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Full Length Research Paper

The relationships between achievement focused motivation and critical thinking

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The aim of this research is to address general relationships between achievement focused motivation and critical thinking. Survey method has been used in the research. In this research, regression analysis has been done. The study sample included a total of 772 students in Turkey, attending the Faculties of Education, Atatürk University (216 students), Cumhuriyet University (110 students), Firat University (331 students) and Yüzüncü Yil University (115 students). Data were collected in the spring of 2010. Two scales were applied to the students at the same time; one of them being achievement focused motivation (AFM) scale, developed by Semerci (2010) and the other one being critical thinking scale. The initial critical thinking scale (the California critical Thinking disposition inventory: CCTDI) was first developed by Facione et al. (1998), and it was adapted to Turkish system by Kökdemir (2003). Of the 772 students participating in the study, 396 are male (51.3%) and 376 are female (48.7%). Most of the correlations between sub-dimensions of "achievement focused motivation" and sub-dimensions of "critical thinking skills" were found positive. In this study, there is a correlation of 0.34 between AFM and general critical thinking. Results of the multiple regression analysis regarding prediction of AFM demonstrate that CT is a significant instrument of prediction on AFM. As a result of this study, the following statement is suggested: While teaching students how to gain AFM, prior importance should be attached to developing their critical thinking skills.

Key words: Achievement focused motivation, motivation, critical thinking.

INTRODUCTION

Motivation and critical thinking are important for the students of the 21st century. Motivation is defined as the impetus to create and sustain intentions and goal seeking acts (Ames and Ames, 1989). Motivation involves four aspects: goal, effort, desire to attain the goal, and favorite attitude towards the activity in question (Gardner, 1985). They are important because they "determine the extent of the learner's active involvement and attitude toward learning" (Ngeow, 1998). The most important distinction to make in types of motivation is between extrinsic motivation and intrinsic motivation. For example, having a will to pass an exam or to please one's family are extrinsic motivations to learn and wanting to know why the sky is blue for its own sake is an intrinsic one (Kürüm, 2007).

In the related literature, motivation has been explained in terms of eight theories: the behavioral, cognitive, cognitive developmental, achievement motivation, psychoanalytic, humanistic, social cognition and transpersonal/spiritual theories. Here, we will examine achievement motivation theories for our purpose. An individual with achievement motivation wishes to achieve objectives and advance up on the ladder of success (Kürüm, 2007). It can be defined as the need for success or the attainment of excellence (Rabideau, 2006).

According to Russell (1971), cited in Vinelli, (1975), there seems to be a "general agreement that the achievement motive is learned from very early experiences (in life) and that it is modified by later learnings". In a study conducted by McClelland et al. (1953) cited in Vinelli (1975) and reported in their book "The Achievement Motive"; "high school students with high n-Achievement perceived their parents as friendly and more, rather than less, successful, while college students with high

n-Achievement perceived their parents as unfriendly, severe, and unsuccessful. Differences in socio-economic background as well as differences in psychological attitudes between high school and college students are offered by the authors as possible explations for these two opposite positions…".

There are many studies about achievement motivation. Some of these are given further. In a study, it has been discovered that the motivation level of students is high and at 14 schools out of 18, there is a positive, average or high correlation between achievement and motivation (Yilmaz, 2007). According to a research in the United States of America, 97% of employees say that it affects their productivity of motivation (Hageman, 1997). There is no statistically significant relationship between motivation and foreign language achievement, except integrative motivation and achievement motivation (Kürüm, 2007).

The results showed that the teachers' frequency and proficiency of using technology in English classes has no statistically significant relationship with student's motivation (Yin, 2010). In another research, the assumption that among Chinese participants, achievement motivation is effectively aroused in both an MO (me-oriented group) and a WO (we-oriented group) setting could not be confirmed. Similarly, to German students, Chinese students showed the highest levels of achievement motivation in contexts that stressed competition. Considering correlations of indicators of achievement motivation for each of the three experimental groups, *n* Achievement and HS (hope of success) showed significant positive correlations in all groups (MO group r = 0.45, WO group r = 0.50, C group r = 0.59, ps < 0.01). Need for achievement and FF (fear of failure) were positively correlated among students assigned to the MO group (r = 0.41, p < 0.01) but were unrelated in the two remaining groups (WO group r = –0.05, C group(control group) r = 0.17, *n*s) (Hofer et al., 2010).

Achievement motivation is an achievement focused motivation (AFM) that is imperative for the students of the 21st century; however, achievement focused motivation has always been important. If it is so, students should think critically because it could increase achievement focused motivation. In other words, AFM could be related to thinking. Dewey (1910) recapitulated this situation by saying that the origin of thinking is some perplexity, confusion, or doubt.

In a study, motivation is shown in critical thinking concept map and in the same study, it is statistically indicated that critical thinking can be taught, learned, and transferred across domains (Reid, 2010). Critical thinking is a reasonable reflective thinking that is focused on deciding on what to believe or do (Ennis, 1986, 1996). Critical thinking is the testing and evaluation of these proposed solutions (Edgar et al., 1985). When we think critically, we are evaluating the solutions of our thinking processes. In another words, critical thinking, as described by Marzano et al. (2001), includes reflective thinking that is focused on understanding an issue, creating and weighing solutions, and making informed decisions.It is one of the objectives of education that students obtain critical thinking skills enabling easy access to knowledge and overcoming challenges more easily (Hudgins and Edelman, 1988; Halpern, 1993). Besides, "critical thinking is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed" (Halpern, 1997). However, a lot of factors contributed to a rich decision-making and critical thinking environment (Legant, 2010).

There are many studies seeking correlation with critical thinking. There is a positive correlation between critical thinking and speed of reading (r = 0.19, p < 0.05) (Semerci, 2002). In Elam's (2001) research, there was a statistically significant difference between the critical thinking tendencies and grades of the students. In another research, a correlation of 0.41 was found between critical thinking and self leadership (Semerci, 2010). There are a lot of definitions (concepts) about achieve-ment focused motivation and critical thinking. Although the words "achievement focused motivation and critical thinking" might appear simple and easy, they are in fact very difficult to define. For these two concepts, they seem to have been impossible for theorists to reach a consensus on a single definition; because, achievement motivation is not independent of social and cultural influences (Hofer et al., 2010) and neither is critical thinking (Kürüm, 2002).The aim of this research is to address general relation-ships between achievement focused motivation and critical thinking as well as relationships with the sub dimensions. To this end, the following questions were attempted to be answered:

1. What are the relationships between sub dimensions of achievement focused motivation and sub dimensions of critical thinking?
2. Is there a relationship between achievement focused motivation and critical thinking depending on the variable of gender?
3. What are the relationships between achievement focused motivation and each of analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, systematicity, general critical thinking?

METHODS

Survey method was used in the research. In this research,

regression analysis is done. According to Parsons (1978), regression is concerned with the specification of the nature of the relationship and the determination of the values of the coefficients in the regression function. In this study, multiple linear regression is used. Multiple linear regression (MLR) is a method used to model the linear relationship between a dependent variable and one or more independent variables. The dependent variable is sometimes also called the predictand, and the independent variables are called the predictors (Notes, 2009). That is, this attempts to model the relationship between two or more explanatory variables and a response variable by fitting a linear equation to the observed data.

The study sample included a total of 772 students in Turkey, attending the Faculties of Education; 216 students from Atatürk University, 110 students from Cumhuriyet University, 331 students from Firat University and 115 students from Yüzüncü Yil University.

Data were collected in the spring term of 2010. Two scales were applied to the students at the same time. One of them was achievement focused motivation (AFM) scale developed by Semerci (2010) which was applied to 827 students. The students of Atatürk University(Erzurum), Cumhuriyet University (Sivas), Firat University (Elazığ), Muş Alparslan University (Muş) and Yüzüncü Yil University (Van) were applied the scale. 4-factored structure (external effects, internal effects, growth of aim and self-conscious) was revealed in the scale. KMO value of AFM scale is found to be 0.911 and the value of Barlett test is found to be 7361.928 (Sd = 595, P < 0.05). It is seen that after factor analysis, the scale provides 37.910% of total variance. In the analyses results of AFM scale, item-total correlations changed between 0.36 and 0.58. In the study, 49 data-paired were applied and it was found out that test-retest correlation was 0.977 ($p < 0.01$). Moreover, correlation coefficient between two halves points was 0.895 ($p < 0.01$) and Cronbach alpha coefficient of AFM scale was 0.896 (35 items) (Semerci, 2010).

The other scale used in the study was the critical thinking scale. The initial critical thinking scale (the California critical thinking disposition inventory: CCTDI) was first developed by Facione et al. (1998), and adapted to Turkish system by Kökdemir (2003). Principal component analysis was applied in order to find out factor structure of the CCTDI scale. Factor load was taken as 0.32 to determine items covered by the factor, and 51 items emerged under various factors. Sub factors are as follows: (1) analyticity, (2) open- mindedness, (3) inquisitiveness, (4) self- confidence, (5) truth- seeking, and (6) systematicity. Cronbach alpha coefficients of the new scale comprised of 6 dimensions and 51 items was found as .88 and the total variance explained by the scale was 36.13% (Kökdemir, 2003).

FINDINGS

Of the 772 students participating in the study, 396 are male (51.3%) and 376 are female (48.7%). Most of the correlations between sub dimensions of achievement focused motivation and sub-dimensions of critical thinking skills were found positive.

The highest positive correlation was found between self-confidence and achievement focused motivation (general) ($r = 0.42$, $p < 0.01$). Another positive correlation is found between self-confidence and self-conscious ($r = 0.37$, $p < 0.01$). Besides, the same positive correlation is found between inquisitiveness and achievement focused motivation (general) ($r = 0.37$, $p < 0.01$).

There found to below correlations between all of sub-dimension of achievement focused motivation and systematicity which is a sub-dimension of critical thinking. Also, the correlations between all external effects, internal effects and growth of aim, and systematicity were all found to be low ($r = 0.05$, $p > 0.05$), ($r = 0.02$, $p > 0.05$), ($r = 0.06$, $p > 0.05$), respectively. However, there found to be a significant (0.05) positive relationship between self-consciousness and systematicity ($r = 0.08$, $p < 0.05$).

The correlations between gender and sub dimensions of critical thinking skills were generally found close to zero, which indicates that there is not a significant relationship between them. However, correlations were found between gender and sub-dimensions of achievement focused motivation; gender and external effects being ($r = 0.12$, $p < 0.01$), gender and growth of aim being ($r = -0.15$, $p < 0.01$ and gender and self-consciousness being ($r = -0.11$, $p < 0.01$).

The correlational results are presented in Table 1. The sub dimensions regarding critical thinking skills in Table 1 are independent variables; analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking and systematicity. In this research, the dependent variable is achievement focused motivation.

Table 2 shows the result of regression analysis regarding prediction of achievement focused motivation.

Considering the analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, systematicity and general critical thinking variables the results of the regression analysis regarding prediction of achievement focused motivation are given in Table 2.

Zero-order and partial correlations between interpreting variables and dependent (what is interpreted) variable indicate that there is a positive relationship between analyticity and achievement focused motivation lower than intermediate level ($r = 0.330$), still the correlation between the two variables was calculated as $r = 0.106$ upon checking of the other variables. It is seen that there is a positive relationship between open-mindedness and achievement focused motivation lower than intermediate level ($r = 0.273$); however, the correlation between the two variables was calculated as $r = 0.037$ upon checking of the other variables. There is a positive relationship between inquisitiveness and achievement focused motivation lower than intermediate level ($r = 0.371$); however, the correlation between the two variables was calculated as $r = 0.091$ upon checking of the other variables. Moreover, there is also a positive relationship between self-confidence and achievement focused motivation lower than intermediate level ($r = 0.416$); however, the correlation between the two variables was calculated as r

Table 1. The correlations between sub dimensions of achievement focused motivation (AFM) and critical thinking skills.

Variable	Gender	External effect	Internal effect	Growth of aim	Self-conscious	AFM
Gender	-	-0.12**	-0.02	-0.15**	-0.11**	-0.13**
Analyticity	-0.03	0.22**	0.21**	0.29**	0.31**	0.33**
Open-mindedness	-0.04	0.21**	0.17**	0.20**	0.24**	0.27**
Inquisitiveness	-0.01	0.30**	0.25**	0.29**	0.32**	0.37**
Self-confidence	-0.01	0.30**	0.33**	0.32**	0.37**	0.42**
Truth-seeking	-0.03	0.26**	0.27**	0.28**	0.29**	0.35**
Systematicity	-0.01	0.05	0.02	0.06	0.08*	0.07
Critical thinking (general)	0.00	0.28**	0.26**	0.23**	0.31**	0.34**

P < 0.05*; p < 0.01**.

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

Variable	B	Std error$_b$	β	T	p	Zero-order r	Partial r
Constant	1.841	0.133	-	13.847	0.000	-	-
Analyticity	0.092	0.031	0.134	2.959	0.003	0.330	0.106
Open-mindedness	0.028	0.027	0.044	1.024	0.306	0.273	0.037
Inquisitiveness	0.076	0.030	0.112	2.522	0.012	0.371	0.091
Self-confidence	0.128	0.027	0.207	4.746	0.000	0.416	0.169
Truth-seeking	0.031	0.028	0.051	1.119	0.264	0.350	0.040
Systematicity	-0.066	0.022	-0.107	-3.030	0.002	0.069	-0.110
Critical thinking (general)	0.106	0.042	0.118	2.524	0.012	0.342	0.091

$R = 0.485$; $R^2 = 0.235$; $F_{(7,764)} = 33.504$; $p = 0.000$; Durbin-Watson (D.W.) Statistic = 1.851.

= 0.169 upon checking of the other variables. Furthermore, there is a positive relationship between truth-seeking and achievement focused motivation at intermediate level (r = 0.350); however, the correlation between the two variables was calculated as r = 0.040 upon checking of the other variables. On the other hand, there is a negative relationship between systematicity and achievement focused motivation at low level (r = 0.069); however, the correlation between the two variables calculated as r = -0.110 upon checking of the other variables.There is a positive relationship between general critical thinking skills and achievement focused motivation lower than intermediate level (r = 0.342); however, the corre-lation between the two variables was calculated as r = 0.091 upon checking of the other variables. In Table 2, R stands for the values of the multiple correlation coefficient between the predictors and the outcome (Field, 2009). When only independent variables (analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, systematicity and general critical thinking) are used as a predictor, this is the simple correlation between dependent and independent variables (R = 0.485). R^2 is a measure of how much of the variability in the outcome is accounted for by the predictors. In this research, for the model its value is 0.235, which means that independent variables account for 23.5% of the variation in achievement focused motivation. That is, the 7 variables mentioned, all together explain around 23.5 % of the total variance in achievement focused motivation.

There is a significant relationship lower than intermediate level between all of analyticity, open-mindedness, inquisitiveness, self-confidence, truth-seeking, systematicity, general critical thinking skills and students' achievement focused motivation scores ($R = 0.485$, $R^2 = 0.235$, $p < 0.01$). According to the standardized regression coefficients (β), the relative order of importance of interpreting variables is as follows: Self-confidence, analyticity, general critical thinking, inquisitiveness, systematicity, truth-seeking and open-mindedness.

T- test results regarding significance of the regression coefficients t reveal that analyticity, inquisitiveness self-confidence, systematicity and general critical thinking are meaningful instruments of prediction on achievement focused motivation. The other two variables (truth-seeking and open-mindedness) do not have a significant effect. Besides, autocorrelation is looked at regression process. Autocorrelation violates the ordinary least squares (OLS)

assumption that the error terms are uncorrelated. While it does not bias the OLS coefficient estimates, the standard errors tend to be underestimated (and the t-scores overestimated) when the autocorre-lations of the errors at low lags are positive (Wikipedia, 2010).

The autocorrelation test is the Durbin–Watson statistic. Durbin-Watson statistic informs us if the assumption of independent errors is tenable (Field, 2009). The closer to 2 the value is, the better. For these data, the value is 1.851, which is so close to 2 that the assumption has almost certainly been met. According to the results of multiple regression analysis held between sub-dimensions of critical thinking and achievement focused motivation, regression equality regarding prediction of achievement focused motivation (mathematical model) is as follows:

Achievement focused motivation = 1.841 + 0.092 analyticity + 0.028 open-mindedness + 0.076 inquisitiveness + 0.128 self-confidence + 0.031 truth-seeking – 0.066 systematicity + 0.106 critical thinking (general).

Conclusion

This study mainly addresses the relationships between AFM and critical thinking. 772 students participated in the study. AFM has 4-sub dimensions while critical thinking has 6-sub dimensions. Majority of the correlations between sub-dimensions of AFM and critical thinking (CT) skills was found positive out of systematicity in CT. Two of them are as follows: (1) there is a correlation of 0.42 between AFM and self-confidence, (2) There is a correlation of .37 between AFM and inquisitiveness. In a study, Sánchez (1993) found that all seven of the California critical thinking disposition ınventory (CCTDI) scales were positively correlated with a measure of ego-resiliency. For example, self confidence was positively correlated with a measure of ego-resiliency ($r = 0.25$, $p < 0.004$) (Sánchez, 1993).

The California measure of mental motivation (CM3) enables educators and researchers to assess a student's motivation to think to better understand how that motivation affects the student's academic achievement (Giancarlo et al., 2004). In this study, there is a correlation of 0.34 between AFM and general critical thinking. This indicates that there is a positive correlation at close-intermediate level between AFM and general critical thinking. Results of the multiple regression analysis regarding prediction of AFM demonstrate that CT is a significant instrument of prediction on AFM.

On the other hand, there is not a significant relationship between critical thinking and gender. Still, there is correlation, though it is low; between gender and general AFM ($r = 0.13$, $p < 0.01$), and gender and growth of aim in AFM ($r = 0.15$, $p < 0.01$). According to Vinelli (1975), a significant interaction is present between levels of achievement-motivation and student' gender. As a result of this study, the following suggestions can be noted:

1. While teaching students how to gain AFM, prior importance should be attached to developing their critical thinking skills.
2. Parallel studies should be carried out on elementary and high school students and teachers concerning the relationships between AFM and critical thinking.

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