

The Role of Metacognitive Skills in Predicting Achievement Motivation

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Abstract: The aim of this research is to analyze the role of metacognition in predicting achievement motivation. For this purpose, Metacognitions Questionnaire (MCQ-30) and Achievement Focused Motivation (AFM) scales were applied to 618 students in Turkey, attending Faculties of Education of Cumhuriyet, İnönü and Fırat Universities. Survey method has been used through the research, and regression analysis has been conducted. Most of the correlations between sub-dimensions of metacognition and achievement motivation are found to be positive. The highest positive correlation is found between Cognitive Self-Consciousness (CSC) and external effects ($r = .43, p < .01$). Moreover, another positive correlation is to be between AFM (general) and CSC ($r = .43, p < .01$). According to the results of multiple regression analysis held between sub-dimensions of metacognition and achievement motivation, regression equality regarding prediction of achievement motivation is; $2.074 + 0.220 PBA - 0.007 UNCON - 0.041 CC - 0.107 NCT + 0.519 CSC$.

Key Words: metacognition, achievement motivation, motivation.

Üst Bilişsel Becerinin Başarı Motivasyonu Yordamasındaki Rolü

Öz: Bu çalışmanın amacı, üst bilişin başarı motivasyonu üzerindeki rolünü incelemektir. Bu sebeple, Üst Biliş Ölçeği ve Başarı Odaklı Motivasyon Ölçeği kullanılmıştır. Ölçekler Türkiye’de, İnönü, Fırat ve Cumhuriyet Üniversitelerinde, Eğitim Fakültelerinde okuyan 618 öğrenciye uygulanmıştır. Çalışma kapsamında anket metodu kullanılmış ve regresyon analizi uygulanmıştır. Üst biliş ile Başarı Motivasyonunun alt boyutları arasında yapılan korelasyon sonucunda, bir çok altboyut ilişkisi pozitif çıkmıştır. En yüksek pozitif korelasyon bilişsel öz bilinç (CSC) ve dış etkiler arasında bulunmuştur ($r = .43, p < .01$). Ayrıca, diğer bir pozitif korelasyon da genel başarı odaklı motivasyon ile bilişsel öz bilinç (CSC) arasında bulunmuştur ($r = .43, p < .01$). Üst biliş ve başarı motivasyonu alt boyutları çoklu regresyon analizi sonuçlarına göre, başarı motivasyonu tahmini üzerindeki regresyon denklemi şu şekildedir: $2.074 + 0.220 PBA - 0.007 UNCON - 0.041 CC - 0.107 NCT + 0.519 CSC$

Anahtar Kelimeler: üst biliş, başarı motivasyonu, motivasyon.

1. INTRODUCTION

Having a general look at the living things in nature including animals, plants and human beings; human beings differ from the rest in terms of their various abilities the most important of all being their ability to think, which can be taken as the source for many other features they can perform.

Ability to think is a very important feature that controls any kind of performance one performs. Thinking and thus making decisions is a continuous process followed by human beings, as people constantly think and decide on various issues, which can not be put aside. As a result of these decisions, what comes next is the outcome of the decisions which puts forward the strong and weak sides of the thought or the decision that takes place. Thus, a successful decision making involves one's ability to use his knowledge efficiently and think appropriately which would in turn affect his life. Therefore, thinking can be taken as a very important feature of mankind which affects every aspect of one's life path.

After all, people constantly get involved in the thinking process no matter what the subject is, how difficult or important it is, or for whom it is done for. So, as every human being is involved in this kind of a process, what is important is how well they do it. Some of the thoughts can sometimes be based on inadequate knowledge, or can be biased and so on. However, due to the fact that thinking and thus giving decisions is an effective factor in one's life effecting their flow of life, what should be done is to think efficiently which involves being aware of 'what to' and 'how to' know and thus learn. Therefore, if one gets aware of the cognitive processes they are involved in, their self-awareness would help them understand, control and improve their cognitive processes, which is named as "metacognition."

1.1. Metacognition

Metacognition is a concept claimed to be essential for the twenty-first century (Blakey and Spence, 1990) and important in every aspect of life and school (Mindshift, 2016). Metacognition is said to be a quality needed by human beings in order to be able to solve any kinds of problems they face (Tunca and Akın-Şahin, 2014, 48) and is used in various disciplines in different ways (Tanner, 2012, pp. 113). Hacker, Dunlosky and Graesser (1998, pp.xiii) have put forward the fact that 503 articles and 169 sections of books have been allocated for the topic of metacognition between the years of 1979 and 1995, showing how much attention has been given to the topic.

Metacognition in broad terms means thinking about thinking (Blakey and Spence, 1990; Lai, 2011, 2; Martinez, 2006, pp.696; Mindshift, 2016; Peirce, 2003; TIP, 2011). In terms of Dean and Kuhn (2003, pp.3) and McCormick (2003, pp.93) on the other hand, metacognition is defined as 'knowing about knowing.' Moreover, GAC (2011, pp.1) defines metacognition as thinking about thinking and knowing, having combined both of the definitions. Thus, considering three of the definitions given metacognition can also be defined as "self awareness of one's own cognitive process" (Doğan, 2014, pp. 6, 14; Gordon, 1996, pp.47; Kane, 2011, pp. 128; Magno, 2010, pp.142; Özsoy, 2008, pp. 713; Tunca and Akın-Şahin, 2014, pp. 48).

The concept of metacognition, which includes the process of evaluating and monitoring one's own mental capacity and using it accordingly has been first used by Flavel (GAC, 2011, pp.2; Genbilim, 2011). Flavel (1976, pp.232) has defined the term metacognition as one's knowledge on his own cognitive process or anything related to it (TIP, 2011). Thus, in short, the term in a way can be explained as knowledge about one's own thinking, or knowing how to think. Therefore, metacognition can also be taken as a thinking process that involves, needs high-level thinking (Mindshift, 2016).

According to a research conducted on metacognition, it has been found that the learners with metacognitive abilities needed to be aware of the process of their learning rather than what –the content– they learn in order to improve their learning outcomes (Gordon, 1996, pp.46). Thus, within the concept of metacognition, it is the process, the steps, that should be paid attention to no matter what the topic is.

Having a further look at the concept, metacognition is put forward as a metacognitive capacity which separates human beings from other living things, and one's ability to analyze his own thoughts (Costa, 2008, 24; Kuhn and Dean, 2004, pp.270; Pintrich, 2002, pp.222). Similarly, the concept has also been defined as the control and monitoring of thoughts (Martinez, 2006, pp.696). Metacognition is defined as a concept that includes knowledge and regulation of cognition (Akpunar, 2011, pp. 358; Lai, 2011, pp. 2, 33; Magno, 2010, pp. 142; Özsoy, 2008, pp. 716). Moreover, according to another view, metacognition has been defined as the knowledge about cognition in general in addition to the knowledge about one's own cognition (Pintrich, 2002, pp.219). Therefore, it can be assumed that metacognition includes one's awareness on his own thinking as well as on cognition in general.

Metacognition is also defined as helping individuals in their thinking, information processing and monitoring of their own learning processes (Gordon, 1996, pp.46). In addition, it is suggested that metacognition consists of planning, monitoring/regulating and evaluating the plan (Blakey and Spence, 1990; Garrett, Alman, Gardner and Born, 2007; Gordon, 1996, pp.49; NCREL, 2011; Peirce, 2003; Pintrich, 2002, pp.220).

As claimed by Gordon (1996, pp.49), metacognition helps individuals in monitoring their own cognitive processes to solve problems, gain insight and become critical thinkers – Critical thinking can be defined as objective, perceptive and in-depth thinking (Aybek, 2007, pp.1) including the thinking, implication, analysis and assessment processes. Similarly, as suggested by Martinez (2006, pp.696), metacognition can be analyzed under three categories; *metamemory and metacomprehension* – one's understanding on his own knowledge state–, *problem solving* and *critical thinking*.

Nevertheless, the features of metacognition include; awareness of one's own brain and learning process, knowledge on the most appropriate learning techniques, planning appropriate approaches towards the learning processes aimed to be succeeded, using effective learning strategies, being able to monitor one's own learning situation and knowing how much the knowledge has been learned, and knowing effective ways for recalling the information needed (Drmrod, 1990, pp.292: Referenced in Genbilim, 2011). Moreover, as suggested by Pintrich, (2002, pp.222) individuals being aware of their own thinking, knowledge, and thus strengths and weaknesses would be able to adjust their cognition and thoughts accordingly which would lead them into being more adaptive and thus would help them learn more easily. Therefore, metacognition can be claimed to be important in terms of individuals to be able to manage their own cognition (Kuhn and Dean, 2004, pp.270).

Metacognitive knowledge is divided into three aspects; *knowledge on individuals* referring to our knowledge and beliefs on individuals' cognitive processors; *knowledge on duty* referring to the knowledge on what to do when faced with a situation; *knowledge on strategies* referring to the knowledge on how to use our brain on learning things (GAC, 2011, pp.2; Genbilim, 2011; Pintrich, 2002, pp.224). Furthermore, the concept of metacognition is classified under three headings by (Genbilim, 2011) as; *cognitive monitoring* – ability to monitor one's own knowledge and knowledge process –; *cognitive regulation* – one's re-regulating of his own thinking process –; and *cognitive monitoring and regulation* – ones ability

to monitor his own knowledge and thoughts as well as using these information in regulating later cognitive process (Genbilim, 2011).

Within the concept of metacognition, in order for the individuals to be able to increase their metacognitive abilities, three types of knowledge are needed; declarative, procedural and conditional (Peirce, 2003; Schraw, 1998, pp.114). To begin with, *declarative knowledge* refers to the factual information that is already known, next *procedural knowledge* refers to the knowledge on how to do something, and lastly, *conditional knowledge* refers to the knowledge on when to use the related strategies. Moreover, as suggested by Blakey and Spence (1990), problem-solving as well as research activities in all subjects are claimed to be providing opportunities for developing metacognitive strategies. Furthermore, the strategies for developing metacognitive behaviours include; specifying what is known and what is unknown, talking about thoughts, keeping a thinking journal, planning and self-auditing, questioning thinking processes and self-evaluation (Blakey and Spence, 1990; Peirce, 2003; Winne and Hadwin, 1998, pp.277-304. In addition to the strategies one makes use of for developing metacognition, there are some strategies needed to be made use of in order to use metacognitive process effectively. These strategies include; combining new knowledge with the old ones, selecting the thinking strategies, planning, monitoring and evaluating the thinking process (Blakey and Spence, 1990; Genbilim, 2011).

Having taken a close look at the definition as well as the features and developmental strategies of metacognition, it can be claimed that the concept of metacognition is considered to be especially important due to its positive effects on learning, critical thinking and problem solving in addition to memorizing, understanding and applying (Hartman, 1998, pp.1). Considering the concept of metacognition, what is of most importance is one's being aware of himself which brings about one's ability to regulate himself towards anyway he decides, leading into the awareness on the process (Peirce, 2003). As suggested by Blakey and Spence (1990), metacognition helps individuals to successfully cope with various new situations as it fosters the development of good thinkers and learners, successful in problem solving.

Therefore, it can be claimed that metacognition has an important role in learning (Pintrich, 2002, pp.222-223). Metacognition is a rather important concept in terms of every individual due to its importance in leading individuals to meaningful learning which includes effective learning in all aspects together with the awareness of the process which would help individuals plan, monitor and evaluate their own learning process. Thus, it is important for the individuals to be familiar with their own way of learning strategies, as otherwise they can not be effective in regulating themselves. In other words, when individuals are aware of what they learn and what they are going to learn, and if they be able to plan their knowledge and thoughts, they can be more effective in learning.

Keeping in mind the importance of metacognition as it is effective on improving knowledge, skills and character qualities (Mindshift, 2016), it is crucial for individuals to be able to learn and apply it in order to be successful in learning (Doğan, 2013, pp. 11; Zhonggen, 2017, 159). Similarly, metacognition is said to have positive relationship with academic success (Doğan, 2013, pp. 11; Hrbáková, Hladík and Vavřová, 2012, pp. 1810; Landine and Stewart, 1998, pp. 200; Özsoy, 2008, pp. 729). As metacognition is something that can be taught and thus be learned, and as it is important for human beings, one of the ways to develop, or teach metacognition is through giving opportunities to the students to practice situations that require metacognition. Another way for teaching metacognition is modeling, referring to the teachers going through think-aloud processes in order for the students to internalize the process. Lastly, it is important for the children to be given some chance to be able to interact with the others in order to practice the metacognitive process (Martinez, 2006, pp.699).

As teaching as well as learning the metacognitive process is crucial, it is important that teachers use easy-to-use assessments in order to be aware of the individuals' knowledge and appliance of metacognition. There are claimed to be various assessment methods in metacognition although it is difficult to be measured, and they are; controlled lab experiments, self-report methods, think-aloud approach and teacher observation (Lai, 2011, pp. 35). In addition, two verbal report methods; interviews and think-aloud protocols, are mentioned by Gardner (1988) for measuring metacognitive knowledge (McCormick, 2003, pp.93). Moreover, Learning and Study Strategies Inventory (LSSI) is a well known broad based measure of study skill used for the measurement of metacognition (McCormick, 2003, pp.93).

1.2. Achievement Motivation

Motivation is an effective force in achievement (Akbabai 2006, pp. 359; Akpan and Umobong, 2013, pp. 385) as they get ready to take action, work and learn when they are motivated (Akbaba, 2006, pp. 314; Soyer et al., 2010, pp. 227). Whereas motivation is considered as a process directing and urging individuals to perform an action, achievement motivation is defined as a process leading individuals to behavior, aiming to achieve a certain standard (Kaplan, 2009). Moreover, achievement motivation is defined as a need which influences individuals' performance, including needs to meet goals, accomplish and receive feed back (AlleyDog.com, 2011). Zenzen, in addition, defines the concept as a non-conscious process, during which individuals make decisions on how to act (2002, pp.1). Furthermore, achievement motivation is also defined to be related with how inspired individuals are on pursuing and accomplishing their goals (American Business.org, 2011). Nonetheless, another definition of achievement motivation is given as the tendency to make an effort for success (E.notes.com, 2011; Rblewis.net, 1999). Achievement motivation has a great effect on academic engagement, meaning that; when students are motivated they become more engaged in academic work which eventually results in good academic performance or success (Akpan and Umobong, 2013, pp. 389). Also, according to Yusuf (2011, pp. 2625), achievement motivation is to influence academic accomplishment. Chetri (2014, pp. 250) and Soyer et al. (2010, pp. 227) in addition, supports this finding by claiming that when an individual has more motivation, they are more likely to achieve. Akbaba (2006, pp. 360) on the other hand, similarly focuses on motivations effect on success, focusing on the fact that there is a two sided relationship between motivation and success, both leading to eachother. Therefore, achievement motivation can be put forward as a process for specific purposes, which lead individuals to success, and thus accomplish their goals, all of which in turn support motivation again.

Intrinsic and extrinsic motivations are the two important motives of achievement motivation which help to foretell about it (Achievement Motivation, 2010; Akbaba, 2006, pp. 345; Soyer et al., 2010, pp. 228). Intrinsic motivation is about the desires of the individuals that involve performing behaviors or tasks for their own sake, whereas extrinsic motivation is about performing these actions in order to earn rewards or avoid punishments that come from others (Akbaba, 2006, pp. 345; American Business.org, 2011; Soyer et al., 2010, pp. 228).

Therefore, achievement motivation, in short, can be interpreted as a drive which makes individuals become willing to learn or do things through intrinsic or extrinsic motives. Thus, the individuals get inspired and try harder for accomplishing their goals. Thus, achievement motivation can be defined as a process that lead individuals' behavior and thus influence their performance, and carry them to success.

1.3. Metacognition and Achievement Motivation

Considering motivation together with the concept of metacognition, Schraw, Crippen and Hartley (2006, pp.111) suggest that their relation can clearly be put forwards through the fact that they are two of the three components of self-regulated learning – An individual/self learning ability or social behavioral factor used by the individuals which includes the individuals' being knowledgeable about their learning styles and techniques, and how to cope with the difficulties while learning (Lennon, 2010, pp.70; Woolfolk, 1998, pp.407; Zimmerman, 1989, pp.329) – together with the third element being cognition – the process of thinking. In addition, Landine and Stewart (1998, 208) found out that metacognition and motivation had positive relationship together with self-efficacy (having confidence in one's own competence).

Whereas metacognition is to be the ability to plan, monitor and evaluate one's own learning, motivation, and in specific achievement motivation is the driving force for students' learning goals and other activities they engage in. Moreover, a motivated student is defined as someone actively engaged in the learning process (Stavrianopoulos, 2007, pp.1), putting forward its important effect on metacognition. Lai (2011, pp. 34) in addition, explains the relationship between motivation and metacognition as; motivation being set of beliefs and attitudes that underlies the development and expression of metacognition.

The relationship between metacognition and motivation can be explained through motivation and metacognition being effective factors on each other. Metacognition is an effective factor in all areas as it is, in broad terms, one's being in charge of his thoughts. Therefore, as metacognition affects self-efficacy and attribution, it would also be quite effective in terms of one motivating himself. In other words, as one goes through a process and succeeds or fails, he believes his success or failure to be due to some reasons. Thus, he would promote self-confidence and therefore motivation when he gets to be successful (Peirce, 2003). Metacognition is found to have a significant effect on academic motivation together with mastery goals; thus as long as individuals have deep and complete understanding their motivation gets to be higher (AL-Baddareen, Ghaith and Akour, 2015, pp. 2071). In addition, the findings of the study conducted by oğuz and Ataseven (2016, 61) puts forward the fact that developing metacognitive skills helps individuals to learn better which in turn supports their motivation.

Ling and Dejun (2003) have revealed in their research that motivation is an energizing device for metacognition similar to Oğuz and Ataseven (2011, 56). In other words, the result of the research put forward the fact that metacognition was affected by motivation which is also claimed by Lai (2011, pp. 34). Also, Vollmeyer and Rheinberg (1999, pp.541) suggested the fact that more motivated individuals analyze more deeply. After all, it is suggested that the individuals are more likely to monitor their understanding of information which interests them (Garrett et al, 2007). Therefore, it can be concluded that motivation is an important aspect effecting metacognition.

It is claimed by GAC (2011, pp.4) that both positive and negative emotions that emerge due to metacognitive self evaluations directly affect individuals' motivation. Moreover, he suggests the fact that metacognition also affects motivation by helping individuals understand themselves, their own situation and thus help them to improve themselves (GAC, 2011, pp.5). In addition, it is also suggested that as individuals use metacognition to improve their weak areas, they can find hope and thus become motivated (GAC, 2011, pp.5).

After all, motivation and metacognition are suggested to have two common goals; to understand the interaction between metacognition and motivation with the learner factors to influence learning outcomes in positive ways, and to test whether and how learning

environments can improve metacognition and motivation in order to increase individuals' learning (PSLC, 2011). Therefore, an important common point of the two concepts can be explained as them being effective in individuals' success in learning, and thus academic achievement.

Within a research conducted among 137 participants taken from a midsize northeastern urban college in order to analyze the relationship between motivation and metacognition, the result revealed that there was a positive relationship between two, and both of them were found to be effective on students' academic success (Stavrianopoulos, 2007, pp.7). Moreover, in another research, done concerning the relationship between metacognition and success, it has been found out that teaching students metacognitive strategies lead the students into performing better and thus being successful (Coutinho, 2007, pp.44-45; GAC, 2011, pp.7; Landine and Stewart, 1998, pp.202), which can as well be linked to motivation which also has positive relationship with success. This relationship between the three concepts –motivation, metacognition and success– has also been supported by GAC (2011, pp.7-8) by the claim that metacognition, together with motivation can be used to further motivate the individuals as well as leading them into achieving more.

The aim of this research is to address role of metacognition in predicting achievement motivation. To this end, the following questions are attempted to be answered:

- What are the relationships between the sub-dimensions of achievement motivation and the sub-dimensions of metacognition?
- Is there a relationship between metacognition and achievement motivation considering the gender variable?
- What are the relationships between achievement motivation and each of “External effects”, “Internal effects”, “Goal Enhancement”, and “Self-consciousness”?

2. METHODOLOGY

2.1. Sample

The sample of the study included total of 618 students from the Faculties of Education of Cumhuriyet, İnönü and Fırat Universities, in Turkey. Among the 618 students 375 of them were from Cumhuriyet University, 89 of them were from İnönü University and 154 of them were from Fırat University.

Two scales were applied to the students at the same time; one of them being ‘Metacognitions Questionnaire (MCQ-30)’ and the other one being ‘The Achievement Focused Motivation (AFM) Scale.’

2.2. Scales

Metacognitions Questionnaire was first developed by Wells and Cardwright-Hatton (2004), and was then adapted for the Turkish population by Tosun and Irak (2008). The scale is used to operationally define and measure an individual's metacognitive beliefs and it consists of five subscales:

- *Positive Beliefs About Worry (PBAW)*: The belief in the benefit and value of worrying.
- *Uncontrollability (UNCON)*: The fear of not being able to control worries.
- *Cognitive Confidence (CC)*: The level of doubting one's own memory.
- *Need to Control Thoughts (NCT)*: The belief in the necessity of controlling one's own thoughts.

- *Cognitive Self-Consciousness (CSC)*: The level of competence on one's own cognition.

The other scale used in the study was the Achievement Focused Motivation (AFM) Scale developed by Semerci (2010). This scale has been applied to 827 students so far; including the students of Atatürk University (Erzurum), Cumhuriyet University (Sivas), Fırat University (Elazığ), Muş Alparslan University (Muş) and Yüzüncü Yıl University (Van). As a result, a 4-factored structure has been revealed (Semerci, 2010, pp.2126):

- *External Effects (EE)*: The effects of the things, which are not within the internal world of individuals, on learning and success. These include situations like; getting encouraged, feeling valuable due to others, appreciating helping the others, etc.

- *Internal Effects (IE)*: The effects of the things, which are about the internal world of individuals, on learning and success. These include situations like; feeling the necessity of getting ready for the next lesson, having the excitement for learning the innovations, appreciating studying, etc.

- *Goal Enhancement (GE)*: The enhancement of the vision of one's own, including; having a desire to take high grades, having a desire to be a pioneer in new fields, working for taking higher grades, etc.

- *Self Consciousness (SC)*: Knowledge about one's own personality; knowing how to react in various situations. These kinds of situations include; believing in one's own success, getting motivated through substantial learning activities, not getting discouraged by failures.

The scale's KMO value has been found to be 0.911 and the value of Barlett test has been found to be 7361.928 (Df=595, P<.05). Thus, it was seen that after the factor analysis, the scale provided 37.910% of the total variance. In addition, the item-total correlations of the AFM scale varied between 0.36 and 0.58. Moreover, within the study, 49 data-paired were applied and it was found out that test-retest correlation was 0.977 (p<0.01). Furthermore, correlation coefficient between the two halves points was 0.895(p<0.01) and Cronbach Alpha Coefficient of AFM scale was 0.896 (35 items) (Semerci, 2010).

2.3. Process

The survey method has been used through the research. The correlations between the sub-dimensions of both metacognition and achievement motivation have been analyzed. Moreover, regression analysis – it is used in order to define how a dependent variable is explained through the other independent variables, giving the researcher information on their relationship, giving the predictions on unknown variables (Sipahi, Yurtkoru, Çinko, 2006, 154) – has been conducted within the study.

3. FINDINGS

Considering the 618 students participating in the study, 263 were male (% 42.60) and 355 were female (57.40 %). Moreover, most of the correlations among the sub-dimensions of metacognition and sub-dimensions of achievement motivation were found to be positive. However, the highest positive correlation was found between “Cognitive Self-Consciousness” of metacognition and “external effects” of achievement focused motivation (r= .43, p< .01), together with another positive correlation between Achievement Focused Motivation (general) and “Cognitive Self-Consciousness” of metacognition (r= .43, p< .01).

There found to be low correlations between Cognitive Confidence (a sub-dimension of metacognition) and external effect (r=.04, p>.05), internal effect(r=-.01, p>.05), goal enhancement (r=-.04, p>.05), self-consciousness (r=.04, p>.05), which are the sub-dimensions of achievement motivation and AFM (general) (r=.04, p>.05),.

The correlations between gender and sub dimensions of metacognition skills were generally found to be close to zero, which indicates that there is not a significant relationship between them. However, meaningful correlations were found between gender and sub-dimensions of achievement motivation; gender and external effect ($r=.15, p<.01$), gender and internal effect ($r=-.10, p>.05$), gender and goal enhancement ($r=-.15, p<.01$), gender and AFM (general) ($r=.14, p<.01$), excluding gender and self-consciousness ($r=.04, p>.05$). The correlation results are presented as follows:

Table 1:
Correlation among Sub-dimensions of Metacognition and Achievement Focused Motivation

	Gender	PBAW	UNCON	CC	NCT	CSC
1. Gender	-	-.05	-.04	-.04	.07	.06
2. External effects	.15**	.22**	.21**	.04	.14**	.43**
3. Internal effects	.10*	.23**	.14**	-.01	.06	.34**
4. Goal Enhancement	.15**	.26**	.20**	-.04	.11**	.33**
5. Self-consciousness	.04	.26**	.15**	.04	.02	.36**
6. AFM(General)	.14**	.28**	.21**	.04	.10*	.43**

p<.05* p<.01**

Notes: Positive Beliefs About Worry (PBAW), Uncontrollability (UNCON), Cognitive Confidence (CC), Need to Control Thoughts (NCT), Cognitive Self-Consciousness (CSC).

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The sub-dimensions regarding metacognition in Table 1 –positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts and cognitive self-consciousness– are to be taken as independent variables, and thus the achievement motivation variables –External Effects, Internal Effects, Goal Enhancement, Self-Consciousness and AFM in general– are to be taken as the dependent variables.

Considering the positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts and cognitive self-consciousness variables, the results of the regression analysis regarding the prediction of achievement motivation are given in the following:

Table 2.
Results of regression analysis regarding prediction of achievement motivation

Variable	B	Std-Err.	B	T	P	Zero-order R	Partial r
Constant	2.074	0.162	-	12.781	0.000	-	-
PBAW	0.220	0.056	0.163	3.915	0.000	0.284	0.156
UNCON	-0.007	0.050	-0.006	-0.144	0.885	0.208	-0.006
CC	-0.041	0.039	-0.043	-1.062	0.289	0.037	-0.043
NCT	-0.107	0.048	-0.096	- 2.254	0.025	0.101	-0.091
CSC	0.519	0.055	0.414	9.460	0.000	0.434	0.357

R=0.462 R²= 0.214 F_(5,612)= 33.283 p=0.000 Durbin-Watson (D.W.) Statistic=1.816

Zero-order and partial correlations between interpreting variables and dependent (what is interpreted) variable indicate that there is a positive relationship between PBAW and achievement motivation, which can be interpreted as a low level relationship ($r= 0.284$), the correlation between the two variables being $r= 0.156$ considering the other variables.

Moreover, it is seen that there is a low and positive relationship between UNCON and achievement motivation ($r= 0.208$); however, the correlation between the two variables are to be calculated as $r= -0.006$ considering the other variables. In addition, there is found to be a low and positive relationship between CC and achievement motivation ($r= 0.037$), whereas the correlation between the two variables was calculated to be $r= -0.043$ considering the other variables. Furthermore, another low level positive relationship was found between NCT and achievement motivation ($r= 0.101$); their correlation being calculated as $r= -0.091$ considering the other variables. Lastly, there was found to be another positive relationship between CSC and achievement motivation which is considered to be at intermediate level ($r= 0.434$); however, the correlation between the two variables was calculated as $r= 0.357$ upon checking of the other variables.

According to Field (2009, pp.7), “R” stands for the values of the multiple correlation coefficient between the predictors and the outcome. Therefore, when only independent variables (positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts and cognitive self-consciousness) are used as predictors, there turns up to be a simple correlation between dependent and independent variables ($R=0.462$). On the other hand, “R²” is a measure of variability, focusing on how much variability is accounted for by the predictors, considering the outcome. In this research, R²'s value for the model is found to be 0.214, which means that independent variables account for 21.4% of the variation in achievement motivation. That is, the 5 variables of metacognition, mentioned above, are all together found to be explaining around 21.4 % of the total variance in achievement motivation.

The results of the analyses revealed that there is a significant, low level relationship between all of; positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts and cognitive self-consciousness and students' achievement motivation scores ($R= 0.462$, $R^2= 0.214$, $p<0.01$). According to the standardized regression coefficients (β), the relative order of importance of interpreting variables is as follows: Positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts and cognitive self-consciousness.

The T- test results regarding significance of the regression coefficients revealed that PBAW, NCT and CSC are to be meaningful instruments for predicting achievement motivation, whereas the other two variables (UNCON, CC) are found not to have any significant effect on achievement motivation.

Besides, autocorrelation has also been considered during the regression process, and it is found to violate the Ordinary Least Squares (OLS) assumption that the error terms are uncorrelated. After all, the autocorrelation test is also known as the Durbin–Watson statistic as claimed by Field (2009, pp.7), and this statistic informs us about whether the assumption of independent errors is tenable. As the value gets closer to 2 it is interpreted to be better, as it means the assumption of independent errors is tenable. Considering the present data, the value is found to be 1.816, which is so close to 2 that the assumption has almost certainly been met.

Consequently, according to the results of multiple regression analyses held between sub-dimensions of metacognition and achievement motivation, the regression equality regarding prediction of achievement motivation is found to be as follows:

$$\text{Achievement motivation} = 2.074 + 0.220 \text{ PBAW} - 0.007 \text{ UNCON} - 0.041 \text{ CC} - 0.107 \text{ NCT} + 0.519 \text{ CSC}.$$

4. CONCLUSION

Considering the present study, it mainly addresses metacognition as a predicting factor on achievement motivation, having 618 students participated within the study. Through the study, achievement motivation has been considered with its four sub-dimensions –external effects, internal effects, goal enhancement, self consciousness– while metacognition has been considered with its five sub-dimensions –positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts, cognitive self-consciousness.

As a result of the analyses, considering the gender variable, it has been found that gender and metacognition had no meaningful relationships; meaning that metacognitive abilities are found not to vary according to gender. In addition, having a look at the relationship between gender and achievement motivation variables, it has been put forward that gender and achievement motivation had a relationship which was rather low. However, having a specific look at the achievement motivation dimensions, external effect and achievement focused motivation in general are found to have positive and low level relationships, whereas internal effect and goal enhancement had negative and low level relationships with gender, self-consciousness having no relationship at all. Therefore, it can be interpreted that, while metacognition has no relationships with gender differences, achievement motivation generally varies according to gender differences in low levels.

It has been found that there are positive relationships between the four sub-dimensions of achievement motivation and the five sub-dimensions of metacognition; the two most important relationships being between cognitive self-consciousness, and achievement focused motivation in general and external factors variable of achievement motivation. Thus, it is clearly put forward that metacognition and achievement motivation have a meaningful relationship and an increase in one of them would lead in to an increase in the other, as well as the vice versa. This finding has found support from various studies, claiming that there is a positive relationship between motivation and metacognition (Coutinho, 2007, pp.44-45; GAC, 2011, pp.7; Garrett et al, 2007; Lai, 2011, pp. 34; Landine and Stewart, 1998, pp.202; Oğuz and Ataseven, 2016; Stavrianopoulos, 2007, pp.7). This situation has also been partially supported by Ling and Dejun's (2003) research through claiming that metacognition was affected by motivation. Moreover, according to Vollmeyer and Rheinberg (1991, pp.541), motivated individuals analyze more deeply, meaning again that motivation is effective on metacognition, and according to Hrbackova et al. (2012, pp. 1809), as long as the individuals believe that the success depends on them (intrinsic motivation), they may have a higher level of metacognition. On the contrary, AL-Baddareen et al. (2015, pp.2071) and GAC (2011, pp.4) partially supports the finding of this study by claiming that metacognition is effective on motivation.

Considering metacognition's predictions on achievement motivation, it has been put forward that all of positive beliefs about worry, uncontrollability, cognitive confidence, need to control thoughts and cognitive self-consciousness had positive relationships with achievement motivation, cognitive self-consciousness having the strongest relation among all. Therefore, it can be concluded from these information that metacognition in general –and especially cognitive self-consciousness in specific–, is effective in predicting achievement motivation, meaning that having metacognitive abilities would lead the individuals to being motivated as suggested by the other finding considering motivation and metacognition being effective on each other. In addition to this information, it has been put forward by the analysis that metacognition, all together with its dimensions, in general explains and thus predicts about %21.4 of achievement motivation, meaning that although metacognition is effective on

achievement motivation, it can explain around %21.4 percent of it, the rest being effected by other kinds of variables. Afterall, although metacognition is an effective factor on achievement motivation, having high levels of achievement motivation does not solely depend on metacognitive abilities.

It is crucial to mention that; it is important for individuals themselves as well as the teachers to work towards developing their metacognitive abilities. Individuals who are aware of their cognitive process and are able to regulate their own learning would be better in making use of appropriate metacognitive strategies, which would in turn help them ease their own problem solving skills. Thus, this situation would motivate the individuals and carry them to success, which would motivate them more and than in turn again support and bring more success at the end, and so on. As the individuals become more successful, they would continue to improve themselves which would in turn lead them into becoming more knowledgeable and thus aware of their own thinking.

In short, it can be claimed that metacognition and motivation are interrelated concepts and they have a positive relationship as well as being effective on individual's learning outcomes, which in turn again support both of the concepts. So, metacognition, motivation and success can be seen as having a close relationship in which all three affect each other in one way or another.

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GENİŞ ÖZET

Yeryüzünde, insanları diğer canlılardan ayrı tutan özellik, düşünme becerisidir. Düşünme, bireylerin hayatlarının her alanında ihtiyaç duydukları, her adımda kullandıkları bir beceridir. Düşünmenin önemli olmasının yanı sıra, bu sürecin dolayısıyla da nihayi bilginin kalitesi daha da büyük öneme sahiptir. Bu noktada, düşünmekten ziyade, düşünme sürecinin farkında olarak bu süreci kontrol altında tutmak önemlidir, ve insanları birbirinden ayırtıran bir özellik olarak karşımıza çıkar. Üst biliş, bireylerin kendi düşünme süreç ve içeriğinin farkında olduğu üst düzey düşünmeyi kapsayan bir beceridir ve bireylerin hedeflerine ulaşmalarına, başarı sağlamalarına ve ayrıcalık sahibi olmalarına olanak sağlar. Kapsamlı düşünen ve doğru, derindeki bilgiye ulaşabilen bireyler daha fazlası için hevesli ve güdülenmiş olurlar. Motivasyon bireyleri belli bir hedef doğrultusunda güdüleyen bir unsurdur. Dolayısıyla, her bir üst biliş ve motivasyon bireyleri başarıya taşıyan özelliklerdir. Birbirleri üzerindeki etkiler incelendiğinde ise, kimi çalışmalar her ikisinin de birbiri üzerinde etkili olduğunu iddia ederken, kimileri ise tek taraflı etki üzerinde durmuşlardır. Mevcut çalışmada, üst bilişin başarı motivasyonu üzerindeki rolünü incelemek hedeflenmiştir. Bu amaçla, Wells ve Cardwright-Hatton (2004) tarafından geliştirilip Tosun ve Irak (2008) tarafından Türk toplumuna uyarlanmış olan Üst Biliş Ölçeği ile Semerci (2010) tarafından geliştirilmiş olan Başarı Odaklı Motivasyon Ölçeği kullanılmıştır. Ölçekler Türkiye’de; 89’u İnönü, 154’ü Fırat ve 375’i Cumhuriyet Üniversitelerinden olmak üzere, Eğitim Fakültelerinde okuyan 618 öğrenciye uygulanmıştır. Çalışma kapsamında anket metodu kullanılmıştır. Analiz sonucunda, cinsiyet değişkeni incelendiğinde, üst biliş ve cinsiyet arasında herhangi anlamlı bir ilişki bulunmamıştır; dolayısıyla, üst biliş becerilerinin cinsiyete göre farklılık göstermediği sonucuna varılmıştır. Ayrıca, başarı motivasyonu ve cinsiyet arasında düşük seviyeli bir ilişki bulunmuştur; dolayısıyla, başarı motivasyonunun cinsiyete göre düşük seviyede farklılık gösterdiği sonucuna varılmıştır. Bir sonraki analizde, Üst bilişin alt boyutları olan “Bilişsel Güven/Cognitive Confidence (CC),” “Olumlu İnançlar/Positive Beliefs About Worry (PBAW),” “Bilişsel Farkındalık/Cognitive Self-Consciousness (CSC),” “Kontrol Edilemezlik ve Tehlike/Uncontrollability (UNCON)” ve “Düşünceleri Kontrol İhtiyacı/Need to Control Thoughts (NCT)” ile Başarı Motivasyonunun alt boyutları olan “Dış Etkiler/External Effects (EE),” “İç Etkiler/Internal Effects (IE),” “Hedef Geliştirme/Goal Enhancement (GE)” ve “Özbilinç/Self Consciousness (SC)” arasında yapılan korelasyon sonucunda, bir çok ilişki pozitif çıkmıştır. En yüksek pozitif korelasyon bilişsel öz bilinç (CSC) ve dış etkiler arasında bulunmuştur ($r = .43, p < .01$). Ayrıca, diğer bir pozitif korelasyon da genel başarı odaklı motivasyon ile bilişsel öz bilinç (CSC) arasında bulunmuştur ($r = .43, p < .01$). Toplanan verilere, bağımlı değişkenin bağımsız değişken tarafından ne denli açıklandığını görmek için ise regresyon analizi uygulanmıştır. Üst biliş ve başarı motivasyonu alt boyutları çoklu regresyon analizi sonuçlarına göre, üst bilişin başarı motivasyonu yordamasında etkili olduğuna varılmış, etki oranı %21,4 çıkmıştır. Başarı motivasyonu tahmini üzerindeki regresyon denklemi şu şekildedir: $2.074 + 0.220 PBA - 0.007 UNCON - 0.041 CC - 0.107 NCT + 0.519 CSC$. Dolayısıyla, çalışma sonucunda; yüksek seviyeli başarı motivasyonunun yalnızca üst biliş seviyesine göre belirlenemeyeceği; üst biliş seviyesinin, başarı motivasyonuna olan etkinin yalnızca bir bölümünü oluşturduğu sonucuna varılmıştır. Sonuç olarak, bireylerin üst bilişlerini geliştirmeleri ve bu yönde eğitilmeleri önemlidir. Bilişsel süreçlerinin farkında olan ve kendi öğrenimlerini kontrol altında tutabilen bireyler uygun üst biliş stratejilerini uygun yer ve zamanlarda kullanarak bir çok durumun üstesinden gelebilirler. Bu da bireylerin motivasyonuna olumlu etki ederek onları başarıya götürür. Dolayısıyla, elde edilen başarı da daha fazla motivasyon ve başarı getirir, ve bireydeki genel gelişim de onların üst biliş gelişimlerini destekler.