Statistics Anxiety, Achievement Goals, and Academic Motivation

Masoud Gholamali Lavasani*, Mokhtar Weisani

*Department of Educational Psychology and Counselling, University of Tehran, Tehran, Iran

Abstract

The present study aims at analyzing the effect of achievement goals on statistics anxiety through academic motivation approaches. In doing so, 345 undergraduate students (68 male and 277 female) from the faculties of psychology and educational sciences of Tehran city were selected using census sampling method. The participants answered the questionnaires prepared on achievement goals, academic motivation and, statistics anxiety. The Path Analysis method indicated that mastery goals have direct negative effects on statistics anxiety (p<0.01). Performance-Approach and Performance-Avoidance goals affect on statistics anxiety only through extrinsic motivation and amotivation. Mastery as well as Performance-Approach goals have direct positive effects on intrinsic motivation and the extrinsic one respectively (p<0.01). All the three variables of academic motivation directly influence statistics anxiety. All in all the findings indicate that achievement goals affect statistics anxiety more often through academic motivation.

Keywords: Achievement Goals, Academic Motivation, Learning Strategies, Statistics Anxiety

1. Introduction

When we talk about anxiety in educational environments, it could have completely distinct and clear outcomes and results on education and learning. For example, anxiety is one of the most important motivation and cognition variables that affect considerably educational progress, learning, performance and also learners' attention, concentration, and information retrieval (Schunk et al. 2008; Bembenutty, 2008). Since anxiety is a reaction to pressure, an urgent need is felt for recognizing press-producing and
annoying factors in educational environments. Psychologists and educational specialists have had a particular view toward this problem. Although the variable of anxiety is a wide and comprehensive one, during the last few decades most of the researchers have of necessity attempted to distinguish and study this phenomenon in learning situations for a better recognizing of its causes, aspects, and effects upon different domains of educational and learning domains. Among the most kinds of anxiety to which some studies have been allocated in the last three decades, one can refer to 'Math Anxiety', 'Computer Anxiety', 'Test Anxiety', 'Library Anxiety', and 'Statistics Anxiety'. Most of the researchers have called the aforementioned anxieties as 'State Anxiety' (Wang et al. 2009). State Anxiety refers to the unstable and transient experiences of tension, fear, and intense emotion of the self-dependant neural system in a specific context and situation (Tanaka et al. 2006).

Among the most important state anxieties pertinent to education are the situations and problems of statistics which is considered by a large number of the students a highly stress-producing and distressing phenomenon (Wang et al. 2009). Statistics anxiety has been defined as a state anxiety, since this kind of anxiety occurs when the student is learning statistics concepts and terms and also its application in a special context. Some evidences indicate that nearly 66 to 80 percent of the students experience a high level of statistics anxiety when facing statistics' concepts and subjects and also evaluations related to this course (Baloglu, 2003).

Various studies have indicated that statistics anxiety has a positive relationship with the increase in dropping out and procrastination in the pursuit of education (Onwuegbuzie, 2004; Hanna et al. 2008). Some researchers believe that many students describe statistics as the most distressing course in their academic studies (Bandalos et al. 2003).

The science of statistics is considered as a basic and important domain for developing other sciences, specifically behavioural, social, managerial, and medical science and for this very reason understanding the importance and value of statistics and applying its issues are a basic and unavoidable matter in education and also the development of the aforementioned sciences (Hanna et al. 2008).

Although statistical science as well as its application are among the important unavoidable courses for the students of psychology and educational sciences and also it is quite clear that statistical concepts reinforce students reasoning
power and critical thinking (Baloglu, 2003), a great number of the students have not yet understood it or they feel considerably anxious about it and call this course as the most detestable course in their academic studies. Zidner (1991) and Conners et al. (1998) assert that if there was a chance for omitting a course in their academic studies, most of the students would choose statistics. Among those who have played a major role in introducing and providing research fields concerning statistics are Cruise and Wilkins (1980). In performing their studies in statistics anxiety, in association with some other researchers like Cruise, Bolton and Cash (1985), they came to defining statistics, identifying its multiple aspects, constructing a scale for measuring anxiety, and also performing some studies concerning the scope of spreading out this psychological phenomenon among the students.

1.1. Statistics anxiety
Statistics anxiety has been defined as some special feelings of anxiety that the students experience in dealing with statistical matters such as collecting, processing, and interpreting data (Cruise et al.1985; Hanna et al. 2008). State anxiety is a state in which one experiences in dealing with statistics' concepts, matters, educational situation, and an evaluation context as intense worries, displeasing attitudes, mental disorder, tension and mental emotion (Zidner, 1991). From the very beginning statistics anxiety was defined as a multidimensional variable over the multidimensionality of which most of the scholars are unanimous. Cruise and Wilkins (1980), and Hanna et al. (2008) have all identified 6 components or variables for statistics anxiety and any of them have studied a different dimension of this variable. These six dimensions of statistics anxiety include: Worth of Statistics, Test and Class Anxiety, Fear of Asking for Help, Interpretation Anxiety, Computational Self-Concept, and Fear of Statistics Teacher. Although most of the studies done concerning statistics anxiety have emphasized on its cognitive aspect, based on three aforementioned effective factors upon statistics anxiety it can be concluded that various variables like motivate, emotional, social, and cognitive variables affect this phenomenon. Thus many of the problems in statistics may not result from inadequacy or lack of talent and capability, rather it may have originated from the attitude, emotional, and motivate variables (Baloglu, 2003). Gal and Ginsburg (1994) believe that the results achieved from the large corpus of studies in emotional issues related to the instruction of
mathematics can be applied, with a little prudence, as the effective procedures and methods in teaching statistics and help the researchers in this domain. Some other researchers concerning the effective factors upon statistics anxiety and math anxiety as well as the relationship between these two variables state that organized studies in math anxiety are good methodologies and contexts for understanding statistics anxiety because the previous studies of math courses indicate that computational self-concept has a negative correlation with statistics anxiety (Luna and Sherry, 2008; Baloglu, 2003). Despite the great importance of statistics anxiety in the academic settings and specially the universities and also its spreading out among the students, few studies have been done, most of which study the relationship between statistics anxiety and variables of age and sex with less attention for motivate, emotional, and cognitive variables. Also it must be mentioned that no study has been done yet concerning statistics anxiety in Iran and it seems that studying this phenomenon at the universities and performing studies in this field is highly needed in the country.

It seems to be necessary that the psychological factors that are effective in statistics anxiety must be identified and the effects of any of these factors should be evaluated. For this very reason this is often stated that which factors are effective in statistics anxiety's decrease or increase? Or whether goal orientation, academic motivation, and learning strategies can affect statistics anxiety or not?

From a long time ago psychologists and teachers have discussed the role of motivation in success and failure of different academic domains (Pintrich et al. 2003) and in the contemporary literature of 'motivation in education', the motivative structures of cognitive-social theories, specially achievement goals (Ames:1992) and self-determination (Deci and Ryan, 1985) have appeared useful in describing anxiety.

1.2. Motivation

The term motivation, as it is clear from its name, refers to the cause of a behavior. In this sense motivation encompasses the entire psychology. But psychologists limit the concept of psychology to factors that direct behaviors and make them coordinated (Deci and Ryan, 1985). Achievement Goals (Dweck and Leggett, 1988; Ames, 1992) and self-determination (Deci and Ryan, 1985) are among the motivation theories of educational problems.

1.3. Achievement Goals

' Achievement goals' is one of the most outstanding and complete frameworks for understanding progress motivation and specially
motivation in education and skill domains (Kaplan and Flum, 2010). Achievement goals theory was developed in the early 1980s, based on some studies and research projects that claim students pursue special aims and values in learning and educational situations and based on this and given the goals adopted, the students get involved in the educational activities in a wide and different manner (Nicholls: 1984; Kaplan and Flum, 2010). This theory presented by Dweck (1986) and Nicholls (1984) involves the specific state orientations that indicate the tendency for progress, growth, knowledge achievement or showing one's competence in a specific context or setting (Ames, 1992; Kaplan and Flum, 2010). Midgley, Kaplan, and Middleton (2001) identify achievement goals as behavioral goals that are understood or followed by the individual in competence attitude context. Since the introduction of achievement goal, researchers and theoreticians have adopted different terms for this theory. For example Nicholls (1984) has used duty or ego goals. Dweck and Leggett have adopted learning and performance goals, and Ames has used performance and mastery goals. But Elliot and church (1997), as well as Kaplan (Kaplan et al. 2002) have proposed the 'Three-Part Achievement Goals Framework'. This new classification is the outcome of incongruous findings concerning the element of performance goals, because this element embraces some opposite goals i.e., the tendency goal for positive evaluation or avoiding the negative one. Thus performance goals are divided into two parts; performance and avoidance, and in this way achievement goals are divided into three distinct elements: Performance-Approach Goals, Performance-Avoidance Goals, and Mastery Goals. Findings of most of the studies done concerning achievement goals and other variables indicate that mastery goals have a positive relationship with high 'self-efficacy', adopting deep cognitive strategies such as 'expansion' as well as learning meta-cognitive strategies, self-controlling learning, effective and appropriate treatment with the problems and failures, high grades, help request, peer (or classmate) learning, and generally with individuals' positive motivation emotions and profiles and their psychological social well-being (Elliot et al. 1999; Dweck and Leggett, 1998; Lee et al. 2010; Kaplan and Flum, 2010). Avoidance goals have a positive relationship with employing superficial learning strategies such as mental reviewing and memorizing (Liem et al. 2008), learning intrinsic motivation decrease, endurance and involvement decrease in homework, help request avoidance, procrastination, low grades and generally all of
the negative emotions (Elliot, 2005; Kaplan, Gal, and Middgley, 2002; Pintrich, 2000; Sidridis, 2005; Aurdane, 2004, quoted from Lee et al. 2010).

On the other hand since performance-approach goals are connected with a combination of positive and negative patterns and outcomes, there is not much coordination in the researchers' findings, i.e., the students with performance-approach goals experience both the positive emotions such as deep learning strategies, high self-efficacy, high grades, more efforts, and intrinsic motivation increase as well as the negative emotions such as anxiety and jealousy. With regard to performance-avoidance goals there is a high coordination in the studies suggesting that it is connected with the negative and irreconcilable patterns (Lee et al. 2010; Vosloo et al. 2009; Middgley, Kaplan, and Middleton).

According to the research findings that have studied the relationship between achievement goals and anxiety, one can claim that there is a negative relationship between mastery goals and anxiety (Putwain and Daniels, 2010), an insignificant positive relationship between performance goals and anxiety (Elliot and Church, 1997; Zusho et al. 2005), and a significant positive relationship between avoidance goals and anxiety (Jahromi et al. 2010). Most of the studies also show that there is a positive relationship between performance goals and extrinsic motivation indices, mastery goals and intrinsic motivation goals and high self-determination, and finally between avoidance goals and amotivation (Elliot and Church, 1997; Nien and Duda, 2008).

Mastery goals on the other hand have a negative relationship with the individuals' amotivation, i.e., the students with mastery goals have more reasons for participating in class activities. But students with weak mastery goals believe that there is no relationship between the behaviors and their outcomes and consequences. Individuals with high mastery goals are more interested in doing difficult and challenging activities and believe that success is an outcome of more efforts. In fact these individuals maintain that they have control over their own activities and thus the level of amotivation is decreased (Nien and Duda, 2008; Elliot and Church, 1997).

In a study done by Putwain and Daniels (2010) on achievement goals, the effect of achievement goals on competence beliefs and test anxiety in the freshmen has been analyzed. The results suggested that students with low avoidance goals and competence beliefs in mathematics have been reported to have more negative thoughts and anxiety. Female students with low speech competence beliefs, when they have
performance-approach goals, have been reported to accomplish more pieces of homework when compared to their male counterparts. Students with avoidance goals and weak beliefs toward their own abilities in mathematics, feel anxious and worried in these situations because mathematics test state is considered as a threat for their self-esteem.

1.5. Academic Motivation

Among the other concepts that have driven psychologists and educational trainers is academic motivation. Generally speaking, academic motivation refers to motivations, needs, and factors that lead to an individual's presence in educational environments and achieving an academic degree (Clark and Schroth, 2010). There are various theories concerning academic motivation, but in this study it is defined based on the "self-determination theory" that was developed by Deci and Ryan (1985). Self-determination theory (SDT) is a motivative theory that systematically demonstrates man's progressive, motivative, emotional, and social well-being needs in the society's essential and immediate context. One of the fundamental principles of SDT theory, in contrast to other motivative theories like Bandura's social-cognitive theory that considers man's motivation as an integrated monolithic entity, is that it provides a hierarchic model of intrinsic and extrinsic motivation that allows the researchers to analyze and study the relevant outcomes and consequences of different kinds of motivation in different levels of a whole. This model claims that a complete analysis of motivation process must take into consideration three important entities i.e., intrinsic motivation, extrinsic motivation, and amotivation (Vallerend et al. 2010).

Intrinsic motivation refers to a motivation that drives individuals toward performing a specific homework and duty spontaneously and intrinsically and apart from the extrinsic rewards of performing the homework itself, it is valuable a satisfactory for the individual (Deci and Ryan, 2000; Lee et al. 2010). In the self-determination theory, it is assumed that man has an intrinsic tendency for learning from the very beginning of his birth and this inherent tendency for learning is supported by the environment. This inherent and natural stimulation is the same intrinsic motivation whose presence depends upon the satisfaction of three psychological needs (Deci and Ryan, 1985). Most of the theoreticians (Deci and Ryan, 2000; Vallerend et al. 2010) believe that these three needs whose satisfaction is deemed necessary for having a cordial and friendly interaction with the environment as well as psychological well-being include: Competency
Feeling, Autonomy Feeling, Relatedness Feeling (Chen and Jang: 2010; Deci and Ryan: 1985). If individuals can satisfy these three basic needs, a kind of self-confidence and self-esteem is formed and they try to move toward an improved psychological well-being, but in case prevention and if these three vital needs are not satisfied, one would develop a fragile negative and critical understanding of himself/herself (Chen and Jang, 2010).

Generally speaking, extrinsic motivation refers to a motivation that makes individuals do a specific duty or homework for the sake of rewards and extrinsic factors. In other words, extrinsic motivation includes engaging in activities that are a medium for achieving other goals. When people are motivated extrinsically, they tend to attempt for achieving something beyond the pleasure of the duty or activity itself (Lee et al. 2010). The element of extrinsic motivation is divided into four sub-elements that continuously range from the highest level of autonomy (integrated regulation) to the lowest level of autonomy (extrinsic regulation) i.e., in extrinsic motivation, the individual will move toward amotivation if he has a lower degree of autonomy, and in case of having a higher degree of autonomy, he/she will move toward an intrinsic motivation.

Amotivated individual is referred to someone who has not received any motivation (i.e., neither intrinsic pleasure and value nor extrinsic motivations) for performing his/her activities and thus avoids from doing any kind of activity (Deci and Ryan, 2000; Clark and Schroth, 2010). Amotivation is somewhat like the concept of "learned helplessness". When individuals are in a state feeling that something that is done by them is out of their own control and is governed by the extrinsic powers, so they are not motivated intrinsically or extrinsically and adopt avoidance (Fortier et al.: 1995).

![Fig. 1. The self-determination continuum.](http://www.gjset.org)
Generally the findings of the studies done concerning the academic motivation and anxiety indicate that intrinsic motivation has a positive relationship with health indices such as self-confidence, tranquillity, responsibility, creativity, and self-flourishing while extrinsic academic motivation and amotivation have a positive relationship with the incompatible behaviours' indices such as dropping out, anxiety, alcohol abuse, and indifference towards responsibility (Deci and Ryan, 2000; Shamloo and Cox, 2010). Stoeber et al. (2009) analyzed the relationship between self-directing perfectionism and the society's prescribed one and test anxiety and academic motivation on 140 students. The results indicate that there is a positive relationship between self-directing perfectionism and intrinsic motivation and these two variables have a significant reverse relationship with test anxiety. On the other hand extrinsic motivation had a positive relationship, in a direct and indirect way, with the society's prescribed perfectionism.

2. Methodology

2.1. Design
The method adopted in the present study is a descriptive (non-experimental) one and the research design is path analysis correlation because in this study the relationships among the variables are discussed in a causal model.

2.2. Population and Sampling
The population includes all male and female undergraduate students of educational sciences and psychology in the state universities of Tehran (345 students) who had registered for two courses i.e., descriptive statistics and inferential statistics in the first semester of the 2009-2010 academic year. Due to the low number of the statistical community and since path analysis and correlation measurement of the variables were used in data analysis, a total of 345 students (277 female and 68 male) were studied in this research.

2.3. Instruments
In the present study Middleton and Midgley's questionnaire was used for measuring achievement goals. In the present study in respect of the research subject subscales of mastery goals, performance-approach goals, and performance-avoidance goals were employed. In this questionnaire students state their beliefs about every item by ranking the questions in Likert's five-grade scale. For determining this scale's reliability Cronbach's alpha method was
adopted. In the present study the reliability coefficient of the three subscales of mastery goals, performance-approach goals, and performance-avoidance goals are 79%, 85%, and 81% respectively. Also for identifying as well as approving measurement factors of goals' structure, confirmative factor analysis was done using Lisrel software. In this study the indices (CFI=1, GFI=0.97, AGFI=0.95, RMSEA=0.026) indicates the complete fitness of the model.

For measuring the academic motivation Vallerend's (Vallerend et al. 1992) Academic Motivation Scale was employed. The academic motivation scale includes 7 subscales and each subscale consists of 4 items, so we have a total of 28 items. Among these 7 subscales, three subscales namely intrinsic motivation for understanding, extrinsic motivation for performing an action, and intrinsic motivation for experiencing stimulation are related to intrinsic motivation. Three subscales are related to extrinsic motivation namely cloned regulation, introjections, regulation, and extrinsic regulation. One subscale is 'amotivation'. In this study Cronbach's alpha rate for subscales of intrinsic motivation, extrinsic motivation, and amotivation are 84%, 86%, and 67% respectively. Also indices of confirmative factor analysis (CFI=0.99, GFI=0.96, AGFI=0.94, RMSEA=0.036) indicates the complete fitness of the model.

For measuring students' statistics anxiety, Statistics Anxiety Rating Scale (STARS) Cruise (Cruise et al. 1985) was used. Statistics anxiety rating scale is a 51-question questionnaire that is developed in a Likert five-degree approach. Statistics anxiety rating scale includes 6 subscales that are: statistics value; interpretation anxiety; test and class anxiety; computational self-concept; fear of asking for help; and fear of statistics teacher. High grades in each subscale indicate high statistics anxiety and low grades shows low statistics anxiety. The total grade of statistics anxiety was measured from the average of these six subscales' grades. In this study Cronbach's alpha scale was measured at 0.90 for the subscales of statistics value, interpretation anxiety, test and class anxiety, computational self-concept, fear of asking for help, and fear of statistics teacher. Also indices of confirmative factor analysis (CFI=0.98, GFI=0.90, AGFI=0.88, RMSEA=0.039) indicates the model's complete fitness.

### 3. Research Findings

First descriptive indices (mean, standard deviation, skewness, and kurtosis) for the whole sample were studied and reported in table 1. The average and standard deviation measured
indicates that the grades enjoy an appropriate distribution.

Table 1. Descriptive Indices of the Research Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery Goals</td>
<td>13.45</td>
<td>5.51</td>
<td>0.23</td>
<td>-1.19</td>
</tr>
<tr>
<td>Performance-</td>
<td>10.84</td>
<td>4.62</td>
<td>0.23</td>
<td>-1.10</td>
</tr>
<tr>
<td>Performance-</td>
<td>8.53</td>
<td>3.53</td>
<td>0.09</td>
<td>-1.20</td>
</tr>
<tr>
<td>Intrinsic</td>
<td>27.56</td>
<td>10.58</td>
<td>0.64</td>
<td>-0.52</td>
</tr>
<tr>
<td>Extrinsic</td>
<td>28.85</td>
<td>9.79</td>
<td>0.554</td>
<td>-0.28</td>
</tr>
<tr>
<td>Amotivation</td>
<td>12.57</td>
<td>3.85</td>
<td>-0.15</td>
<td>-0.67</td>
</tr>
<tr>
<td>Anxiety</td>
<td>148.50</td>
<td>30.51</td>
<td>-0.06</td>
<td>-0.96</td>
</tr>
</tbody>
</table>

As for skewness and kurtosis, the findings indicate that data distribution in each variable is a normal one. With regard to the collected data, correlation coefficients of studied variables were measured and they are shown in Correlation Matrix (table 2). Except for the correlation between intrinsic motivation and the extrinsic one that is at a significant (p<0.05), the correlation of other variables is set at a significant (p<0.01).

Table 2. Correlation Matrix of the Research Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastery Goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrinsic Motivation</td>
<td>0.51**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrinsic Motivation</td>
<td>0.34**</td>
<td>0.46**</td>
<td>0.41**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amotivation</td>
<td>-0.49**</td>
<td>0.36**</td>
<td>0.31**</td>
<td>-0.50**</td>
<td>0.22**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistics Anxiety</td>
<td>-0.51**</td>
<td>0.35**</td>
<td>0.39**</td>
<td>-0.48**</td>
<td>0.36**</td>
<td>0.49**</td>
<td>1</td>
</tr>
</tbody>
</table>

*P<0/05, **P<0/01

3.1 Anxiety Predictors

For predicting anxiety, the proposed conceptual model was analyzed through the Path Analysis Method. For assessing the model, the Maximum Probability Method was employed. For measuring the model's fitness K Square Index on the level of latitude, Comparative Fitness Index (CFI), Conformity Fitness Index (GFI), Adjusted Conformity Fitness Index (AGFI) and, Square of Mean Error of Estimate Squares (RMSEA).
Table 3. Characteristics of Conformity Fitness

<table>
<thead>
<tr>
<th>AGFI</th>
<th>GFI</th>
<th>CFI</th>
<th>RMSEA</th>
<th>x/df</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.92</td>
<td>0.98</td>
<td>0.99</td>
<td>0.07</td>
<td>2.72</td>
</tr>
</tbody>
</table>

3.2. Indirect (Side) and Total Effects

Based on the path analysis, the indirect effect of mastery goals on statistics anxiety through the intrinsic motivation and amotivation (-0.26) is at significant level of (p<0.01). Thus the motivative mediation role of intrinsic motivation and amotivation among the mastery goals and anxiety is confirmed.

The indirect effect of performance-approach goals on the statistics anxiety through the extrinsic motivation and amotivation (0.09) is at positive and significant level of (p<0.01). Given that the indirect effect of performance-approach goals on statistics anxiety is done through extrinsic motivation and amotivation, one can say that extrinsic motivation and amotivation play a mediation role between performance-approach goals and statistics anxiety.

Table 4. Examined Paths in Path Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Direct Effects</th>
<th>Indirect</th>
<th>Total Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>mastery goals effects on intrinsic motivation</td>
<td>0.51**</td>
<td>-</td>
<td>0.51**</td>
</tr>
<tr>
<td>mastery goals effects on amotivation</td>
<td>-0.48**</td>
<td>-</td>
<td>-0.48**</td>
</tr>
</tbody>
</table>
4. Conclusion

In this study the effect of achievement goals and academic motivation on statistics anxiety was analyzed. Path analysis confirmed this hypothesis of ours that students' goal orientation and academic motivation can affect students' level of anxiety in statistics. As the research findings indicate, mastery goals, performance-approach goals and performance-avoidance goals have a direct and significant effect on statistics anxiety. All these three points have effect on statistics anxiety through intrinsic motivation, extrinsic motivation and amotivation respectively. All in all achievement goals and academic motivation can explain only 0.31 percent of the statistics anxiety changes. These findings are consistent with those of Dweck and Leggett (1988) indicating that students with mastery goals put a higher value on course understanding and materials' learning they tend to compare themselves less with the extrinsic criteria such as grade and social privileges attainment. For this very reason they enjoy a low anxiety and a high self-regulation. This finding is consistent with the research findings of Ames and Archer (1988), Stipek and Kavalski (1989), Tanaka (Tanaka et al.: 2006), Muis and Franco (2009), Bartels and Jackson (2009), Daniels and Putwain (2010), and Lee et al. (2010).

Based on the findings, performance-approach goals have direct negative significant effect on statistics anxiety and this is not consistent with most of the researcher's findings of Stipek and Kavalski (1989) and Elliot and church (1997). This might be resulted from a dual combination of performance-approach goals from the models and positive-negative results over which there is not much consistency among the researcher's findings i.e., students with performance-approach goals experience both positive emotions like employing deep learning strategies, high self-efficacy, high
grades, more efforts and intrinsic motivation increase and negative emotions such as anxiety and jealousy (Liem et al. 2008; Lee et al. 2010; Kaplan and Flum, 2010).

Findings show that performance-avoidance goals have direct negative weak (but) significant effect on statistics anxiety; rather they affect statistics anxiety through amotivation and extrinsic motivation. This finding is consistent with research findings of Dweck and Leggett (1988), Pintrich et al. (2003), Stoeber et al. (2009), and osloo et al. (2009). The findings of this study indicate the relationship between achievement goals and academic motivation and confirm the correlation between individuals' goal orientation and the level of their self-determination. Mastery goals have a positive significant relationship with intrinsic motivation and a negative significant one with amotivation and explain %26 and %24 of their changes respectively. Also performance-approach goals as well as performance-avoidance goals have a significant relationship with extrinsic motivation and explain %23 of their changes. These findings are consistent with those of Ames (1992), Elliot et al. (1999), Schunk et al. (2008), and Lee et al. (2010).

Generally the findings of this study were consistent with other suggested models (Green and Miller, 1996; Moneta and Spada, 2009; and Putwain and Daniels, 2010) and emphasize on goal orientation and academic motivation in explaining anxiety changes in a specific context (statistics).

References


strategies, task disengagement, peer relationship, and achievement outcome. *Journal of Contemporary Educational Psychology*, 33, 486–512.


