English must enroll in a one-year English preparation school to follow lectures and successfully use English to accomplish the objectives of their major courses. In schools of foreign languages or preparatory schools, EFL students are taught general and academic English abilities to prepare them for upcoming university classes. Typically, learners take a proficiency or placement test at the beginning of the academic year and graduate with a specific

level of English at the end of the year. The Common European Framework (CEFR) is used to specify course levels and objectives. Based on their test results and CEFR, EFL learners are placed in A1, A2, B1, or B2 level classes. The preparatory school curriculum is highly rigorous, students receive 20, 24, or 30 hours of language instruction each week, depending on their proficiency level.

This study used structural equation modeling (SEM) to examine its data. Schumacker and Lomax (2010) underline the relevance of sample size in SEM studies, as some SEM estimations, such as standard errors, may be inaccurate if the sample size is insufficient. Furthermore, sample size influences whether the researcher's conclusions fit the theoretical model. The minimal sample size necessary for SEM analysis is dependent on the normality of the data and the researchers' estimation approach (Schreiber et al., 2006). In this study, to summarize data for SEM the data of 704 participants were transferred to SPSS, and the relevant data set was inspected for missing values. It was discovered that 19 individuals did not complete the provided forms. According to Kline (2015) and Tabachnick and Fidell (2013), if the number of missing values is less than 5% of the entire data set, the present issue is minor and may be resolved in a variety of ways (e.g., deletion according to the list, attributing an average value). The listwise deletion strategy was selected since the data of 19 people were eliminated from the study. In literature, scholars vary in their conception of sample size. For instance, according to Kline (2015), at least 200 people must be contacted to do the path analysis. According to Schumacker and Lomax (2010), the needed number of individuals to execute structural equation modeling should be between 250 and 500. According to this data, it is reasonable to conclude that the study group size of 685 is appropriate for the current study.

3.3. Data Collection

In this study, participants provided data electronically via Google Forms. Students participated voluntarily in this study. A total of five instruments were used to collect data for the purposes of the study. The Demographic Inventory, the Cognitive Flexibility Inventory, the Metacognitive Skills Scale (MSS), the Academic Buoyancy Scale (ABS), and students' academic achievements (GPA) are the data collection instruments utilized.

3.3.1. Demographic inventory

The researcher's demographic inventory tool was utilized to determine the personal characteristics of the study group (see Appendix A).

3.3.2. Academic (language) achievement

In this study, the students' grade point averages (GPA) are used as a measurement of their academic achievement. GPA is not a single lesson grade; it is determined over numerous lessons in which various tasks are assigned, and it is a numerical representation of the students' accomplishments (York et al., 2015). In the study, the grade point average of preparatory school students is defined as the numerical expression of the grades received in reading, writing, listening, grammar and speaking lessons.

3.3.3. Cognitive flexibility inventory

To assess learners' potential for developing acceptable and adaptable thoughts in response to adversity Cognitive Flexibility Inventory was used (see Appendix B). The CFI comprises twenty items, each of which is scored on a five-point scale ranging from strongly disagree to strongly agree. The measure is bidimensional in nature, with two dimensions: alternatives and control. In two separate trials, the CFI

subscales demonstrated strong internal consistency (alternatives =.91, control =.86). The Turkish version of the CFI by Gülüm and Dağ (2012) was utilized in this study. Scores from the scale range from 20 to 100. It is thought that the higher the score, the higher the cognitive flexibility. The Turkish variant of CFI has an internal consistency coefficient of .90.

3.3.4. Metacognitive skills scale

The Metacognitive Skills Scale established by Altındağ and Senemoğlu (2013) was used to assess learners' metacognitive skills (see Appendix C). With 30 items, MSS has a single dimension that explains 35.74% of the total variance. The scale is graded on a 5-point Likert scale (1= I completely disagree, 2= I disagree, 3= Neither agree nor disagree, 4= I agree, and 5= I completely agree). The internal consistency and reliability coefficient of MSS is determined to be .92. While the maximum possible score on the scale is 150, the lowest possible score is 30.

3.3.5. Academic buoyancy scale

The Academic Buoyancy Scale was developed by the researcher in the scope of the study conducted (see Appendix D).

3.3.5.1. Scale development

Multi-stage development research was conducted to provide a measure of academic buoyancy. To steer this multi-staged research, it was determined to employ the scale development processes advocated by DeVellis (2016) as follows:”

1. Determine Clearly What It Is You Want to Measure
2. Generate an Item Pool
3. Determine the Format for Measurement
4. Have Initial Item Pool Reviewed by Experts

5. Consider Inclusion of Validation Items
6. Evaluate the Items
7. Optimize Scale Length (p.78) “.

- 1. Determine Clearly What It Is You Want to Measure:** After deciding on the study's topic, namely, academic buoyancy, an initial advisor-advisee meeting was convened to discuss the early constructs of academic buoyancy, as this is the first critical stage in establishing the theoretical foundation for designing any questionnaire. A preliminary theoretical model was developed as a result of this conference. Following that, the researcher conducted a thorough and analytical evaluation of the extensive literature on academic buoyancy from a variety of sources. The study observed that the examined literature has few metrics assessing academic buoyancy (Martin& Marsh, 2006; Yun et al., 2018; Panjwani &Aqil, 2020; Kumar&Sharma, 2020). Additionally, no academic buoyancy scales in Turkish have been found. Hence, a reliable academic buoyancy scale is aimed to be developed by the researcher.
- 2. Generate an Item Pool:** Following a review of the academic buoyancy literature, the item construction process was initiated. First, tertiary-level EFL students were instructed to write a paragraph about academic issues they face and how they deal with them. The hypothetical sub-dimensions were created based on the students' papers and the preceding literature research on academic buoyancy. The researcher and her advisor deliberated extensively on the final structures and chose to adhere to the definition in Martin (2008). The preliminary list of items was created by focusing on five characteristics

of academic buoyancy, namely confidence, coordination, control, commitment, and composure (Martin&Marsh, 2006). A thorough item pool of 120 items was built with reference to constructions. Due to the existence of some redundant and overlapping items, a series of advisor-advisee conferences was organized to reduce the number of items (DeVellis, 2016). The conferences produced a total of 84 items to measure various aspects of academic buoyancy.

3. **Determine the Format for Measurement:** In this study, a Likert-scale response format was chosen, as it is an illustration of a commonly used item format designed to assess opinions, beliefs, and attitudes (DeVellis, 2016). When a Likert scale is used, the item is presented as a sentence with response categories representing various degrees of agreement or acceptance with the statement. The items are presented as 1= I completely disagree, 2= I disagree, 3= Neither agree nor disagree, 4= I agree, and 5= I completely agree.
4. **Have Initial Item Pool Reviewed by Experts:** After creating a draft scale of 84 items certain field specialists were requested to examine them. First, scholars with specific areas of expertise were discovered, contacted, and invited to participate in the expert review in person. More precisely, panel members qualified as experts in Educational Sciences and English Language Teaching from a variety of universities were contacted for their viewpoints and feedback on the statements' acceptability. The expert panel of researchers was emailed the draft format of the scale. To determine the instrument's content validity, experts were asked to review each statement and react to it using the following criteria: Mark '0' for an unacceptable item, Mark '1' for an item that may or may not be approved, and Mark '2' for an item that is

acceptable. The feedback from the field specialists was thoroughly reviewed, and the items were then amended. Certain statements were removed from the instrument (e.g., coordination 12; commitment 12 and 19; composure 19), while others were adjusted. Following expert advice, the instrument's item count was lowered to 80, including 15 items for confidence, 15 items for coordination, 14 items for control, 20 items for commitment, and 16 items for composure sub-dimensions. Secondly, the draft scale was sent to two Turkish language specialists who checked the items for proper grammatical structure and wording. The input from Turkish field specialists was painstakingly analyzed, and the required semantic and structural adjustments were made. The final draft scale had 80 items with five-point Likert-type responses.

5. **Consider Inclusion of Validation Items:** The Academic Buoyancy Scale includes 18 reverse-scored items to prevent participants from choosing only one side of the scale and to limit the negative consequences of the acquiescence bias (DeVellis, 2016). Moreover, the scale has multiple item statements that measure the same constructs.
6. **Evaluate the Items:** The draft scale was digitized and uploaded to an electronic portal. The preparatory school administration was contacted in person prior to administering the scale, and appropriate days and hours were arranged. Following this meeting, each learner was provided with the scale via a web link. The draft scale was administered to 974 tertiary-level students. Comrey and Lee (1992) suggest a scale of sample sizes for scale development: 100 is poor, 200 is fair, 300 is good, 500 is very good, and 1,000 is excellent; taking this into account the study group size is excellent.

Before the survey could begin, participants were asked to read and sign a consent form. To ensure that the students' responses were as valid as feasible, anonymity and confidentiality were maintained. Following the administration, the data were prepared for analysis. For instance, negative-worded items were reverse-scored prior to data analysis. There are numerous ways to incorporate exploratory and confirmatory factor analysis into the scale development process. If the research comprises both exploration and confirmation and the sample size is sufficient, it is proposed that the analyses on the split dataset be conducted independently (Henson & Roberts, 2006; Worthington & Whittaker, 2006; Fokkema & Greiff, 2017). As a result, the data from the pilot research were separated into two categories for exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The performance of individual items is evaluated using EFA to produce the final constructs of the scale. The researcher used CFA to validate the ABS and its constructs after determining the number of factors in the scale.

7. **Optimize Scale Length:** The length of the scale must be comprehensible for the chosen audience. Consequently, some items with low factor loadings, large cross-loadings, low conceptual consistency, and low contribution to internal consistency can be deleted (Worthington & Whittaker, 2006). To increase the reliability, the researcher excluded items with low factor loadings and average correlations with the remaining items. The final version of the ABS consists of 26 items divided into five subscales: "Commitment, Composure, Confidence, Coordination, Control" (Martin, 2006).

3.4. Psychometric Properties of Data Collection Tools

3.4.1. Psychometric properties of ABS

3.4.1.1 *Exploratory factor analysis*

To verify the dimensionality of the academic buoyancy construct EFA with principal components analysis was performed on the 80 items measurement. As proposed by Field (2009), inter-item correlations were examined, and Varimax with Kaiser Normalization was selected for rotation. Until a clear factor solution was obtained, the analysis was repeated multiple times. Following each iteration, items with low factor loading ($<.40$) and high cross-loadings ($>.40$) were eliminated (Hair et al., 2013). When an object is weighed under two distinct variables, factor analysis cannot be applied. In addition, if the difference between the values of an item under multiple variables is smaller than 0.1, the item should be eliminated from the scale. Tezbaşaran (1996) suggests a different way to choose items: correlation-based item analysis. The correlation between scores on each item scale is computed. A strong item-to-test correlation indicates that the item assesses what the entire test intends to measure. In a similar line, prior research has suggested that items within a scale with correlations of less than 0.30 may not be sufficiently connected to be utilized as measurements of the same phenomenon. The literature demonstrates that construct validity is maintained by high item-total correlations ($>.30$), inter-item correlations ($.30$ to $.70$), and factor loadings ($>.40$) (Taber, 2018). Based on these, some items with low correlation within the same factor were omitted. In the item generation process, multiple items with similar meanings that measure the same phenomenon were generated on purpose. Therefore, the similar items, which exactly aimed at measuring the same phenomenon were eliminated as well. Finally, with 30 items another EFA was conducted. After careful theoretical consideration, four items were removed due

to cross-loadings and low factor loading. The analysis, which yielded a clear factor solution, was that of a five-factor model consisting of 26 items with factor loads of all items greater than .40.

The adequacy of the data for factor analysis was determined using Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. The recommended value of KMO must be greater than the cutoff value of 0.5, and the Bartlett spherical value must be statistically significant with a p-value less than 0.5% (Field, 2009). The result revealed that the KMO value was 0.91, which is greater than the threshold value of 0.5, indicating that the sample size is sufficient. The Bartlett spherical value was significant at 6291.831 ($p < .001$). These values indicate the eligibility of the data set for factor analysis. All extraction values of the 26-item scale were found to be greater than 0.3, and all diagonal values of the anti-image correlation matrix were greater than 0.5. The five-factor structure was discovered as a result of the analysis. In addition, the item-total correlation coefficients of the scale should be greater than .30. If an item on the scale has a value of less than .30, it must be deleted. The correlation coefficients between items and sums varied between .39 and .74. The analyses are displayed in Table 1.

Table 1*Explanatory Factor Analysis Results Related to Academic Buoyancy Scale*

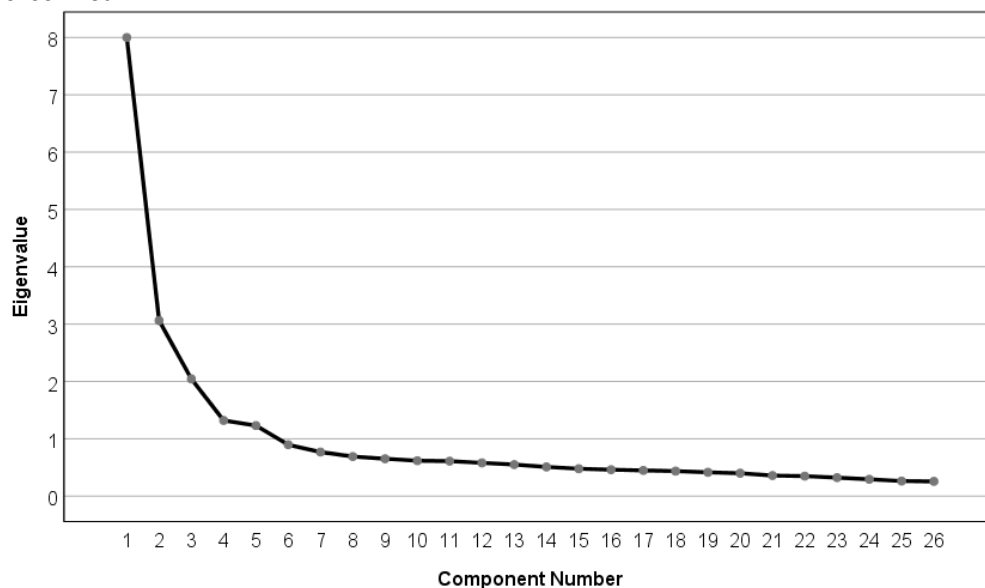
	Commitment	Composure	Confidence	Coordination	Control	Extraction	Item-total-correlation
ABS54	.73					.62	.65
ABS49	.69					.61	.65
ABS53	.68					.60	.62
ABS59	.67					.49	.56
ABS57	.67					.60	.65
ABS63	.64					.53	.60
ABS26	.60					.51	.58
ABS69		.79				.64	.67
ABS72		.80				.65	.69
ABS73		.75				.60	.62
ABS66		.70				.52	.54
ABS70		.67				.58	.63
ABS65		.65				.58	.61
ABS2			.79			.69	.67
ABS1			.74			.67	.67
ABS6			.68			.63	.68
ABS9			.64			.56	.57
ABS12			.59			.50	.57
ABS25				.78		.74	.74
ABS23				.77		.69	.67
ABS30				.74		.69	.70
ABS28				.69		.59	.63
ABS38					.85	.72	.61
ABS44					.80	.63	.51
ABS37					.64	.48	.48
ABS34					.51	.54	.39
Eigenvalue	3.84	3.59	3.05	2.96	2.21		
TVE	14.79	13.81	11.74	11.38	8.48		
CPV	14.79	28.60	40.34	51.73	60.21		
Cronbach's Alpha	.85	.84	.83	.85	.71		
Total Cronbach's Alpha	.90						

TVE: Total Variance Explained CPV: Cumulative Percent Variance, KMO=.909; Barlett's test=6291,831, p<.001

According to the results of the analysis, the commitment dimension accounts for 14.79% of the total variance, the composure dimension 13.81% of the total variance, the coordination dimension 11.38% of the total variance, the confidence dimension 11.74% of the total variance, the control dimension explains 8.48% of the total variance. With five dimensions in total, 60.20% of the total variance is explained (see Table 1). Following factor rotation, the scale's first dimension consisted of seven items (26,49,53,54,57,59,63) the second dimension consisted of items (65,66,69,70,72,73) six items the third dimension consisted of five items (1, 2, 6, 9, 12), the fourth dimension consisted of (23,25,28,30) four items, and the fifth dimension consisted of 4 items (34,37,38,44) The ABS was established as a consequence of the study, and it comprises of five components and 26 elements (see Table 2, Figure 4, Appendix D)

The scree plot shows how many factors emerge according to the eigenvalue. According to Figure 2, a five-factor structure with an eigenvalue of 1 and above was obtained.

Figure 2
Scree Plot



The dimensions were named throughout the item generation process based on the 5Cs of academic buoyancy (Martin& Marsh, 2006). The factor loads of the items in the first component varied between .60 and .73, those in the second component varied between .65 and .80, those in the third component varied between .59 and .79, those in the fourth component varied between .69 and .78, and those in the fifth component varied between .64 and .85 (see Table 1).

3.4.1.2 Confirmatory factor analysis

Confirmatory factor analysis is a theory-testing model. In other words, prior to conducting the study, the researcher develops a hypothesis (Jöreskog & Sörbom, 1993). In this research, confirmatory factor analysis was employed using IBM AMOS 24 to test the fitness of the factor construct obtained through the results of EFA (Kline, 2015). Before conducting the confirmatory factor analysis, any data issues should be corrected (e.g., outliers, skewed values, missing data). Maximum likelihood approaches require that the data follow a normal distribution. The analysis resulted in a critical value of 33,406 for the multivariate normality test. Multivariate normality refers to the fact that all possible combinations of scores derived from all variables in the research conform to the normal distribution (Çokluk et al., 2014). While a score of less than 10 is an excellent result, research has indicated that values up to 20 are often not a problem (Gürbüz, 2019). The data set was also analyzed using multidirectional extreme values. According to Çokluk et al. (2014), these values emerge when associations generated by more than two variables deviate from the expected range. These values are determined using a statistical technique called Mahalanobis distance (Kline, 2015; Tabachnick & Fidell, 2013). When analyzed according to Mahalanobis differences, it was determined that 27 participants in total should be excluded from the analysis, and these values were extreme. After the elimination of outliers, the

critical value was determined to be 19,922 in the multivariate normality test.

Following the data cleansing, a first-level CFA was conducted. As a result of the CFA analysis, a total of 26 items and 5 sub-dimensions were confirmed (see Figures 3 and 4).



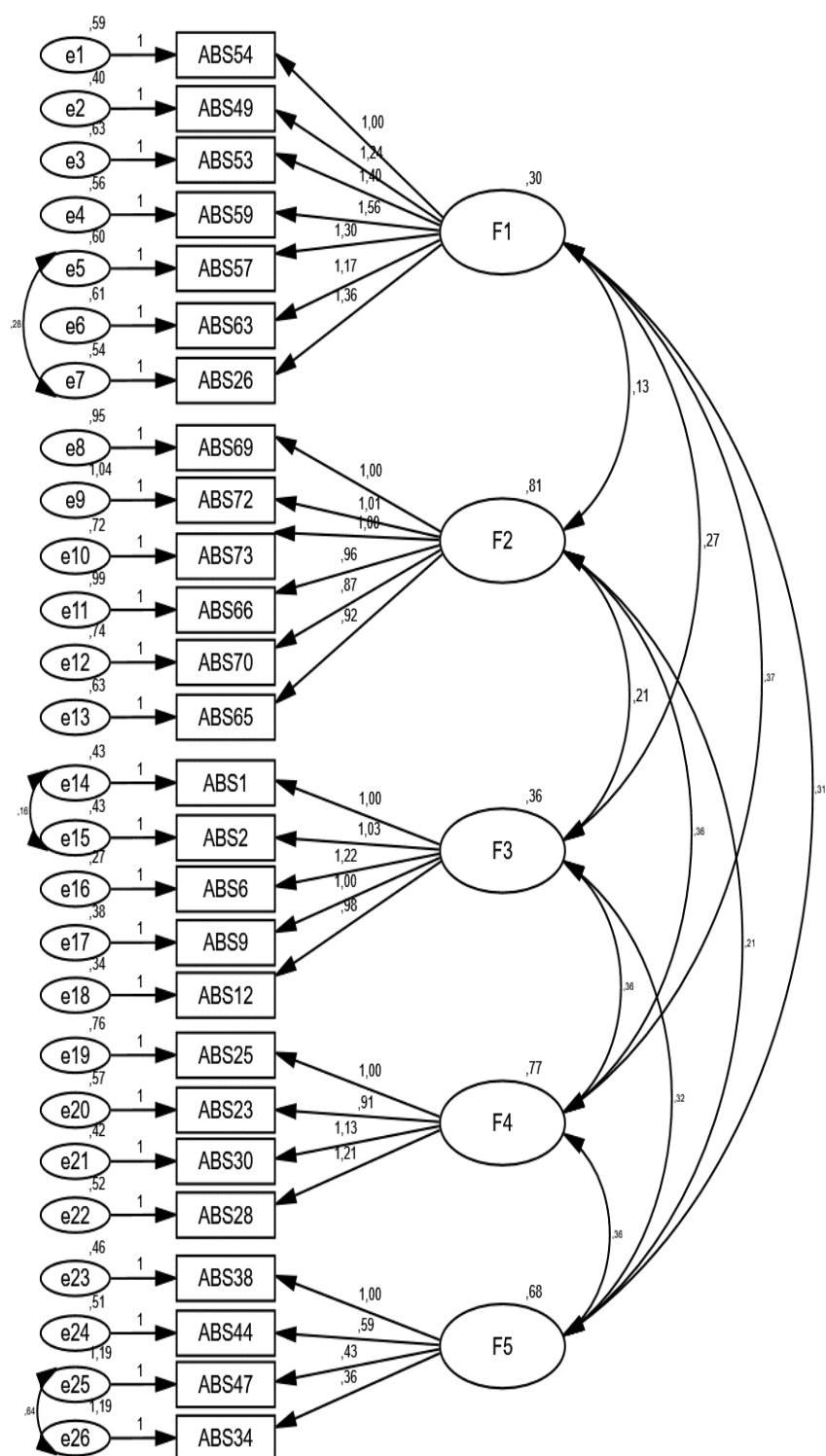
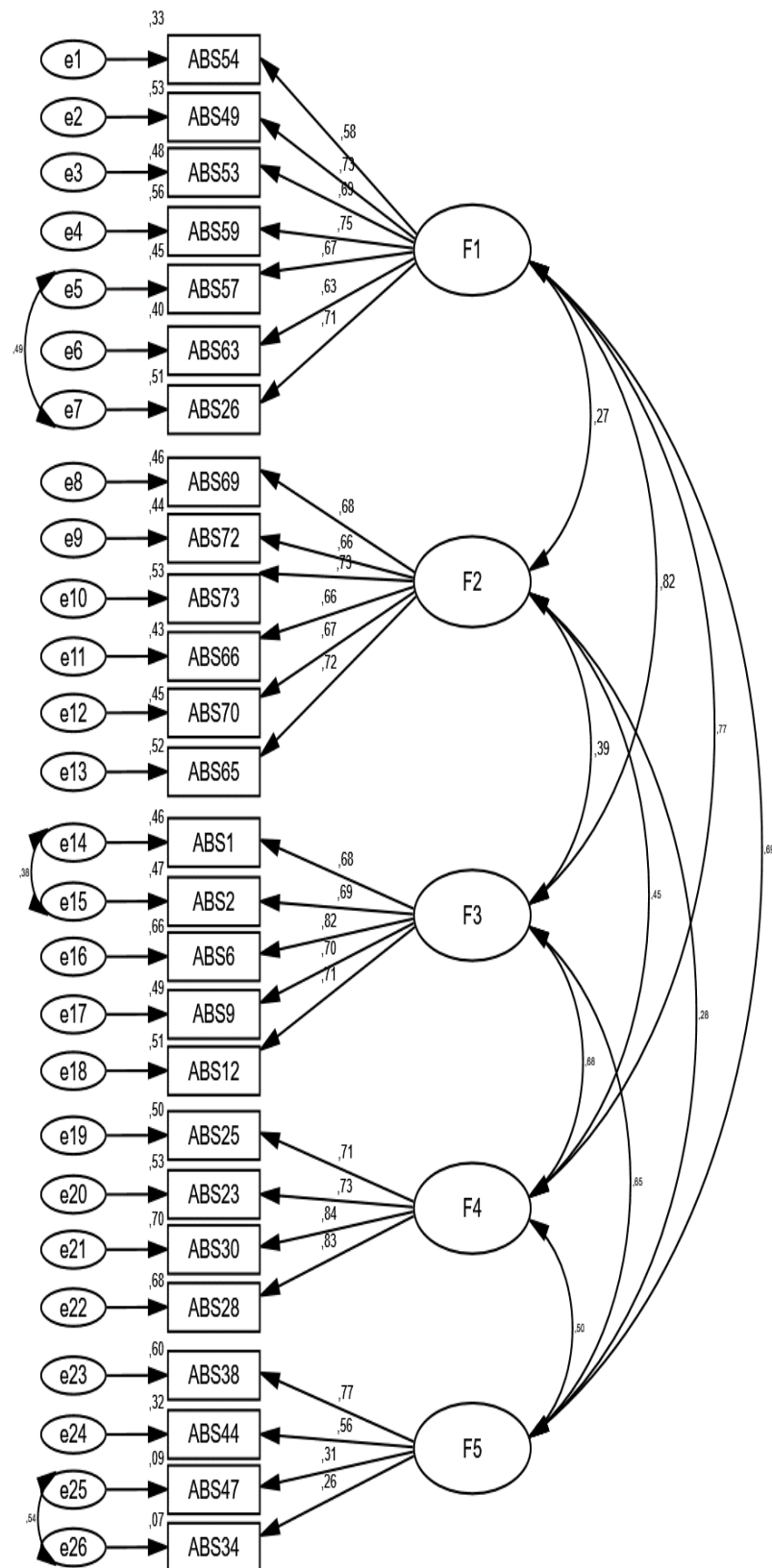
Figure 3*Non-standardized Path Coefficients of Academic Buoyancy Scale*

Figure 4*Standardized Path Coefficients of Academic Buoyancy Scale*

The model fit results after three separate modifications were $X^2 = 815.113$, $df = 286$, ($X^2/df = 2.85$), RMSEA=.07, CFI=.88, GFI=.85, IFI=.88. Furthermore, all path coefficients for all items were discovered to be statistically significant ($p < .001$). It was out that the model was a good fit to the data (Schumacker&Lomax, 2010; Kline, 2015; Şimşek, 2007; Çokluk et al., 2014; Meydan & Şeşen, 2011; Büyüköztürk et al., 2019).

3.4.1.3 Reliability analysis of the academic buoyancy scale

The reliability of the scale was evaluated in this study. Cronbach's alpha values for the ABS and each of the five subscales were determined. The Cronbach's alpha is .90 and according to the alpha coefficient of the scale, the ABS is a highly reliable scale. When it comes to the dimensions, Cronbach's alpha for the first dimension labeled commitment is .86 and the second dimension labeled composure is .84. Cronbach's alpha for the third dimension labeled confidence is .84, while the fourth dimension called coordination is .85. Cronbach's alpha for the fifth-dimension control is .71. Cronbach's alpha values for the scale and its dimensions are summarized in Table 2. When the scale was examined whether it was additive or not, it was found that the scale was not additive according to Tukey's additivity test ($p = .003$).

Table 2*Cronbach's Alpha for the Academic Buoyancy Scale and Its Sub-dimensions*

Cronbach's Alpha	Internal Consistency	Scale and Sub-dimensions	Internal Consistency
$\alpha \geq 0.9$	Excellent	Academic Buoyancy $\alpha = .90$	Excellent
$0.7 \leq 0.9$	Good	Commitment $\alpha = .85$	Good
$0.6 \leq 0.7$	Acceptable	Composure $\alpha = .84$	Good
$0.5 \leq 0.6$	Poor	Confidence $\alpha = .83$	Good
$\alpha \leq 0.5$	Unacceptable	Coordination $\alpha = .85$	Good
		Control $\alpha = .71$	Good

(Streiner, 2003)

3.4.2. Psychometric properties of CFI and MSS

3.4.2.1. Reliability and validity

Reliability is critical in SEM research since a lack of measurement quality while defining the constructs might undermine the credibility of the data and influence the model (Marcoulides & Schumacker, 1996). To investigate the reliability and validity and to test the structure of the MSS and CFI partial least squares structural equation modeling (PLS-SEM) was performed in conjunction with the SmartPLS tool. According to Hair et al. (2013), PLS-SEM is a non-parametric analysis technique that does not make any assumptions about the normal distribution. PLS-SEM strives to maximize explained variance while minimizing error variances. It can also be used to examine single or two-item variables. Since the CFI and MSS

do not meet multiple normality assumptions, the construct validity and reliability of the measures were determined using the variance-based PLS-SEM (see Table 3)

Table 3

Results for the Internal Consistency and Convergent Validity of the Cognitive Flexibility Inventory

	Items	Factor Load	Cronbach's Alpha	CR	AVE
Alternatives	CFI8	.40	.87	.87	.35
	CFI3	.41			
	CFI12	.43			
	CFI10	.43			
	CFI6	.53			
	CFI5	.55			
	CFI14	.62			
	CFI13	.65			
	CFI1	.67			
	CFI16	.67			
	CFI19	.67			
	CFI20	.73			
Control	CFI18	.76	.83	.82	.40
	CFI11	.70			
	CFI15	.82			
	CFI17	.66			
	CFI2	.40			
	CFI4	.58			
	CFI7	.58			
	CFI9	.58			

CR: Composite Reliability, AVE: Average Variance Extracted

Internal consistency reliability of CFI was determined using Cronbach's alpha and composite reliability coefficients. The Cronbach's alpha and composite reliability

coefficients for each sub-dimension were .87 (alternatives) and .83 (control), respectively (see Table 3). To maintain internal consistency, Cronbach's alpha and composite reliability coefficients should be .70 or more. Internal consistency reliability was determined based on these coefficients. The factor load for each item must be $\geq .70$ for convergent validity. If it is less than this amount and greater than .40, it is necessary to evaluate CR or AVE values. Although the factor load is between .40 and .70, no item is deleted because the CR value is greater than .70, ensuring convergent validity.

The MSS had an item load ranging between .43 and .74. Cronbach's alpha coefficient was found to be greater than .70, and the CR value was found to be greater than .70. Hence, internal consistency is ensured. The CR value is high, and the factor loads are greater than .40, ensuring convergent validity (see Table 4).

Table 4

Results for the Internal Consistency and Convergent Validity of the Metacognitive Skills Scale

	Items	Factor Load	Cronbach's Alpha	CR	AVE
Metacognitive Skills	MSS1	.44	.95	.95	.37
	MSS10	.55			
	MSS11	.61			
	MSS12	.43			
	MSS13	.70			
	MSS14	.48			
	MSS15	.63			
	MSS16	.70			
	MSS17	.68			
	MSS18	.68			
	MSS19	.52			
	MSS2	.66			
	MSS20	.67			
	MSS21	.66			
	MSS22	.74			
	MSS23	.64			
	MSS24	.66			
	MSS25	.64			
	MSS26	.63			
	MSS27	.56			
	MSS28	.64			
	MSS29	.56			
	MSS3	.54			
	MSS30	.52			
	MSS4	.50			
	MSS5	.56			
	MSS6	.61			
	MSS7	.64			
	MSS8	.54			
	MSS9	.67			

CR: Composite Reliability, AVE: Average Variance Extracted

Examining discriminant validity is a prerequisite for studying correlations between latent variables, which is widely recognized. In variance-based structural equation modeling, such as partial least squares, the Fornell-Larcker criterion and study of cross-loadings are the primary methods for evaluating discriminant validity (Fornell & Larcker, 1981). The objective of discriminant validity is to ensure that a reflective concept has the strongest relationships with its indicators in the PLS path model (Hair et al., 2013). As demonstrated in Table 5, the Fornell–Larcker was used to test the discriminant validity.

Table 5

Results for Discriminant Validity (Fornell-Larcker) of CFI and MSS

	Alternatives	Control	Meta-cognitive Skills
Alternatives	.59		
Control	.54	.63	
Metacognitive Skills	.60	.36	.61

Following the Fornell-Larcker criterion for discriminant validity, the square root of the AVE coefficients of the components must be bigger than the correlation coefficients between the other factors in the structure. The values on the diagonals that are highlighted in bold font reflect the average square root of the components, while the other values represent the correlation coefficient between the factors. Since the square root coefficients of AVE were greater than the correlation coefficients in their row and column, discriminant validity was established (see Table 5).

Henseler et al. (2014), offer an alternative technique for establishing discriminant validity based on the multitrait-multimethod matrix: the heterotrait-monotrait correlation ratio (HTMT). According to experts, the HTMT threshold value

varies. The HTMT value should be less than .85 (Kline, 2015), .90 (Gold et al., 2001), or less than 1.00 (Henseler et al., 2014). Since all obtained HTMT coefficients were less than .85 (see Table 6), discriminant validity was guaranteed.

Table 6

Results for Discriminant Validity (HTMT) of CFI and MSS

	Alternatives	Control	Meta-cognitive Skills
Alternatives			
Control	.49		
Meta-cognitive Skills	.60	.35	

The results established that the measurement models possessed discriminant validity. All of these evaluations culminated in the completion of measurement model tests and the beginning of the structural model analysis process.

3.5. Data Analysis

To analyze the data, structural equation modeling (SEM), namely path analysis, which is a multivariate statistical analysis technique to test the relationships between endogenous and exogenous variables, was employed (Schumacker & Lomax, 2010). All the descriptive statistics were run using IBM Statistical Packages of Social Sciences (SPSS) 24 and the computer software IBM Analysis of a Moment Structures (AMOS) 24 was used to investigate the structural links (Arbuckle, 2014). To check the CFA of the CFI and MSS, partial least squares structural equation modeling (PLS-SEM) was performed in conjunction with the SmartPLS tool.

3.5.1. Structural equation modelling

Structural equation models employ a variety of models to portray relations between observed variables, with the common purpose of giving a quantitative evaluation of a researcher's theoretical model (Hoyle, 1995; Schumacker & Lomax, 2010; Kline 2015). SEM can be used to evaluate a variety of different theoretical models, including regression, path analysis, and confirmatory factor analysis.

Holbert and Stephenson (2002) defined three different types of SEM models as observable variable (OV), latent composite (LC), and hybrid (HY). The OV method is limited to specifying relationships between observed (measured) variables. Second, individuals who prefer to apply a composite measure but also benefit from latent variable modeling may do so using the LC technique. Finally, the HY method represents a model that incorporates latent and observed variables (Çokluk et al., 2014).

A path model is a structural diagram made up of exogenous (independent) endogenous (dependent), and mediator (intermediary) variables that depict a theorized causal link between the observed variables (Kline, 2015). Path analysis is a more detailed and expanded form of a multiple regression model (Schumacker & Lomax, 2010). Path analysis is a more powerful data analysis approach than regression for assessing the probability of causal linkages among three or more variables. It enables the researcher to build a theory about the likely causes of a given phenomenon, whereby found causal relationships among the selected variables explain the reasons for the occurrence of that particular phenomenon, and correlations demonstrate the consistency of the formulated theory. The hybrid path model was used in this investigation. The terminologies of path analysis are described in the following paragraphs.

An endogenous variable is a synonym for a dependent variable and is predicted in the model by the independent (exogenous) variable(s) in a direct or indirect manner (Byrne, 2010). Academic buoyancy and academic achievement are endogenous variables in this study. The exogenous variable is synonymous with the independent variable and serves as the source of differences in the values of the model's other variables. (Byrne, 2010). The exogenous variables of the study include cognitive flexibility, metacognitive skills, and academic buoyancy. A mediator refers to a variable that helps explain the relationship between the criteria and the predictor variables (or variables) (Baron & Kenny, 1986). The mediator variable in this study is the academic buoyancy construct. Path coefficients/weights are statistical estimates of direct effects computed in a path model by the influence of independent variables on dependent variables (Kline, 2015). It is calculated as the predicted change in the dependent variables, as a result of a unit change in the independent variable (Olobatuyi, 2006). Results less than .10 are considered small, .30 is considered medium, and more than .50 is considered strong (Cohen, 1988; Kline, 2015). Direct effects are those that flow directly from one variable to another. Indirect effects are the effects of two variables that are mediated by one or more intervening factors, referred to as the mediating variable. The process of setting criteria a priori in order to access model fit and confirm factor structure is referred to as a fit index. Some criteria indicate acceptable model fit, while others are close to achieving acceptable fit values (Kline, 2015). The following paragraphs discuss several common fit indices.

The Chi-square (X^2) test measures the level of concordance between the conceptual framework and the observed data (Olobatuyi, 2006). A non-significant X^2 signifies that the model is consistent with the data (Kline, 2015). The Chi-square value, on the other hand, should be employed with extreme caution because of its

sensitivity to sample size. Chi-square statistics tend to provide a significant result when the sample size reaches 200; nevertheless, the significance of the test does not automatically suggest a poor fit to the data (Marcoulides & Hershberger, 1997). Therefore, if the sample size is large, alternative fit indices must be considered. Nevertheless, it is well-known that significance tests respond to larger sample sizes; hence, additional measures of fit should also be examined.

The root mean square error of approximation (RMSEA) is a fit index that compares hypothesized and independent models. The RMSEA close to zero suggests a satisfactory match (Kline, 2015). A fit value of .05 or less is regarded as an excellent match (Browne & Cudeck, 1993; Kline, 2015; Çokluk et al., 2014). In addition, fit values between .08 and .10 are deemed average (Kline, 2015).

The Bentler Comparative Fit Indicator (CFI) is an incremental fit measure that assesses how well a suggested model (the independence model) fits a baseline model (Kline, 2015). CFI can be between 0 and 1 as a value. Bentler (1992) states that a CFI value more than .90 suggests a sufficient model fit, but a CFI value greater than .95 implies a robust model fit (Hu & Bentler, 1999).

The Tucker-Lewis index (TLI) is a measure of incremental (comparative) fit. The TLI has a score range of 0 to 1. Greater scores indicate a better model fit, but a higher value of .95 is just viewed as a good match (Hu & Bentler, 1999).

The Normed Fit Index (NFI) is an incremental assessment of a model's goodness of fit that is unaffected by the model's number of parameters/variables (Ullman & Bentler, 2012). The NFI has a score range of 0 to 1. Higher scores indicate greater model fit; however, a higher value of .95 is only considered a good fit (Hu & Bentler, 1999).

The goodness of fit index (GFI) established by Jöreskog and Sörbom (1993) as a measure of the relative amount of variances and covariances jointly explained by the model. The GFI has a score range of 0 to 1. A higher value of .95 is only considered a good fit (Hu & Bentler, 1999).

The discrepancy between the actual and expected correlations is indicated by the standardized root mean square residual (SRMR). It has a range of 0 to 1, and an approximation to zero signifies a perfect fit (T.A. Brown, 2006). Hu and Bentler (1999) proposed an SRMR cut-off value of .08 or less for a satisfactory match.

For the current study, Chi-square, goodness-of-fit index (GFI), Bentlers' comparative fit index (CFI), root-mean-squared error of approximation (RMSEA) standardized root mean square residual (SRMR), Normed Fit Index (NFI), and Tucker-Lewis index (TLI) were used to assess model fit to the data (Marcoulides & Hershberger, 1997). The recommended cut-off values for each goodness of fit index are summarized in Table 7.

Table 7

<i>Fit Indices</i>		
Fit Indices	Perfect Fit	Accepted Fit
χ^2 / sd	$0 \leq \chi^2 / sd \leq 2$	$2 < \chi^2 / sd \leq 5$
RMSEA	$0 \leq RMSEA \leq .05$	$.05 < RMSEA \leq .10$
SRMR	$0 \leq SRMR \leq .05$	$.05 < SRMR \leq .10$
GFI	$.95 \leq GFI < 1.00$	$.80 \leq GFI < .95$
NFI	$.95 \leq GFI < 1.00$	$.90 \leq NFI < .95$
CFI	$.95 \leq CFI < 1.00$	$.90 \leq CFI < .95$
TLI	$.95 \leq TLI < 1.00$	$.90 \leq NFI < .95$

The fit indicators for the current study were developed based on the recommendations of numerous researchers. (Hu & Bentler, 1999; Schumacker &

Lomax, 2010; Kline, 2015; Şimşek, 2007; Çokluk et al., 2014; Meydan & Şeşen, 2011; Büyüköztürk et al., 2019; Raykov & Marcoulides 2006; Sümer, 2000; Şencan, 2005).

Sometimes, the hypothesized model may not show fit results. When the gathered data are inconsistent with the suggested model, Jöreskog and Sörbom (1993) defined three alternative techniques that the researcher can use. A rigorously confirmatory approach requires the researcher to have a single model, which is rejected if the sample data do not meet the hypothesized model (Kline, 2015). Various alternative models are proposed in advance based on theory in the alternative models approach, and the model that is most suited for the sample data is chosen, while the others are rejected by the researcher (Byrne, 2010). A model generation or trimming occurs as the final technique when the initial model is rejected owing to a poor fit to sample data and adjusted by the researcher to generate a model that better describes the sample data (Byrne, 2010). According to Kline (2015), the model generation / trimming strategy is more popular than others because the purely confirmatory approach is quite limited and it is difficult to offer more than one model, as mentioned in the alternative model's application.

4. FINDINGS

This section of the research summarizes descriptive statistics for the variables in the research, including the total number of participants (N), the mean (M), the standard error (SE), and the standard deviation (SD) and discusses and summarizes the hypothesized path analysis model.

4.1. Descriptive Statistics

Table 8

The Mean, Standard Deviation and Standard Error Values of Sub-Dimensions of Cognitive Flexibility Inventory and Academic Buoyancy Scale and the Mean, Standard Deviation and Standard Error Values of the Metacognitive Skills Scale

	N	M	SE	SD
Commitment	685	27.0	.19	5.2
Composure	685	20.4	.11	3.1
Confidence	685	16.7	.21	5.5
Coordination	685	13.6	.14	3.7
Control	685	16.0	.11	3.0
MSS	685	111	.71	18.6
CFI	685	80	.38	9.9

As seen in Table 8, the means of the scores obtained from the sub-dimension of ABS are as follows: commitment is 27.0 (SD=5.2) composure is 20.4 (SD=3.1), confidence is 16.7(SD=5.5), coordination is 13.6 (SD=3.7), control is 16.0 (SD=3.0) and standard error values vary between 11 and 21. As for the metacognitive skills

scale means of the scores obtained from the scale is 111 (SD= 18.54) standard error value is .71. With regards to cognitive flexibility means of the scores obtained from CFI is 80 (SD=9.9) the standard error value is .38.

4.2. Results of the Fit Statistics for Hypothesized Path Model

Initially, the data were used to test the hypothesized model in this study. The goal of this study was to evaluate how well the model fits the data. Table 9 provides an overview of the initial fit statistics discovered by the path analysis. To discover causal relationships between the variables in the path model, the overall fit of the initial model was evaluated using several fit statistics.

Table 9

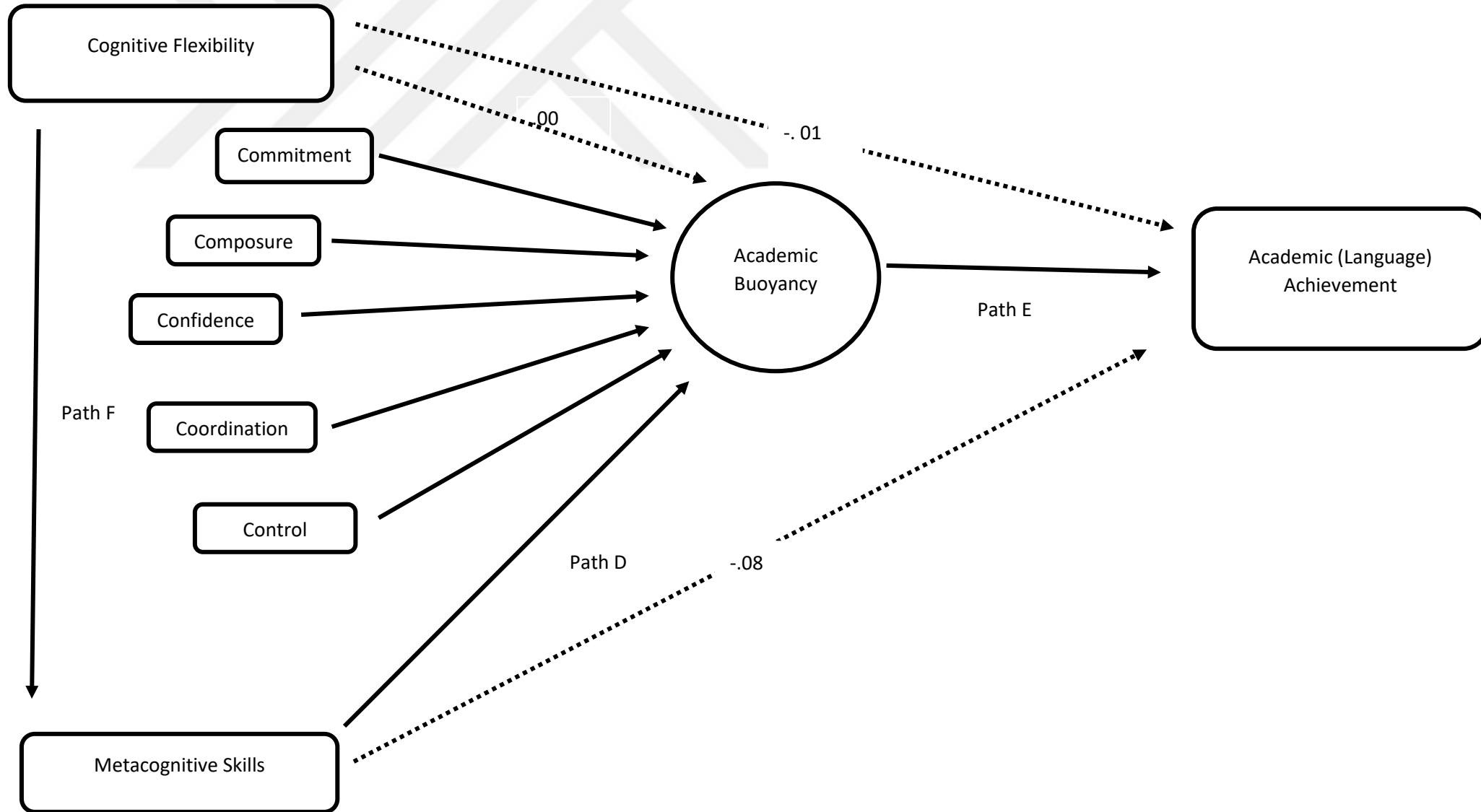
The Fit Statistics for the Hypothesized Model

Fit Indices	Perfect Fit	Accepted Fit	Model
χ^2/sd	$0 \leq \chi^2/\text{sd} \leq 2$	$2 < \chi^2/\text{sd} \leq 5$	6.69
RMSEA	$0 \leq \text{RMSEA} \leq .05$	$.05 < \text{RMSEA} \leq .10$	.09
SRMR	$0 \leq \text{SRMR} \leq .05$	$.05 \leq \text{SRMR} \leq .10$	.04
GFI	$.95 \leq \text{GFI} < 1.00$	$.80 \leq \text{GFI} < .95$	.92
NFI	$.95 \leq \text{GFI} < 1.00$	$.90 \leq \text{NFI} < .95$	.92
CFI	$.95 \leq \text{CFI} < 1.00$	$.90 \leq \text{CFI} < .95$	.90
TLI	$.95 \leq \text{TLI} < 1.00$	$.90 \leq \text{NFI} < .95$	.93

Based on these indices, certain fit statistics for the suggested model showed an inadequate fit. In the path analysis used to evaluate the suggested model, a large and statistically significant Chi-square statistic value ($\chi^2/\text{df} = 6.69$) indicated that the model did not adequately match the data. As previously stated, it should be emphasized that Chi-square is sample size sensitive. The Chi-square produces

significant values when the sample size is large, according to Schumacker and Lomax (2004). Other different goodness of fit indices, such as GFI, CFI and RMSEA are advised to evaluate model fit in order to overcome the constraints of Chi-square statistics. Even though some of the fit indices as $GFI = .92$, $CFI = .90$, $NFI = .92$, $TLI = .93$, $SRMR = .04$, $RMSEA = .09$ suggested an acceptable fit with the data, and another model was tried for better results.

Attempting a new model is necessary since some of the paths in the model were insignificant. The output of the software suggested that these paths are eliminated. Consequently, the hypothesized model was modified to determine the optimal model fit. To do this, the paths with lower weights were eliminated. Specifically, the relationships between cognitive flexibility and academic achievement, cognitive flexibility and academic buoyancy, and metacognitive skills and academic achievement were not statistically significant. Following the implementation of the suggested modifications to increase the model's fit, a path analysis was re-executed with the modified model. Figure 5 shows that the dashed lines from cognitive flexibility to academic achievement ($-.01$) and academic buoyancy ($.00$) were relatively low and deleted. In addition, the correlation between metacognitive skills and academic achievement was rather weak ($-.08$) and was therefore eliminated. Regarding the modification indices table, Path F (connecting cognitive flexibility to metacognitive skills) was added to the revised model to improve model fit.

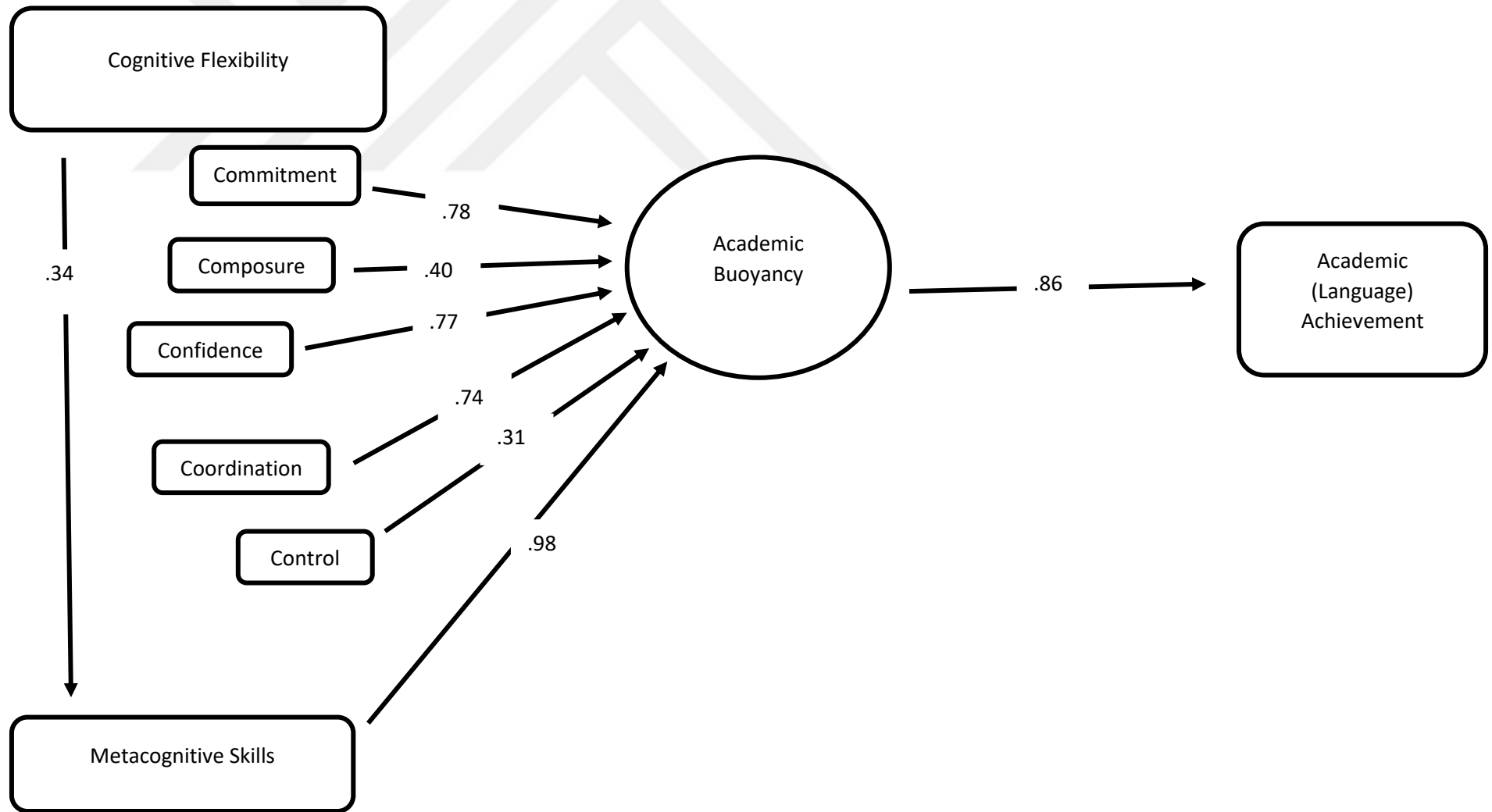
Figure 5*Hypothesized model with Its Significant and Insignificant Paths*

4.3. Path Analysis: Testing the Final (Trimmed) Language Achievement Model

Parsimonious models are one outcome sought after by path analysis.

Considering the outcomes of the initial study for the hypothesized model, a parsimonious model can be used in subsequent tests with additional data to determine the prediction accuracy of the model (Marcoulides & Hershberger, 1997). Because the overall model did not adequately represent the data, it was simplified by removing three insignificant paths and adding one path that was not hypothesized. As an alternate path model of language achievement, the reduced model was undertaken. The path analysis did not find any paths any insignificant paths. Consequently, the reduced model fits the data far better than the suggested model. Figure 6 depicts the standardized path coefficients for the paths of the final model.

Figure 6
Final (Trimmed) Model



An assessment of the path coefficients between the variables of the final model revealed that every path was statistically significant. For the reduced model, the same model-fitting statistics were calculated. Table 10 displays the summary of model-fitting statistics for the final model.

Table 10

The Fit Statistics for Final (Trimmed) Model

Fit Indices	Perfect Fit	Accepted Fit	Model
χ^2/sd	$0 \leq \chi^2/\text{sd} \leq 2$	$2 < \chi^2/\text{sd} \leq 5$	5.41
RMSEA	$0 \leq \text{RMSEA} \leq .05$	$.05 < \text{RMSEA} \leq .10$	.08
SRMR	$0 \leq \text{SRMR} \leq .05$	$.05 \leq \text{SRMR} \leq .10$	.03
GFI	$.95 \leq \text{GFI} < 1.00$	$.80 \leq \text{GFI} < .95$	.97
NFI	$.95 \leq \text{GFI} < 1.00$	$.90 \leq \text{NFI} < .95$	.97
CFI	$.95 \leq \text{CFI} < 1.00$	$.90 \leq \text{CFI} < .95$	.98
TLI	$.95 \leq \text{TLI} < 1.00$	$.90 \leq \text{NFI} < .95$	.96

In the final model, the result of Chi-square ($\chi^2/\text{df} = 5.4$) indicated that the model suited the data well. Moreover, fit indices for the reduced model suggested a strong model-to-data fit: GFI = .97, CFI = .98, TLI = .96, NFI = .97 and RMSEA = .08. The second path analysis, which revealed no nonsignificant paths, was thus chosen as the final path model of language achievement. This suggests that the reduced model much better matches the data than the suggested model.

4.3.1. Direct and indirect relationships

As shown in Figure 6, the path coefficients for the reduced model ranged from 0.34 to 0.98. Cohen (1988) introduced the impact size index and its values for the standardized path coefficient (β), where values less than .10 indicate a minor effect, values between .30 and .50 a medium effect, and values greater than .50 a big effect. Accordingly, metacognitive skills had a strong direct effect on academic buoyancy ($\beta = .98$); academic buoyancy had a substantial effect on academic accomplishment ($\beta = .86$); cognitive flexibility had a moderate effect on metacognitive skills ($\beta = .34$). The indirect effects mentioned in hypotheses were evaluated using bootstrapping (set at 5000) and bias-corrected bootstrap (BC) confidence intervals were sought. Bootstrapping is essentially a statistical technique that resamples the original data set in order to determine the significance of indirect effects (Kline, 2015). Academic buoyancy is a mediator between metacognitive skills and academic achievement, according to the findings ($\beta = .84$). The calculated direct and indirect effects, as well as their statistical significance, for the final model are reported in Table 11.

Table 11*Standardized Total, Direct and Indirect Effects of the Trimmed Model*

Paths	Standardized Estimates (β)
Cognitive Flexibility → Metacognitive Skills	
Total	.34
Direct	.34
Metacognitive Skills → Academic Achievement	
Total	.84
Indirect	.84
Metacognitive Skills → Academic Buoyancy	
Total	.98
Direct	.98
Academic Buoyancy → Academic Achievement	
Total	.86
Direct	.86
Metacognitive Skills → Academic Buoyancy	
Indirect & Total	
→ Commitment	.77
→ Composure	.40
→ Confidence	.76
→ Coordination	.76
→ Control	.30

As it is clear from Table 11 metacognitive skills have a large effect on commitment ($\beta = .77$), confidence ($\beta = .76$), coordination ($\beta = .76$), composure ($\beta = .40$) and a medium effect on control ($\beta = .30$).

4.3.2. Squared multiple correlations (R²)

Cognitive flexibility, metacognitive skills, and academic buoyancy predicted language achievement as seen in Table 12 below.

Table 12

Squared Multiple Correlations Regarding the Variables in the Model

Variables	R ²
Metacognitive skills	.12
Academic Buoyancy	.97
Academic (Language) Achievement	.73

Regarding the research question of the study three variables explained 73% of the total variance in achievement. Additionally, metacognitive skills were predicted by cognitive flexibility, and the prediction explained 12% of the total variance in metacognitive skills. Moreover, metacognitive skills predicted academic buoyancy. It explained 97% of the total variance in academic buoyancy.

4.4. Hypotheses Testing

Hypothesis 1: *Cognitive flexibility is directly and positively associated with academic achievement (Path A).* Hypothesis 1 was rejected because cognitive flexibility was not found to be related to academic achievement ($\beta = .00$, $p > .05$) which means there is no direct significant relationship between cognitive flexibility and academic achievement. Therefore, this link is eliminated.

Hypothesis 2: *Metacognitive skills are directly and positively associated with academic achievement (Path B).* Hypothesis 2 was rejected as metacognitive skills

were found to be not very significantly and positively related to academic achievement ($\beta = -.08$, $p > .05$). Hence, this path has been deleted.

Hypothesis 3: *Cognitive flexibility is directly and positively associated with academic buoyancy (Path C).* Hypothesis 3 was rejected because cognitive flexibility was found to be not significantly and positively related to academic buoyancy ($\beta = -.01$, $p < .05$) which means there is no direct relationship between cognitive flexibility and academic buoyancy. As a result, the link is deleted.

Hypothesis 4: *Metacognitive skills are directly and positively associated with academic buoyancy (Path D).* The hypothesis was accepted as there was a positive and direct relationship between metacognitive skills and academic buoyancy ($\beta = .98$, $p < .001$).

Hypothesis 5: *Academic buoyancy is directly and positively associated with academic achievement (Path E).* The results verified hypothesis 5 as academic buoyancy was related to academic achievement ($\beta = .86$, $p < .001$).

Hypothesis 6: *Cognitive flexibility is positively linked to academic buoyancy, which in turn; is positively linked to academic achievement (Path C and Path E).* The hypothesis was rejected because cognitive flexibility was not related to academic achievement indirectly ($\beta = .01$, $p < .05$) through academic buoyancy indicating that there is no mediating effect of academic buoyancy on the relationship between cognitive flexibility and academic achievement.

Hypothesis 7: *Metacognitive skills are positively linked to academic buoyancy, which in turn; academic buoyancy significantly predicts academic achievement. (Path B and Path E).* The hypothesis was accepted as there was a

positive and significant relationship between metacognitive skills and academic achievement through academic buoyancy ($\beta = .84$; $p < .001$).



5. CONCLUSION AND DISCUSSION

The section discusses and interprets the direct, indirect, and total effects of cognitive flexibility, metacognitive skills, and academic buoyancy as predictors of university students' language achievement regarding the hypothesized and trimmed models.

5.1. Discussion Regarding the Relationship between Endogenous Variables and Cognitive Flexibility

Findings revealed that EFL learners' cognitive flexibility scores had no direct effect on achievement, that is cognitive flexibility does not directly contribute to students' language achievement (Path A). This finding is different from the growing studies indicating a beneficial relationship between cognitive flexibility and academic achievement (Toraman et al. 2020; Barnes et al. 2022). According to Kercood et al. (2017), reading, mathematical, and writing abilities all correlate substantially with cognitive flexibility, implying that cognitive flexibility has broad implications for academic achievement. Previous research with college students Timarova and Salaets (2011) established a link between enhanced cognitive flexibility and decreased anxiety, increased motivation, and effectiveness in training programs. This study has found no relation between cognitive flexibility and academic achievement congruent with the study of Alper and Deryakulu (2008) which found that cognitive flexibility had no effect on students' achievement, retention of information, or attitudes in web-mediated problem-based learning. This finding of the current study could be explained by the fact that cognitive flexibility is thought to make people better problem solvers because they are adaptable to changing circumstances (Stevens, 2009). However, those who are more flexible may tend to flee rather than confront the issue at hand. A learner may be highly flexible, yet s/he may avoid the negative

outcome of the events. This suggests that cognitive flexibility may not have played a role in the study's findings regarding language achievement.

Furthermore, the study concluded that students' cognitive flexibility had no discernible effect on language learners' academic buoyancy (Path C). Martin et al. (1998) defines cognitive flexibility as awareness of the existence of options and alternatives, the desire to adapt to a new environment and a belief in one's own competence in relation to flexibility. Academic buoyancy is described as a way of examining students' constructive and positive responses to a variety of obstacles encountered during the current academic year or school, such as high-risk test stress, low grades, and so on (Martin & Marsh, 2009). One of the most critical components of academic buoyancy is the necessity of capitalizing on one's abilities and responding to setbacks or issues proactively rather than reactively (Martin, 2008). Both concepts necessitate adaptive manners. Thus, if a student is academically buoyant, which requires adaptive skills, s/he may not require cognitive flexibility, or cognitive flexibility may not contribute greatly to buoyant students because they may already possess the ability to adapt to a changing or difficult circumstance. Hence, cognitive flexibility may not play a crucial role in affecting learners' academic buoyancy directly.

5.2. Discussion Regarding the Relationship between Endogenous Variables and Metacognitive Skills

According to the findings of this study, metacognitive skills do not have a direct significant impact on academic achievement (Path B). While multiple research studies have established the importance of metacognitive skills in learning, it is widely recognized that metacognitive knowledge or regulation alone is insufficient to boost student accomplishment (Whitebread, 1999). As Schraw (1998) noted, even

when individuals acquire metacognitive awareness about their learning and performance, they may struggle to master skills and approaches. This study demonstrates that metacognitive skills do not greatly affect achievement; this may be because students must also be motivated and ready to use their metacognitive skills (Zimmerman, 1990; Bandura et al., 1996). The findings of this study are consistent with those of T.Yılmaz (2017), who indicate that learners possess a high number of metacognitive skills and, contrary to popular belief; there is little association between learners' mathematical abilities and their metacognition level. Metacognition can be leveraged more to enhance the rate of learner reflection beyond their existing knowledge and skills, which may aid in the development of learner self-reflection and pave the path for improvement (Buitrago, 2020). Moreover, metacognitive skills involve a range of distinct behaviors and capacities for cognitive control, including planning, monitoring, controlling, and changing task performance (Veenman & Elshout, 1999; Schraw & Moshman 1995). Possessing metacognitive skills alone may not be sufficient to ensure achievement. To effectively use metacognitive skills, a learner must have a thorough understanding of learning processes (Senemoğlu, 2013). As a result, it is about action control and strategy application, in which learners comprehend strategies and their application, and then apply them as needed (Efklides, 2008; Veenman et al., 2004). Otherwise, it may not contribute to achievement. In the same vein, Cullen (2013) emphasizes that metacognition can also negatively affect students. Students who lack reading and comprehension abilities cannot benefit from metacognitive strategies (Keskin, 2013). It requires pupils who can comprehend the directions and requirements of the assigned assignments.

The study discovered that students' metacognitive skills have a considerable favorable effect on their academic buoyancy (Path D). This result corroborates

Layco's findings (2020). It can be elaborated on this finding that metacognitive knowledge and skills are recognized as a means of altering one's approach or strategies in response to a specific challenge or setback (Flavell, 1979) and academic buoyancy, similarly, is described as the capacity to rebound from setbacks and is regarded as an adaptive reaction (Martin, 2008). Both metacognitive skills and academic buoyancy are adaptive constructs within the educational context.

Due to the inevitability of setbacks in academic contexts, learners have to develop their metacognitive capacities to self-reflect, express, and regulate their emotional responses. They can then refocus their plan, restore their confidence, and chart a new course toward their objectives with those aspects in place. Hence, metacognitive skills may have a huge impact on the academic buoyancy of EFL learners. The learners' awareness of these internal processes must be developed. Additionally, individuals seek attention and a sense of validation to help them integrate their information. Academic buoyancy can be further developed and maintained through a range of classroom and school-level strategies.

As Anderson et al., (2020) argue, numerous aspects can contribute to metacognitive skills having a major effect on academic buoyancy in this study. Metacognition and self-regulation are critical for dealing with mistakes and increasing students' perseverance and tolerance for unpleasant circumstances. Failure, difficulties, and errors are an unavoidable part of the educational process and academic development. Metacognitive awareness and the ability to modify and strategize, as well as academic buoyancy, are required for adaptive reactions to setbacks. Students may need metacognitive skills to retain a growth attitude and stay motivated during times of stress, as well as to regulate their emotions during moments of failure that make them want to abandon.

5.3. Discussion Regarding Academic Buoyancy and Academic Achievement

The results indicate that academic buoyancy has a beneficial impact on academic achievement. Academic buoyancy scores were hypothesized to be an excellent predictor of academic achievement. This research demonstrates that a student's achievement is proportional to his or her level of academic buoyancy. A study by Barnett (2012) found that pupils who were considered the most academically buoyant were awarded the best grades. This study confirms the findings of Martin (2008) which identify academic buoyancy as a predictor of academic achievement.

School achievement, teacher happiness, class participation, and general self-confidence were all found to be strongly correlated with students' levels of academic buoyancy (Martin&Marsh, 2009; Martin, 2013). Additionally, students with a strong sense of buoyancy demonstrate excellent task performance and dedication as well as minimal levels of absenteeism (Martin&Marsh, 2008). Furthermore, the findings support previous research that has linked academic buoyancy to greater performance on exams (Collie et al., 2015; Martin, 2013; Putwain et al., 2015). Similarly, Colmar et al. (2019) has shown that buoyancy improves reading and mathematics achievement in Australian children when self-concept is mediated. In a large-scale study of school-aged children, academic buoyancy was also discovered to be related to academic achievement (Miller et al., 2013) Aydın and Michou (2019) discovered that academic buoyancy serves as a predictor of achievement, which is consistent with the findings of this study. Academic buoyancy at the end of the academic term was found to be positively correlated with high final marks in English. An additional study conducted in Iran by Jahedizadeh et al., (2019) looked into buoyancy in higher education and developed a scale for evaluating it concerning to GPA, gender, and educational attainment. The study concluded that buoyancy has connections to these

factors and can improve the long-term buoyancy of EFL students. However, academic buoyancy has not received the attention it needs from EFL experts, despite its importance.

Academic buoyancy has evolved into one of the factors influencing how students adapt to academic life, which adds to achievement. It is focused on how students react to academic challenges and hazards (Putwain et al., 2012). It inspires pupils to overcome obstacles and progress in the face of adversity (Martin & Marsh, 2003). Several motivational factors were tentatively identified as being highly associated with students' academic buoyancy. The 5Cs of academic buoyancy was defined as confidence, coordination, commitment, composure, and uncertain control (Martin et al., 2010). Consistent with past studies focusing on the 5Cs for academic buoyancy and achievement, the outcomes of the current study support the 5Cs. For example, Hsieh and Kang (2010) discovered a link between a high sense of efficacy (confidence) and foreign language success. The commitment was also considered since it refers to a learner's ability to endure in the face of changing challenges or highs and lows associated with this language learning path (Dörnyei et al., 2016). One of the sub-dimensions of academic buoyancy is composure (low anxiety). The literature has consistently emphasized the importance of reducing the impact of anxiety on the learning processes of language learners (Huang, 2012). The more buoyant language learners are, the more successful they will be at language acquisition, according to Yun et al (2018). They are all beneficial to academic buoyancy. Academic buoyancy minimizes the potential threat of examinations by altering self-regulation mechanisms and allowing for improved examination performance. In other words, buoyant learners may exhibit greater desire, more

positive self-perceptions, and more flexible responses to setbacks, all of which correlate to lower test anxiety (Putwain et al., 2015).

5.4. Discussion Regarding Cognitive Flexibility and Metacognitive Skills

As a result of the initial model output, a direct association between cognitive flexibility and metacognitive flexibility has been proposed (Path F). The results of the final model show that students' cognitive flexibility has a favorable influence on their metacognitive skills. This finding suggests that pupils who are more cognitively flexible can employ more metacognitive skills. The intricacy of everyday living necessitates cognitive flexibility (Martin et al., 1998). Adapting to a new circumstance or solving a problem necessitates the person being aware of many behavioral options in the face of the current situation, being able to implement these various behavioral options and strategies willingly and feeling sufficient in this regard. To overcome obstacles, 21st-century learners must include abilities such as problem-solving, decision-making, assumption analysis, and enquiry (Greenstein, 2012). A set of cognitive control mechanisms that enable goal-oriented behavior, cognitive flexibility, the blocking of irrelevant information, and self-management or self-regulation are together referred to as metacognition, also known as executive function. These mechanisms are responsible for controlling, directing, and managing thought, action, and emotion. Metacognition and cognitive flexibility are both interconnected. To be more exact, metacognition refers to an individual's awareness and control over his/her cognitive processes. Cognitive flexibility is the capacity to change one's cognitive framework, style of thinking, or focus in order to observe, analyze, or react to circumstances in a different way (Eslinger & Grattan, 1993; Rende, 2000). Cognitive flexibility is the capacity to generate a variety of ideas, explore various courses of action, and adapt behavior and cognition in response to shifting contextual pressures

(Rende, 2000). Under brief, cognitive flexibility, defined as the ability to shift cognitions in difficult conditions, is linked to metacognition (Dennis & Wander Val, 2009; Ionescu, 2012). In this way, cognitive flexibility can increase and strengthen metacognitive skills. Similarly, enhancing cognitive flexibility can contribute to metacognition by supporting students in altering their perspectives on a task, particularly with regard to the numerous means or strategies available to accomplish a goal. If students actively reflect on the change - metacognitive knowledge - or passively realize that the change has occurred - metacognitive experience - then their metacognitive experiences and knowledge are enhanced. Enhanced metacognition is a common outcome of cognitive flexibility, regardless of how much active metacognitive processes are engaged (Clere & Clement, 2016).

5.5. Discussion Related to Indirect Effects of the Model

The research findings indicate that the indirect influence of metacognitive skills on academic achievement is statistically significant. As stated above, metacognitive skills have no direct effect on achievement. However, metacognitive skills actively contributed to academic success via the mediating effect of academic buoyancy. This shows that academic buoyancy mediates the relationship between academic achievement and extrinsic elements such as academic cognition, motivation, behavior regulation, and other external factors. The findings are consistent with those of Layco (2020), who discovered that students with low levels of negative academic emotions in their grades and high levels of metacognition and academic buoyancy receive higher grades in mathematics. Therefore, it may be concluded that metacognitive skills must be supported by specific variables in order to be effective. In other words, metacognition acts in concert with other factors that influence accomplishment. A more recent meta-analysis demonstrated that metacognition

predicts academic success (Ohtani & Hisasaka, 2018). Previous research has demonstrated that metacognition is associated with the application of a variety of cognitive techniques, which are linked to academic achievement (Pintrich & De Groot 1990; Pintrich et al., 1993). According to Hattie's (2009) analysis of determinants predicting academic accomplishment, training in metacognitive skills is one of the most influential elements of student learning and success.

Like the direct effect of cognitive flexibility on academic achievement, when it comes to indirect effect, there is no substantial indirect influence on academic achievement due to the mediating effect of academic buoyancy in both hypothesized and trimmed models. This finding is congruent with Alper and Deryakulu (2008) who found that cognitive flexibility had no effect on students' achievement. Additionally, Kılıç (2008) indicated that cognitive flexibility had little effect on students' achievement

5.6. Discussion Regarding Academic Buoyancy and Its Sub-dimensions

As previously indicated, the ABS was developed specifically for the purposes of this study. It was discovered that the scale is non-additive, which implies that the five sub-dimensions of the scale together reflect academic buoyancy; nevertheless, no total point can be obtained from this scale. The results of the study indicate that the 5Cs are interrelated and mutually supportive. It can be concluded that competence in one of the 5Cs increases the probability of provoking the others. Coordination, for instance, paves the way for efficient study habits, which in turn boost confidence from achievement. Low uncertain control and low anxiety may be the result of strong levels of commitment and confidence.

When the total effects of metacognitive skills on the sub-dimensions of the academic buoyancy scale were examined independently, metacognitive skills had a significant positive influence on commitment, confidence, coordination, and a middling positive effect on control and composure. Metacognition refers to the awareness and regulation of an individual's cognitive processes. Higher metacognitive ability may therefore support more adaptive educational outcomes, such as school enjoyment, class involvement, academic self-efficacy, planning, persistence, and control, as well as reduced academic and test anxiety (Martin, 2013; Martin et al., 2010; Martin & Marsh, 2008; Putwain et al., 2012; Putwain & Daly, 2013). This finding is consistent with Martin's research (Martin et al., 2010), which indicated that the 5Cs of academic buoyancy was confidence (high self-efficacy), coordination (high degree of planning), commitment (high level of persistence), composure (low anxiety), and control (a low amount of uncertain control). Metacognition has also been linked to coordination (Rani et al., 2020) and confidence (Kleitman & Stankov, 2007) in the literature. Consequently, it may be extrapolated that the findings of this investigation are consistent with those of earlier studies.

5.7. Implications for Practice

The outcomes of the present study have several implications for EFL/ESL instructors, English teachers, counselors, and other educators. The current study investigated the links between cognitive flexibility and metacognitive skills through the mediating function of academic buoyancy on language success among a group of university students enrolled in an English preparatory school. The study and conceptual model presented a multi-theoretical framework for tackling the language achievement of EFL learners at the postsecondary level, as well as an understanding of the components that contribute to language achievement. Therefore, the present

study has the potential to offer useful information for comprehending the relationship between language success and its contributing components. Therefore, the results may give helpful guidance for EFL/ESL instructors, university counselors and curriculum developers, as they design new programs to improve the language achievement of EFL learners.

This was one of the first attempts to analyze the function of variables considered to be contributing factors to the language achievement of Turkish EFL learners at the postsecondary level. According to the researcher, the current investigation is a beginning effort to analyze language performance within a broad theoretical framework. In this sense, the present study's findings have the potential to guide future treatments aimed at enhancing language success in this demographic.

This research aimed to establish a model of linguistic proficiency by analyzing its antecedents. As 73 % of the variance in language accomplishment is described by the final model, the components that have been postulated and explored in the present study can significantly explain language achievement. In this regard, to promote language achievement, the educator should take into account the following:

1. cognitive flexibility does not directly predict academic buoyancy and language achievement, but it is a predictor of metacognitive skills,
2. metacognitive skills do not directly predict language achievement; yet predict language achievement via the mediating effect of academic buoyancy,
3. academic buoyancy is the predictor of academic achievement; it mediates the linkage between metacognitive skills and language achievement, but it insignificantly mediates the relation between cognitive flexibility and academic achievement.

It is clear from the study that academic achievement is affected by various factors differently. Theoretically, the study supported and extended the premise that language achievement is not merely a reflection of figures related to the GPA of the students, but also has cognitive, affective, and behavioral aspects. In this regard, educators should recognize that a change in accomplishment is attainable through the modification of feelings, attitudes, motivation, and strategies. Therefore, the present findings may be useful for preventing underachievement and may be utilized by counseling units to assist students.

Given that academic buoyancy is one of the greatest predictors of language proficiency according to the model developed in the current study, it appears appropriate to recommend that students enhance their academic buoyancy. EFL/ESL instructors and other university staff may find it valuable to encourage students to improve their coordination, commitment, confidence, and decrease their level of composure, and control. In other words, making learners aware of the subcomponents of academic buoyancy and offering them treatments may also be effective.

Surveys should be carried out at educational institutions to determine whether pupils are buoyant. After that, the areas in which there is room for improvement can be identified using a combination of interviews and observations. To resolve any potential problems, students may be provided training on their areas of weakness, such as task organization and time management. Additionally, this has the potential to act as a forewarning system, providing the opportunity to formulate a plan tailored to each student's needs. In the present study, a Turkish version of the academic buoyancy scale was developed, which might facilitate the development of academic buoyancy interventions in Turkish culture. The scale can be used for measuring the academic buoyancy of the students in any subject like mathematics, science,

geography, art, and so on, not solely in English. If students' academic buoyancy is assessed, measured, or evaluated, it may improve their overall school attitude and academic performance as well as adaptation.

Using descriptive statistics and path analysis, the study revealed the relative significance of several parameters. Therefore, researchers, counselors, administrators and curriculum planners should take these characteristics into mind while designing preventative programs and plan accordingly. For instance, the current findings revealed that enhancing students' metacognition might be a useful strategy to improve their academic buoyancy, which in turn aids in boosting their linguistic accomplishment. However, cognitive flexibility has a direct association with neither academic buoyancy nor academic achievement.

The findings suggest that students should be instructed on how to utilize their metacognitive skills. Rather than focusing on cognitive flexibility greatly, interventions may target specific metacognitive skills more. Effective context-based education in metacognitive abilities includes training in the application of strategies, evaluation of the learning material, planning and management, and so on (Flavell, 1987). In addition to enhancing a learner's abilities, explicit teaching can increase the likelihood of success. As the study indicates, boosting metacognitive skills both affects academic buoyancy and their achievements in turn. This result of the study is in line with the study, which found a statistically significant positive correlation between metacognition, motivation, self-efficacy, and academic achievement (Landine & Stewart, 1998). In addition, metacognition promotes academic performance, according to Coutinho (2007), who examined the relationship between metacognition, goal orientation, and academic achievement.

Because setbacks in academic environments are unavoidable, learners must build their metacognitive skills to self-reflect, express, and manage their emotional responses. With those elements in place, they may refocus their strategy, regain confidence, and chart a new route toward their objectives. As a result, metacognitive abilities may have a significant influence on the academic buoyancy of EFL learners. It is necessary to raise learners' awareness of these internal processes. Individuals also desire attention and validation to help them absorb their information. A variety of classroom and school-level initiatives may be used to generate and sustain academic buoyancy. In addition, the results demonstrated that students' academic buoyancy influences their success in language learning. Furthermore, the association between metacognitive abilities and achievement is mediated by academic buoyancy, indicating that metacognition indirectly affects academic performance as measured by grades. This suggests that metacognitive skills are responsible for students' improved performance as a result of their adaptability. With these results, it is recommended that to boost the impact of metacognitive skills on achievement, educators should consider metacognitive strategies for their students to be buoyant and finally increase the chances to achieve academic success.

As a result of the findings of the study, psychological researchers are inspired to prioritize academic success. Accurate psychological theories on how students' motivation, cognition, and learning outcomes affected by academic buoyancy must be prioritized. Theoretical constructs may serve as a resource for instructors who wish to provide their pupils with an atmosphere that is favorable to learning and assists them in achieving their goals and achieving a better level of learning. It can be implied from this study that university staff and counselors should work hand in hand for the students to develop their ability to be buoyant in facing their language learning

difficulties, turn negative academic emotions into positive ones, and improve their performance in the said subjects.

In the study of academic buoyancy and the use of metacognitive abilities, educators, researchers, and psychologists must emphasize attention and interest. This is one technique to determine how metacognitive skills and academic buoyancy influence the academic performance of pupils. Researchers and educators should conclude from this study that it is crucial to monitor and improve students' academic buoyancy and metacognitive skills at the territorial level since both direct and indirect findings indicate that these factors have a significant impact on accomplishment.

School psychologists can identify individuals and groups with poor levels of adaptation and, in partnership with teachers, ensure that they are able to manage the academic demands of everyday life in the most adaptable manner. In addition, educators should observe how students employ their metacognitive skills.

In contrast to what has been hypothesized for the study, cognitive flexibility did not appear to have much impact in this model. It neither has a direct effect on academic buoyancy nor academic achievement. In the final model, cognitive flexibility has a mediocre impact on metacognitive skills. To put it another way, as metacognition is the ability to define a task, choose an appropriate mental and physical representation, decide on the best strategy for completing the task, allocate resources, activate relevant prior knowledge, value feedback on how the task is progressing and translate reviews into improved performance, it allows an individual to employ information strategically for efficiency (Gourgey, 2001).

Metacognitive abilities encompass specialized cognitive control behaviors and capacities such as planning, monitoring, controlling, and adjusting task performance,

all of which are necessary for language learning (Veenman & Elshout, 1999; Schraw & Moshman, 1995). As previously stated, fostering cognitive flexibility can boost metacognition by enabling learners to shift their viewpoints on a task, particularly regarding the many means or techniques to achieve a goal. To boost the use of metacognitive skills some training on flexibility can be given. The learners can be provided with scenarios and asked how to respond to the situations. Therefore, changing one's perspective on a task or problem boosts metacognitive experiences and metacognitive knowledge if students actively reflect on this shift - metacognitive knowledge - or passively recognize that this change has occurred - metacognitive experience. Moreover, they can be asked to reflect on the strategies that they will be using. These kinds of sessions in classes and seminar sessions may aid learners to be cognitively flexible and enhance the use of metacognitive skills.

Academic buoyancy and metacognitive skills are crucial for society at this time since they signify the beginning of a student's career on a certain route, from which they might determine their eventual vocation. Hence, this model of academic achievement may be modified and used in numerous stages of education, including preschool, elementary school, and secondary school.

5.8. Recommendations for Further Research

The following are some recommendations for further research based on the present study. First and maybe most obviously, is to duplicate this study in a new environment. Undoubtedly, more research with bigger and more demographically varied groups would enhance the study's conclusions. This study was conducted using a group of college-level EFL students, which limits the generalizability of the findings to similar groups alone. Therefore, future studies should concentrate on more varied populations, such as different grade levels, in order to enhance our understanding of

language success in relation to various developmental phases. In other words, the same type of study may be undertaken on many target groups, including elementary school children, students in upper secondary school, students in postsecondary education, and educationally disadvantaged students. It is advised that further research be conducted using samples from various institutions and areas of Turkey. In addition, conducting future studies with diverse age groups and subcultures may yield rewarding results for a better understanding of language achievement.

Second, this study was conducted at a tertiary-level English preparation school. It is recommended that research may be undertaken on several target groups studying in various faculties, such as sports, finance, medical, and so on.

Thirdly, future research should also examine the academic buoyancy, metacognitive skills, and cognitive flexibility of teachers. At various time intervals, longitudinal designs may be utilized to explore the relationship between numerous variables and academic buoyancy, metacognitive skills, and cognitive flexibility.

Next, it is feasible to determine if the academic achievement model constituted of the same variables differs based on demographic factors such as gender, educational background, personality traits, and socio-economic status.

Furthermore, longitudinal research might be conducted to assess whether cognitive flexibility, metacognitive skills, and academic buoyancy influence the academic achievement of university students. To improve the academic performance of university students, a program that assesses cognitive flexibility, metacognitive skills, and academic buoyancy might be designed and could be incorporated into orientation programs for the adjustment to university life. It is possible to undertake a cross-cultural study to determine the academic achievement models' reflections in different cultures.

Cognitive flexibility and metacognitive skills were anticipated to influence language performance positively and directly. The study indicated, however, that neither cognitive flexibility nor metacognitive skills directly predicted linguistic performance. Therefore, it might be beneficial to duplicate this study in a different context to see whether these variables and academic achievement are related. In addition, the researcher believes that the final model developed for this study should be retested in additional samples to ensure that the alterations made were not unique to these subjects.



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APPENDICES

APPENDIX A

Değerli Katılımcı,

Bu anket sizin İngilizce öğrenmeye yönelik beceri, strateji ve hedeflerinizi ölçmeyi amaçlamaktadır. Ankete vereceğiniz cevaplar, bilimsel bir araştırmanın yürütülmesi amacıyla kullanılacak, kişisel bilgi ve görüşleriniz kesinlikle gizli tutulacaktır.

Lütfen soruları cevaplamadan önce dikkatle okuyunuz. Soruların doğru yada yanlış cevabı yoktur; her soruda size en yakın olan seçeneği işaretleyiniz. Bu anketin sağlayacağı yarar, soruları cevaplamakta göstereceğiniz içtenlik ve dikkate bağlıdır. Katkılarınız için teşekkürler.

Araştırmayla ilgili yukarıda belirtilenleri okudum ve araştırmaya kendi isteğimle katılmayı kabul ediyorum.

- ☐ EVET
- ☐ HAYIR

Demografik Bilgiler

- 1) Öğrenci Numaranız
- 2) Sınıf Kodunuz (103, 256, 357 vb.)
- 3) Cinsiyetiniz?
 - ☐ Kadın
 - ☐ Erkek
 - ☐ Cevap vermek istemiyorum
- 4) Yaşınız?
 - ☐ 18-20
 - ☐ 21-25
 - ☐ 26-30
 - ☐ 30+

5) Kaç yıldır ingilizce öğreniyorsunuz?

- ☐ 1-2
- ☐ 3-5
- ☐ 6-10
- ☐ 11+

6) Bölümünüz (İşletme, Mühendislik, Tıp vb.)

7) İlköğretim okul türünüz

- ☐ Özel okul
- ☐ Devlet okulu

8) Lise okul türünüz

- ☐ Özel okul
- ☐ Devlet okulu

9) Lise mezuniyet puanınız

APPENDIX B

BİLİŞSEL ESNEKLİK ENVANTERİ

Aşağıdaki ifadelerin size ne kadar uygun olduğunu göstermek için lütfen ifadelerin solunda yer alan ölçeği kullanınız.		Hiç uygun değil	Pek uygun değil	Kararsızım	Uygun	Tamamen uygun
1.	Durumları "tartma" konusunda iyiyimdir.	1	2	3	4	5
2.	Zor durumlarla karşılaştığımda karar vermekte güçlük çekerim.	1	2	3	4	5
3.	Karar vermeden önce çok sayıda seçeneği dikkate alırım.	1	2	3	4	5
4.	Zor durumlarla karşılaştığımda kontrolümü kaybediyormuşum gibi hissederim.	1	2	3	4	5
5.	Zor durumlara değişik açılardan bakmayı tercih ederim.	1	2	3	4	5
6.	Bir davranışın nedenini anlamak için önce, elimdeki dışında ek bilgi edinmeye çalışırım.	1	2	3	4	5
7.	Zor durumlarla karşılaştığımda öyle strese girerim ki sorunu çözecek bir yol bulamam.	1	2	3	4	5
8.	Olaylara başkalarının bakış açısından bakmayı denerim.	1	2	3	4	5
9.	Zor durumlarla baş etmek için çok sayıda değişik seçeneğin olması beni sıkıntıya sokar.	1	2	3	4	5
10.	Kendimi başkalarının yerine koymakta başarılıyım.	1	2	3	4	5
11.	Zor durumlarla karşılaştığımda ne yapacağımı bilemem.	1	2	3	4	5
12.	Zor durumlara farklı açılardan bakmak önemlidir.	1	2	3	4	5
13.	Zor durumlarda nasıl davranacağıma karar vermeden önce birçok seçeneği dikkate alırım.	1	2	3	4	5
14.	Durumlara farklı bakış açılarından bakarım.	1	2	3	4	5
15.	Hayatta karşılaştığım zorlukların üstesinden gelmeyi becerebilirim.	1	2	3	4	5
16.	Bir davranışın nedenini düşünürken mevcut bütün bilgileri ve gerçekleri dikkate alırım.	1	2	3	4	5
17.	Zor durumlarda, şartları değiştirecek gücümün olmadığını hissederim.	1	2	3	4	5
18.	Zor durumlarla karşılaştığımda önce bir durup çözüm için farklı yollar düşünmeye çalışırım.	1	2	3	4	5
19.	Zor durumlarla karşılaştığımda birden çok çözüm yolu bulabilirim.	1	2	3	4	5
20.	Zor durumlara tepki vermeden önce birçok seçeneği dikkate alırım.	1	2	3	4	5

APPENDIX C

YÜRÜTÜCÜ BİLİŞ BECERİLERİ ÖLÇEĞİ

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen katılıyorum
1.Hangi konuları kolaylıkla öğrenebileceğimi, hangilerini öğrenirken zorlanacağımı bilirim.					
2.Öğrenme gerçekleşmediğinde etkili olabilecek başka stratejileri araştırırım.					
3.Öğrenme sırasında bilgiyi hangi koşullarda öğrendiğimi, hangi koşullarda öğrenemediğimi belirlemekte <u>zorlanırım</u> .					
4.Bir konuyu çalışmadan önce eleştirel bir biçimde düşünerek plan yaparım.					
5.Bir konuyu öğrenirken öğrenmede gerekli olan ortamı hazırlarım.					
6.Bir dersi öğrenirken kullandığım öğrenme stratejilerinin, başka hangi derslerde de işe yarayabileceğini bilirim.					
7.Öğrenmede kullandığım çalışma planımı yeniden gözden geçirip gerekli düzeltmeleri yaparım.					
8.Öğrenme sırasında neyi ne kadar öğrendiğimi izlemeye pek zaman <u>ayırmam</u> .					
9.Bir konuyu öğrenirken kullandığım öğrenme stratejilerinin işe yaramadığı durumlarda yenilerini kullanırım.					
10.Öğrenme sırasında ne zaman yardım istemem gerektiğini bilirim					
11.Bir konuyu öğrenirken onu iyi anlayıp anlamadığımı kontrol ederim.					
12.Bir konuyu öğrenirken zamanı etkili kullanıp kullanmadığımı kontrol ederim.					
13.Bir konuyu öğrenirken sonuca ulaşıncaya kadar dikkatimi sürdüreceğim biçimde koşulları düzenlerim.					
14.Bir konuyu ne kadar sürede öğreneceğimi bilirim.					
15.Öğrenme sırasında yaptığım hataları belirlerim.					
16.Bir konuyu öğrenirken hangi öğrenme stratejisini nasıl kullanmam gerektiğinin farkında <u>değilim</u> .					
17.Derse çalışırken kullandığım öğrenme stratejilerini gözden geçirip düzeltirim.					
18.Bir konuyu öğrenirken başarısız olduysam, başarısızlığın nedenlerini araştırırım.					
19.Öğrenme sırasında öğrenilen konular arasında anlamlı ilişkiler kurmak benim için önemlidir.					
20.Kendi öğrenme özelliklerime göre bir konuyu nasıl öğreneceğimi planlamakta <u>güçlük çekerim</u> .					

21.Öğrenme sırasında kullandığım öğrenme stratejilerinin işe yarayıp yaramadığını değerlendiririm.					
22.Öğrenmemi nasıl organize edeceğim konusunda pek bir fikrim yoktur.					
23.Konuyu iyi şekilde öğrenmeme yardımcı olacak kaynakları ne zaman ve nasıl kullanacağımı planlarım.					
24.Öğrenme sırasında karşılaştığım güçlüğü nedenini anlamada zorlanırım.					
25.Herhangi bir şeyi öğrenirken onu en etkili şekilde nasıl öğrendiğimi araştırırım.					
26.Ders çalışmaya başlamadan önce hangi öğrenme stratejisini kullanmam gerektiğini belirlerim.					
27.Zaman zaman öğrendiklerimi gözden geçirmeyi, neyi ne kadar öğrendiğimi belirlemek açısından önemserim.					
28.Yeni öğrenmelerimi düzenlerken önceki kazandığım deneyimlerden yararlanırım.					
29.Bir konuyu çalışmaya başlamadan önce o konuyla ilgili neler öğreneceğimi belirlerim.					
30.Metin veya öğrenme birimi ile ilgili önemli bilgileri ayırt etmede zorlanırım.					

APPENDIX D

AKADEMİK ENGELLERİ YÖNETME BECERİSİ ÖLÇEĞİ (AEYBÖ)

	Kesinlikle katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen katılıyorum
1.İngilizce dersinde benden beklenen görevleri yerine getirebilirim.					
2.İngilizce dersinde görevlerimi tek başıma tamamlayabilirim.					
3.İngilizce dersinde başarılı olacağıma inanıyorum.					
4.İngilizce dersinde karşılaştığım akademik sorunlarla başa çıkabilirim.					
5.İngilizce dersinde yapılan etkinliklerde İngilizce bilgimi kullanabilirim.					
6.İngilizce dersi için bir çalışma planı oluşturmakta zorlanırım					
7.İngilizce dersinde belirlediğim amaçlara ulaşp ulaşmadığımı kontrol etmekte güçlük çekerim.					
8.İngilizce dersinde bir konuyu nasıl çalışmam gerektiğini belirlemede güçlük çekerim.					
9.İngilizce dersine çalışmaya nasıl başlayacağımı belirlemede sorun yaşarım.					
10.İngilizce dersinde başarılı olmak benim kontrolümdedir.					
11.İngilizce sınavlarında başarısız /başarılı olunca nedenini kendimde ararım.					
12. İngilizce sınavlarında başarısız olunca yeterli çaba göstermediğimi düşünürüm.					
13. İngilizce dersinde başarısız olunca çalışmak için yeterli zaman ayırmadığımı düşünürüm.					
14.İngilizce dersinde amacıma ulaşmak için izleyeceğim yolu planlarım.					
15. İngilizce dersinde bir konuyu/kavramı anlayamadığım zamanlarda anlayana kadar onu gözden geçiririm					
16. İngilizce öğrenme süreci uzun zaman alacak bile olsa gerekli sabrı kendimde görüyorum.					
17. İngilizce ile ilgili zor bir görev verildiğinde onu bitirmek için azimli olamam.					
18. İngilizce sınavlarda başarısız olunca çalışmayı bırakırım.					
19.İngilizce dersinde bir sorunla karşılaştığım zaman farklı yöntemler denerim.					

20. Herhangi bir akademik zorluk ile karşılaştığımda İngilizce öğrenmekten vazgeçerim.					
21. İngilizce öğrenme sürecinde endişelenirim.					
22.İngilizce sınavlarında heyecanlanmam.					
23. İngilizce sınavlarda soruların zorluğu beni endişelendirir.					
24.İngilizce sınavlarında bildiklerimi unutuyorum.					
25. İngilizce dersinde kaygılandığım zaman dikkatim dağınık.					
26.İngilizce dersi ile ilgili bir görevi yerine getirmekte zorluk çekince endişelenirim.					



APPENDIX E

AKADEMİK ENGELLERİ YÖNETME BECERİSİ ÖLÇEĞİ (AEYBÖ)

(CONFIDENCE)

- 1 İngilizce dersinde benden beklenen görevleri yerine getirebilirim.
- 2 İngilizce dersinde görevlerimi tek başıma tamamlayabilirim.
- 6 İngilizce dersinde başarılı olacağıma inanıyorum.
- 9 İngilizce dersinde karşılaştığım akademik sorunlarla başa çıkabilirim.
- 12 İngilizce dersinde yapılan etkinliklerde İngilizce bilgimi kullanabilirim.

(COORDINATION)

- 23 İngilizce dersi için bir çalışma planı oluşturmakta zorlanırım
İngilizce dersinde belirlediğim amaçlara ulaşp ulaşmadığımı kontrol etmekte güçlük
- 28 çekerim.
- 25 İngilizce dersinde bir konuyu nasıl çalışmam gerektiğini belirlemede güçlük çekerim.
- 30 İngilizce dersine çalışmaya nasıl başlayacağımı belirlemede sorun yaşarım.

(CONTROL)

- 34 İngilizce dersinde başarılı olmak benim kontrolümdedir.
- 37 İngilizce sınavlarında başarısız /başarılı olunca nedenini kendimde ararım.
- 38 İngilizce sınavlarında başarısız olunca yeterli çaba göstermediğimi düşünürüm.
İngilizce dersinde başarısız olunca çalışmak için yeterli zaman ayırmadığımı
- 44 düşünürüm.

(COMMITMENT)

- 26 İngilizce dersinde amacıma ulaşmak için izleyeceğim yolu planlarım.
İngilizce dersinde bir konuyu/kavramı anlayamadığım zamanlarda anlayana kadar
- 49 onu gözden geçiririm
İngilizce öğrenme süreci uzun zaman alacak bile olsa gerekli sabrı kendimde
- 53 görüyorum.
- 54 İngilizce ile ilgili zor bir görev verildiğinde onu bitirmek için azimli olamam.
- 57 İngilizce sınavlarda başarısız olunca çalışmayı bırakırım.
- 59 İngilizce dersinde bir sorunla karşılaştığım zaman farklı yöntemler denerim.
- 63 Herhangi bir akademik zorluk ile karşılaştığımda İngilizce öğrenmekten vazgeçerim.

(COMPOSURE)

- 65 İngilizce öğrenme sürecinde endişelenirim.
- 66 İngilizce sınavlarında heyecanlanmam.
- 69 İngilizce sınavlarda soruların zorluğu beni endişelendirir.
- 70 İngilizce sınavlarında bildiklerimi unutuyorum.
- 72 İngilizce dersinde kaygılandığım zaman dikkatim dağılır.
- 73 İngilizce dersi ile ilgili bir görevi yerine getirmekte zorluk çekince endişelenirim.