

Prediction of Academic emotions based on Mindfulness with the mediating role of Resilience

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Abstract

Background: Emotions play a role in different part of human life, including education and learning. Pekrun (2003) along with his colleagues introduces a variable called Academic emotions. Academic emotions are emotions such as joy, pride, anger, anxiety and shame that a person experiences in the classroom.

Purpose: This research was carried out with the aim of predicting Academic emotions based on Mindfulness with the mediating role of Resilience.

Method: this research was carried out with the correlation method and structural equation method. The statistical population included all undergraduate students of Mazandaran university in the academic year 2023-2024. 382 students were selected from this society by voluntary sampling method. And pekrun's academic emotions scale (2005), Conner and Davidson's resilience scale (2003), and Baer's five factor questionnaire of mindfulness (2007) were sent to them online. Spss, Lisrel and Amos software were used for data analysis.

Results: Mindfulness predicts academic emotions with a standard coefficient of 0.092 with the mediating role of resilience. This variable has a direct relationship with positive academic emotions and an inverse relationship with negative academic emotions.

Conclusion: The results showed that the mindfulness predicts the academic emotions with the mediating role of resilience. Positive academic emotions increase with increasing of mindfulness and negative academic emotions decrease with decreasing of mindfulness.

Keywords: Academic emotions, Mindfulness, Resilience

Introduction

Emotions play a significant role in various aspects of human life. Researchers generally

agree that cognition precedes emotions. According to definitions, the interaction between neural processes and cognition generates a state recognized as emotion or feeling (Ashkanasy & Dorris, 2017). Empirical findings confirm that various emotions are experienced in classroom settings. For instance, university students frequently experience emotions such as joy, interest, hope, pride, anger, anxiety, frustration, and boredom (Pekrun & Garcia, 2012). Academic emotions are all types of emotions experienced in learning situations and have two dimensions: emotional arousal and emotional valence. Emotional valence refers to whether a stimulus is perceived as pleasant, while emotional arousal refers to the intensity of the emotion triggered by a stimulus (Tan, Mao, Jiang, & Gao, 2014). Academic emotions refer to a set of feelings and emotions that can influence students' learning outcomes (Li, Cui, & Chiu, 2018).

Academic emotions significantly affect students' engagement and involvement in learning. For example, they mediate the relationship between adaptability and academic engagement (Zhang, Wu, Zhou, Zhao, Goetz, & Stamm, 2021). Similarly, in a study conducted by Hanani, Zarandi, Amiri, and Azadi (2023), a strong correlation between academic emotions and academic motivation was observed, with positive academic emotions linked to higher academic motivation. Another study emphasized the relationship between academic emotions and academic performance, indicating that positive academic emotions strongly enhance students' engagement, whereas negative academic emotions do not have a significant impact (Carmona-Halty, Salanova, Llorens, & Schaufeli, 2021).

Furthermore, increased academic engagement has been shown to improve students' self-efficacy. Therefore, it can be concluded that positive academic emotions contribute to higher self-efficacy (Hu, Fang, Wu, Mei, & Dai, 2024). Positive emotions such as joy and pride have been found to predict academic success, while academic success itself can reciprocally predict positive emotions. On the other hand, negative emotions have an inverse relationship with academic success

(Pekrun & Lichtenfeld, 2017). Emotions also influence adolescent learning by affecting attention, motivation, the use of learning strategies, self-regulated learning, and achievement outcomes (Pekrun, 2017).

From Pekrun's perspective, the effects of emotions on learning and achievement are driven by several cognitive and motivational mechanisms, including motivation for learning, learning strategies, cognitive resources, and self-regulated learning. Academic emotions are associated with learning strategies, cognitive resources, self-regulation, and academic performance while also impacting students' physical and psychological well-being (Hashmizadeh & Mahdian, 2018).

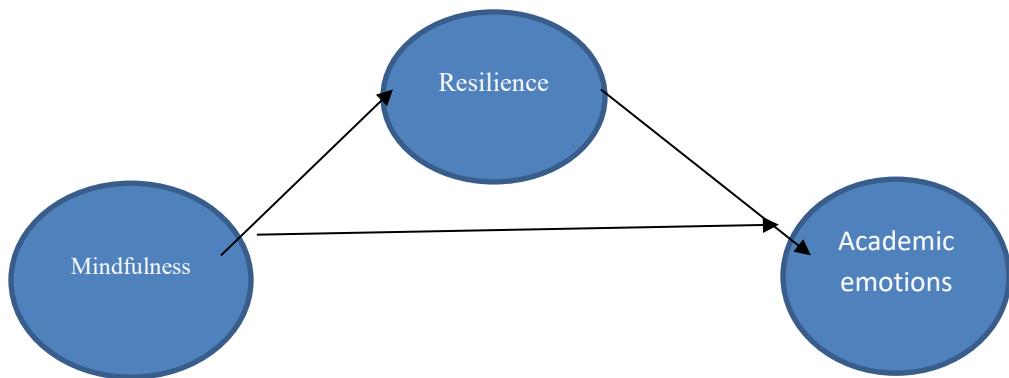
One of the variables examined in relation to academic emotions is mindfulness. Mindfulness, in its most well-known definition, refers to awareness and being present in the current moment. This experience contrasts with many moments of daily life where we unintentionally allow our minds to wander (Creswell, 2017). Mindfulness, in its primary definition, is described as focused attention and awareness on the present moment. It positively influences attention, cognition, emotions, behavior, and physiology. Mindfulness significantly affects human performance (Good, 2015). Baer defines mindfulness as purposeful, conscious, and non-judgmental attention to the present moment. Through specific meditation practices, individuals can direct their attention to the present moment. Baer emphasizes non-judgmental observation of internal and external stimuli (Baer, 2003). Baer identifies five components of mindfulness: observing internal and external experiences, describing experiences, acting with awareness, non-judgment of internal and external experiences, and non-reactivity (Tamanaeifar, 2019). Research has shown that mindfulness is associated with the academic emotions experienced in the moment (Senker, 2021). Another study concluded that mindfulness has a direct relationship with positive emotions, such as enjoyment of learning, and an inverse relationship with negative emotions, such as academic stress (Kuroda, Ito, Yamakawa, 2022). Mindfulness inversely relates to student stress

(Malik & Parveen, 2021). Teaching mindfulness techniques to university students can significantly reduce their aggression (Gao, Shi, Smith, Kingery, Thompson, 2016). Mindfulness is also effective in reducing and preventing stress and fatigue among medical students (Daya & Heath Hern, 2018).

Another variable examined in relation to academic emotions is resilience. Resilience is a component of the positive psychology approach. It is described as positive adaptation or the ability to maintain and restore mental health in the face of adversity. Herrman identifies three factors for resilience: personal factors, biological factors, environmental factors, and the interaction between these three (Herrman, 2011). According to Tugade, resilience refers to the ability to recover from negative thoughts and feelings resulting from stressful experiences. Resilient individuals maintain a positive and energetic outlook on life and remain open and curious about new experiences. For example, they are recognized for their positive emotions (Tugade, 2004). Studies show that migrant students with higher psychological resilience can improve their stress levels by accessing positive emotional resources (Geng, Wang, Zhong, Shao, 2023). Resilience positively correlates with self-efficacy and can predict success-related emotions such as anger, fatigue, frustration, shame, and anxiety (Tang, 2019). Evidence also confirms that resilience affects stress symptoms and psychological disorders in nursing students (Li & Hasson, 2020). Additionally, resilience inversely relates to university students' fatigue (Ye, Zhou, Im, Liu, Wang, Yang, 2020). There is a positive correlation between positive emotions and resilience among undergraduate students (Magalingan & Ramli, 2021).

Based on the reviewed research and existing limitations, this study uses a larger sample size. Furthermore, no variable was found to examine the mediating role of resilience in the

relationship between mindfulness and academic emotions. Therefore, the aim of this study is to investigate the mediating role of resilience in the relationship between mindfulness and academic emotions. The proposed model for this research is presented below:



Methods

This research is an applied study based on its objective. Regarding data collection, it is a cross-sectional study, and data analysis was conducted using descriptive methods and a correlational design within the framework of structural equation modeling (SEM) and path analysis. The statistical population consisted of all undergraduate students at Mazandaran University during the academic year 2023-2024. According to Kline (2011), the minimum sample size required for structural equation modeling is 200 participants. Therefore, a total of 382 undergraduate students from Mazandaran University were selected through voluntary sampling. An online questionnaire link was shared with them, which they completed.

Research Instruments:

a) Baer's Five Facet Mindfulness Questionnaire (FFMQ) (2006)

The Five Facet Mindfulness Questionnaire (FFMQ) is a 39-item self-report scale developed by Baer et al. (2006) through the combination of items from the Freiburg Mindfulness Inventory

(FMI), the Mindful Attention Awareness Scale (Brown & Ryan, 2003), the Kentucky Inventory of Mindfulness Skills (Baer & Smith, 2004), and additional items from Baer et al.'s mindfulness questionnaire based on factor analysis. The questionnaire consists of five components: observing, describing, acting with awareness, non-judging, and non-reactivity, rated on a 5-point Likert scale ranging from 1 (never true) to 5 (always true). The scoring range is between 39 and 195. The reliability and validity of the questionnaire were found to be acceptable, with Cronbach's alpha coefficients ranging from 0.75 to 0.91 for the subscales. This tool has been standardized in Iran by Ahmadzadeh.

b) Connor-Davidson Resilience Scale (CD-RISC) (2003)

The Connor-Davidson Resilience Scale (CD-RISC) was developed by Connor and Davidson in 2003. It contains 25 items measured on a 5-point Likert scale ranging from 0 (not true at all) to 5 (almost always true). Connor and Davidson reported a Cronbach's alpha reliability of 0.89 for this scale. The scale was standardized

in Iran by Mohammadi (2005), who also reported a reliability coefficient of 0.89 using Cronbach's alpha. The CD-RISC includes five components: competence, trust in instincts and tolerance of negative emotions, positive acceptance of change and secure relationships, control, and spiritual influences.

c) Pekrun's Academic Emotions Questionnaire (AEQ) (2005)

The Academic Emotions Questionnaire (AEQ) was developed by Pekrun et al. (2005). It consists of 43 items measuring two components: positive and negative academic emotions. Responses are rated on a 5-point Likert scale, with statements such as "I enjoy attending class." Kadivar et al. (2009) validated this questionnaire in Iran, reporting Cronbach's alpha coefficients ranging from 0.88 to 0.93, indicating high reliability. The two components

measured are positive and negative academic emotions.

Procedure:

Initially, the researchers coordinated with the university's student union managers and contacted students from various groups through virtual messaging platforms. Students were asked about their willingness to participate in the study. Those who expressed interest received the online questionnaire link. Ultimately, 382 undergraduate students participated in the study.

3. Results

The demographic characteristics and score distributions, along with the correlation of the research variables, are presented in Tables 1 and 2 for the student sample. Out of the total 382 participants, 235 were female (61%) and 147 were male (38%).

Table 1 – Gender Frequency in Research Sample

Gender	Frequency	Percentage
Female	235	61.5%
Male	147	38.4%
Total	382	100%

Table 2 – Marital Status Frequency in Research Sample

Marital Status	Frequency	Percentage
Single	355	92.9%
Married	27	7.1%
Total	382	100%

Table 2 indicates that 92.9% of the participants were single, while less than 8% were married.

Table 3 – Descriptive Statistics of Research Variables

Kurtosis	Skewness	Max	Min	Std. Deviation	Mean	Variable
-0.288	-0.393	40	13	6.229	27.12	Observation
0.148	-0.709	40	9	7.45	26.07	Description
-0.358	-0.32	40	12	6.589	25.25	Mindful Action
-0.159	-0.11	39	8	7.29	22.63	Non-judgment
0.212	0.72	39	12	6.585	22.48	Non-reaction
-0.651	-0.117	20	3	3.494	10.12	Competence
-0.597	-0.374	9	0	2.194	5.2	Trust in Instincts
6.089	2.069	23	0	4.025	7.7	Positive Acceptance
-0.074	0.214	28	3	4.531	15.6	Control
-0.642	-0.094	32	0	6.715	20.28	Spiritual Impact
-0.109	-0.354	15	3	2.592	9.86	Positive Emotion 1
2.921	2.339	25	2	3.707	8.46	Positive Emotion 2
0.57	-0.173	31	9	4.698	19.38	Positive Emotion 3
-0.425	-0.606	10	2	2.073	7.13	Negative Emotion 1
-0.809	0.148	15	3	3.113	8.8	Negative Emotion 2
-1.231	-0.48	25	4	6.381	16.03	Negative Emotion 3

The table below summarizes descriptive statistics, including skewness, kurtosis, mean, standard deviation, minimum, and maximum values for the variables:

Table 4: Correlation Matrix of Research Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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Observation 1

Description 0.68 1

Mindful 0.73 0.63 1
 Action

The highest correlation was observed between Non-judging and Acting with Awareness, while the lowest correlation was found between Positive Acceptance and Observing.

Data Handling:

A total of 25 missing data points were identified and replaced using the mean substitution method.

Normality Assumption:

In the hypothesized model, the skewness values for observable variables ranged between -1.137 and 2.33, while kurtosis ranged from -1.237 to 6.02. According to Chou and Bentler (1995), when skewness values are within ± 3 and kurtosis values are within ± 10 , the data distribution can be considered normal for structural equation modeling. Furthermore, Kline (2023) confirmed that for samples larger than 100 participants, data can be assumed to follow a normal distribution.

In this study, the assumption of multivariate normality was examined using Mardia's index, which yielded a value of 30.536 with a critical ratio of 2.59. Since a critical ratio equal to or

less than 5 indicates the presence of multivariate normality (Byrne, 2010), it can be concluded that the data distribution in this study is multivariate normal.

The correlation matrix among the observed variables indicated no multicollinearity issues. The correlation coefficients for the hypothetical model ranged from -0.23 to 0.76. Correlation coefficients above 0.85 could lead to multicollinearity problems, causing issues in the accurate estimation of the model (Kline, 2023). Therefore, the assumption of no multicollinearity has also been confirmed. After meeting the assumptions of structural equation modeling, the model was examined further.

Research Model

Table 5: Model Fit Indices

Fit Index	Acceptable Range	Value
Chi-Square (χ^2)	Not Significant	68.95
Chi-Square (χ^2) / df	Less than 3	2.99
Comparative Fit Index (CFI)	Greater than 0.90	0.98
Relative Fit Index (RFI)	Greater than 0.90	0.96
Goodness of Fit Index (GFI)	Greater than 0.90	0.96
Normed Fit Index (NFI)	Greater than 0.90	0.97
Standardized Root Mean Square Residual (SRMR)	Less than 0.10	0.041
Root Mean Square Error of Approximation (RMSEA)	Less than 0.08	0.069

The results in Table 5 show that while the chi-square test is significant, this statistic is sensitive to sample size. Therefore, the chi-square to degrees of freedom ratio (χ^2/df) was used to explain the model fit, where values below 3 are considered acceptable (Kline, 2015).

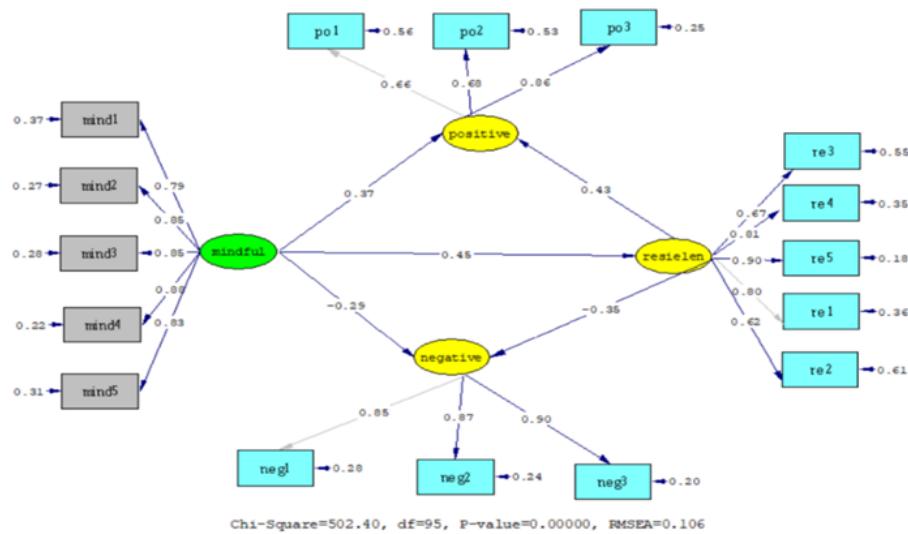


Figure 2 – Research Model:

As illustrated in Figure 2, mindfulness affects positive and negative emotions and resilience with standardized coefficients of 0.37, -0.29, and 0.45, respectively. Additionally, resilience affects positive and negative emotions with standardized coefficients of 0.43 and -0.35.

Table 6: Bootstrap Test Results for Mediating Effects

Exogenous Variable	Mediator Variable	Dependent Variable	Bootstrap Lower	Bootstrap Upper	Estimation Error	Effect Size	Significance Level
Mindfulness	Resilience	Emotions	0.042	0.111	0.018	0.092	0.001

The contents of Table 6 show that all direct pathways in the model are significant. The bootstrap test was used to evaluate the mediating relationships. As indicated, the path from mindfulness to academic emotions through resilience, with a standardized coefficient of 0.092, is significant at $p < 0.05$.

Discussion and Conclusion:

The results of the data analysis indicate a relationship between mindfulness and academic emotions with the mediating role of resilience. Mindfulness has a direct positive relationship with positive academic emotions and a negative relationship with negative academic emotions.

Mindfulness helps individuals shift their attention from the past and future to the present moment. When a person is present in the moment, they perceive various aspects of reality and understand that the mind, due to its judgments and interpretations, can lead to cognitive biases, depression, and anxiety. Mindfulness enables individuals to become more aware of their thoughts, examine them without judgment, and understand their origins. A mindful person recognizes that thoughts are merely thoughts and may not represent reality. This awareness helps individuals let go of thoughts more easily.

In attention control training, the individual focuses deeply on the present moment. Mindful students, by observing their inner reality, realize that positive emotions occur when they are not dependent on external and internal factors, such as thoughts. A person should be able to detach from automatic behaviors aimed at avoiding negative emotions and seeking positive ones.

Another characteristic of mindful individuals is acceptance, meaning they understand they have control over some situations while lacking control over others. This awareness also contributes to reducing negative emotions and increasing positive emotions (Moradi, Birami, Hashemi, & Taklavi, 2020).

Mindfulness provides a balanced mental framework that prevents emotional exaggeration and distress. It helps individuals experience fewer unpleasant emotional states and emotional instability. Furthermore, mindfulness reduces emotional disturbances such as depression, anxiety, and stress,

while promoting higher levels of positive affect, life satisfaction, and lower negative affect. Among students, mindfulness leads to positive changes in life orientation, attitude, and thinking patterns. It also enhances their ability to cope with stressful situations and improves overall performance, resulting in greater life satisfaction (Bozorgi, Asadi, Abedini, & Avarideh, 2019).

Mindfulness exercises allow individuals to redirect their attention and awareness during anxiety to neutral parts of the body, helping them manage emotions effectively. These exercises also reduce automatic and habitual responses to stressful experiences, contributing to improved physical and psychological health. By practicing mindfulness, individuals become aware of their mind's preoccupation with the past and future. This awareness helps them manage thoughts, feelings, and physical sensations associated with those thoughts more effectively.

As individuals become more conscious of their moment-to-moment feelings and emotions, they learn to acknowledge negative emotional thoughts without judgment. Among the subscales of mindfulness, non-judgmental attitudes toward thoughts and feelings are the strongest negative predictors of depression. Both non-judgment and mindful action are closely linked to reduced depressive symptoms. Those who tend to judge themselves and criticize their emotions and thoughts often experience higher levels of depression. Therefore, adopting a neutral and non-judgmental perspective plays a significant role in reducing depression (Sarabandani, Morvati, & Yousefi, 2020).

Research Limitations:

One limitation of this study is that short versions of the questionnaires were not used, which may have led to participant fatigue and a lack of precision in their responses.

Another limitation is that the use of structural equation modeling (SEM) does not allow for causal relationships between variables to be determined.

Research Suggestions:

It is recommended that the relationships between variables be re-examined using shorter versions of the questionnaires.

Another suggestion is to design an experimental study to explore the causal relationships between the variables.

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