



An investigation of the effect of some affective variables on predicting 6th grade students' academic achievement in the science course*

Elif Öznur Tokgöz^a *, Alev Doğan^b

^a Ministry of National Education, Turkey

^b Gazi University, Ankara, Turkey

Abstract

The study focuses on the effects of four different affective variables, namely; well-being, perceived self-regulation, trust in the teacher, and alienation from school, on the academic achievement of middle school 6th grade students in the Science course. The participants of the study were composed of randomly selected 332 (156 girls, 176 boys) middle school 6th grade students in Ankara Turkey. The data were collected using the EPOCH Well-Being scale developed by Kern et al. (2015) and adapted to Turkish by Demirci and Ekşi (2015); the Perceived Self-Regulation Scale developed by Aslan and Gelişli (2015); the Teacher Trust Scale developed by Adams and Forsyth (2009) and adapted into Turkish by Özer and Tül (2014); and the Student Alienation Scale developed by Sanberk (2003). Multiple regression analysis was used as a research method in the study. In order to determine the students' academic success in their Science classes, mean scores of the students' papers in four different written exams in the 1st and 2nd semesters of the 2018-2019 academic year were considered. In the study, initially, the correlations between the sub-dimensions of each affective variable and science academic achievement were examined. Models were created via stepwise regression analysis, starting from the sub-dimension that gave the highest correlation with science academic achievement. Sub-dimensions that did not contribute significantly to science academic achievement were removed from the model and its final shape was obtained. The results revealed that, the sub-dimension of EPOCH well-being was relatedness and the sub-dimension of perceived self-regulation being openness were significant predictors of academic success in the science course. These sub-dimensions explain 10% of academic achievement in science classes.

Keywords: Science academic achievement, Epoch well-being, perceived self-regulation, trust in teacher, alienation from school

1. Introduction

Öztekin (2012) defines academic achievement as the level of proficiency exhibited by students towards the goals predetermined in a specific curriculum. Undoubtedly, academic success occupies an important space among the expectations of parents, teachers and school administrators from students. Academic success is an important factor that determines students' future expectations and determines the life direction of students in the transition from primary education to secondary education, from

*Corresponding author Elif Öznur. ORCID ID.: <https://orcid.org/0000-0001-8028-9251>

E-mails: elifoznurtokgoz@gmail.com

: alevd@gazi.edu.tr

secondary education to higher education. It is among the expectations of each student to experience a sense of achievement and to be appreciated by their parents, teachers and those around them. While this situation brings to mind the factors affecting academic success, it makes it necessary to make students feel a sense of success by addressing the positive and negative aspects of these factors in the student's life.

Razon (1987) points out that academic success depends on three parameters: the individual, his family, and his school. Kırmızıgül (2019) states that among these three parameters, the individual's part originates from himself: the individual's developmental characteristics such as intelligence and readiness; affective characteristics of the individual such as self-efficacy belief, motivation, attitude, anxiety; determined as the behavioral characteristics of the individual, such as regular homework and the time allotted to his homework. The family-based part of academic success is due to factors such as the attitudes and behaviors of parents towards the individual, their socioeconomic levels, education levels of parents, and their understanding of discipline towards the individual (Razon, 1987). On the other hand, in the part of the academic success originating from the school, factors such as the quality of the teacher and the behavior towards the students, the curriculum, the methods and techniques used in the course, and the physical structure of the school are listed. Undoubtedly, among these three factors affecting academic success, the factor originating from the individual has an important place. Factors originating from the individual are listed as cognitive, affective and psychomotor.

According to Zhu and Zhou (2012), affective factors are a concept that indicates the inner world of individuals and the feelings that individuals have towards situations, events or objects. Selvi (1999), on the other hand, defined affective factors as including beliefs, attitudes, values and orientations that shape people's behavior. The concept of well-being, which is among the affective factors, is an important concept belonging to positive psychology. According to Seligman (2011) the concept of well-being consists of a multidimensional structure and lists these dimensions as positive emotions, engagement, positive relationships, meaning and achievement. The PERMA model for the concept of well-being for adults was created by taking the initials of these five dimensions specified by Seligman (2011). Although the PERMA model, which was created by Seligman (2011) by combining these five conditions, was developed for adults, researches show that the concept of well-being is an important factor not only for adults but also for students. Considering this situation, the concept of well-being for students gained importance and studies in this direction were emphasized. As a result of the studies on students, the concept of well-being was gathered in five sub-dimensions. These sub-dimensions are: engagement, perseverance, optimism, connectedness and happiness (Kern, Waters, Adler, White, 2015). Commitment sub-dimension: It is the ability of individuals to be involved and focus on the activities they participate in, the work they will do, the tasks they need to complete (Csikszentmihalyi, 1990). Determination sub-dimension is an ability that individuals show on the way to progress towards their goals. Optimism sub-

dimension is expressed as being hopeful for the future and trusting the future. The sub-dimension of relatedness is expressed as individuals being satisfied with their relationships, feeling cared for and loved by those around them, and making them feel these feelings towards those around them. The last dimension created is the happiness sub-dimension. This dimension expresses that individuals are generally happy and satisfied with their lives rather than instant happiness (Kern, Benson, Steinberg, & Steinberg, 2016).

Another affective variable is perceived self-regulation. Self-regulation refers to the beliefs that the individual has, that the individual determines his/her own goals, that the individual is active and constructive in terms of his/her behaviors, metacognition and motivation (Liskara, Vauras, & Lehtinen, 2004). According to Israel (2007), self-regulation skill is to enable individuals to remain independent by establishing full dominance in the learning process without being dependent on their environment or others. Arslan and Gelişli (2015), on the other hand, define self-regulation as a situation in which individuals determine their own learning goals and in which individuals' motivations, behaviors, metacognitions and beliefs are constructive and active. The concept of 'learning to learn' was emphasized in the primary school science curriculum published by the MEB (2018). This concept has been explained as the individual's pursuit of learning and persistence while performing his own learning action, including knowledge management and active time. When the definition of the concept of 'learning-learning' emphasized by the Ministry of National Education is examined, it is seen that this definition is related to self-regulation. It can be stated that a student who has self-regulation skills effectively applies the concept of 'learning to learn'. 21st century. In our education system, which aims to raise students with self-regulated skills, it is important for students to have self-regulation skills. Studies show that students who have self-regulation skills are active in both social and school lives. This activity in school life has been associated with academic success. Pintrich (2000) also states this relationship by expressing that there is a relationship between the student's academic self-efficacy and self-regulation skills. Similarly, according to Bandura (2006), having high self-regulation skills affects both the motivation and academic success of the student.

One of the important factors affecting the relationship between people is trust (Tecim, 2011). Trust is an individual's optimistic expectation about the consequences of an event or a person's behavior (Hosmer, 1995). According to Hosmer (1995), trust is formed not as a result of coercion, but as a result of the will of the person. In organizations such as schools, trust is of great importance. Students and teachers form the human resources of the school organisation. In this context, the existing trust between the student and the teacher has an important and critical role between the student and the teacher. (Özer, Üstüner, Demirtaş and Cömert, 2006). Undoubtedly, teachers play an important role in students' lives. As a result of the relationship established between the student and the teacher, a state of trust begins to form. As the relationship established between the teacher and the student progresses in a positive direction, the trust of the student

towards the teacher also increases. Confidence is an important element for student learning and academic success (Goddard, Salloum, & Berebitsky, 2009). Studies have shown that trust between students and teachers plays a very important role in students' learning. It has been observed that teacher effort is an important factor in the learning process of students, and these efforts positively affect students' trust in their teachers (Tschannen-Moran & Gareis, 2015). The feeling of trust between the teacher and the student causes the student to benefit from education and training at the highest level, the student's learning, the increase in the academic success of the student, the formation of a strong communication between the teacher and the student, the increase in the student's attendance to school, the increase in the motivation of the students, and the formation of a positive atmosphere in the school environment. (Adams, 2014; Lee, 2007; Coleman, 1988). It has been stated by Tschannen-Moran and Gareis, (2015) that the feeling of trust between the teacher and the student causes an increase in the school performance of the student, and it has been noticed more recently. If the feeling of trust between the student and the teacher is not formed enough, it is seen that the student cannot attend the lessons effectively, the decrease in the academic success of the student, the increase in absenteeism, the decrease in the sense of commitment to the school, the increase in the alienation state of the students, and the undisciplined behaviors by not following the classroom rules (Adams, 2014).

Alienation can be defined as the feeling of insecurity that the individual feels towards other individuals or society, the feeling of powerlessness caused by the problems in social life, the feelings of self-isolation and alienation. We can consider the concept of alienation for schools in four dimensions: meaninglessness, powerlessness, irregularity and isolation (Seeman, 1959). The concept of powerlessness is a situation in which the individual has low self-control and external factors are intense, and the individual feels the feeling of powerlessness (Elma, 2003). The concept of irregularity is the situation where the individual does not consider it necessary to perform the behaviors that must be done in order to achieve a goal (Seeman, 1959). The concept of isolated is the minimum level of participation in the current environment, less friendship bonds (Seeman, 1959). Isolation can occur when an individual withdraws from society or is excluded from society (Yılmaz & Sarpkaya, 2009). The concept of meaninglessness is the situation where a meaningful relationship cannot be established between the present and the future (Manneheim, 1954, cited in Mau, 1992). Alienation from school is considered as the level of social and academic alienation of students from their schools (Schulz & Rubel, 2011). Finn (1989) stated that alienation from school occurs from the first years of school. According to Gedik (2014), the most intense period of alienation from school is stated as adolescence. Yılmaz and Sarpkaya (2009) stated that the reasons for students' alienation from school depend on many environmental factors such as the culture of the society in which the students live, the characteristics of the school, religious beliefs, and socio-economic conditions. Alienation from school has many negative consequences for the student. These negative effects include the alienation of the student from the learning process, even refusing the school and finishing his education life (Finn, 1989), isolating himself

from the school group (Tarquin & Cook-Cotton, 2008), and showing negative bullying behaviors (Hyman, Cohen & Mahon, 2003). can be specified as. One of the most important effects of alienation from school is low academic achievement (Burbach, 1972).

2. Method

2.1. Research design

This research is a relational study that examines the effects of affective variables such as EPOCH well-being, perceived self-regulation, trust in teacher and alienation from school on the academic achievement of 6th grade secondary school students in science. Relational research is the study of whether there is a relationship between two or more variables and the cause-effect relationships between these variables (Büyüköztürk, Çakmak, Aygün, Karadeniz, & Demirel, 2013).

2.2. Participants

The participants of the study consisted of randomly selected 332 (156 girls, 176 boys) 6th grade students at a public secondary school in Ankara, Turkey.

2.3. Data collection tools

In the study, the data were collected via four different data collection tools were used. These data tools are given and explained below.

2.3.1. Epoch Well-Being Scale: The EPOCH Well-Being scale to be used in the study was developed by Kern et al. (2015). The adaptation of the scale to Turkish was made by Demirci and Ekşi (2015) and the study was conducted with 262 high school students. At the end of the study, the scale consisting of five sub-dimensions and twenty items was given its final form. The sub-dimensions of the scale are Determination (4 items), Commitment to Life (4 items), Happiness (4 items), Optimism (4 items) and Relatedness (4 items) and each item has a positive structure. The scale is in a 5-point Likert structure (Never:1 point...Always:5 points) and getting a high score from the scale indicates an increase in well-being. The internal consistency coefficients of the factors that make up the scale range from 0.72 to 0.82, and the total Cronbach's alpha internal consistency coefficient of the scale is expressed as 0.95. Kern et al. (2015) determined the factors of positive psychology that individuals in adolescence have with the EPOCH well-being scale. In the study of adapting the scale to Turkish, high school students were selected as adolescents by Demirci and Ekşi (2015). Although it is stated that puberty begins between the ages of 10-12 in girls and 11-14 in boys, according to the data of Reproductive Health of Turkey (2007), expert opinion was also sought on whether the scale to be used would be appropriate for 6th grade students (1 guide and 1 Turkish teacher). Expert opinions stated that the items that make up the scale are appropriate and understandable for 6th grade students.

2.3.2. Perceived Self-Regulation Scale: The Perceived Self-Regulation Scale to be used in the study was developed by Aslan and Gelişli (2015). The study was conducted

with 604 secondary school students. At the end of the study, a two-factor and 16-item scale was developed. The sub-factors of the scale are Seeking (8 items) and Openness (8 items), and the scale is in a 5-point Likert structure (Never :1 pointAlways: 5 points). Each item constituting the scale has a positive structure and getting a high score from the scale is expressed as an increase in self-regulation. The internal consistency coefficients for the two factors constituting the scale were found to be 0.84 and 0.82, respectively, and the Cronbach's alpha internal consistency coefficient for the whole scale was 0.90.

2.3.3. Teacher Trust Scale: The Teacher Trust Scale to be used in the study was developed by Adams and Forsyth (2009) and adapted into Turkish by Özer and Tül (2014). The adaptation study was conducted with 635 both middle and high school students. As a result of the Exploratory Factor Analysis, it was stated that the scale was unidimensional, consisting of 12 items, and the factor loads of the items varied between 0.52 and 0.77. As a result of the Confirmatory Factor analysis, it was stated that the fit indices were at the accepted value. It was stated that the Cronbach alpha internal consistency coefficient of the scale was 0.89 and the test-retest reliability coefficient was 0.80. The scale is in a 5-point Likert structure (I Disagree:1 point.....Completely Agree:5 points) and all items are in a positive structure. A high score from the scale indicates an increase in teacher trust.

2.3.4. School Alienation Scale: The Student Alienation Scale to be used in the study was developed by Sanberk (2003). The scale consists of four sub-dimensions and 17 items in total. These dimensions are Powerlessness (4 items), Irregularity (5 items), Meaninglessness (5 items) and Social Distancing (3 items). The scale is in a 5-point Likert structure (Disagree:1 point.....Completely Agree:5 points) and all items are in a negative structure, and getting a high score from the scale indicates an increase in alienation from school. It was stated that the factor loads of the items in the scale ranged from 0.52 to 0.80. It was stated that the total variance was 50.87%. Cronbach's alpha internal consistency coefficients for the sub-dimensions of the scale range from 0.45 to 0.77. It has been reported that the Cronbach alpha internal consistency coefficient of the entire scale is 0.79. Sanberk (2003) conducted this research with 611 high school students. Conducting the research with high school students brought to mind the question of whether this scale would be suitable for secondary school students, and then 2 different experts (1 guide and 1 Turkish teacher) were consulted and it was discussed whether the scale items were suitable for secondary school students. It was stated by the expert opinions that the scale items were understandable for secondary school students and suitable for their age levels.

2.4. Analysis of the data

For data analysis, an Excel file was first created and the school number and gender of 332 students were added to this file. In the 2018-2019 academic year through the e-school

system, the students took the I. and II. Science academic success was formed by taking the averages of 4 different written grades, 2 of which were in the semester. Then, the results of the sub-dimensions of 4 different affective variables applied to the students were entered separately for each student, taking into account the school numbers of the students. Before proceeding to the analysis, the skewness and kurtosis coefficients were examined by looking at the data distribution of academic achievement in science and each dimension in the scales, and it was seen that this value was between +1 and -1. The main thing in Büyüköztürk's (2012) analysis is that the scores did not deviate excessively from normal. If the skewness coefficients (SC) are within the limits of ± 1 , this can be expressed as the scores do not show an excessive deviation from the normal distribution. In line with this information, it was accepted that the data showed a normal distribution. Pearson correlation and regression analyzes will be used in the study. Pearson correlation coefficient is made to find and interpret the relationship between two variables (Büyüköztürk, 2012). If the correlation coefficient between two variables is between 0.70-1.00, it means high correlation between the two variables, 0.70-0.30 means there is a medium relationship between the variables, and between 0.30-0.00 means there is a low level of relationship between the variables. A positive relationship between two variables means that as the value of one variable increases, the value of the other variable increases, or the value of both decreases. A negative relationship between two variables means that while the value of one variable increases, the value of the other variable decreases (Büyüköztürk, 2012). Of the two variables that are related; Regression analysis is performed to determine to what extent the independent variable explains the dependent variable and to explain the relationship between them with a mathematical formula. In multiple regression analysis, the number of dependent variables is one and the number of independent variables is more than one. In regression analysis, the effect of independent variables on the dependent variable is determined by looking at the coefficient of determination (r^2) (Büyüköztürk, 2012). The dependent variable (predicted variable) of this study is science academic achievement, while the independent variables (predicting variables) are different affective variables such as EPOCH well-being, perceived self-regulation, trust in the teacher, and alienation from school. In the study, first of all, Pearson Correlation Analysis was performed to determine the relationship between the sub-dimensions of each scale and science academic achievement. According to the results of the analysis, starting from the sub-dimension with the highest correlation with science academic achievement, all sub-dimensions were included in the stepwise regression analysis and models were created. The sub-dimensions that did not contribute to the model created in the stepwise regression analysis were removed from the model and the final model was reached.

3. Results

Pearson Correlation Analysis was conducted to determine the relationship between the science academic achievement of 6th grade students and the independent variables. In

the analysis, the relations of each sub-dimension with both other sub-dimensions and science academic achievement were examined. Analysis results are given in Table 1.

Table 1. Correlation Coefficients of 6th Grade Students' Academic Achievement in Science and Independent Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
Academic Achievement in Science (1)	1												
Relatedness (2)	.23**	1											
Commitment to life (3)	.02	.30**	1										
Determination (4)	.22**	.34**	.44**	1									
Happiness (5)	.12*	.42**	.49**	.49**	1								
Optimism (6)	.12*	.45**	.42**	.58**	.61**	1							
Openness (7)	.28**	.40**	.49**	.64**	.46**	.56**	1						
Quest (8)	.17**	.28**	.38**	.65**	.37**	.47**	.72**	1					
Meaninglessness (9)	-.08	-.19**	-.13*	-.32**	-.30**	-.30**	-.36**	-.29**	1				
Irregularity (10)	-.10	-.17**	-.07	-.31**	-.23**	-.24**	-.22**	-.34**	.38**	1			
Social distance (11)	.01	-.12*	-.05	-.28**	-.13*	-.22**	-.12*	-.21**	.28**	.41**	1		
Weakness (12)	-.14*	-.24**	.04	-.18**	-.20**	-.15**	-.12*	-.16**	.36**	.38**	.41**	1	
Trust in teacher (13)	.17**	.21**	.12*	.29**	.28**	.26**	.31**	.30**	-.52**	-.40**	-.25**	-.28**	1

(2,3,4,5 and 6 EPOCH sub-dimensions of well-being; 7 and 8 sub-dimensions of perceived self-regulation; 9,10,11 and 12 indicate sub-dimensions of alienation from school. *p<.05, ** p<.01)

According to Table 1, the sub-dimensions of Alienation from School 'meaninglessness, irregularity, social distance' and the 'life commitment' sub-dimension of EPOCH Well-being did not show a significant relationship with science academic achievement. Thereupon, these four sub-dimensions will not be included in the multiple regression analysis. In the next stage of the research, models were created in stepwise regression analysis, starting from the sub-dimension with the highest correlation with science academic achievement. The sub-dimensions that did not contribute significantly to the model were removed from the model and the final model was reached. The models created are given in Table 2.

Table 2. Stepwise Multiple Regression Analysis of Affective Variables Affecting Academic Achievement in Science

Model	Predictors	B	SD	β	t	p	R ²
1	Openness	.34	.06	.28	5.36	.000	.08
	Stabilized	48.40	5.15				
2	Openness	.28	.07	.23	3.97	.000	.10
	Relatedness	.15	.06	.14	2.40	.017	
	Stabilized	41.03	5.96				
3	Openness	.24	.09	.20	2.77	.006	.10
	Relatedness	.14	.06	.13	2.30	.022	
	Determination	.05	.06	.05	0.79	.429	
	Stabilized	41.11	5.96				
4	Openness	.34	.10	.28	3.55	.000	.10
	Relatedness	.14	.06	.14	2.38	.018	
	Quest	-.07	.07	-.07	-0.98	.330	
	Stabilized	41.42	5.97				
5	Openness	.25	.07	.21	3.49	.001	.10
	Relatedness	.14	.06	.13	2.25	.025	
	Trust in teacher	.07	.05	.08	1.44	.152	
	Stabilized	38.56	6.19				
6	Openness	.27	.07	.23	3.93	.000	.10
	Relatedness	.13	.06	.12	2.05	.041	
	Weakness	-.06	.04	-.08	-1.48	.139	
	Stabilized	45.75	6.75				
7	Openness	.30	.07	.25	4.05	.000	.10
	Relatedness	.16	.06	.15	2.57	.011	
	Happiness	-.05	.05	-.06	-0.93	.352	
	Stabilized	41.35	5.97				
8	Openness	.34	.08	.28	4.31	.000	.10
	Relatedness	.18	.06	.17	2.80	.005	
	Optimism	-.09	.06	-.11	-1.67	.096	
	Stabilized	40.78	5.95				

Dependent variable: Academic Achievement in Science

In the first model created, the sub-dimension of Perceived Self-Regulation, 'openness', was first entered. Openness was a significant predictor of science academic achievement ($F_{(1,330)} = 28.75$; $p=.00<.05$) and openness explained 8% of science academic achievement. In the second model, 'relationship', a sub-dimension of EPOCH Well-Being, was added. Relevance significantly predicted science academic achievement ($F_{(2,329)} = 17.47$; $p=.00<.05$), and being open and relatedness together explained 10% of science academic achievement. In the third model, the 'stability' sub-dimension of EPOCH Well-Being was added. Since it was seen that the stability sub-dimension did not make a significant contribution to the model, it was removed from the model again. The 'seeking' sub-dimension of Perceived Self-Regulation was added to the fourth model. Since the search dimension added to the model did not make a meaningful contribution to the model, this dimension was removed from the model. Teacher Trust Scale was added to the fifth

model, but this dimension was removed from the model again as it was seen that it did not make a significant contribution to the model. In the sixth model, the 'weakness' sub-dimension of Alienation from School was added, but since the powerlessness sub-dimension did not make a significant contribution to the model, it was removed from the model again. The 'happiness' sub-dimension of EPOCH Well-Being was added to the seventh model, but the happiness sub-dimension was removed from the model because it did not make a significant contribution to the model. In the eighth model, the 'optimism' sub-dimension of EPOCH Well-Being was added, but the optimism sub-dimension was removed from the model because it did not make a significant contribution to the model.

It is openness and relatedness sub-dimensions that contribute significantly to the models created for science academic achievement. These sub-dimensions explain 10% of science academic achievement. The mathematical formula created according to the second model is given below.

$$\text{Science Academic Achievement} = 41.03 + 0.28 * \text{openness} + 0.15 * \text{relationship} + \varepsilon$$

4. Discussion and Conclusions

In this study, the effect of the sub-dimensions of four different affective variables on the science academic achievement of 6th grade students was investigated. As a result of the research, it was observed that both sub-dimensions of Perceived Self-Regulation, which is one of the affective variables (being open, seeking), had a low-level positive and significant relationship with science academic achievement (Table 1, $r=.28$, $r=.17$). Openness sub-dimension, which gives the highest correlation with science academic achievement, was added to the first model created in the stepwise regression analysis. This sub-dimension was a significant predictor of science academic achievement and explained 8% (Table 2). This situation can be stated that students with high self-regulation skills will also have higher academic achievement in science. There are many studies in the literature explaining that academically successful students have self-regulation skills (McMillan, 2010; Kaufman & Baer, 2004; Pintrich & De Groot, 1990; Young & Vrongistinos, 2002). Similarly, in the study conducted by Israel (2007), the change in the science academic achievement of the 6th grade students in secondary school was examined by conducting self-regulation training. At the end of the study, it was seen that self-regulation had a positive effect on science academic achievement. Again, in the study conducted by Sümer (2012) with 5th grade students, it was stated that the motivation and self-regulation strategies of the students were related to their academic success, and these two factors were a significant predictor of academic success. In the study conducted by Duru, Duru, and Balkıs (2014) with university students, it was stated that self-regulation was directly related to burnout, while academic achievement was indirectly related to burnout. In line with all this information and the data in the study, it can be stated that with the increase in the Perceived Self-Regulation of the

students, they actively control their learning processes and are more successful academically.

According to Table 1, another affective variable, EPOCH, has a low level of positive and significant relationship between 'relevance, determination, happiness and optimism' sub-dimensions of well-being and science academic achievement ($r=.23$, $r=.22$, $r=.12$, $r=.12$). It can be stated that the increase in these sub-dimensions will increase the academic success of science. It is the relatedness sub-dimension that gives the highest correlation with science academic achievement. This sub-dimension made a significant contribution to the model created in Table 2, and together with the seeking sub-dimension of perceived self-regulation, it explained 10% of science academic achievement. Relatedness means that the individual is cared for, loved and able to establish positive relations with his environment. The fact that the relatedness sub-dimension predicts the science academic achievement of 6th grade students can be expressed as that positive relationships with the people around them will contribute positively to the academic success of the students in this age group. There are opinions in the literature that the concept of well-being has positive effects on academic achievement (Water, 2011; Özden 2014; Halisdemir, 2013), but there are hardly any studies on the effect of the concept of well-being on academic achievement. One of the limited number of studies was conducted by Tokgöz (2020) for 5th grade students. In the study, the relationship between the EPOCH well-being of 5th grade students and their academic achievement in science was examined. As a result of the study, it was reported that many sub-dimensions of well-being had a low level of positive correlation with science achievement. It was also stated in the study that the relatedness sub-dimension, together with school burnout, explained 18% of science academic achievement. In a study conducted by Ateş (2016) on university students, it was reported that psychological well-being significantly predicted the academic success of students. Another view on well-being is that it indirectly affects academic achievement through school burnout and self-efficacy (Özhan, 2019; Ateş, 2016).

When the effect of alienation from school, which is another affective variable, on science academic success is examined, it is seen that only the 'weakness' sub-dimension has a low-level negative significant relationship ($r=-.14$) with science achievement (Table 1). According to these results, it can be stated that as the state of powerlessness increases, science achievement decreases. However, other sub-dimensions of alienation from school were not associated with academic achievement in science (Table 1) and this is not an expected situation. Because there are studies in the literature showing that alienation is a significant predictor of academic success. One of these studies was conducted by Servet (2016) for high school students and it was stated that alienation from school is a negative and significant predictor of academic success. Again, Ülker (2019) examined the effect of self-regulation and reflective thinking skills on academic achievement in mathematics in a study conducted with secondary school students, and at the end of the study, it was stated that self-regulation skill was a significant predictor of

academic success in mathematics. However, it has been stated in the literature that alienation from school has not a direct effect on academic achievement but an indirect effect on school burnout (Atik, 2016).

Finally, when we look at the effect of Trust in Teacher on academic achievement in science, there is a low level of positive and significant relationship between trust and science achievement (Table 1, $r=.17$). According to this result, it can be stated that as the feeling of trust in the teacher increases, the success in science increases. However, trust in the teacher did not significantly contribute to the model created in this study (Table 2). However, there are studies in the literature that show parallelism with the result of this study. One of them was conducted by Atik (2016) with high school students, and it is stated that the trust factor does not directly affect academic achievement, but indirectly affects it through school burnout and alienation from school. A similar situation was stated by Romero (2015) in the study conducted with high school students, that trust in the teacher affects the academic achievement status indirectly, not directly.

In line with all these data, some sub-dimensions of the four different affective variables discussed in this study have a low-level, negative or positive, significant relationship with science academic achievement. This situation necessitates giving due importance to the affective intelligence of students as well as cognitive intelligence in studies aimed at increasing academic success in science. To parents, subject teachers and school counselors; It plays an important role in providing the necessary help and environment to increase students' well-being and self-regulation skills. It may be important for teachers to be honest, stable, tolerant and helpful towards students in order for the trust factor to be formed in a healthy way between the student and the teacher. In order to minimize the alienation from the school in students, it can be suggested to focus on social activities in order to create a democratic environment in the school, to prevent the rules in the school from creating intense pressure on the students, and to create a perception that the school is not just a place for lectures.

There are studies in the literature on the effects of perceived self-regulation, trust in the teacher, and alienation from school on academic achievement, but the absence of a previous study on the effect of EPOCH well-being on the academic achievement of secondary school students makes this study important. The fact that many sub-dimensions of well-being have a significant relationship with science academic achievement makes this concept important on academic success. Considering this situation by other researchers, it may allow the investigation of its effects on academic achievement at other grade levels and in different courses.

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