Critical Thinking as a Predictor of Self-Esteem of University Students

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This study aimed to examine the predictive role of critical thinking on university students' self-esteem. The participants of the study included 433 undergraduate students in a variety of programs. Of the 433 students, 294 were female, 139 were male, and the mean age was 20.2 years. Data collection tools included the California Critical Thinking Scale and Coopersmith Self-Esteem Inventory. The relationship between the critical thinking and self-esteem of university students were determined using correlation analysis and multiple regression analysis. The findings of the correlation analysis showed that analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, and systematicity were significantly correlated with self-esteem. In addition, a regression analysis showed that self-esteem was predicted by open-mindedness, inquisitiveness, and self-confidence.

Cette étude avait comme objectif d'examiner le rôle prédictif de la pensée critique sur l'estime de soi des étudiants à l'université. Les participants à cette étude comprenaient 433 étudiants provenant de différents programmes du premier cycle, dont 294 femmes et 139 hommes d'un âge moyen de 20,2 ans. Parmi les outils de collecte de données, notons le California Critical Thinking Scale et le Coopersmith Self-Esteem Inventory. Le rapport entre la pensée critique et l'estime de soi des étudiants à l'université a été établi par une analyse de corrélation et une analyse de régression multiple. Les résultats de l'analyse de corrélation indiquent que l'analyticité, l'ouverture d'esprit, la curiosité, la confiance en soi, la recherche de la vérité et la systématicité présentent une corrélation significative avec l'estime de soi. De plus, une analyse de régression a indiqué que l'ouverture d'esprit, la curiosité et la confiance en soi étaient des facteurs prédictifs de l'estime de soi.

Education is a process that occurs between individuals and their social environment (Lindeman, 2015). It is through education that people are encouraged to acquire the desired and validated behaviors that their community deems necessary (Hawkins & Weis, 2017). Moreover, each society aims to produce individuals who reflect the characteristics of the society itself. Passing on such characteristics for people living in the society may be possible through education. For a long time, the acquisition of knowledge was seen as the main purpose of school and life; however, this vision has changed: the acquisition of knowledge is no longer seen by researchers as memorizing concepts, principles and processes (Bloch, 2018; Harlen, 2018). In contrast, the way one uses knowledge is emphasized more than how they acquire it: this approach aims to educate individuals who may be able to use information, think logically, conduct research, and gain critical thinking abilities (Harlen, 2018). By doing so, these individuals would learn how to

question, investigate, make connections between concepts, obtain new knowledge, and contribute to society, thus feeling good about their self-worth (Fahim & Masouleh, 2012).

Because today's societies are considered to be information societies, in order to support the intellectual development of students, new regulations need to be made within educational systems (Drucker, 2017). Improving student academic potential depends on their effective critical thinking, creative thinking, scientific thinking, relational thinking, and reasoning skills through a qualified educational system (Fahim & Masouleh, 2012; Özden, 2005). All of these thinking approaches may be possible through a quality education. *Quality education* is a student-centered education system that allows students to focus on a given topic, think about a concept, increase their imagination, and be able to make constructive criticism while being eager to seek knowledge (Hopkins, 2015). In that sense, the main aim of education is helping students to make meaningful connections between series of phenomena (Kafai & Resnick, 2012). Education should aid students in determining ways of learning, thinking critically, assessing their own learning, and being aware of their potential. In other words, educational systems should help students learn "how to think" rather than "what to think" (Meichenbaum, 2017). Such approaches would support educators and students to understand the meaning and significance of critical thinking (Flores, Matkin, Burbach, Quinn, & Harding, 2012). Quality education would therefore help both educators and students feel confident about their personalities as they start learning how to think and question certain situations (Crocker & Park, 2004).

Literature Review

Critical Thinking

In the field of education, critical thinking has been one of the most emphasized topics in recent years. When the quality of the education system, teachers, and school is questioned by members of society, it may be seen that this quality does not meet the desired standards outlined by the Ministry of National Education in Turkey (Özden, 2005). Experts suggested that this problem is mainly associated with teaching approaches based highly on memorization rather than daily applications (e.g., Azar, 2011). Furthermore, as Azar (2011) indicated, the teaching methods, which are employed by educators, do not allow students to develop their thinking skills (Azar, 2011). Critical thinking is thought to be a complex skill, which is difficult to explain with a certain definition (Tsui, 2008). Even though there is no particular description of critical thinking, there have been some agreements on the term. Critical thinking recognizes the strengths and weaknesses of our own thinking in an improved form (Eales-Reynolds, Judge, McCreery, & Jones 2013). According to Evancho (2000), *critical thinking* is defined as the concepts that form an individual's evaluative and conscious judgment in solving problems. Bloom, Krathwohl, and Masia (1956) claimed that critical thinking is linked to higher order thinking processes. Critical thinking involves a person's ability to recognize relationships, make inferences or deduce conclusions from data, make assumptions in an argument, and evaluate evidence (Furedy & Furedy, 1985). Pascarella and Terenzini (2005) explained that a purposeful instruction could enhance critical thinking. Tsui (2002) stressed that discussions involving higher order thinking processes, integration of ideas, interactive exchanges, and the critique of epistemological assumptions are associated with critical thinking, which may increase the numbers of open-minded people for learning new information or concepts.

Facione (1990, 2013) identified critical thinking and its components: critical thinking is not a recall of ideas but may be conceived as a process that includes a two-way learning process. First, critical thinking evaluates the rational adequacy of an empirical statement, and second, critical thinking tends to defend a logical statement meaning that it is rational and does not depend on emotions, ideologies, or folk wisdom (Paul & Elder, 2006).

Facione (2013) defined critical thinking as self-regulatory judgment resulting in interpretation, analysis, evaluation, and inference. Facione and Facione (1992) explained the subscales of critical thinking as truth-seeking, open-mindedness, analyticity, systematicity, self-confidence, and inquisitiveness. The authors also provided definitions for these subscales:

- *Truth-seeking* entailed pursuing information about a problem;

- *Open-mindedness* included tolerating while also considering new ideas and opinions;

- *Analyticity* used higher-order thinking approaches in order to provide solutions to problems;

- *Systematicity* involved having effective plans and being focused while doing something;

- *Self-confidence* required believing in one's own capabilities; and

- *Inquisitiveness* encompassed being eager in acquiring the best knowledge (Facione & Facione, 1992).

These subscales are associated with obtaining or planning to acquire new information, meaning, that people with these skills would eventually enhance their beliefs about their self-worth; thus, they would be more satisfied with their life (Diener and Diener, 2009).

The theoretical framework of critical thinking has mainly been explained by Bloom's Taxonomy (Lipman, 1988), which is used to find differences in human cognition (Meyers, 1986). Because critical thinking includes cognitive activities such as formulating hypotheses, solving problems, and making plans, the cognitive model of Bloom's Taxonomy may be used by educators to help student improve their cognitive skills. According to Bloom, Engelhart, Furst, Hill, and Krathwohl (1956), the model included six steps, including knowledge, comprehension, application, analysis, synthesis, and evaluation. These steps are crucial for the higher-order thinking skills of the students. This design is considered to be a logical framework in terms of enhancing students' learning, analyzing, and thinking skills. Using this model may allow the educators to understand that a critical thinker has cognitive skills to approach issues in a critical and thoughtful manner (Rickles, Schneider, Slusser, Williams, & Zipp, 2013). It is likely that individuals with critical thinking dispositions tend to have social agency and self-confidence since increased levels of critical thinking are related to one's personal feelings and social actions (Laird, 2005).

Self Esteem

It is crucial for students to understand the fact that having positive or negative attitudes towards their own personality may affect their motivation, enthusiasm, and eagerness towards school, classroom, friends, learning activities, and their higher-order thinking skills. One of the most important things that may affect students is their level of self-esteem (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

Academicians have been divided with respect to self-esteem's definition and function. Self-

esteem has been used as a subject in relation with violence, unemployment, social problems, and teenage pregnancy. Some believe that self-esteem is essential for human life (e.g., Pyszczynski et al., 2004), while others argues that it does not include any value of life (e.g., Baumeister, Campbell, Krueger, & Vohs, 2003). Leary and MacDonald (2003) defined *self-esteem* as the personal evaluation that may be positive or negative depending how a person feels about their own self. Self-esteem involves psychological challenges, depression, loneliness, and academic failure (Pyszczynski et al., 2004).

Although the definition and function of self-esteem have not been fully agreed upon by researchers, there is an understanding that self-esteem includes three dimensions. The first is called *Global* or *Trait Self-Esteem*, which is related to a personality variable that represents how people feel about themselves (Crocker & Park, 2004). Researchers think that Global Self-Esteem is a decision that individuals make about their worth (Crocker & Knight, 2005); it is something that persists and is continuous. *State Self-Esteem*, on the other hand, refers to the emotions that we call the feelings of self-worth (Heimpel, Wood, Marshall, & Brown, 2002). Different from Global Self-Esteem, State Self-Esteem refers to feelings, which are considered to be temporary (Pyszczynski et al., 2004). Finally, *Domain Specific Self-Esteem* occurs in situations when individuals evaluate their various abilities (Marsh, 1993). According to this approach, individuals tend to evaluate their certain attributes, abilities, and personality characteristics (Marsh, 1993). People employing attributes that help them determine, analyze, and solve problems may have positive effects on their personal self-worth (Hart Research Associates, 2010).

Some of the attributes of self-esteem include believing in your capacity to solve problems, trusting your own judgments, making decisions and choices, and considering yourself self-worthy (Scheirer & Kraut, 1979). Kafka et al. (2012) found that an individual's the level of self-esteem may elevate negative outcomes in their life. Negative outcomes mainly include increases in aggression and prejudice. Haney and Durlak (1998) defined self-esteem as certain attitudes that people have towards themselves. Rosenberg (1965) stressed that self-esteem involves attitudes of approval or disapproval towards the concept of the self. Rosenberg, Schooler, and Shoenback (1989) suggested the that three main elements of self-esteem are reflected appraisal, social comparisons, and self-attribution. How other people view someone based on their own assumptions, according to Rosenburg et al. (1989) is called *reflected appraisal*. The authors defined making comparisons in terms of viewing between self and other people as *social comparisons*. Lastly, *self-attribution* involved drawing a conclusion about ones-self from seeing the successful and unsuccessful outcomes of one's actions (Rosenburg et al., 1989).

Judge, Erez, Bono, and Thoresen (1998) emphasized that the concept of self-esteem has become one of the most researched and important topics in the field of psychology (as cited in Arum & Roksa, 2010). Some researchers strongly believe that self-esteem supports the academic success of university students. Baumeister, Smart, and Boden (1996) suggested that stakeholders and administrators in universities think that being persistent in the face of failure, aspiring to be successful in life, and diminishing the feelings of incompetence are possible for students if they have a higher level of self-esteem. As such, many universities have made attempts to implement effective programs which may increase students' critical thinking disposition by increasing their level of self-esteem (Arum & Roska, 2010; Haney & Durlak, 1998; Scheirer & Kraut, 1979).

Self-esteem and academic achievement. In their study, Pottebaum, Keith, and Ehly (1986) found that most of the research conducted on self-esteem was about the investigation on

the relationship between high school students' self-esteem and their academic achievement. Findings from this study showed that the correlation between students' self-esteem and their academic achievement was quite little. Bachman and O'Malley (1986) found that the correlation between two variables was weak as self-esteem was an insignificant predictor of students' academic performance. Stupnisky et al. (2007) conducted a survey on 802 university students to find out whether self-esteem was a predictor of students' academic success. They found that self-esteem was not a strong determinant of the academic success of these students. In terms of finding a relationship between college students' self-esteem and their academic achievement, Crocker and Luhtanen (2003) found that self-esteem was not able to predict the students' academic achievement. According to Marsh and Craven (2005), Peixoto (2003) as well as Valentine and DuBois (2005), self-esteem has an incoherent association with performance indicators such as academic achievement, motivation, and critical thinking. Although the findings mentioned above suggest that the relationship between self-esteem and critical thinking is inconsistent, the current study is aimed to outline whether a clear association occurs between the effects of critical thinking in the context of self-esteem.

Woodard and Suddick (1992) investigated the relationships between students' self-esteem and their grades. Positive correlations were found between these variables. Rosenberg et al. (1989) explained that academic achievement had an important and positive impact on students' self-esteem (Ross and Broh, 2000). In addition, Demo and Parker (1987) conducted research on the relationships between university students' self-esteem and their academic achievement, finding significant correlations between these variables. In their studies, Baumeister, Campbell, Kruegger, and Vohs (2005) in addition to Diener and Diener (2009) revealed that there was strong relationship between students' self-esteem and their satisfaction in life. However, Liu, Kaplan, and Risser (1992) found that due to students' low self-esteem, they performed poorly in their courses. Students with lower levels of self-esteem may have a negative outlook and lack of confidence towards participating in problem solving activities requiring critical thinking skills (Howard & Zoeller, 2007).

Self-esteem and critical thinking. Bachman and O'Malley (1986) conducted a study on the relationship between self-esteem and critical thinking. They found that self-esteem was a weak predictor of student critical thinking tendencies (Skaalvik and Hagtvet, 1990). Lyon (1993), Marsh (1987), Muijs (1997), as well as Skaalvik and Hagtvet (1990) suggested that the relationship between self-esteem and critical thinking tendencies of students is not very strong. Based on the findings of Branscombe and Wann (1994) as well as Covington (1984), the weak links between the self-esteem and critical thinking tendencies of students may be because of their personal struggles. Similarly, Crocker and Luhtanen (2003), in addition to Rosenberg et al. (1989), suggested that self-esteem was not a predictor of students' critical thinking abilities. Furthermore, Ewen (2001) found that there was no significant relationship between self-esteem and critical thinking tendencies of nursing students.

In their study, Lui et al. (1992) expressed that self-esteem had an indirect influence on students' critical thinking and learning. On the other hand, Barkhordary, Jalalmanesh, and Mahmodi (2009) discovered strong correlations between student critical thinking and self-esteem. However, Crocker and Luhtanen (2003) found that self-esteem negatively predicted student dissatisfaction with school and their critical thinking tendencies. It is likely that students with low self-esteem may have difficulty expressing their needs and weaknesses, which would make them reluctant to engage in critical thinking activities (Barkhordary et al., 2009; Twenge & Campbell, 2001).

Facione (2013) concluded that people with critical thinking skills are more likely to initiate logical thinking that aims to direct our attitudes. People with effective critical thinking abilities are more likely to interpret, analyze, and evaluate surrounding conditions due to their self-esteem (Scheirer & Kraut, 1979). Haney and Durlak (1998) emphasized that people who believe in their capacities can make decisions, solve problems, and trust their own judgment.

This Study

Based on the review of the literature on critical thinking and self-esteem, and in particular self-esteem and academic achievement and self-esteem and critical thinking, it seems as though (a) critical thinking affects people's beliefs, and (b) there may be a relationship between critical thinking and self-esteem. From these factors I hypothesize that as the level of critical thinking someone possesses increases, their self-esteem may also increase. In the same vein, as someone's self-esteem increases, so may their critical thinking abilities.
This research poses two hypotheses:
- Critical thinking is positively associated with self-esteem.

- Critical thinking is a predictor self-esteem.

Methods

Participants. A total of 433 undergraduate students participated in the study; 294 were female and 139 were male. The students ranged in age from 18 to 27 and the mean age was 20.2 years. The study took place at a university in the Western Black Sea Region of Turkey. Students were enrolled in programs such as psychological counseling and guidance (n = 232), special education (n = 102), and Turkish education (n = 99). There were 46 first-year, 116 second-year, 141 third-year, and 130 fourth-year students in this research. The GPA scores of the participants ranged from 1.81 to 3.89 on a 4.0 scale.

Measures. Two instruments were used for data collection. The first one was called the California Critical Thinking Scale (CCTS). This was used to measure students' critical thinking skills. The construct was developed by Facione, Facione, and Giancarlo (2001). Kökdemir (2003) adapted this instrument to for use with the Turkish language. The CCTS is a 5-point Likert scale (from 1 = absolutely disagree to 5 = absolutely agree) and includes 51 items. The CCTS is consisted of six dimensions: Analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, and systematicity. The reliability coefficients of the instrument were first measured by Facione et al. (2001) and found to be .78. Later on, the instrument's reliability was measured by Kökdemir (2003) after its adaptation and was found to be .81. Additionally, the reliability coefficient for each subscale was .63 for systematicity, .77 for self-confidence, .75 for analyticity, .61 for truth-seeking, .78 for inquisitiveness, and .75 for open-mindedness (Kökdemir, 2003).

The Coopersmith Self Respect Inventory (CSRI), developed by Coopersmith (1967) was used as the second instrument in this research. This construct was used to measure students' self-esteem. Piskin (1999) adapted the instrument for the Turkish language. According to Leary and MacDonald (2003), the Coopersmith Self Respect Inventory was developed to measure people's beliefs in their worthiness and capability. This five-point scale Likert scale (from 1 = absolutely disagree to 5 = absolutely agree) included 58 items. The original instrument's Cronbach alpha

coefficient was .88. After adapting the original scale, the overall internal consistency coefficient of the scale was determined to be .81.

Procedure and statistical analysis. As soon as participants' permits were received from the department of ethics, students started participated in the study on voluntary basis. The pre-study folder of the students included information about their identification numbers, ages, grade levels, and GPA scores. It is also important to note that all of the participants were informed about the main goal of this research. For the confidentiality of research, the folders were kept in a safe place throughout the study. Statistical analyses such as correlation analysis and multiple regression analysis were employed using SPSS 20.0. In order to test both Hypothesis 1 and Hypothesis 2, CCTS and CSRI were used to collect data from the university students. In regard to testing Hypothesis 1, Pearson's correlation analyses were used to find out about the relationships between critical thinking and self-esteem of university students. For testing Hypothesis 2, a multiple regression analysis was used to determine the predictive role of critical thinking in determining students' self-esteem.

Results

Descriptive data and inter-correlations. The study variables such as internal consistency coefficients, standard deviations, means, and inter correlations are shown in Table 1. According to the study findings, systematicity (r = .16, p < .01), analyticity (r = .14, p < .01), truth-seeking (r = .17, p < .01), self-confidence (r = .03, p < .01), open-mindedness (r = .30, p < .01), and inquisitiveness (r = .34, p < .01) had positive associations with self-esteem. Based on these findings, the correlation between these variables and self-esteem was quite weak. The findings also indicated that the relationships between analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, and systematicity were positive and significant.

Multiple regression analysis. Before applying the regression, assumptions of multiple regression needed to be verified. A test of normality was conducted using the Kolmogorov-

Table 1

Descriptive Statistics, Alphas, and Inter-Correlations of the Variables

Variables	1	2	3	4	5	6	7
1. Analyticity	-						
2.Open-mindedness	.18[a]	-					
3. Inquisitiveness	.24[a]	.36[a]	-				
4. Self confidence	.20[a]	.25[a]	.25[a]	-			
5. Truth-seeking	.23[a]	.27[a]	.18[a]	.45[a]	-		
6. Systematicity	.13[a]	.22[a]	.27[a]	.29[a]	.31[a]	-	
7. Self-esteem	.14[a]	.30[a]	.34[a]	.03[a]	.17[a]	.16[a]	-
Mean	3.57	3.05	3.10	3.29	3.22	2.78	2.77
Standard deviation	.40	.307	.343	.47	.41	.41	.22
Cronbach's a	.71	.75	.73	.78	.67	.70	.65

Note. a: *p* < .01.; b: *p* < .05.

Smirnov test. The test results ($p > .05$) indicated that a normality of distributions of the scores for all instruments in the current research were ensured. Levene's test was also completed to ensure the assumption of homogeneity of variance. Since the participants were made up of students from three programs and four levels, I conducted an ANCOVA test to make sure that these groups were equivalent as well. After the test, the results showed that the groups were equivalent. The findings from these tests suggested that all assumptions were met ($p > .05$). Moreover, outliers were examined using the Mahalanobis distance. An *outlier* within this study may be defined as an observed case that employs abnormal distance from the majority of values in a sample from a population. Tabachnick and Fidell (2001) suggested that a case is an outlier which involves a value of D^2, which is .001 or less. Based on this approach, six of the cases were labeled as outliers and then deleted. Variance inflation factors (VIF) were used to determine multicollinearity (Tabachnick and Fidell, 2001). The findings of VIF showed values less than 10. This value suggested that there was no severe multicollinearity. After these assumptions were met, a multiple regression analysis was performed. In this case, the dependent variable was self-esteem and the independent variables were the subscales of critical thinking.

Firstly, a regression analysis was performed to determine the significant variables predicting self-esteem. The analysis showed that the variables such as open-mindedness ($p < .05$), inquisitiveness ($p < .05$), and self-confidence ($p < .05$) were able to predict self-esteem. However, analyticity ($p > .05$), truth-seeking ($p > .05$), and systematicity ($p >. 05$) did not significantly predict self-esteem, as seen in Table 2. After obtaining the findings of this test, a multiple regression analysis was performed using the forward model as a type of stepwise regression. This model was employed in order to start adding from the most significant predictor to the least significant predictor in the model.

According to the findings of multiple regression analysis, summarized in Table 2, inquisitiveness was entered in the equation first, accounting for 12% of the variance in predicting self-esteem ($R^2 = .12$, adjusted $R^2 = .12$, $F(1, 431) = 59,821$, $p < .01$). Second, open-mindedness was entered accounting for an additional 3.5% variance ($R^2 = .03$, $\Delta R^2 = .03$ adjusted $R^2 = .03$, $F(2, 430) = 40,490$, $p < .01$). Lastly, self-confidence was entered, accounting for an additional .6% variance ($R^2 = .008$, $\Delta R^2 = .008$ adjusted $R^2 = .006$, $F(3, 429) = 28,560$, $p < .01$).

Table 2

Summary of Linear Regression Analysis for Variables Predicting Self-Esteem

Variables	B	Standard error of B	Beta	t	p
(Constant)	1.82	.14		12.51	.00
Analyticity	.01	.02	.01	.41	.68
Open-mindedness	.14	.03	.18	3.79	.00
Inquisitiveness	.20	.03	.29	5.85	.00
Self confidence	-.08	.02	-.16	-3.27	.00
Truth-seeking	.04	.03	.07	1.45	.14
Systematicity	.00	.02	.00	.07	.93

Note. $p < .05$.

Table 3

Summary of Multiple Regression Analysis for Variables Predicting Self-Esteem

Model	Variables	B	Standard error of B	Beta	t*
Model 1	Constant	2.06	.09		22.34
	Inquisitiveness	.22	.03	.34	7.73
Model 2	Constant	1.75	.11		15.29
	Inquisitiveness	.18	.03	.27	5.77
	Open-mindedness	.15	.03	.20	4.32
Model 3	Constant	1.83	.12		15.27
	Inquisitiveness	.19	.03	.29	6.06
	Open-mindedness	.16	.03	.22	4.63
	Self confidence	-.04	.02	-.09	-2.02

*All $p < .01$.

The initial regression model included factors such as self-confidence, systematicity, inquisitiveness, analyticity, truth-seeking, and open-mindedness; however, the final regression design included only open-mindedness, inquisitiveness, and self-confidence, because analyticity, truth-seeking, and systematicity were not statistically significant, as seen in Table 3. The factors such as open-mindedness, inquisitiveness, and self-confidence were able to predict the variances of self-esteem by 16.1%. The value of the standardized beta coefficient was found to be significant for inquisitiveness (β= .29, $p < .01$), open-mindedness (β= .20, $p < .01$), and self-confidence (β= -.14, $p < .01$).

Discussion

The aim of this research was to determine the predictive role of critical thinking of university students on their self-esteem. The findings of the study showed that there were significant relationships between some of the sub-factors of critical thinking on self-esteem. As one of the few studies examining the predictive role of critical thinking on self-esteem of students in Turkish universities, there were some indications of predictions. Based on the findings, as subscales of critical thinking, the subscales of inquisitiveness and open-mindedness positively predicted self-esteem. Conversely, self-confidence negatively predicted self-esteem. Lastly, variables such as analyticity, truth-seeking, and systematicity did not emerge as significant predictors in the regression model.

The findings of this study showed that students' inquisitiveness positively predicted self-esteem and had the highest association with self-esteem compared to the rest of the subscales of critical thinking. The findings of the current research emphasized that students' eagerness towards learning was provided by their inquisitiveness (Facione and Facione, 1992). This finding is consistent with the literature that university students with higher levels of self-esteem are more determined to be persistent towards learning (Baumeister et al., 1996; Sternberg, 1987). Research has shown that students who are willing to search, analyze, and learn tend to be ambitious in overcoming their own prejudices and feeling better about themselves (Baumeister et al., 1996; Eales-Reynolds et al., 2013).

The findings of the study also suggested that as another subscale of critical thinking, open-mindedness positively predicted self-esteem. It is understandable that students who are open-minded may be able to build higher self-esteem as they are eager to learn new things, obtain experience, and strengthen their visions (Paul and Elder, 2006). Students with more experiences are able to see and interpret their attitudes in vigorous and successful ways compared to their classmates and may draw more effective and affirmative conclusions about life; this may contribute to their well-being and self-esteem (Rickles et al., 2013). Open-minded individuals also take crucial attempts to solve problems and make choices that increase their self-sufficiency in life (Diener and Diener, 2009).

In the study, however, students' self-confidence negatively predicted their self-esteem. This finding indicated that students with essential urges for believing in their capabilities were reluctant to engage in activities acquiring critical thinking skills. In their similar findings, Crocker and Luhtanen (2003) found that there was negative relationship between students' self-esteem and critical thinking. This result may be obtained due to students' dissatisfaction with their university. Many items such as poor physical conditions, inadequate quality of the programs and faculty may negatively affect students' enthusiasm for learning, questioning, analyzing, and critical thinking (Valentine and DuBois, 2005). Therefore, school administrators need to take urgent actions to implement effective programs, which will increase students' satisfaction with their university in a more holistic approach (Haney and Durlak, 1998).

The other findings of the study showed that three subscales of critical thinking including analyticity, truth-seeking, and systematicity did not predict students' self-esteem. Supporting my argument is that some of the previous studies suggested there was no relationship between critical thinking and self-esteem (e.g., Ewen, 2001). These findings suggest that indicators such as student achievement or critical thinking may not be able to predict students' self-esteem (Marsh & Craven, 2005; Peixoto, 2003). It may be inferred from these findings that some of the students who tend to plan, seek knowledge, or try to find solutions to problems do not need to possess any feelings of self-worth (Ewen, 2001).

When the results of this academic research are evaluated, various limitations should be taken into consideration. First, perhaps the most important limitation of the study is that the findings are obtained from one Turkish university, meaning, that these findings should not be generalized to other student populations in other universities in Turkey. Due to this reason, further studies must take place to assess the relationships between critical thinking and self-esteem. By doing so, other student populations may be targeted to obtain more concrete associations between the constructs of this study. Causality is the second limitation of this scholarly research. Because of the use of correlational statistics, definitive statements on causality may not be acceptable. The third limitation involves the method of data collection. The data collected in this study highly depended on quantitative data and lacked the qualitative data. Therefore, a mixed method approach may be employed in further studies.

As a result, the current research provides crucial information on self-esteem predictors and provides a better understanding of the psychological process of self-esteem. This is achieved because the findings seemed to suggest that some of the factors of critical thinking are significantly related to self-esteem. The implications of findings insinuate that when university students improve their critical thinking abilities through inquisitiveness and open-mindedness they would have some feelings of assurance related to their self-worthiness. These feelings would help university students to trust their judgments and be eager to learn in order to solve problems and make effective choices. On the other hand, the findings of the current study

demonstrated that self-confidence as another subscale of critical thinking has negatively predicted self-esteem. This means that even though some of students had essential urges for believing in their capabilities, they were unwilling to participate in critical thinking activities (Crocker & Luhtanen, 2003).

Students, educators, and other stakeholders need to be aware that the benefits of critical thinking may not only be considered on a personal level but should also be contemplated on interpersonal levels within educational settings (Diener & Diener, 2009). This fact is important as educators, who provide guidance for their students, may effectively focus on students' relationships with their peers, families, or instructors in order to help improve their critical thinking skills; in turn, this may assist students in solving their problems in a psychologically beneficial manner (Paul & Elder, 2006). This approach may be useful when students experience personal devaluations in midst of a crisis. It would also allow students to have a positive reflected appraisal and self-attribution when they would have to deal with their negative feelings. From these conclusions, it may be suggested that more studies must be conducted to investigate the relationship between critical thinking of students and their self-esteem in order to find what actually steers the relationships between the two. That way, specific cognitive and emotional variables that illuminate the link between the two may be explained in more details.

Acknowledgement

References

Arum, R., & Roksa, J. (2010). *Academically adrift: Limited learning on college campuses*. Chicago, IL: University of Chicago Press.

Azar, A. (2011). Türkiye'deki öğretmen eğitimi üzerine bir söylem: Nitelik mi, nicelik mi [Quality or quantity: A statement for teacher training in Turkey]. *Yükseköğretim ve Bilim Dergisi [Journal of Higher Education], 1*(1), 36-38. Retrieved from http://higheredu-sci.beun.edu.tr/summary_en.php3?id=1520

Bachman, J. G., & O' Malley, P. M. (1986). Self-concepts, self-esteem, and educational experiences: The frog pond revisited (again). *Journal of Personality and Social Psychology, 50*(1), 35-46. Retrieved from http://dx.doi.org/10.1037/0022-3514.50.1.35

Barkhordary, M., Jalalmanesh, S., & Mahmodi, M. (2009). The relationship between critical thinking disposition and self esteem in third and fourth year bachelor of nursing students. *Iranian Journal of Medical Education, 9*(1), 13-19. Retrieved from http://ijme.mui.ac.ir/article-1-925-en.pdf

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4*(1), 1-44. https://doi.org/10.1111/1529-1006.01431

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2005). Exploding the self-esteem myth. *Scientific American, 292*(1), 84-91. Retrieved from https://www.scientificamerican.com/article/exploding-the-self-esteem/

Baumeister, R. F., Smart, L., & Boden, J. M. (1996). Relation of threatened egotism to violence and aggression: the dark side of high self-esteem. *Psychological review, 103*(1), 5-33. Retrieved from http://dx.doi.org/10.1037/0033-295X.103.1.5

Bloch, M. E. (2018). *How we think they think: Anthropological approaches to cognition, memory, and literacy*. New York, NY: Routledge.

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives. Handbook I: The cognitive domain*. New York, NY: David McKay Co Inc.

Bloom, B. S., Krathwohl, D. R., & Masia, B. (1956). *Taxonomy of educational objectives. Handbook I: The cognitive domain*. New York, NY: David McKay.

Branscombe, N. R., & Wann, D. L. (1994). Collective self-esteem consequences of out-group derogation when a valued social identity is on trial. *European Journal of Social Psychology, 24*(6), 641–657. https://doi.org/10.1002/ejsp.2420240603

Coopersmith, S. (1967). *The antecedents of self-esteem*. San Francisco, CA: Freeman.

Covington, M. V. (1984). The motive for self-worth. In R. E. Ames & C. Ames (Eds.), Research on motivation in education: Student motivations (Vol. 1, pp. 77–113). San Diego, CA: Academic.

Crocker, J., & Knight, K. M. (2005). Contingencies of self-worth. *Current directions in psychological science, 14*(4), 200-203. Retrieved from https://www.jstor.org/stable/20183024

Crocker, J., & Luhtanen, R. K. (2003). Level of self-esteem and contingencies of self-worth: Unique effects on academic, social, and financial problems in college students. *Personality and Social Psychology Bulletin, 29*(6), 701-712. https://doi.org/10.1177/0146167203029006003

Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin, 130*(3), 392-414. Retrieved from http://dx.doi.org/10.1037/0033-2909.130.3.392

Demo, D. H., & Parker, K. D. (1987). Academic achievement and self-esteem among Black and White college students. *Journal of Social Psychology, 127*(4), 345-355. https://doi.org/10.1080/00224545.1987.9713714

Diener, E., & Diener, M. (2009). *Cross-cultural correlates of life satisfaction and self-esteem*. In E. Diener (Ed.), Culture and well-being (pp. 71-91). Dordrecht, Netherlands: Springer

Drucker, P. (2017). *The age of discontinuity: Guidelines to our changing society*. New York, NY: Routledge.

Eales-Reynolds, L. J., Judge, B., McCreery, E., & Jones, P. (2013). *Critical thinking skills for education students*. London, England: Learning Matters.

Evancho, R. S. (2000). *Critical thinking skills and dispositions of the undergraduate baccalaureate nursing student*. (Unpublished master's thesis), Southern Connecticut State University, New Haven, Connecticut.

Ewen, L. L. (2001). *A longitudinal study of nursing students' self-esteem locus of control anxiety critical thinking and academic achievements* (Unpublished doctoral dissertation). University of South Florida, Tampa, FL.

Facione, A. P. (1990). *The complete American Philosophical Association delphi research report*. Millbrae, CA: The California Academic Press.

Facione, A. P. (2013). *Critical thinking: What it is and why it counts*. Millbrae, CA: Measured Reasons LLC, Hermosa Beach.

Facione, P., & Facione, N. (1992). *The California Critical Thinking Disposition Inventory Test Manual*. Millbrae, CA: The California Academic Press

Facione, P. A., Facione, N. C., & Giancarlo, C. A. F. (2001). *California critical thinking disposition inventory: CCTDI*. Millbrae, CA: California Academic Press.

Fahim, M., & Masouleh, N. S. (2012). Critical thinking in higher education: A pedagogical look. *Theory & Practice in Language Studies, 2*(7), 1370-1375. Retrieved from http://www.academypublication.com/issues/past/tpls/vol02/07/06.pdf

Flores, K. L., Matkin, G. S., Burbach, M. E., Quinn, C. E., & Harding, H. (2012). Deficient critical thinking skills among college graduates: Implications for leadership. *Educational Philosophy and Theory, 44*(2), 212-230. Retrieved from https://doi.org/10.1111/j.1469-5812.2010.00672.x

Furedy, C., & Furedy, J. (1985). Critical thinking: Toward research and dialogue. *New Directions for Teaching and Learning, 23*, 51-69. https://doi.org/10.1002/tl.37219852307

Haney, P., & Durlak, J. A. (1998). Changing self-esteem in children and adolescents: A meta-analytical

review. *Journal of Clinical Child Psychology, 27*(4), 423-433. https://doi.org/10.1207/s15374424jccp2704_6

Harlen, W. (2018). *The teaching of science in primary schools*. New York, NY: David Fulton Publishers.

Hart Research Associates. 2010. *Raising the Bar: Employers' views on college learning in the wake of the economic downturn*. Washington, DC: Hart Research Associates.

Hawkins, J. D., & Weis, J. G. (2017). The social development model: An integrated approach to delinquency prevention. In P. Mazerolle (Ed.), *Developmental and life-course criminological theories* (pp. 3-27). New York, NY: Routledge.

Heimpel, S. A., Wood, J. V., Marshall, M. A., & Brown, J. D. (2002). Do people with low self-esteem really want to feel better? Self-esteem differences in motivation to repair negative moods. *Journal of personality and social psychology, 82*(1), 128-147. Retrieved from http://dx.doi.org/10.1037/0022-3514.82.1.128

Hopkins, D. (2015). *Improving the quality of education for all: A handbook of staff development activities*. New York, NY: Routledge.

Howard, J., & Zoeller, A. (2007). The role of the introductory sociology course on students' perceptions of achievement of general education goals. *Teaching Sociology, 35*(3), 209-222. https://doi.org/10.1177/0092055X0703500301

Judge, T. A., Erez, A., & Bono, J. E. (1998). The power of being positive: The relation between positive self-concept and job performance. *Human Performance, 11*(2-3), 167–187. https://doi.org/10.1080/08959285.1998.9668030

Kafai, Y. B., & Resnick, M. (2012). Introduction. In Y. B. Kafai & M. Resnick (Eds.), *Constructionism in practice* (pp. 13-20). New York, NY: Routledge.

Kafka, S., Hunter, J. A., Hayhurst, J., Boyes, M., Thomson, R. L., Clarke, H., ... & O'Brien, K. S. (2012). A 10-day developmental voyage: converging evidence from three studies showing that self-esteem may be elevated and maintained without negative outcomes. *Social Psychology of Education, 15*(4), 571-601. Retrieved from https://link.springer.com/article/10.1007%2Fs11218-012-9177-3

Kökdemir, D. (2003). *Belirsizlik durumlarında karar verme ve problem çözme [Decision making and problem solving under uncertainty]* (Unpublished doctoral dissertation). Ankara University, Ankara Turkey

Laird, T. F. N. (2005). College students' experiences with diversity and their effects on academic self-confidence, social agency, and disposition toward critical thinking. *Research in Higher Education, 46*(4), 365-387. https://doi.org/10.1007/s11162-005-2966-1

Leary, M. R., & MacDonald, G. (2003). Individual differences in self-esteem: A review and theoretical integration. In M. R. Leary & P. J. Tangney (Eds.), Handbook of self and identity (pp. 401-418). New York, NY: Guildford Publications.

Lindeman, E. C. (2015). *The meaning of adult education*. Cambridge, England: Ravenio Books.

Lipman, M. (1988). *Philosophy goes to school*. Philadelphia, PA: Temple University Press.

Liu, X., Kaplan, H. B., & Risser, W. (1992). Decomposing the reciprocal relationships between academic achievement and general self-esteem. *Youth & Society, 24*(2), 123-148. https://doi.org/10.1177/0044118X92024002001

Lyon, M. A. (1993). Academic self-concept and its relationship to achievement in a sample of junior high school students. *Educational and Psychological Measurement, 53*(1), 201–210. https://doi.org/10.1177/0013164493053001022

Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology, 79*(3), 280–295. Retrieved from http://dx.doi.org/10.1037/0022-0663.79.3.280

Marsh, H. W. (1993). Relations between global and specific domains of self: The importance of individual importance, certainty, and ideals. *Journal of Personality and Social Psychology, 65*(5), 975-992. Retrieved from http://dx.doi.org/10.1037/0022-3514.65.5.975

Marsh, H. W., & Craven, R. G. (2005). A reciprocal effects model of the causal ordering of self-concept

and achievement: New support for the benefits of enhancing self-concept. In H. W. Marsh, R. G. Craven, & D. M. McInerney (Eds.), *International advances in self research: New frontiers for self research* (Vol. 2, pp. 17-51). Greenwich, CA: Information Age Publishing.

Meichenbaum, D. (2017). Changing conceptions of cognitive behavior modification: Retrospect and prospect. In D. Meichenbaum (Ed.), *The evolution of cognitive behavior therapy: A personal and professional journey with Don Meichenbaum* (pp. 32-38). New York, NY: Routledge.

Meyers, C. (1986). *Teaching students to think critically*. San Francisco, CA: JoseyBass.

Muijs, R. D. (1997). Predictors of academic achievement and academic self-concept: A longitudinal perspective. *British Journal of Educational Psychology, 67*, 263–277. https://doi.org/10.1111/j.2044-8279.1997.tb01243.x

Özden, Y. (2005). *Öğrenme ve Öğretme [Learning and teaching]*. Ankara, Turkey: Pegem Akademi Yayıncılık.

Pascarella, E., & Terenzini, P. (2005). *How college affects students*. San Francisco, CA: Jossey-Bass.

Paul, R., & E*lder, L. (2006).* Critical thinking: Learn the tools the best thinkers use. Concise edition. Saddle River, NJ: Pearson Prentice Hall.

Peixoto, F. (2003). *Auto-estima, autoconceito e dinâmicas relacionais em contexto escolar [Self-esteem, selfconcept and relational dynamics in school context]* (Unpublished doctoral dissertation). Braga, Portugal, Universidade do Minho.

Piskin, M. (1999). Özsaygıyı geliştirme eğitimi [Training for developing self-esteem]. In Y. Kuzgun (Ed.), *İlköğretimde Rehberlik [Guidance in elementary education]*. Ankara, Turkey: Nobel

Pottebaum, S. M., Keith, T. Z., & Ehly, S. W. (1986). Is there a causal relation between self-concept and academic achievement? *The Journal of Educational Research, 79*(3), 140-144. https://doi.org/10.1080/00220671.1986.10885665

Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical review. *Psychological Bulletin, 130*(3), 435-468. Retrieved from http://dx.doi.org/10.1037/0033-2909.130.3.435

Rickles, M. L., Schneider, R. Z., Slusser, S. R., Williams, D. M., & Zipp, J. F. (2013). Assessing change in student critical thinking for introduction to sociology classes. *Teaching Sociology, 41*(3), 271-281. https://doi.org/10.1177/0092055X13479128

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.

Rosenberg, M., Schooler, C., & Shoenback, C. (1989). Self-esteem and adolescent problems: modeling reciprocal effects. *American Sociological Review, 54*(6), 1004-1018. Retrieved from https://www.jstor.org/stable/2095720

Ross, C. E., & Broh, B. A. (2000). The roles of self-esteem and the sense of personal control in the academic achievement process. *Sociology of Education, 73*(4), 270-284. Retrieved from https://www.jstor.org/stable/2673234

Scheirer, M. A., & Kraut, R. E. (1979). Increasing educational achievement via self concept change. *Review of educational research, 49*(1), 131-149. https://doi.org/10.3102/00346543049001131

Skaalvik, E. M., & Hagtvet, K. A. (1990). Academic achievement and self-concept: An analysis of causal predominance in a developmental perspective. *Journal of Personality and Social Psychology, 58*(2), 292-307. Retrieved from http://dx.doi.org/10.1037/0022-3514.58.2.292

Sternberg, R. J. (1987). Teaching critical thinking: Eight easy ways to fail before you begin. *The Phi Delta Kappan, 68*(6), 456-459. Retrieved from https://www.jstor.org/stable/20403395

Stupnisky, R. H., Renaud, R. D., Perry, R. P., Ruthig, J. C., Haynes, T. L., & Clifton, R. A. (2007). Comparing self-esteem and perceived control as predictors of first-year college students' academic achievement. *Social Psychology of Education, 10*(3), 303-330. Retrieved from https://link.springer.com/article/10.1007/s11218-007-9020-4

Tabachnick, B. G., Fidell, L. S., & Osterlind, S. J. (2001). *Using multivariate statistics (6th ed.)* Boston, MA: Pearson.

Tsui, L. (2002). Fostering critical thinking through effective pedagogy. *Journal of Higher Education, 73*(6), 740-763. https://doi.org/10.1080/00221546.2002.11777179

Tsui, L. (2008). Cultivating critical thinking: Insights from an elite liberal arts college. *The Journal of General Education, 56*(3/4), 200-227. Retrieved from https://muse.jhu.edu/article/238240

Twenge, J. M., & Campbell, W. K. (2001). Age and birth cohort differences in self-esteem: A cross-temporal meta-analysis. *Personality and Social Psychology Review, 5*(4), 321-344. Retrieved from http://dx.doi.org/10.1207/S15327957PSPR0504_3

Valentine, J. C., & DuBois, D. L. (2005). Effects of self-beliefs on academic achievement and vice-versa: Separating the chicken from the egg. In H. W. Marsh, R. G. Craven, & D. M. McInerney (Eds.), *International advances in self research: New frontiers for self research* (Vol. 2, pp. 52–77). Greenwich, CT: Information Age Publishing.

Woodard, P. G., & Suddick, D. E. (1992). Self-esteem of older adult college students. *Perceptual and Motor Skills, 74*(1), 193-194. https://doi.org/10.2466/pms.1992.74.1.193

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