Determining the relationship between achievement goals and students' anxiety in statistics course with regard to the mediating role of self-efficacy

Elham. Amirgholami[1], Alireza. Heydarei[2*], Parviz. Askari[3] & Mukhtar. Weisani[4]

1. Ph. D Student in Educational Psychology, Department of Educational Sciences and Psychology, Ahvaz branch, Islamic Azad University, Ahvaz, Iran.
2. ***Corresponding Author:** Associate Professor, Department of Educational Sciences and Psychology, Ahvaz branch, Islamic Azad University, Ahvaz, Iran
3. Professor, Department of Educational Sciences and Psychology, Ahvaz branch, Islamic Azad University, Ahvaz, Iran
4. Assistant Professor, Department of Educational Sciences and Psychology, Farhangian University, Sanandaj branch, Sanandaj, Iran

ARTICLE INFORMATION	*ABSTRACT*
	Background and Aim: The responsibility that the entire education system is facing today is to formulate policies and policies for the development of society in the economic, social, emotional and personality fields of individuals. Therefore, the purpose of this research was to investigate the relationship between achievement goals and students' anxiety in statistics course, considering the mediating role of self-efficacy. **Methods:** The current research was of the type of relational design, and more precisely, the correlation design was of the structural equation modeling type. Among the first, second, third, and fourth year students, the second and fourth year students were randomly selected, and 324 students completed the questionnaires of this research. Finally, after removing incomplete questionnaires, 312 questionnaires were analyzed. In order to collect data, achievement goals goals scale (1997), self-efficacy scale (Sherer and Adams, 1986) and Kravis et al.'s statistics anxiety scale (1985) were used as research tools in this research to collect data. 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. **Results:** The results of the hypothesis analysis showed that the effect of the mediator variable in the regression model is significant and effective. As a result, the main hypothesis of the research that there is a relationship between professional ethics based on teacher's emotions and the mediating role of moral identity in teachers of Babak city is confirmed. **Conclusion:** It can be concluded that students' anxiety can be predicted through achievement goals with the mediation of self-efficacy.

How to Cite This Article:
Amirgholami, E., Heydarei, A., Askari, P., & Weisani, M. (2023). Determining the relationship between achievement goals and students' anxiety in statistics course with regard to the mediating role of self-efficacy. *jayps*, 4(6): 94-102.

Introduction

Self-efficacy is an important construct in Bandura's social-cognitive theory. Bandura considers self-efficacy as a person's judgment of his abilities in the field of performing a specific action to achieve a desired result. He believes that people who have higher self-efficacy believe that they can change the environmental events by taking specific actions, and the probability of their success is higher. People with high academic self-efficacy are more confident that they can do the educational tasks compared to students with low academic self-efficacy. High levels of academic self-efficacy leads to higher average grades and persistence to complete assignments. Also, high self-efficacy leads to improvements in performing tasks; While low self-efficacy keeps students away from doing their tasks (Samareh & Khezri Moghadam, 2016).

Therefore, people with test anxiety usually have a low level of self-efficacy. This means that a person suffering from exam anxiety feels anxious and helpless and is unable to influence and control the events of the exam. As a result, people at the cognitive level believe that any effort to succeed in the exams is futile and doomed to failure, and if the initial efforts to overcome the obstacles and problems of the exam are ineffective, people with exam anxiety quickly give up. On the other hand, people with high self-efficacy are able to deal better with the obstacles in the exam situation, compared to those with low self-efficacy, they probably try harder to overcome the obstacles on the exam. Higher levels of self-efficacy in people lead to less test anxiety, which makes them more confident in their abilities (Nordziel et al., 2021).

Achievement goals represent psychological frameworks and structures for explaining learning performance and learning outcomes. Initially, these constructs were divided into mastery and performance goals until Elliott and Harakievich (cited in Stavropolou et al., 2023) presented a triple model that included mastery, performance-approach goals, and performance-avoidance goals. Later, mastery-avoidance goals were proposed as another dimension. (Senko, 2019, Baron and Harakievich, 2003). In the three-dimensional model investigated in the present study, it explains three goal orientations related to the variability in students' academic behavior. The goal of mastery is associated with essential assessment standards with an emphasis on understanding and deeper learning, so it is related to adaptive behavioral patterns such as high self-efficacy, high interest in school, use of strategies, emotional and behavioral involvement. (Elliott and Hallman, 2017; Huang, 2016; Senko, 2019; Scherer et al., 2020; Stamoulasis and Gonida, 2018; Van Yepren et al., 2015). Conversely, performance avoidance goals are associated with maladaptive (negative) patterns, while performance approach goals are associated with both adaptive and maladaptive patterns (Linenbrink, 2005; Senko & Dawson, 2017).

Regarding performance-avoidance goals, there are consistent findings for negative affective, cognitive, and behavioral outcomes. Individuals with performance-avoidance goals avoid showing a lack of capabilities and negative judgments and are associated with maladaptive patterns. In particular, studies have shown that they are associated with poor performance and often low interest (Elliott & McGregor, 2001). In addition, individuals who adopt performance avoidance goals can exhibit illegal behaviors such as cheating. They also exhibit dysfunctional behaviors, disengagement, and often destructive actions (Elliott, 2005). These people are afraid of failure and may show a high level of anxiety. As a result, they spend too much time on one task, may give up more easily, and negatively affect self-regulated learning (Lin, 2020). They are also at risk of failure, with low academic interest, leading to lower achievement (e.g., Scherer et al., 2020; Weimer et al., 2018).

Kali et al. (2019) examined students' learning approaches through the orientations of the goal of progress, academic self-efficacy and hope. Academic self-efficacy and hope were significant predictors of achievement goals, while performance-avoidance goal orientation was a significant predictor of surface approach. Female students are superior to boys in terms of learning goal orientation. Students (20-22 years old) showed higher scores in the same variable than others (23-25 years old). Based on the class level, there was no significant difference in the scores of achievement goal orientations, academic self-efficacy, hope and learning approach. The results pointed to the fact that such concepts related to the academic performance of an undergraduate student can be considered as distinct characteristics that create

different learning attitudes towards academic education.

According to what has been said, the responsibility that the entire education system is facing today is the formulation of policies and policies for the development of society in the economic, social, emotional and personality fields of individuals. Therefore, the purpose of this research was to investigate the relationship between achievement goals and students' anxiety in statistics course, considering the mediating role of self-efficacy.

Method

The current research was of the type of relational design, and more precisely, the correlation design was of the structural equation modeling type. The statistical population of the present study includes all undergraduate students in the fields of educational sciences, psychology and sociology in the universities of Ahvaz city, who are enrolled and studying in the class of descriptive statistics or inferential statistics in the second semester of the 2021-2022 academic year. According to the statistics announced by the education experts of the aforementioned faculties, the number of these students was around 730. As described in the section related to the method of conducting the research, the research sample was selected using the single-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. Cronbach's alpha method was used to determine the reliability of this scale. The reliability coefficient of this scale was reported using Cronbach's alpha method in Vakili's study (2008) for mastery goals subscale, approach-performance goals and avoidance-performance goals, respectively 0.83, 0.83 and 0.61. In Weisani's (2010) study, the reliability of mastery goals, approach-performance goals, and avoidance-performance goals subscales were reported using Cronbach's alpha method as 0.79, 0.85, and 0.81, respectively. Also, in Rahmani's research (2013), the reliability of subscales of mastery goals, approach-performance goals, and avoidance-performance goals were obtained using Cronbach's alpha method of 0.86, 0.85, and 0.67, respectively. In the present study, the reliability coefficient of mastery goals, approach-performance goals, and avoidance-performance goals were obtained as 0.84, 0.85, and 0.80, respectively.

2. Self-efficacy questionnaire. In this study, the self-efficacy questionnaire of Scherer and Adams (2006) was used to measure self-efficacy. This scale has 17 questions. The reliability of the Sherer and Adams self-efficacy questionnaire has been investigated in various studies, and the results obtained indicate the high reliability of this questionnaire. In Rajabi's research (1385), Cronbach's alpha coefficients for the whole scale were 0.82, 0.84 for psychology students of Shahid Chamran University, Ahvaz, and 0.80 for psychology students of Maroodasht Azad University. Also, the concurrent validity coefficient for the job self-efficacy scale and the Rosenberg self-esteem scale was estimated to be 0.30 among 318 respondents, 0.20 in the psychology students of Shahid Chamran University of Ahvaz, and 0.23 in the psychology students of Marvdasht Azad University, which were all significant. Schwartzer et al. (2000) obtained the validity coefficient of the scale of general self-efficacy beliefs with an optimistic documentary style, 0.49 in a group of students and 0.45 with the perception of challenge in stressful situations, and 0.58 for teachers with self-regulation; All coefficients were significant (cited by Rajabi, 2006).

3. Statistics anxiety questionnaire. The statistics anxiety scale (Cruise & 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. Cronbach's alpha method was used to determine the reliability of

this scale. The reliability coefficient of this scale was obtained using Cronbach's alpha method in the study of Kravis et al. (1985) for its subscales in the following order: Statistical value (0.94); interpretation anxiety (0.87); Exam and class anxiety (0.68); Computational self-concept (0.88); Fear of asking for help (0.89); Fear of statistics professor (0.80). In Weisani's (2013) study, Cronbach's alpha and semi-quantitative values for the subscales of statistics value, interpretation anxiety, exam and class anxiety, computational self-concept, fear of asking for help, and fear of the statistics teacher were obtained as 0.90 and 0.83. In the present study, the reliability of the statistics anxiety scale was obtained using Cronbach's alpha method and halving method, respectively, 0.91 and 0.82.

Implementation

The method of collecting data and conducting the research was as follows: first, coordination was made with the research vice-chancellor of Shahid Chamran, Payam Noor and Islamic

Azad University and obtaining permission to conduct the research. Then, through the educational experts of the faculties, a list of the classes in which the statistics course is held was prepared, and finally, the second and fourth year students were randomly selected from each of the mentioned faculties. Then, with the coordination of educational experts, at the appropriate time, by attending the classes of the desired fields, the research tools were provided to the students for completion. Also, the subjects were asked to be diligent in answering the questions and honestly in choosing the options, to answer all the questions, and in order to obtain complete information and to appreciate the cooperation of the students, a gift was considered for them.

Results

Before analyzing the data, the homogeneity of the demographic characteristics of the statistical sample of the research was checked and confirmed.

Table 1. Descriptive indices of research variables				
Variable	Index			
	Min	Max	Mean	SD
Statistics anxiety	53	249	181/89	18/70
Efficacy	18	81	63/75	9/13
Academic conflict	38	151	101/94	11/05
Mastery goals	5	25	17/70	3/61
Performance goals	4	20	14/40	3/19
Avoidance goals	3	15	10/07	2/12

As the results of Table 1 show, the average and (standard deviation) anxiety statistics are 181.89 and (18.70); Mean and (standard deviation), mean and (standard deviation) self-efficacy 63.75 and (9.13); The mean and (standard deviation) of academic involvement is 101.94 and (11.05); The average and (standard deviation) of proficiency goals are 17.70 and

(3.61); The mean and (standard deviation) performance goals are 14.40; (3.19) and the mean and (standard deviation) of avoidance goals 10.07 and (2.12). Also, the Kolmogorov-Smirnov test showed that the assumption of normality of the data was met in all variables ($p < 0.05$). Therefore, it is possible to use parametric tests.

Table 2. The results of Levene's homogeneity of variance test for research variables				
Variable	Df1	Df2	F	Sig
Mastery goals	1	299	3/19	0/17
Performance goals	1	299	2/66	0/22
Avoidance goals	1	299	3/02	0/31
Efficacy	1	299	4/55	0/23
Statistics anxiety	1	299	7/06	0/39

As can be seen, the results obtained in the above table show that Levene's test is not significant in the research variables: Mastery goals (F = 3.19

and p = 0.17); functional goals (F = 2.66 and p = 0.22); avoidance goals (F = 3.02 and p = 0.31); self-efficacy (F = 4.55 and p = 0.23);

Statistics anxiety (F = 7.06 and p = 0.39). Therefore, the variance of the research sample in the variables of mastery, performance, avoidance, self-efficacy and statistics anxiety are not significantly different and the assumption of homogeneity of variances is confirmed.

Table 3. Correlation matrix of research variables					
Variables	1	2	3	4	5
Statistics anxiety	1				
Efficacy	-0/38**	1			
Mastery goals	-0/44**	0/30**	1		
Performance goals	-0/26**	0/18*	0/09	1	
Avoidance goals	0/33**	-0/24**	-0/36**	-0/25**	1

$**p<0.01$ $*P<0.05$

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 $\chi 2/df$, RMSEA, CFI, GFI, AGFI and NFI are reported in this research. In this study, the values of $\chi 2/df$, RMSEA, CFI, GFI and AGFI are 2.72, 0.07, 0.99, 0.98 and 0.92 respectively. All indicators are at a suitable level and it shows the appropriate fit of the model with the data.

Table 4. Estimated coefficients of indirect effects on statistics anxiety with the mediation of self-efficacy				
Variable	Beta	SE	t	Sig
Mastery goals	-0/25**	0/10	-5/67	0/001
Performance goals	-0/13*	0/16	-2/16	0/05
Avoidance goals	0/31**	0/17	8/25	0/001

$**p<0.01$ $*P<0.05$

The above table shows that the indirect effect of mastery goals through self-efficacy on statistics anxiety is significant (-0.25) and (-0.29) at p<0.001 level.

Table 5. Estimated coefficients of total effects on statistics anxiety with the mediation of self-efficacy				
Variable	Beta	SE	t	Sig
Mastery goals	-0/53**	0/09	-14/67	0/001
Performance goals	-0/29**	0/14	-7/29	0/001
Avoidance goals	0/40**	0/11	12/45	0/001

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

The results of the above table show that 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 p<0.001 level. Also, according to the results of the above table, the total effect of performance goals on statistics anxiety was obtained (-0.29), which is significant at the level of p<0.001, according to the index value (t=7.29). According to the results of the above table, the total effect of avoidance goals on statistics anxiety is (0.53),

which according to the index (t = 12.45), this
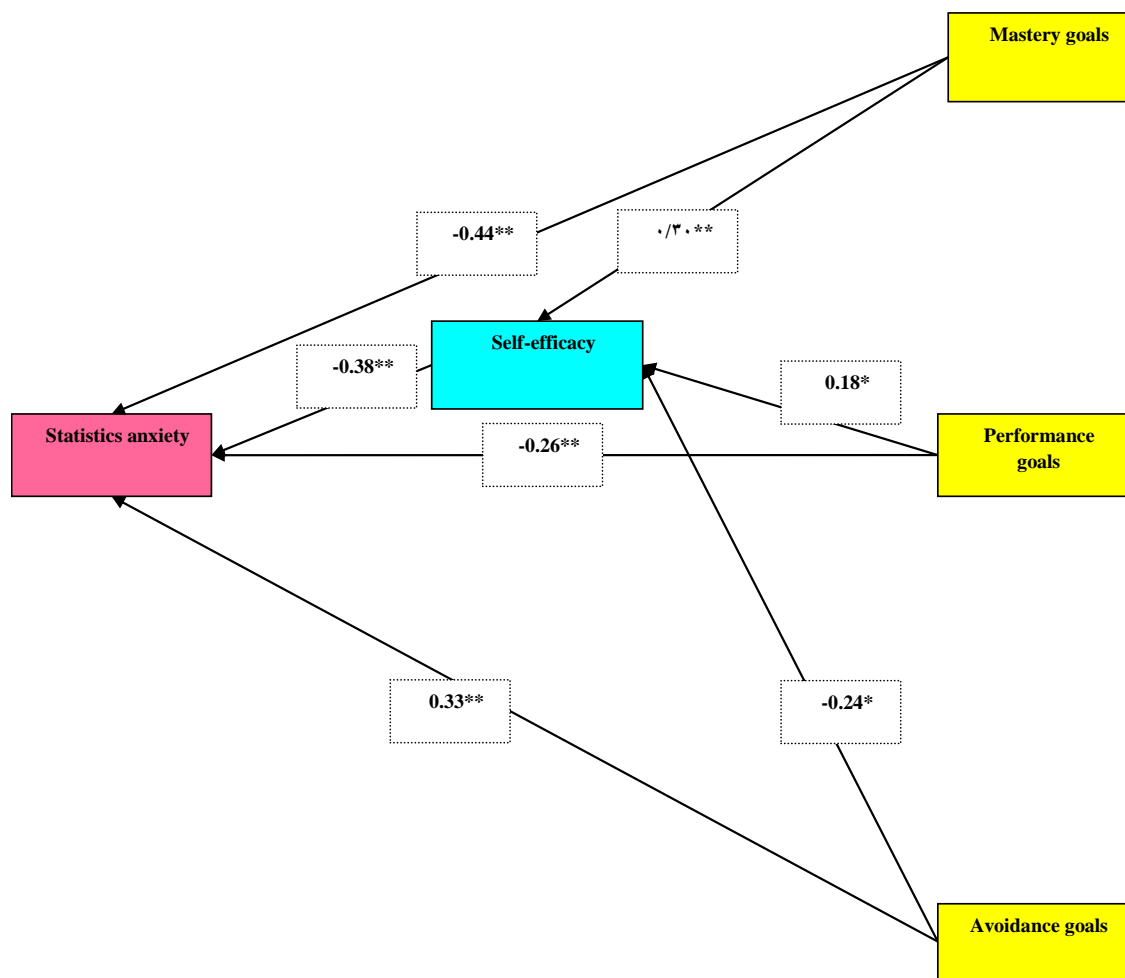
effect is also significant at the p<0.001 level.

Figure 1. Path coefficients of the fitted model predicting statistics anxiety

The fitted model shows anxiety prediction statistics. The numbers on the paths are standardized parameters. Except for the direct effect of performance goals on self-efficacy, which is significant at the p<0.05 level, the rest of the 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 present study was conducted with the aim of modeling the structural equations of the relationship between professional ethics and teacher's emotions with the mediation of moral identity. The results of the statistical analysis of the data confirmed the research hypothesis that there is a relationship between professional ethics based on the teacher's needs and the mediating role of moral identity in the teachers of Babak city. The results of this research are consistent with the results of some previous studies. (Frenzel et al., 2009; Aquino et al., 2009; Walker & Frimer, 2009). In explaining the findings of the research, it can be said that some believe that professional ethics is a general and important issue (Aquino et al., 2009). Organizations are looking for employees with professional ethics, and it can also be said that organizations are judged based on the professional ethics of their employees. Lewis considers professional ethics to have principles that have been established around the world and are issues that change shape from time to time (Aziz et al., 2021; Ghazli et al., 2014). Experts generally consider ethics in the form of a set of principles that often act as a guide to behavior in the form of a charter or system. In work

environments, people differ in values and perform behaviors that may be ethical or unethical according to others. In one situation, people may feel that a behavior is ethical, while the same behavior is unethical in another situation. Also, emotions can be described and explained in two ways. On the one hand, emotions are classified by value labels such as being good or bad (Gunaywicz et al., 2022). In this regard, verbs that have positive consequences for others are labeled as good, and in contrast to verbs that have negative consequences for others, they are attributed to the category of negative and bad emotions (Gazli et al., 2014). Also, in further explanation of the findings, it can be said that teachers who experience emotions such as pleasure, pride and pride in the context of teaching, feel more social responsibility. Shy and high-anxiety teachers have the least belief in their own effectiveness while teaching. Also, anxious teachers have problems in solving problems and their success is less than other teachers (Boegershausen et al., 2015). In general and by summarizing the said material, it can be acknowledged that the continuity and survival of any society requires that a set of beliefs, values, behaviors, tendencies, knowledge and skills be transferred to new generations. And teachers have the most basic roles in transferring these values to the new society, so with the growth and promotion of sociability in teachers, we can witness the formation and growth and development of moral identity among the strata of society. Also, moral identity as a fundamental and important factor has a positive and meaningful relationship with socialization, and the higher the moral identity is, the higher the professional ethics level of the person (Stets, 2016; Gonaiewicz et al., 2022). One of the important organizational processes in relation to human resources is the professional ethics of the organization's employees. During it, the people are taught the correct and desirable behavior in the organization and get to know the culture, goals, values and main norms of the organization and finally convince themselves to accept it. If this process (professional ethics) is done well, the individual values of people in the organization are developed and better communication is established (Walker & Frimerr, 2009; Shahin et al., 2021; Matsuba & Walker, 2004). Also, professional ethics is an efficient and effective factor in integrating the individual values of teachers in education and has a very important role in building people's values and attitudes as well as their social exploits about many issues. In general, moral identity has an effect on teachers' professional ethics. Moral identity, like a guide, helps people to direct their intentions, morals and actions. Moral identity is important, because they create bases and bases for understanding attitude, motivation and influence in people's perception. In addition, ethics implies certain behaviors or outcomes that are prior to others. The nature of ethical identity is considered as a necessary factor that affects individual values and leads to more professional ethics in the organization. Professional ethics not only causes the emergence of moral identity; Rather, it creates individual values in education and causes people to see their moral identity as tied to their own and organization's personal values and to express their ethics. In other words, having an ethical identity causes professional ethics to emerge in the environment (Walker & Frimer, 2009; Shahin et al., 2021).

The current research, like other researches, had limitations, among which the following can be mentioned: 1) The statistical population of this research included education teachers of Shahrbabak city, so it is necessary to be cautious in generalizing the results to teachers of other cities. 2) In the current research, only a questionnaire was used to collect the desired information, and methods such as interview and observation may yield different results. In this regard, it is suggested to investigate this research in other cities and schools and with other samples to increase the generalizability of the findings. Also, it is suggested to future researchers to identify the factors affecting the components of professional ethics and moral identity. In addition, it is suggested to conduct research with the aim of comparing the components of professional ethics based on demographic indicators among teachers. In this research, only the questionnaire tool was used to collect data. It is suggested that future researchers conduct this research using interview and observation tools. Based on the findings of the research, it is suggested that the Department of Education should do the necessary planning in order to institutionalize moral values at the school level. Also, it is

suggested to evaluate the level of emotions of teachers before hiring them in schools. In addition, the design of professional ethics models in the education system has received less attention from researchers. In this regard, it is suggested to take an effective step towards the recognition and creation of theoretical and experimental knowledge in this field. Departments of education, schools and associations of parents and trainers in charge of holding family education classes should provide the grounds for holding workshops on explaining emotions, professional ethics by mediating the teacher's moral identity for teachers, student teachers, school administrators, parents and students.

Conflict of Interest

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

References

Aquino K, Freeman D, Reed II A, Lim VK, Felps W. (2009). Testing a social-cognitive model of moral behavior: the interactive influence of situations and moral identity centrality. Journal of personality and social psychology. 97(1):123.

Aziz F, Md Rami AA, Zaremohzzabieh Z, Ahrari S. (2021). Effects of emotions and ethics on pro-environmental behavior of university employees: A model based on the theory of planned behavior. Sustainability.13(13):7062.

Boegershausen J, Aquino K, Reed II A. (2015). Moral identity. Current Opinion in Psychology. 1;6:162-6.

Campbell A, Gillett G, Jones G. (2015). Medical ethics: the Geneva Convention Code of Medical Ethics. UK: Oxford University Press.

Frenzel AC, Goetz T, Lüdtke O, Pekrun R, Sutton RE. (2009). Emotional transmission in the classroom: Exploring the relationship between teacher and student enjoyment. Journal of educational psychology. 101(3):705.

Gamayunova O, Vatin N. (2015). Education in the field of construction of unique, high-rise and long-span buildings and constructions. InAdvanced Materials Research, (Vol. 1065, pp. 2459-2462). Trans Tech Publications Ltd.

Gazley JL, Remich R, Naffziger-Hirsch ME, Keller J, Campbell PB, McGee R. (2014). Beyond preparation: Identity, cultural capital, and readiness for graduate school in the biomedical sciences. Journal of Research in Science Teaching. 51(8):1021-48.

Ghasemi, A., Kadivar; P., Keramati; H., & Arabzadeh, M. (2019). Checking the validity and reliability of the four-factor teacher's emotions questionnaire. New Educational Thoughts, 15(2): 7-30. (In Persian)

Goniewicz K, Goniewicz M, Włoszczak-Szubzda A, Lasota D, Burkle FM, Borowska-Stefańska M, Wiśniewski S, Khorram-Manesh A. (2022). The Moral, Ethical, Personal, and Professional Challenges Faced by Physicians during the COVID-19 Pandemic. International journal of environmental research and public health. 19(9):5641.

Karimi Khozani, A. (2017). Compilation of ethical criteria for police officers. Police Science Quarterly, 9(3): 96-111. (In Persian)

Majdabadi, Z. (2017). Factor structure and internal consistency of a moral identity scale. Evolutionary Psychology: Iranian Psychologists, 14(54): 147-153. (In Persian)

Matlabi Fard, A., Naveh Ebrahim, A., & Mohsen Zadeh, F. (2011). Investigating and identifying professional and ethical indicators in education and teaching from the point of view of master's students: a qualitative study. Ethics in Science and Technology, 6(4): 9-16. (In Persian)

Matsuba MK, Walker LJ. (2004). Extraordinary moral commit2 ment: Young adults working for social organization. Journal of personality. 72(2):4132436.

Panicker S. (2012). Research ethics education in the behavioral & psychological sciences: A mistaken case of one-size-fit-all. Teaching Ethics.12(2):137-40.

Pekrun R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. Educational psychology review.18:315-41.

Sadeghimahalli F, Valipour Khajehghyasi R, Akbari Farmad S. (2021). Professional Ethics in Teaching from the Perspectives of Professors and Graduate Students of Mazandaran University of Medical Sciences: A Comparative Study. Strides Dev Med Educ. 18(1):e1035.

Şahin F, İbrahim Yüksel D. (2021). Meaning and Uniqueness of Ethics and Ethical Teacher Behaviors in the Teaching Profession. ie: inquiry in education. 13(2):2.

Semradova I, Hubackova S. (2016). Teacher responsibility in distance education. Procedia-Social and Behavioral Sciences. 5;217:544-50.

Shakeri, A. (2018). Professional ethics in educational management and educational organizations, the first international conference on management and innovation, Tehran, University of Tehran. (In Persian)

Stets JE. (2016). Rationalist vs. intuitionist views on morality a sociological perspective. InDual-process theories in moral psychology: Interdisciplinary approaches to theoretical, empirical and practical considerations 2016 Mar 22 (pp. 345-366). Wiesbaden: Springer Fachmedien Wiesbaden.

Walker LJ, Frimer JA. (2009). The song remains the same': rebuttal to Sherblom's re-envisioning of the legacy of the care challenge. Journal of Moral Education. 38(1):53-68.