Predicting Academic Resilience based on Metacognitive Beliefs and Achievement Motivation in High School Students in Shiraz, Iran

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Abstract

Background
Resilience is one of the other essential variables that, in the educational setting, despite challenges and environmental difficulties, is regarded as a very high likelihood of success in school and other life situations. The purpose of this study was to predict academic resilience based on metacognitive beliefs and achievement motivation in first-grade high school students in Shiraz, Iran.

Materials and Methods: This was a cross-sectional study with a correlational design. The study population comprised all first-grade high school students in Shiraz, Iran. The research sample included 162 students (79 boys and 83 girls) selected by the multi-stage cluster sampling method. The Academic Resilience Inventory (ARI), the Metacognition Questionnaire (MCQ-30), and the Herman's Achievement Motivation Questionnaire were used to measure the studied variables. Data were analyzed using SPSS software version 22.0.

Results: 162 (49.40%) of the students were females. The results showed that metacognitive beliefs could predict students 'academic resilience β = -0.601; P< 0.01) and achievement motivation, improving students' academic resilience. According to F = 27.285, the fitted regression model's significance at the 95% confidence level. Considering R 2 = 0.15, it can be claimed that 15% of the changes in students' resilience are explained by achievement motivation.

Conclusion
Based on the results, metacognitive beliefs and motivation for progress significantly predict students' academic resilience.

Key Words: Achievement motivation, Academic resilience, Metacognitive, Students.

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1- INTRODUCTION

Students have essential potential whose flourishing is a necessary condition for today's societies' success and development. However, many students face difficult social and educational situations in the classroom, home, and community while studying, leading to their failure at school (1). However, many studies have shown that students who succeed and experience high education levels despite being in stressful, problematic, and threatening situations. This process is called academic resilience (2). Academic resilience refers to high motivation levels for achievement and performance, despite students' stressful events and conditions at school. This man's capacity could cause him to successfully overcome adverse events and improve his social, educational, and professional competence despite being exposed to severe stress (3).

Identifying the factors affecting academic resilience as one of the essential factors in preventing academic failure and improving students' educational status in this course can be considered essential. One of the interpretations used for a person to believe in his abilities and capabilities and increase his resilience is metacognitive beliefs. Metacognitive beliefs refer to metacognitive knowledge that relates a person's beliefs about cognition and cognitive and emotional experiences (4). Another influential factor in academic resilience is achievement motivation. The achievement motivation was introduced by Morella in 1970 and can be defined as the effort and desire to achieve something or achieve a goal (5). According to previous research, student resilience changes are explained by various metacognitive beliefs that cognitive trust and cognitive awareness have the most significant effect on student resilience (6-8). Metacognitive knowledge and beliefs can be defined as one's beliefs or convictions about their

thinking. This metacognitive knowledge includes positive and negative metacognitive beliefs about thinking. Positive and negative metacognitive beliefs are considered another underlying mechanism involved in developing and sustaining this disorder and pathological concern. Positive metacognitive beliefs are associated with the benefits of worry, rumination, attention bias (threat monitoring), but negative metacognitive beliefs are associated with uncontrollability, importance, and meaning of internal cognitive events such as thoughts and common beliefs (2).

Wells' metacognitive approach believes that people fall into the trap of emotional distress because their metacognition leads to a particular pattern of responding to inner experiences, perpetuating negative emotions, and reinforcing negative beliefs. This pattern is called a cognitive-attentional syndrome, including anxiety, rumination, and maladaptive coping strategies (9). According to the results of Desoete and Roeyers (2006), by teaching strategies and metacognitive beliefs, one expands his alternative system so that he can evaluate and process experiences in a new way (10). Motivation varies in intensity and direction. One of the motivations that have been considered recently is the achievement motivation, desire or need to dominate and excel, desire to succeed and dominate (11).

The need for achievement is the desire to do good things following the criteria of excellence. This motivates people to seek "success in competing with excellence" (12). The achievement motivation includes design and striving for excellence, but the attitude towards achievement matters, not the success itself. Thus, achievement motivation may include various activities and emerge in various professions, from driving to account for a company (11). Martin explains the underlying thoughts, feelings, and behaviors of academic

conflict by providing a learner motivation wheel model. In this model, the factors that increase motivation include self-confidence, focus on learning, the value of school education, study, and factors that weaken motivation, namely anxiety, low control, fear of failure, and self-destruction (13). Many studies on students have shown that people with high achievement motivation have more self-esteem (14, 15).

Moyano et al. (2020) showed that metacognitive beliefs and resilience could predict resilience changes. It was also observed that the dimensions of metacognitive beliefs, self-awareness, positive beliefs, uncertainty, and negative beliefs could predict resilience, and the control dimension could not significantly increase the amount of prediction. Moreover, all the dimensions of academic resilience could predict resilience variables (15). Hutauruk et al. (2019), in a study, sought to investigate the relationship between metacognitive beliefs and resilience in students. The results showed a relationship between metacognitive beliefs and some of its dimensions with resilience (6). Metacognition is also able to predict resilience (7). Katz et al. (2013) found that autonomous motivation plays a mediating role in the correlation between self-efficacy and resilience, suggesting that students' crucial role is to do their homework. According to this study results, resilience does not increase simply by enhancing self-efficacy without considering students' autonomous motivation (16). Since a sense of anxiety and stress always accompanies education and academic failure for students; lack of academic resilience is one of the significant problems in the quality of education centers; the study aimed to predict metacognitive beliefs and achievement motivation on academic resilience in high school students in districts one and two of Shiraz, Iran.

2- MATERIALS AND METHODS

2-1. Study design and population

This was cross-sectional research with a correlational design. The study population comprised all first-grade high school students between 15-18 years old in Shiraz, Iran. The research sample included 162 students (79 boys and 83 girls) selected by the multi-stage cluster sampling method. According to Cochran's formula, the sample size was determined, which explains results regarding the probability distributions of statistics (with parameters: $\alpha = 0.05$, $d = 0.03$), using a multi-stage sampling method.

2-2. Measuring tools

In this study, three tools were used to collect information: Academic Resilience Inventory (ARI), Metacognition Questionnaire (MCQ-30), and Herman's Achievement Motivation Questionnaire.

2-2-1. Academic Resilience Inventory (ARI)

Samouelz (2004) designed this questionnaire, and its validity has been confirmed in Iran (17). This questionnaire has 29 items and 3 subscales of positivity (items: 1, 2, 3, 9, 21, 22), future orientation (items: 24, 20, 19, 18, 17, 16, 12, 8, 6, 4), and communication skills (items: 26, 25, 23, 15, 14, 13, 11, 10, 7, 5, 29, 28, 27). The final version is 40 items that asked participants to rate their academic resilience on a five-point Likert scale from strongly agree (5) to disagree (1) strongly. Out of 29 items, items 4, 5, 7, 10, 11, 14, 15, 23, 27, 28 and 29 have inverse scores. After standardization in Iran, the Academic Resilience Inventory by Soltanynejad et al. (2013) was reduced from 40 to 29 items. Items 4, 10, 11, 15, 18, 19, 20, 32, 38 were removed due to having factor loads close to each other, and also items 7 and 21 were removed due to having a factor load less than 0.30. Finally, 29 items were prepared for confirmatory factor analysis (18). In research, the questionnaire's reliability was obtained in

two samples of high school and college students. The reliability of the communication skills component among students is 0.77 and 0.76, the reliability of the future orientation among students is 68, 0.65, and the reliability of the problem-oriented and positivity components among students is 0.63 and 0.62, respectively. In the present study, this questionnaire's reliability based on Cronbach's alpha was equal to 0.78 (18).

2-2-2. Metacognition Questionnaire (MCQ-30)

The Metacognition Questionnaire was developed by Wells and Cartwright-Hatton (2004) and is a 30-item self-report scale that measures individuals' beliefs about their thinking (19). This questionnaire includes five subscales: cognitive trust, positive beliefs about anxiety, cognitive awareness, dangerous thoughts, and need to control thoughts. This questionnaire has 30 items, and each subject answers the items in four options (strongly agree to strongly disagree). Questions related to the dimensions of metacognition: cognitive trust (items: 29-26-24-17-14-8), positive beliefs about anxiety (items: 28-23-19-19-10-1-1), cognitive awareness (items: 30-18-16-12-12-3), dangerous thoughts (items: 21-15-11-9-4-2), need to control thoughts (items: 27-25-22-20-20-16). To calculate the score for each dimension, we add the score for each of the questions in that dimension (19). Sadegh et al., have localized this questionnaire for the Iranian population. The Cronbach's alpha coefficient of the whole scale in the Iranian sample is reported to be 0.91 (20). Wells and Cartwright-Hatton (2004), also obtained Cronbach's alpha coefficients in the range of 0.72 to 0.93 for the subscales of this questionnaire. He reported the reliability of retesting this scale for the total score after 22 days to be 0.75 and for the subscales from 0.59 to 0.87 (19). In the present study, the reliability of this

questionnaire based on Cronbach's alpha is equal to 0.76.

2-2-3. Achievement Motivation Questionnaire

Hermans developed the scale in 1970 based on theoretical and empirical knowledge of the need for achievement, and after numerous studies, he finally selected 29 out of 92 items that many researchers have used for many years (21). The questionnaire questions are expressed in incomplete sentences, and several options are given after each sentence. For each question, four options are written. Total score means the score obtained from the set of questions, if it is high, indicates high motivation for achievement, and low scores indicate the low motivation for achievement in the individual. Besides, in a study conducted by Edwards (2009) on high school students, the validity of this scale was 0.81, and its reliability was 0.89 (22). In Hooman and Asgari's research, Cronbach's alpha and retest methods were used to estimate the reliability after three weeks, and the reliability was 0.89 and 0.85, respectively (23). In the present study, the reliability of this questionnaire-based on Cronbach's alpha was equal to 0.80.

2-3. Intervention

The statistical population of this study included all first-grade high school students in districts one and two of Shiraz in 2020. The multi-stage cluster sampling method was used to select the members of the sample group. In such a way that from four educational districts of Shiraz, two districts were randomly selected, and from each district, one school for boys and one school for girls (four schools were randomly selected), and from the total number of classes in each school, two classes were randomly selected. Due to the outbreak of coronavirus and school closures, questionnaires were prepared in PDF and WORD files and provided to

school principals and counselors. They placed questionnaires in the WhatsApp messaging groups of high school freshmen and administered the questionnaire. Students sent their answers to principals and counselors, and they sent responses to the researcher. Out of 180 questionnaires sent to the researcher by school principals and counselors, and students, 18 questionnaires were excluded from the study due to incompleteness, leaving 162 questionnaires, including 83 questionnaires for girls and 79 questionnaires for boys.

2-4. Ethical consideration

This article results from the student's dissertation in the general psychology of the Islamic Azad University of Shiraz and has the code of ethics IR.IAU.SHIRAZ.REC.1399.017 from the Ethics Committee of the Islamic Azad University of Shiraz. The objectives of the research and the need for its implementation were explained to the officials. Confidentiality of all information obtained from the participants was guaranteed, and for this purpose, the name and surname are not mentioned. The results of this research will be provided to the officials in the research units if they wish.

2-5. Inclusion and exclusion criteria

The inclusion criterion was being a first-grade high school student of both sex and studying in a governmental school. Students not being inclined to respond to the questionnaire were excluded. All of them were homogeneous in the level of education and at the first year of high school.

2-6. Data Analyses

In order to analyze the findings of the questionnaires, SPSS software version 22.0 was used. The descriptive and inferential sections in the descriptive statistics section use methods such as mean, standard deviation, and in the inferential statistics section, multivariate regression statistical methods were used.

3- RESULTS

Results showed that 162 (49.40%) were females, and (48.46%) were male in the sample group. Other demographic characteristics are shown in **Table.1**. As can be seen in **Table.2**, all path coefficients and structural factor loads on the markers were statistically significant.

Table-1: Frequency distribution of the studied sample by demographic variables.			
Variables	Variable Levels	Frequency	Percentage
Gender	Male	79	48.46
	Female	83	49.40
Age	16 years	86	53.08
	17 years	54	33.33
	18 years	22	13.58
Educational level	Mathematics	40	24.69
	Humanities	82	50.61
	Experimental	40	24.69

Table-2: Descriptive indicators of in research variables.				
Variables	Subscale	Mean± SD	Min	Max
Academic resilience	Total score	85.53±7.32	29	145
Metacognitive beliefs	Cognitive trust	17.47 ±4.81	5	25
	Positive beliefs to worry about	19.57 ±4.47	6	30
	Cognitive awareness	20.37 ±3.96	7	35
	Dangerous thoughts	17.89 ±2.89	8	40

	Need to control thoughts	12.20 ±3.67	4	20
	Total score	87.50±16.07	30	150
Achievement motivation	Total score	62.43 ±10.06	29	116

SD: Standard deviation.

Table.3 indicates the mean, standard deviation, minimum and maximum score in the test variables questionnaires. As shown in **Table 4**, the statistic F = 61.89 indicates the significance of the regression model fitted at the 95% confidence level. According to the fitted model R = 0.44, it can be claimed that 44% of the changes in students' resilience are explained by metacognitive beliefs and achievement motivation, in which metacognitive beliefs were playing the most crucial role (β = -0.601; P<0.01). According to **Table.4**, F=24.94 statistic indicates the significance of the regression model fitted at the 95% confidence level. According to R = 0.444 of the fitted model, it can be claimed that 44.4% of the changes in resilience. Various metacognitive beliefs explain to students that cognitive trust and cognitive role-play the most role in students' resilience. According to **Table.4**, F=27.285 indicates the significance of the fitted regression model at the 95% confidence level. Considering R 2 = 0.15, it can be claimed that 15% of the changes in students' resilience are explained by achievement motivation.

Table-3: Correlation matrix of the studied variables.

Variables	1	2	3	4	5	6
1. Cognitive trust	1					
2. Positive beliefs about worry	**0.44	1				
3. Cognitive awareness	**0.51	** 0.48	1			
4- Dangerous thoughts	**0.52	* 0.18	**0.38	1		
5. Need to control thoughts	**0.54	** 0.41	**0.51	**0.57	1	
6. Achievement motivation	**-0.36	** -0.31	** -0.29	** -0.26	** -0.30	1
7. Academic resilience	**-0.46	** -0.22	**-0.44	* -0.15	** -0.30	** 0.38

Table-4: Simultaneous Regression of students' resilience regression based on metacognitive beliefs and achievement motivation.

Predictive variables	B	β	t-test	P-value	R	R2	F	P-value
Constant	58.54	-	16.87	0.001	0.662	0.44	61.89	0.0001
Metacognitive beliefs	0.274	-0.601	-9.089	0.001				
Achievement motivation	0.086	0.118	1.777	0.07				
Constant	13.19	–	5.22	0.001	0.667	0.44	24.94	0.0001
Cognitive trust	-0.585	-0.384	-3.825	0.001				
Positive beliefs to worry about	-0.059	-0.036	-0.372	0.710				
Cognitive awareness	-0.368	-0.199	2.371	0.02				
Dangerous thoughts	-0.242	-0.096	-1.196	0. 233				
Need to control thoughts	-0.179	-0.090	-0.910	0.364				
Constant	78.18	-	23.5	0. 001	0.382	0.15	27.285	0.001
Achievement motivation	0.278	0.382	5.224	0.001				

B: This value represents the slope of the line between the predictor variable and the dependent variable, β: Beta (β) refers to the probability of Type II error in a statistical hypothesis test, R: R2: R squared", is the proportion of the variance in the dependent variable, F: F-statistic is a ratio of two quantities that are expected to be roughly equal under the null hypothesis p-value: significance level.

4- DISCUSSION

This study was conducted with the aim of metacognitive beliefs and achievement motivation able to predict academic resilience in high school students in Shiraz, Iran. According to the obtained results, metacognitive beliefs significantly predict students' resilience. As observed, 44.4% of changes in student resilience are explained by a variety of metacognitive beliefs that cognitive trust and cognitive awareness played the most significant role in student resilience. These results are consistent with the results of research by Aghamohammadian Shaarbaf et al. (13), Hakimi et al. (14), and Hutauruk et al. (6). Positive and negative metacognitive beliefs, by activating cognitive-attentional syndrome, disrupt the process of adaptation to existing conditions and cause psychological damage (24-25).

In other words, there is a cognitive-attentional syndrome in the second level of processing or level of thinking. When this syndrome is activated, the person first focuses on himself and his mental subjects. Attention bias leads to misunderstanding. The review process is then activated, and the review of defective cognitions invokes the third level of processing or metacognitive beliefs. Metacognitive beliefs activate the control process, and the activity of this mechanism creates situation avoidance, repression, and other incompatible mechanisms, which in turn reduces the individual's resilience (26).

In the present study, among metacognitive beliefs, cognitive trust and cognitive awareness have the most significant role in students' academic resilience. Explaining the negative relationship between cognitive trust and academic resilience, Wells et al. (25) Cognitive Beliefs Questionnaire is dominated by cognitive trust-related questions about memory that one can probably use other abilities other than memory, such as reasoning and analysis to resolve conflicts. Also, beliefs such as lack of trust in memory, poor memory, and lack of memory in remembering actions are raised in cognitive trust. Increasing such beliefs can reduce the constructive resolution of disruptive conflicts and reduce resilience in the individual (20). Therefore, negative academic resilience from the cognitive trust is expected, and cognitive awareness includes overthinking thoughts, keeping thought under constant control, and constantly checking thoughts, so overcoming such beliefs can reduce students' resilience. Also, regarding the component of positive belief about worry, it can be said that a person is worried about solving his problems, proper performance, avoiding his problems, and dealing with his problems, and such worries seem to keep a person away from appropriate and constructive conflict resolution. Accordingly, such beliefs are expected to reduce students' academic resilience. Therefore, the negative prediction of academic resilience based on metacognitive beliefs is expected (14, 15).

According to the results, achievement motivation significantly predicts students' resilience, as it was observed that 15% of changes in students' resilience are explained by achievement motivation. These findings are consistent with the findings of Ann and Kim (27) and Park and Oh (28). Based on the current study, it can be said that being motivated, as a driving force of behavior, is the basis for trying and insisting on goals, which are significant in resilient people. Those students who are more motivated have a positive perception of their set of inner characteristics and value their abilities and motivations, indicating signs of academic resilience in students (29). People who are more motivated for educational activities control the educational situation more. On the other hand, the dominance of motivated people in the learning situation reduces their anxiety or fear of failure.

Therefore, effort and commitment, along with not worrying about failure, cause learner resilience (30). The results of Magnano et al. (2016) indicate that motivation can predict resilience in learners. Research findings indicate that people perform better when they have higher achievement motivation and feel that they control their environment, tolerate annoying stimuli better, and act at a higher level (30). The motivational perspective states that highly motivated people solve problems when faced with problems, believing that they can overcome them due to their ability to solve problems in the past and having successful experiences (31). Besides, in difficult situations, such people, instead of misunderstanding the situation, focus on their abilities to solve the problem and seek solutions. A person with high achievement motivation is confident in his abilities to manage different situations, and the highly motivated person shows endurance and stability in the face of challenging tasks, and these people experience higher academic resilience during their studies (32).

4-1. Study Limitations

In this study, data were collected through self-reported questionnaires, which may affect the research results due to social desirability. Due to the outbreak of the coronavirus and the closure of schools, the questionnaires were administered online, which may reduce students' accuracy in filling out the questionnaires. Samples were from districts 1 and 2 of the Education organization, and caution should be exercised when extending it to other education districts.

5- CONCLUSION

According to the results of this study, it can be concluded that the relationship between metacognition and academic motivation and resilience was found to be significant. Therefore, it can be concluded that being motivated, as a driving force of behavior, is the basis for striving and insisting on goals, which are significant in resilient people. People with more achievement motivation showed more resilience for the problems and difficulties in growth and development and tried harder to achieve their goals. Also, these people have more hope of achieving success and solving problems, and continuing their lives. They see more opportunities for advancement in education, work, and family life, and they have more motivation to move forward and progress. More motivated students are said to have a positive perception of their set of inner characteristics and value their abilities and motivations, indicating higher resilience signs.

6- CONFLICT OF INTEREST: None.

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