Determining the relationship between achievement goals and students' anxiety in statistics course with regard to the mediating role of academic engagement

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ARTICLE INFORMATION	ABSTRACT
Article type Original research Pages: 145-149 Corresponding Author's Info Email: heidarei@iauahvaz.ac.ir **Article history:** Received: 2022/12/31 Revised: 2023/03/03 Accepted: 2023/03/16 Published online: 2023/03/19 **Keywords:** *Achievement goals, students' anxiety, statistics course and academic engagement.*	**Background and Aim:** In the present study, the relationship between achievement goals and students' anxiety in statistics course was investigated with regard to the mediating role of conflict. **Methods:** The present research is of the type of relational design, and more precisely, the correlation design is of the structural equation modeling type. Method: Among the first, second, third, and fourth year students, the second and fourth year students were randomly selected, and the number 324 students completed the questionnaires of this research. Finally, after removing incomplete questionnaires, 312 questionnaires were analyzed. In this research, in order to collect data, Middleton and Migli (1997) achievement goals scale, Pintrich and DeGroot (1994) academic engagement scale, and Kravis et al.'s (1985) statistics anxiety scale were used as research tools. In the present study, SPSS19 software was used for data recording and preliminary analysis, and AMOS software was used for data analysis, and a significance level of $p < 0.05$ was considered for all hypotheses. **Results:** The fitted model shows the prediction of statistical anxiety. The numbers on the lines are standardized parameters. All paths are significant at the 0.001 level. Among the exogenous variables (mastery goals, performance goals and avoidance goals), mastery goals variable has the most direct effect on statistics anxiety. **Conclusion:** The findings of this research indicated that progress goals have a significant direct effect on statistics anxiety, that the effect of mastery goals and performance goals on statistics anxiety was negative and the effect of avoidance goals on statistics anxiety was positive.

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Introduction

Statistics anxiety can be defined as the anxiety that people experience when dealing with statistics "in any form and at any level" (Wall, 2021). Statistical anxiety is associated with mental disorganization, worry and tension that learners feel when working with statistical content. Statistical anxiety is usually caused by the environment, emotions and mentality of the individual (Gordon et al., 2018).

For progress goals, they have presented a three-dimensional division, which are: mastery goals, approach-performance goals, and avoidance-performance goals. Weirthwein (2021) The relationship between the components of achievement goals and the results of academic achievement and academic engagement has been shown during the last few decades of research. Among the development goals that have attracted significant attention in particular are stated by (Elliott, 2011).

In mastery goals, people believe that effort leads to success and focus on the intrinsic value of learning. In fact, they think about their own growth and competence (Chang et al., 2020; Hackel, 2016). The goals of mastery focus on students' understanding and learning, acquiring new skills, increasing their competence and mastering their progress based on the criteria set by themselves, on avoiding misunderstandings, not mastering the task, and using the criteria of not making mistakes (Rezaei, 2016).

Performance-oriented goals, unlike those who tend to mastery, focus on the external manifestation of competence and how ability is judged in comparison to others, using social comparison criteria, in search of reputation for high level of performance (Wirthwein, 2020).

Academic engagement has received the attention of researchers and educators due to its comprehensiveness in describing people's motivation and learning, as well as being a strong predictor of students' performance, progress and success in school. Various and different definitions have been provided for academic engagement. Some researchers have considered conflict as a process, however, all these diverse definitions share several categories: conflict is an important mediator for learning. Involvement is a multidimensional structure and people show themselves when they move from one stage to another by reducing their involvement in learning activities. Despite agreement on the multidimensional nature of academic engagement, there is disagreement about the number of dimensions. Various studies have considered its dimensions from two to four. (Alenso et al., 2022; Sephond et al., 2021).

According to the mentioned materials, in the current research, the mediating role of academic conflict between the achievement goals and statistics anxiety of students has been discussed in the framework of a causal model in order to know the direct and indirect effect of these variables on statistics anxiety.

Method

The current research is of the type of relational design, and more precisely, the correlation design is of the structural equation modeling type, because its purpose is to determine the relationship between the progress goals and the students' statistics anxiety, considering the mediating role of academic engagement.

The statistical population of the present study includes all male and female undergraduate students of educational sciences, psychology and sociology at the universities of Ahvaz (Islamic Azad University, Shahid Chamran University of Ahvaz and Payam Noor University). In the second semester of the 2021-2022 academic year, they are enrolled in the class of descriptive statistics or inferential statistics and are studying. According to the statistics announced by the education experts of the aforementioned faculties, the number of these students was around 730. The research sample was selected using one-stage cluster sampling method. In this way, among the first, second, third and fourth year students, the second and fourth year students were randomly selected, and a total of 324 students completed the questionnaires of this research. Finally, after removing incomplete questionnaires, 312 questionnaires were analyzed.

In this research, SPSS19 software was used for data recording and preliminary analysis, and AMOS software was used for data analysis, and a significance level of $p < 0.05$ was considered for all hypotheses.

Materials

1. Midleton and Migli's progress goals questionnaire. The achievement goals questionnaire was developed by Middleton and Migli (1997) in order to collect data related to goal orientation. This questionnaire consists of subscales of mastery goals, approach-performance goals, avoidance-performance goals, self-efficacy, sustainability and learning strategies.

2. Academic conflict questionnaire. In order to measure academic engagement, the Motivational Strategies for Learning Questionnaire (MSLQ) was used, compiled by Pintrich and DeGroot in 1994. The questions related to the academic engagement scale include 32 items that measure the three subscales of behavioral engagement, cognitive engagement and motivational engagement.

3. Statistics anxiety questionnaire. The statistics anxiety scale (Cruise and Wilkins, 1985) was used to measure students' statistics anxiety. The statistical anxiety scale is a 51-question questionnaire that is arranged in a 5-point Likert scale and includes two parts.

Results

According to the results of the Levene test, the variance of the research sample in the variables of mastery, performance, avoidance, academic engagement and statistics anxiety are not significantly different and the assumption of homogeneity of variances is confirmed.

Considering that the basis of the analysis of causal models is the correlation matrix. Therefore, the correlation matrix of the examined variables is presented in the table below. According to this table, among the variables correlated with statistics anxiety, the variables of academic involvement and mastery goals have the highest correlation with academic performance. In general, all the variables of this research have a significant correlation with statistical anxiety at the level of (0.001).

Correlation coefficients of variables of academic involvement, mastery goals, performance goals and avoidance goals with statistics anxiety are respectively equal to: -0.38, -0.51, -0.44, -0.26 and 0.33. All correlations are significant at the 0.001 level. Also, it should be noted that all variables, except for avoidance goals, had a negative correlation with statistics anxiety.

In order to evaluate the proposed model, structural equation modeling (SEM) was used. All analyzes were done using SPSS-22 and AMOS-22 software. To check the suitability of the model, suitability indices have been used. In general, among the various fit indices that exist, the fit indices $\chi2/df$, RMSEA, CFI, GFI, AGFI and NFI are reported in this research. In this research, the value of $\chi2/df$, RMSEA, CFI, GFI and AGFI indices are 2.72, 07, 99, 98 and 92, respectively, which all indices are at a suitable level and indicate the appropriate fit of the model with the data. As a result, it can be concluded that the answer to the research question is positive and there is a relationship between achievement goals and statistics anxiety with the mediation of academic conflict.

The current research model consists of 5 variables in total. The variables of progress goals (mastery goals, performance goals, and avoidance goals) are considered as exogenous variables, the variable of academic engagement as a mediating variable, and the variable of statistics anxiety as an endogenous variable.

The direct effect of mastery goals on academic engagement (0.42) is positive and significant at the 0.001 level, and on statistics anxiety (-0.44) at the 0.001 level, it is negative and significant.

The direct effect of performance goals is positive on academic engagement (0.28) and negative on statistics anxiety (-0.26), which was significant on academic engagement and statistics anxiety at the 0.001 level and on self-efficacy at the 0.05 level.

Also, the direct effect of avoidance goals is on academic involvement (-0.35) and statistics anxiety (0.33), which is significant at the 0.001 level.

The direct effect of academic engagement on statistics anxiety was obtained (-0.51), which was negative and significant.

One of the features of path analysis is estimating the indirect effects of variables on each other. In this way, if variable A has an effect on B and C, using path analysis, it is possible to determine the indirect effect it has on D through B and C.

The indirect effect of mastery goals through academic engagement on statistics anxiety (-0.29) is significant at the p <0.001 level.

It is a measure of total effects that is obtained from the combination of direct and indirect effects. In some cases, the variables have a direct or indirect effect on each other, in which case the total effect is equal to the direct and indirect effect. For example, in the present study, mastery goals have only a direct effect on academic engagement and self-efficacy. Therefore, the total effect of this variable is equal to the direct effect. Considering that the direct and indirect effects of all variables are given in the respective tables, it is avoided to bring the variables that only have a direct or indirect effect.

The total effect of mastery goals on statistics anxiety is (-0.53), which according to the index (t = 14.67), this effect is significant at the level of p>0.001. The total effect of functional goals on statistics anxiety (-0.29) was obtained, which is significant at the level of p < 0.001, according to the index (t = 7.29). The total effect of avoidance goals on anxiety is (0.53), which according to the index (t = 12.45), this effect is also significant at the level of p>0.001.

The numbers on the paths are standardized parameters. Paths are significant at the 0.001 level. Among the exogenous variables (mastery goals, performance goals, and avoidance goals), the mastery goals variable has the most direct effect on statistics anxiety, and the direct effect on statistics anxiety is related to academic involvement.

Conclusion

The purpose of this research was to predict the goals of progress based on students' anxiety in the course of statistics with the mediating role of academic engagement in students. The results related to the fit indices of the measurement model showed that all the fit indices support the acceptable fit of the measurement model with the collected data. Also, the results showed that the largest factor load belongs to mastery goals and the smallest factor load belongs to the indicator of avoidance goals. Thus, according to the fact that the factor loadings of all indicators were higher than 0.22, therefore, all of them had the necessary power to measure the current research

variables. The structural model also had an acceptable fit with the collected data. This suggests that there could be other variables that could be considered in other studies.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

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