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Effects of Agricultural Students' Self-Efficacy Beliefs and Test Anxiety on their Achievement Motivation and Academic Performance

Abstract

In this study, the influences of agricultural students' self-efficacy beliefs and test anxiety on their achievement motivation and academic performance were examined. A sample of 466 students from Iranian Colleges of agriculture participated in this study. A questionnaire was used for data collection. Data were analyzed descriptively and inferentially using SPSS/win and AMOS graphic. The findings revealed that self-efficacy beliefs had more effect on motivation to approach success and academic performance than test anxiety. In contrast, test anxiety had more effect on motivation to avoid failure than self-efficacy beliefs. In addition, motivation to approach success had more effect on academic performance than motivation to avoid failure.

Keywords: *achievement motivation, academic performance, self-efficacy beliefs, test anxiety, agricultural students*

Introduction

Global population growth, one of the agricultural sector challenges (Connors et al., 2004), makes the worth of agriculture doubled. As agriculture is based on advanced science and technologies, request for qualified work-forces is growing in this sector (Okutsu et al., 2004). Thus, a main focus of agricultural development policy-makers must be directed toward providing advanced human resources. Trained and skilled work-forces have a significant position in labor productivity

as a main component of agricultural development (Hunt, 2000). Formal education plays an influential role in the development of work-forces and development of economy (Krueger & Lindahl, 2001). Agricultural education is a fundamental element for preparing adept work-forces in agriculture. In an achievement-oriented society, student academic performance is one of the most important pieces of information used by employers in decision making as a signal of individuals' capability (Barkley & Forst, 2004). Exams have always been used as one of the main bases for assessing the student's capability and as a method of selection for employment (Nie et al., 2011). Previous studies in the field of education found different factors affecting students' academic performance including achievement motivation (Collins et al., 2004), self-efficacy (Bandura, 1986; cited in Walker et al., 2006), and test anxiety (Burns, 2004; Trifoni & Shahini, 2011) separately. In the presented study, the influences of self-efficacy beliefs and test anxiety on academic performance, taking into account the mediating role of achievement motivation, are modeled. There are three specific objectives in this study: (1) validating the research scales for data collection of agricultural students, (2) identifying agricultural students' self-efficacy beliefs, test anxiety, achievement motivation, and academic performance (3) determining students' achievement motivation and academic performance by self-efficacy beliefs and test anxiety.

Theoretical background

Achievement motivation: In the 1950s and 1960s, achievement motivation was a noticeable topic in motivation research. To define achievement motivation, it is worth explaining the meaning of "achievement" and "motivation" separately. Achievement refers to the importance of fulfillment with effort involved (Mandel & Marcus, 1988). Motivation refers to the process by which goal-directed activity is begun and sustained (Pintrich & Schunk, 2002). Achievement motivation is seen as a personality attribute that differentiates individuals based on their aspiration to do things well (Wigfield & Eccles, 2002). One's perception of probability for achievement results from two types of motives including achieving success and/or to avoiding failure (Atkinson & Feather, 1966). When an individual predicts success of an achievement-related activity, he/she has a sense of pride, as opposed to the prediction of failure, which is related to the consequent feeling of shame (Atkinson, 1966).

Self-efficacy: One self-belief construct influencing academic performance is self-efficacy, or the belief that one is capable of successfully carrying out a specific task

(Bandura, 1986; as cited in Walker et al., 2006). Self-efficacy is a multidimensional construct that varies in accordance with the field of demands. In academic settings, according to Schunk (1991), self-efficacy refers to “individuals’ convictions that they can successfully perform given academic tasks at designated levels”. It affects the effort students make to learn and the time they will persist in difficult assignments (Bandura, 1993). There is evidence that self-efficacious students work harder, persist longer in difficult assignments, and have fewer adverse emotional reactions when they face difficulties than those with less self-efficacy beliefs, who doubt their capabilities (Bandura, 1997).

Test anxiety: Anxiety is a phenomenon that people often face in their life. Anxiety can be described as an emotional component of human beings that shows itself in a form of worry and restlessness (Olatoye, 2009). Researchers have provided a classification of this phenomenon into different sub-categories, such as test anxiety, which is “a feeling of uneasy suspense” (Rachman, 2004) during evaluation. In other words, test anxiety is an unpleasant feeling of worry experienced where the individual feels he/she is being evaluated (Dusek, 1980). In a competitive society, examinations at all levels of education, including higher education, have been considered as powerful tools for decision making (Rizwan & Nasir, 2010). Therefore, exams can become a main source of stress, particularly when exam scores serve as a significant factor in future opportunities and career pathways (Peleg & Klingman, 2002). According to Sarason (1975), highly anxious individuals have a tendency to perceive evaluative situations as unpleasant to self-esteem. Eysenck and Calvo (1992) and Mulvenon (2005) also found that test anxiety could lead to lower exam scores.

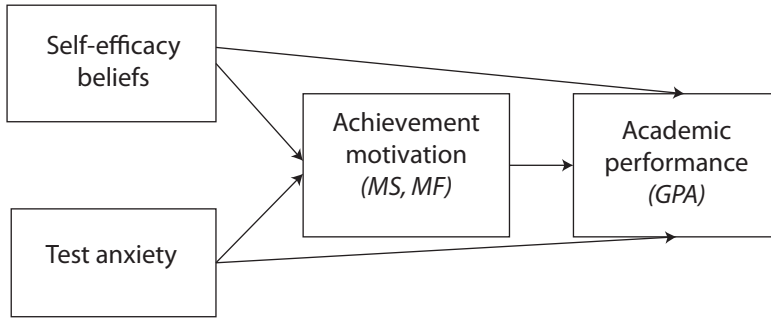
Research framework

The self-efficacy theory assumes that students who consider themselves as able are more likely to be motivated, while those who consider themselves as unable will not be motivated (Seitfert, 2004). Previous research reported a positive correlation between self-efficacy beliefs with achievement motivation (Bong & Skaalvik, 2003; Zhang, 2006) and academic performance (Bong, 2001).

Test anxiety has a negative effect on students’ attitudes toward courses (Hall Brown et al., 2005). Hancock (2001) reported that students with a high anxiety level performed poorly and were less motivated to learn. A main source of anxiety stimulation is a lack of self-efficacy to turn it off (Bandura, 1988). Task significance would be threatening for those who do not perceive themselves as being capable

of carrying out excellently in the task (Nie et al., 2011). Consequently, test anxiety can lead to lower test scores (Hong & Karstenson, 2002). According to the aforementioned literature review, we draw the theoretical framework as shown in Figure 1:

Figure 1. Theoretical framework of the research



Research questions and hypotheses

The following questions and hypotheses were developed to guide this study: Q: Can a structural model of the relationships among self-efficacy beliefs, test anxiety, achievement motivation, and academic performance fit across the sample? We predict that self-efficacy beliefs and test anxiety influence achievement motivation and academic performance. Therefore, (Ha) There is a positive relationship between students' self-efficacy beliefs and their motivation to approach success. (Hb) There is a negative relationship between students' self-efficacy beliefs and their motivation to avoid failure. (Hc) There is a negative relationship between students' test anxiety and their motivation to approach success. (Hd) There is a positive relationship between students' test anxiety and their motivation to avoid failure. (He) There is a positive relationship between students' self-efficacy beliefs and their academic performance. (Hf) There is a negative relationship between students' test anxiety and their academic performance. (Hg) There is a positive relationship between students' motivation to approach success and their academic performance. (Hh) There is a negative relationship between students' motivation to avoid failure and their academic performance.

Methodology of Research

Population and sample: The statistical population of this study included Bachelor students in the colleges of agriculture at selected universities of Iran (N= 11834). A sample of 466 students (by applying Cochran's formula) was selected, using the proportional random sampling method. The profile of the agricultural students participating in this study showed that 45.9% were male and 54.1% were female, their ages ranged between 18 and 28 (Mean= 21.36), and the most frequency related to the group of 20–22 years old (43.2%). About a third of the respondents (38.2%) lived with their family and the others (61.8%) in a dormitory, and 81.8% of the respondents were from cities.

Instrument: The instrument used to collect data was a questionnaire. Students' self-efficacy beliefs (SEBs) scale was derived from items including the motivation part of "the Motivation Strategies for Learning Questionnaire" (MSLQ) (Pintrich et al., 1991). Test anxiety (TA) scale was taken from items comprising the motivation part of the MSLQ (Ibid). "Compared with other students in my field of study, my learning and study skills are strong" and "I feel my heart beating fast when I take an exam," are examples of the SEBs and TA scales, respectively. Achievement motive scale (Gjesme & Nygard, 1970; as cited in Fu, 2011) was applied to measure the students' achievement motivation according to their own judgment. The scale consists of two subscales-motivation to approach success (MS) and motivation to avoid failure (MF)- each subscale with 15 items. "I will be attracted by difficult tasks" and "I dislike working in an unfamiliar environment even if nobody knows," are examples of the MS and MF subscales, respectively. In addition, students' grade point averages at the completion of the whole passed semesters were used to measure their academic performance.

Reliability and face validity of the instrument were checked through the opinions of professors and application of Cronbach's alpha, which estimates the degree of interconnectedness and variance amongst a set of items. Netemeyer et al. (2003) suggested Cronbach's alpha $>.7$ as an acceptable level. Reliability for the scale of motivation to approach success was .96 and for motivation to avoid failure was .94, which met this criterion. The coefficient for the scales of self-efficacy beliefs and test anxiety were 0.90 and .84, respectively. As the scales of self-efficacy beliefs, test anxiety, and achievement motivation had previously not been tested for the agricultural students, confirmatory factor analysis (CFA) was used to validate the scales (Hernandez, 2010), using a maximum likelihood method of estimation (Table 1). In general, the findings revealed that the scales were reliable and valid measures for applying in data collection of agricultural students.

Table 1. Results of confirmatory factor analysis for the scales used in the study

Scale	Item	SE	C.R.	
Self-efficacy beliefs	X1	.834		
	X2	.592	3.188**	
	X3	.784	6.021***	
	X4	.473	2.085*	
	X5	.512	2.151*	
	X6	.535	2.954**	
	X7	.775	5.604***	
	X8	.721	4.994***	
Test anxiety	X1	.841		
	X2	.464	2.985**	
	X3	.544	3.246**	
	X4	.463	2.812**	
	X5	.562	3.355**	
Achievement motivation	X1	.549		
	X3	.330	2.171*	
	X5	.328	2.073*	
	X7	.484	3.177**	
	X9	.470	2.862**	
	X11	.561	4.012***	
	X13	.476	2.901**	
	Motivation to approach success	X15	.585	4.609***
	X17	.511	3.402**	
	X19	.339	2.185*	
	X21	.532	3.550***	
	X23	.442	2.650**	
	X25	.498	3.267**	
X27	.604	5.626***		
X29	.514	3.406**		
Motivation to avoid failure	X2	.654		
	X4	.889	6.869***	
	X6	.521	3.448***	
	X8	.722	4.719***	
	X10	.683	4.272***	
	X12	.409	2.887**	
	X14	.362	2.635**	

Scale		Item	SE	C.R.
Achievement motivation	Motivation to avoid failure	X16	.354	2.089*
		X18	.654	3.975***
		X20	.452	2.945**
		X22	.549	3.561***
		X24	.731	4.746***
		X26	.571	3.877***
		X28	.541	3.451***
		X30	.382	2.805**

Note: SE.= *Standardized Estimate*, C.R. = *Critical Ratio*; *: $p < .05$; **: $p < .01$; ***: $p < .001$; ns: Non significant

Data analysis: Using SPSS/Windows, Excel, and AMOS Graphic, data were analyzed descriptively and inferentially. The descriptive statistics included frequencies, percentages, means, and standard deviations; while inferential statistics included comparative tests, correlation coefficients, and path analysis. The male and female students' self-efficacy beliefs, test anxiety, achievement motivation, and academic performance were compared, using Students-t test. Using ANOVA, the students' with different years of study were compared with respect to self-efficacy beliefs and test anxiety. Pearson correlation analysis was used to test the relationship between the students' age and their self-efficacy beliefs and test anxiety. Also, path analysis was used to establish the effects of the students' self-efficacy beliefs and test anxiety on achievement motivation and academic performance.

Results

Students' self-efficacy beliefs, test anxiety, achievement motivation, and academic performance

The self-efficacy beliefs (SEBs) mean score of the agricultural students was 21.95 out of the maximum possible score of 40, and the test anxiety (TA) mean score of the students was 15.88 out of the maximum possible score of 25. The students' motivation to approach success (MS) was 57.88 (out of 75), with means more than the middle of the scale spectrum. The students' motivation to avoid failure (MF) was 37.97 (out of 75), with means less than the middle of scale spectrum. In addition, the students' academic performance was 15.93 (out of 20).

Correlation analysis

Pearson correlation analysis was used to examine the relationship between self-efficacy beliefs, test anxiety, achievement motivation, and academic performance. Self-efficacy beliefs were positively related to motivation to approach success and academic performance ($p < .01$) and negatively related to motivation to avoid failure ($p < .05$). In contrast, test anxiety was negatively related to motivation to approach success ($p < .01$) and academic performance ($p < .05$) and positively related to motivation to avoid failure ($p < .01$). The correlation between motivation to approach success and academic performance was positive ($p < .01$), while the correlation between motivation to avoid failure and academic performance was negative ($p < .01$). Motivation to approach success and motivation to avoid failure were negatively and significantly related ($p < .01$). The detailed results are presented in Table 2.

Table 2. Results of correlation analysis

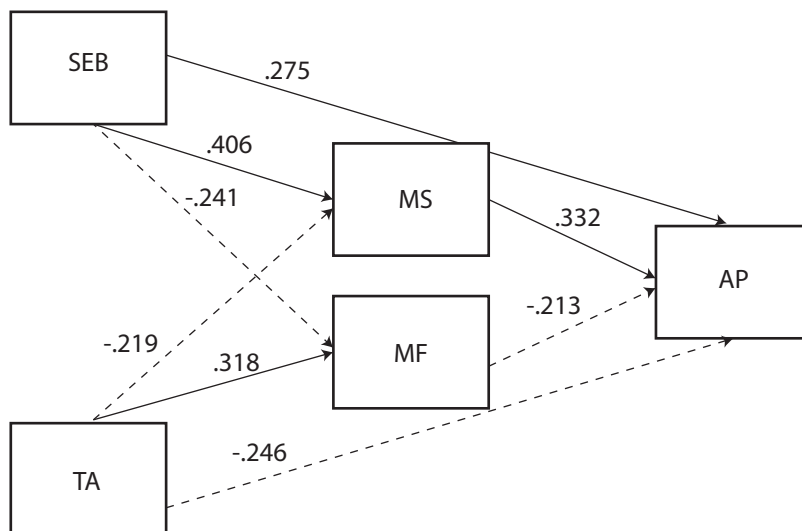
		X1	X2	X3	X4	X5
Self-efficacy beliefs	X1	1				
Test anxiety	X2	-.410**	1			
Motivation to approach success	X3	.487**	-.171**	1		
Motivation to avoid failure	X4	-.112*	.323**	-.624**	1	
Academic performance	X5	.346**	-.106*	.412**	-.135**	1

* $p < 0.05$; ** $p < 0.01$

Modeling students’ academic performance by self-efficacy beliefs, test anxiety and achievement motivation

In order to estimate the effect of the size of self-efficacy beliefs and test anxiety on the students’ achievement motivation and academic performance, path analysis was conducted. Figure 2 shows the path model and numbers on the arrows are standardized coefficients. In this Figure, solid lines represent positive effects and dashed lines represent negative effects. Table 3 displays the standardized total effects, direct and indirect effects of the research model. The sum of the direct and indirect effects reflects a total effect on a given variable.

Figure 2. Path diagram



Note: SEB= *Self-efficacy beliefs*, TA= *Test anxiety*, MS= *Motivation to approach success*, MF= *Motivation to avoid failure*, AP= *Academic performance*

Self-efficacy beliefs had positive effects on motivation to approach success and academic performance, while test anxiety had a positive effect on motivation to avoid failure and a negative effect on academic performance. According to the standardized coefficients, self-efficacy beliefs had a greater effect on motivation to approach success ($\beta=.406$) and academic performance ($\beta=.460$) than test anxiety. In contrast, test anxiety had a greater effect on motivation to avoid failure ($\beta=.318$) than self-efficacy beliefs. In addition, motivation to approach success had a greater effect on academic performance than motivation to avoid failure ($\beta=.332$).

Table 3. Direct, indirect, and total effects of the research model

Outcome	Determinant	Standardized estimates		
		Direct	Indirect	Total
Academic performance	Self-efficacy beliefs	.275	.185	.460
	Test anxiety	-.246	-.101	-.347
	Motivation to approach success	.332	-	.332
	Motivation to avoid failure	-.213	-	-.213

Outcome	Determinant	Standardized estimates		
		Direct	Indirect	Total
Motivation to approach success	Self-efficacy beliefs	.406	-	.406
	Test anxiety	-.219	-	-.219
Motivation to avoid failure	Self-efficacy beliefs	-.241	-	-.241
	Test anxiety	.318	-	.318

Discussion and conclusions

Achievement motivation is a prominent issue for psychologists and individuals in the educational context, resulting in a higher quality of learning and performance. If students are motivated in a positive way, they probably are more apt to take initiative to make positive choices, and thereby engage in a cycle of hard work and success. In this study, two psychological characteristics, namely self-efficacy beliefs and test anxiety, were studied and their effects on achievement motivation and academic performance of students were investigated. The findings about the students' test anxiety, as a negative psychological construct, revealed that the respondents obtained a mean value that was close to the mid-point of the scale, implying that the students perceived examination to a certain extent as an uncertain condition in letting them present their accurate knowledge or skills.

We found that the correlation between motivation to approach success and academic performance was positive, while the correlation between motivation to avoid failure and academic performance was negative. Correlation analysis indicated that self-efficacy beliefs were positively related to motivation to approach success and academic performance. Bong and Skaalvik (2003) reported a positive correlation between self-efficacy beliefs and achievement motivation. In practice, self-efficacy beliefs influence motivation and the expectations of certain outcomes. For example, a student who is confident in his/her academic abilities predicts to perform better on an exam than a student who is not confident. Test anxiety was negatively related to motivation to approach success and academic performance. As Hancock (2001) stated, test-anxious students show a low motivation in highly evaluative and competitive classrooms, while in classrooms with less evaluative environment have a higher motivation to learn. Therefore, since test anxiety has many adverse effects on the accurate evaluation of students' academic performance, it is imperative that professors pay attention to new alternatives for evaluating students. Exams formats should be relatively more flexible in structure than structured and rigid. It is recom-

mended that students be fully informed by professors about the exam format and the type of rating system, which Alcalá (2002) also cited in his study. The findings revealed that self-efficacy beliefs and test anxiety were negatively correlated. This is what happened in previous studies (Bandalos et al., 1995; Bonaccio & Reeve, 2010), which showed that academic self-efficacy was negatively associated with test anxiety in learning context. To explain the finding we infer that the students who have higher self-efficacy beliefs are more likely to be motivated and have fewer adverse feelings when they encounter difficulties. They develop good study habits, adopt a deep learning strategy in their learning to help their understanding of the material, and make an effort to relax periodically during tests. Therefore, their test anxiety will be decreased and they will get better grades compared to the students who doubt their capabilities. Consequently, this cycle will repeat and the successful students will get higher self-efficacy beliefs, higher achievement motivation, less test anxiety, and finally, higher grades in exams. Accordingly, we recommend that agricultural colleges pay attention to both these factors. Students should be trained about handling stress situations in academic life. Study counselors at agricultural colleges can provide useful information about methods to control test anxiety. Positive thinking, use of humor, and making an effort to relax periodically during exams are some strategies which students can use for coping with test anxiety. Therefore, it is imperative that each university possesses a specialized consultation center to offer students useful information about increasing self-efficacy beliefs and handling test anxiety.

There are some limitations that need to be considered and addressed in future research. This study was limited as it was based on self-reported data. It is possible that students forgot their grade point average (GPA) or reported it incorrectly. This study focused on the effects of self-efficacy beliefs and test anxiety on achievement motivation and academic performance. As self-efficacy beliefs can be changed through experience and vary depending upon the context and specificity of assignments (Saracalolu & Dincer, 2009), it is important to investigate educational factors influencing students' self-efficacy beliefs. Furthermore, in order to effectively manage test anxiety, educational factors influencing test anxiety should be studied.

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