



## HIGH SCHOOL STUDENTS' COGNITIVE FLEXIBILITY IS PREDICTED BY SELF-EFFICACY AND ACHIEVEMENT

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### Abstract:

In this research, the prediction cognitive flexibility obtained by general self-efficacy, academic self-efficacy, social self-efficacy, emotional self-efficacy and achievement is examined. This study is executed in 2014- 2015 academic year on 760 high school students who are between ages 15 and 18. Cognitive flexibility Scale is developed by Bilgin (2009b) is used for defining cognitive flexibility, Self-Efficacy Scale is developed by Çelikkaleli, Gündoğdu ve Kiran-Esen (2006) is used for defining self-efficacy. Achievement information are determined from TEOG's input points of students. Data are tested by regression analysis. The results of research shows the facts that cognitive flexibility is predicted meaningfully in positive direction by five of the variables "*achievement, general self-efficacy, academic self-efficacy, social self-efficacy and emotional self-efficacy*". In the multiple regression analysis, it is found that five variables all together explain 34% of cognitive flexibility. Also, it is found in stepwise regression analysis that cognitive flexibility is predicted meaningfully by their two variables.

**Keywords:** adolescent, cognitive flexibility, self-efficacy, achievement

### 1. Introduction

Adolescents are faced with various problems in their daily lives and they try to overcome the problems. Individuals get to make choices on different subjects or make decisions even though they aren't faced with a problem, and in these situations they have the potential and the right to display different behaviours (Sapmaz and Doğan, 2013). The changes in adolescence where individuals experience help them explore

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different emotional and behavioural stimulus of their adulthood (Özmen, 2006). Therefore, it is natural for every individual to think differently from others about a particular incident. The reaction when adolescents are faced with a problem, perspective and making choices reveals the cognitive flexibility of adolescents. Cognitive flexibility; in a simple way, is to create options. One must have the flexibility to create an alternative. Cognitive flexibility is defined as:

- a) to be aware of the option;
- b) to be flexible to adapt to new situations;
- c) to feel competent when the state of flexible (Martin and Anderson, 1998; Martin, Anderson and Trweatt, 1998; Martin and Rubin, 1995).

Those adolescents feel self-sufficient and successful in the face of events leads to the development of self-efficacy. Self-efficacy is the belief which people have the impact on the events that affect their lives in order to produce the required performance levels.

Self-efficacy influences the perception of the events that people face, perspectives and emotional responses. When people, who have a high level of self-efficacy, encounter difficulties, they don't go back while they are struggling patiently and confident with themselves; the people, who have a low level of self-efficacy they become stressed by increasing concerns and they actually make it more difficult (Pajares, 2002). It is important for individuals to be solution-oriented and successful and to adapt quickly to the changes. Cognitive flexibility and self-efficacy levels are bringing these features together. According to Martin and Anderson (1998) it is the part of cognitive flexibility, because individuals must be sufficient to show desired behaviour although they are aware of the alternative option of behaviour even in the face of a given situation, or willing to be flexible. From this point of view some of the variables that predict cognitive flexibility of adolescents in this study were examined.

The aim of this research: In this study, in the light of the views discussed above, it was aimed to examine whether high school students predict the flexibility of cognitive, emotional, social, general self-efficacy and academic achievement of significant variables. To achieve these objectives the answers for the following questions were sought. The variables of Academic, emotional, social, general self-efficacy and academic success:

1. How does it predict cognitive flexibility separately?
2. How does it predict cognitive flexibility all together?
3. What is the power of these variables while predicting cognitive flexibility?

## **2. Method**

### **2.1. Participants**

This research was conducted with a randomly selected voluntary sample of 760 (386 female, 374 male) adolescent students from nine high schools in the Mersin province of Turkey. The participants comprised students with a mean age of 14 years.

## 2.2. Instruments

**2.2.1. The Cognitive Flexibility Scale (CFS):** The Cognitive Flexibility Scale is developed by Bilgin (2009a). CFS which consists of 19 items is composed of adjective pairs. The points gained from the scale change between 19 and 95. The increase of the points in the scale means that the individual comes closer to the individual's cognitive flexibility. Reliability analysis study of the scale is carried out and criteria validity is determined by Non-Functional Attitude Scale and the correlation between two scales are determined to be -.44. In the reliability analysis studies of the scale, it is found out that Cronbach's Alpha of the whole scale is .92, item total correlation of the items are between .49 and .63. In this study the internal reliability coefficient was .91.

**2.2.2. Self-Efficacy Expectation Scale for Adolescents (SEES-A):** The SEES-A was developed by Murris (2001) and adapted into Turkish by Celikkaleli, Gündoğdu, and Kiran-Esen (2006). In reliability studies on the original scale, the internal consistency coefficient was calculated at .88 for the whole scale, and ranging from .85 to .88 for each subscale. In a factor analysis to test the validity of the scale, the scale's three factors explained 56.7% of the total variance (Muris, 2001). In a reliability study of the Turkish adaptation of the SEES-A, the test-retest correlation coefficient was  $r = .85$  for the whole scale and ranged between .65 and .77 for each subscale. The SEES-A is composed of 24 items and includes three dimensions: academic, social, and emotional efficacy expectations. High scores indicate high self-efficacy expectations, and low scores indicate low self-efficacy expectations. In this study, the internal reliability coefficient was for whole scale .83, and ranged between .74 and .78 for each subscale

## 2.3. Analysis of Data

In the analysis of the data, Simple linear regression analysis and stepwise multiple regression analysis was used to examine whether academic, social, and emotional self-efficacy and total self-efficacy beliefs predict cognitive flexibility scores or not. SPSS 20 program was used for the analysis.

## 3. Findings

The findings obtained the purpose of the research analyses is given below.

### 3.1. Do the variables of academic, emotional, social, and general self-efficacy predict cognitive flexibility?

Simple linear regression analyses results, in order to check whether academic, emotional, social, general self-efficacy and academic achievement predict cognitive flexibility alone meaningfully or not is shown in Table 1.

**Table 1:** The Simple Linear Regression Analysis Summary Table whether academic, emotional, social, general self-efficacy and academic achievement predicts cognitive flexibility alone meaningfully or not.

Variables	R	R <sup>2</sup>	Std. Error	B	β	t	F <sub>(1,758)</sub>
General self-efficacy	,575	,331	,031	,604	,575	10,25*	374,674
Academic self-efficacy	465	,216	,085	1,233	,465	24,84*	209,415
Social self-efficacy	,414	,172	,080	1,007	,414	16,44*	156,916
Emotional self-efficacy	,421	,178	,078	,998	,421	28,825*	163,714
Academic achievement	,209	,044	,618	3,628	,618	65,37*	34,521

p<.01

When Table 1 is considered, it is observed that academic, emotional, social, general self-efficacy and academic achievement variables predict cognitive flexibility meaningfully (p< 0.05). It is observed that there is a relationship between the variables discussed and the cognitive flexibility. When the regression coefficients of the predictor variables studied, the lowest variable regression coefficient is seen.

### 3.2 How long does academic, emotional, social and general self-efficacy and academic achievement of all variables predict cognitive flexibility meaningfully?

**Table 2:** Multiple Regression analysis Summary Table that is made of whether academic, emotional, social, general self-efficacy and academic achievement of all predict the cognitive flexibility meaningfully or not

Variables	R	R <sup>2</sup>	B	Std. Error	β	t
Constant	,348	,342	25,58	3,06		8,36*
General self-efficacy			15,2	,454	,145	,335
Academic self-efficacy			,621	,509	,234	1,221
Social self-efficacy			,479	,467	,197	1,026
Emotional self-efficacy			,286	,467	,121	,612
Academic achievement			-1,748	,524	,101	8,361

F<sub>(6-759)</sub>= 66,890, \*p<.01

As shown in Table 2, five predictor variables that examined in the study can explain the variance in cognitive flexibility 34 % (R<sup>2</sup>= ,342) while 66% of the variation in cognitive flexibility can be explained by other variables.

### 3.3 What is the significant power of all academic, emotional, social, general self-efficacy to predict cognitive flexibility meaningfully?

**Table 3:** The Stepwise regression Analysis Summary Table about academic, emotional, social, the general self-efficacy and academic performance variables

Variables	Model	R	R <sup>2</sup>	Std. Error	B	β	t
General self-efficacy	1	,575	,33	2,38	24,395	,575	10,253*
General self-efficacy & Academic achievement	2	,583	,34	2,738	28,838	,583	10,531**

\*F<sub>(1-758)</sub>= 374,674, p<.01, \*\*F<sub>(1-757)</sub>= 194,816, p<.05

As shown in Table 3 of all arguments that is analysed predict the cognitive flexibility 34% with general self-efficacy and academic achievement. (F=194.816 p <0.005).

#### 4. Discussion and Conclusion

Results show that, the variables taken into consideration school performance, general, academic, social, emotional, self-efficacy predict cognitive flexibility in a positive way. It is shown that the independent variables taken together in the multiple regression analysis predict cognitive flexibility 34 %. That the two variables (general self-efficacy and academic achievement) in the stepwise regression analysis predicted cognitive flexibility meaningfully is obtained. Individuals who can change their opinions according to changing conditions can put more compatible and incompatible ideas instead of pushing themselves, they can generate new options and they believe that they can cope with difficult situations.

There are some similarities between the results of the research and some theoretical approaches and some differences between the studies. Bandura, who expresses the self-efficacy is the part of cognitive flexibility (1982), indicates that the desired behaviour will be mostly effective when they themselves are effective although they are aware of other options can be put in place to conduct (Akt: Martin, Anderson and Thweatt, 1998). According to Bandura (1998), individuals with a high level of self-efficacy have a higher cognitive flexibility. Martin and Bandura indicate that the more cognitive flexibility the individuals have got the higher self-efficacy and internal observation they have got. In addition, the person who expresses that he is more flexible considers himself more competent than the others that aren't flexible. In researches, for the relationship between self-efficacy and cognitive flexibility, meaningful relations are conducted in a positive way (Brewster, 2011; Kim and Omizo, 2005; Shimogori, 2013; Çelikkaleli, 2014). So the results of the previous research show that the more cognitive flexibility, the more self-efficacy.

Schunk (1990) indicates that self-efficacy belief is the most important predictor of human behaviours. At the same time, it is thought that cognitive flexibility is important in social relations and communication. Bilgin (2009b), in the study of variables predicted cognitive flexibility conducted social self-efficacy predicts cognitive flexibility meaningfully.

In this study the predicting of academic success cognitive flexibility is another result. It is said that there is a close correlation between self-efficacy and the level of success. (Pajares, 2002)

When the studies examined, more highlighted relationship between the two variables has been seen. Yücel (2011) and Zahal (2014) have found a significant positive correlation between the cognitive flexibility of students and academic success. However, Alper and Deryakulu (2008) state that there is no significant effect on the students' success of cognitive flexibility. It is also observed that there is a correlation associated with academic success between creativity and cognitive flexibility (Çuhadaroğlu, 2011). It can be said that the studies examined in this research support these findings.

Considering all these information, it is expected that the development of individual's self-efficacy removes them from cognitive rigidity to think more flexible and to adapt new situations. In the development of self-efficacy, great responsibilities fall to families and schools. Therefore, the regulation of psychological consulting service for families and group work conducted with students that can cause sometimes directly or sometimes variable which may contribute to the development of cognitive flexibility.

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