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Examining the Impact of Family Functioning, Basic Psychological Needs, and Academic Emotions on Students' Academic Engagement in the Post-COVID Era

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A B S T R A C T

Objective: The present study aimed to investigate the impact of family functioning, basic psychological needs, and academic emotions on students' academic engagement in the post-COVID era.

Methods and Materials: The study followed a descriptive methodology with a correlational research design based on structural equation modeling. The statistical population consisted of all high school students in Tehran's educational system, from which 428 participants were selected using cluster sampling. Participants completed questionnaires on academic engagement, family functioning, basic psychological needs, and academic emotions. The reliability and validity of the instruments were confirmed using Cronbach's alpha coefficient and confirmatory factor analysis. Data were analyzed using structural equation modeling through AMOS software.

Findings: The results indicated that the direct effect of family functioning and its indirect effect via academic emotions on students' academic engagement were positive and significant. The direct effect of basic psychological needs on academic engagement was not significant; however, its indirect effect via academic emotions was positive and significant. The effect of positive academic emotions on students' academic engagement was positive and significant, while the effect of negative academic emotions was negative and significant.

Conclusion: It can be concluded that family functioning and basic psychological needs, mediated by students' academic emotions, influence academic engagement, leading to increased engagement in the post-COVID era.

Keywords: *family functioning, basic psychological needs, academic emotions, academic engagement, post-COVID era*

1. Introduction

Academic engagement is a positive, fundamental, and enduring psychological state concerning learning (Schaufeli et al., 2002). Academic engagement is not only a critical predictor of academic achievement but also an effective indicator for assessing the quality of learning and forecasting students' development (Liu et al., 2017). This characteristic is essential for learning because the amount of effort students invest significantly and directly affects their academic progress (Rabani et al., 2017). Studies have shown that the more students are engaged with academic tasks and learning assignments, the more likely they are to succeed academically (Johnson & Stage, 2018). Moreover, academic engagement is crucial in schools because teachers view it as an observable indicator of students' intrinsic motivation during lessons (Pekrun, 2006; Pekrun et al., 2002).

Numerous studies have examined factors influencing academic engagement from various perspectives. A hallmark of recent investigations is the shift from a one-dimensional to a multidimensional and systematic approach. In this perspective, environmental and personal factors must be holistically selected to predict academic engagement. Thus, to achieve a comprehensive understanding of academic engagement, examining the interplay of individual and contextual factors affecting this variable is necessary. Consequently, this study investigates the role of family functioning, basic psychological needs, and academic emotions in students' academic engagement during the post-COVID era (Badamiyan et al., 2023; Carmona-Halty et al., 2021; Eskandari & Sadoughi, 2021; Gao et al., 2023; Perkmann et al., 2021; Saati-Masoomi et al., 2021; Samadieh et al., 2023; Wenhui et al., 2023; Xu et al., 2023).

According to previous research (Camacho-Morles et al., 2021; Carmona-Halty et al., 2021; Saati-Masoomi et al., 2021; Zadeh-Mohammadi & Malek-Khosravi, 2006), one of the significant factors influencing students' academic engagement is academic emotions. Emotions are psychological states associated with physiological reactions and evaluative responses to certain actions, conditions, or events or as general evaluative responses to learning experiences, academic demands, progress, outcomes, and feedback (Lei et al., 2018). In this regard, Pekrun (2006) posits that emotions directly related to academic activities or outcomes are defined as academic emotions (Pekrun, 2006). This term, first introduced by Pekrun (2002) in educational contexts, can be categorized as positive (e.g., pride, joy, hope) or negative (e.g., fatigue, anger, anxiety), as well as active (e.g., enjoyment, pride, or anger) or passive (e.g., shame). Academic emotions are experienced across all educational contexts, including before, during, and after class attendance, studying, and exams. Some researchers identify emotions as critical determinants of motivation and academic success (Pekrun et al., 2002). Studies suggest that emotions significantly impact learning by either facilitating or impeding it. Additionally, academic emotions are directly and indirectly linked to students' academic outcomes, goal orientation, self-concept, happiness, mental and physical health, motivation, learning strategies, cognitive resources, self-directed learning, teacher-student interactions, classroom instruction, attention, processing, storage, and retrieval of information, learning, and academic achievement (Carmona-Halty et al., 2021).

Previous research has also emphasized the role of family factors in academic engagement (Amalia & Latifah, 2019; Badamiyan et al., 2023; Bayanfar et al., 2021; Wenhui et al., 2023) and academic emotions (Amalia & Latifah, 2019; Bayanfar et al., 2021; Mohammadi et al., 2021). Family background variables, such as perceived emotional support, cultural-social and socioeconomic levels, and parenting styles, positively and significantly correlate with students' academic engagement. Family functioning refers to how family members communicate, interact, and maintain relationships, as well as how decisions are made and problems are solved (Silburn et al., 2006).

Research findings indicate that variables such as the warmth of relationships, parenting styles, levels of parental support, family management and discipline, parental expectations for achievement, supervision, and cohesion are significantly associated with higher levels of cognitive and behavioral engagement in academic activities (Williams & Bryan, 2013). Empirical evidence highlights the family's role in shaping students' interactions with school and related activities (Veiga et al., 2016).

The study by Shakarami et al. (2017) indicates that a positive family emotional climate increases academic engagement (Shakarami et al., 2017). Additionally, research by Qamari et al. (2019) suggests that family dysfunction leads to students' academic underperformance (Qamari et al., 2014).

According to the literature, basic psychological needs are among the influential variables in students' emotions and academic engagement (Bordbar & Yousefi, 2016; Gao et al., 2023; Sadeghi & Barzgar, 2019; Samadieh et al., 2023; Zhen et al., 2017). A significant aspect of educational settings is the degree to which psychological needs are met during

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assignments and activities (Tian et al., 2016). Basic psychological needs can be explained using the self-determination theory. This theory posits that basic psychological needs—relatedness, competence, and autonomy—form the energy required for active engagement with the environment, skill development, and healthy growth (Deci & Ryan, 2011, 2013).

In school contexts, the need for autonomy reflects an individual's tendency to experience freedom and gain validation for their actions. Autonomy in assignments enhances competence (Leon & Liew, 2017). The need for relatedness reflects a desire for a sense of belonging at school, including connections with teachers and peers. The need for competence indicates a desire for effective interaction with the school environment and opportunities to showcase abilities. Competence fosters the confidence needed to feel accepted and connected to the surrounding environment (Tian et al., 2016).

When basic psychological needs are satisfied, individuals develop self-confidence and self-worth; when unmet, they may develop fragile, negative, alienated, and self-critical perceptions (Chen & Jang, 2010). Research findings indicate that satisfying psychological needs increases positive academic emotions (Sadeghi & Barzgar, 2019; Zhen et al., 2017) and academic engagement (Benlahcene et al., 2021; Deci & Ryan, 2011, 2013; Eskandari & Sadoughi, 2021; Mirzaei-Fandakht et al., 2020; Wang et al., 2019). Creating conditions to satisfy students' psychological needs is crucial for enhancing their academic engagement.

In summary, academic success or failure is a primary concern for any educational system. Academic success and progress reflect an educational system's effectiveness in addressing individual needs. An educational system can be considered effective and successful when students achieve high levels of academic progress. One of the major concerns of teachers, educational administrators, and students' families is improving academic engagement and preventing academic decline, particularly in the post-COVID era, due to students' dependency on smartphones. Many studies highlight the significant impact of academic decline on individuals' futures and the associated high costs for families and society. Engagement energizes learners and directs their activities, yet academic engagement significantly decreased during online education and persisted into the post-COVID era due to factors such as dependence on virtual environments. Academic emotions are directly related to academic performance and outcomes. According to previous studies, family functioning and basic psychological needs significantly influence students' academic emotions and, consequently, their academic engagement. Thus, this study seeks to investigate whether family functioning and basic psychological needs, mediated by academic emotions, are related to students' academic engagement in the post-COVID era.

2. Methods and Materials

2.1. Study Design and Participants

The present study can be classified as fundamental research in terms of its objective and nature. The research method was descriptive-correlational, utilizing structural equation modeling (SEM). The statistical population included all high school students in the Tehran education system. Considering the use of SEM in this research, the sample size was determined based on the number of variables in the model. Generally, in SEM, the sample size is determined as 10 to 20 observations per measured variable. Therefore, a sample size of 450 participants was initially considered, and after excluding incomplete questionnaires, 428 completed questionnaires were analyzed.

To select a representative sample and increase measurement accuracy, a multistage cluster random sampling method was employed. Tehran was divided into five regions (northern, southern, central, western, and eastern), and one district was randomly selected from each region. From each selected district, two schools (one for boys and one for girls) were chosen, and questionnaires were distributed among the students. The randomly selected districts were: District 3 (north), District 6 (center), District 5 (west), District 8 (east), and District 16 (south).

2.2. Measures

2.2.1. Academic Engagement

The Academic Engagement Scale by Reeve (2013) was used to measure academic engagement. This questionnaire includes 17 items across four dimensions: behavioral engagement (items 1–4), emotional engagement (items 14–17), cognitive engagement (items 10–13), and agentic engagement (items 5–9). Responses are rated on a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). Reeve (2013) reported Cronbach's alpha coefficients for the subscales as follows: behavioral engagement (0.86), emotional engagement (0.90), cognitive engagement (0.84), and agentic engagement (0.86). Bardbar

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and Yousefi (2016) confirmed the validity of the questionnaire through confirmatory factor analysis (CFA), reporting factor loadings above 0.47 at the 0.001 significance level. Ramazani and Khamsan (2017) also verified the questionnaire's validity through CFA. In the current study, Cronbach's alpha coefficients were as follows: behavioral engagement (0.74), emotional engagement (0.79), cognitive engagement (0.76), agentic engagement (0.81), and overall questionnaire reliability (0.83), indicating satisfactory reliability. CFA fit indices for this questionnaire in the present study were: GFI = 0.963, NFI = 0.903, CFI = 0.913, RMSEA = 0.028, demonstrating good validity (Ramazani & Khamsan, 2017).

2.2.2. *Family Functioning*

The Family Assessment Device (FAD) developed by Epstein, Lawrence, Baldwin, and Bishop (1983) was used to measure family functioning. This instrument, based on the McMaster model, assesses family structure and interaction characteristics across six dimensions: problem-solving, roles, affective involvement, communication, affective responsiveness, and behavior control. Responses are rated on a 5-point Likert scale from "strongly agree" (1) to "strongly disagree" (5). Items 1, 4, 7, 8, 9, 13, 14, 15, 17, 19, 21, 22, 23, 25, 28, 31, 33, 34, 35, 37, 39, 41, 42, 44, 45, 47, 48, 51, 52, 53, 54, and 58 are reverse-scored. Epstein et al. (1983) conducted the initial validation on a sample of 503 participants, reporting Cronbach's alpha values between 0.72 and 0.92 for the subscales, indicating good internal consistency. In Iran, Zadeh Mohammadi and Malek Khosravi (2006) validated the questionnaire with Cronbach's alpha coefficients as follows: problem-solving (0.87), communication (0.88), roles (0.89), affective involvement (0.89), affective responsiveness (0.89), behavior control (0.89), and overall reliability (0.87). In this study, the Cronbach's alpha coefficient was 0.89 for the overall questionnaire, indicating satisfactory reliability. CFA fit indices for this questionnaire in the current study were: GFI = 0.981, NFI = 0.941, CFI = 0.960, RMSEA = 0.065, demonstrating good validity (Zadeh-Mohammadi & Malek-Khosravi, 2006).

2.2.3. *Basic Psychological Needs*

To measure basic psychological needs, the questionnaire developed by La Guardia et al. (2000) was used. This questionnaire consists of 21 items measuring three components: autonomy (7 items), competence (6 items), and relatedness (8 items). Responses are rated on a 7-point Likert scale ranging from "not at all true" (1) to "completely true" (7). Items 3, 4, 7, 11, 15, 16, 18, 19, and 20 are reverse-scored. Deci et al. (2001) reported internal consistency coefficients for an American sample as follows: autonomy (0.79), competence (0.63), relatedness (0.84), and overall questionnaire (0.89). For a Bulgarian sample, coefficients were: autonomy (0.62), competence (0.85), relatedness (0.57), and overall questionnaire (0.83). In Iran, the questionnaire has been validated with reliability coefficients ranging from 0.74 to 0.79. Ajeh et al. (2008) assessed its validity using CFA with fit indices (GFI = 0.94, AGFI = 0.92, CFI = 0.92, RMSEA = 0.05), indicating good fit in the Iranian context. In this study, Cronbach's alpha coefficients were as follows: autonomy (0.71), competence (0.76), relatedness (0.79), and overall reliability (0.81), demonstrating satisfactory reliability. CFA fit indices for this questionnaire were: GFI = 0.902, NFI = 0.904, CFI = 0.911, RMSEA = 0.064, indicating good validity (Eskandari & Sadoughi, 2021).

2.2.4. *Academic Emotions*

The Academic Emotions Questionnaire (AEQ) developed by Pekrun et al. (2005) was used to measure academic emotions. This questionnaire consists of 43 items across seven components: enjoyment of class (5 items), pride (5 items), anger (4 items), anxiety (5 items), hopelessness (4 items), shame (8 items), and fatigue (11 items). Responses are rated on a 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). Pekrun et al. (2005) reported Cronbach's alpha coefficients ranging from 0.75 to 0.95, indicating acceptable reliability. In Iran, the questionnaire was adapted by Kadivar et al. (2009), who confirmed its validity and reliability. In this study, Cronbach's alpha coefficients were 0.79 for positive academic emotions and 0.85 for negative academic emotions, indicating satisfactory reliability. CFA fit indices for this questionnaire were: GFI = 0.975, NFI = 0.944, CFI = 0.958, RMSEA = 0.078, indicating good validity (Kadivar et al., 2009).

2.3. *Data Analysis*

Data analysis was performed in two stages. Descriptive statistics, including percentages, frequencies, means, and standard deviations, were calculated first. Inferential statistics were then used to test the research hypotheses. Shapiro's test was used to check data normality. If normal,

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Levene's test for homogeneity of variances and multivariate analysis of variance (MANOVA) were applied using SPSS version 26.

3. Findings and Results

Table 1 presents the descriptive statistics of the study variables, including mean, standard deviation, skewness, and kurtosis. One of the assumptions for using causal modeling is the normal distribution of variables. Skewness and kurtosis were used to evaluate this assumption.

Table 1

Descriptive Statistics of Study Variables

Variables	Mean	Standard Deviation	Skewness	Kurtosis
Family Functioning	180.250	11.899	-0.024	1.008
Basic Psychological Needs	63.813	6.452	-0.124	0.253
Positive Academic Emotions	24.23	15.21	0.786	-1.105
Negative Academic Emotions	95.56	23.58	-0.007	1.469
Academic Engagement	53.771	7.907	0.561	1.096

As shown in Table 1, the absolute values of skewness and kurtosis for all variables are below one, indicating that the assumption of normality for causal modeling is met. Table 2 reports the correlation matrix of the study variables.

Table 2

Correlation Matrix of Study Variables

Variables	Family Functioning	Basic Psychological Needs	Positive Academic Emotions	Negative Academic Emotions	Academic Engagement
Family Functioning	1				
Basic Psychological Needs	0.16*	1			
Positive Academic Emotions	0.196*	0.306*	1		
Negative Academic Emotions	-0.093	0.009	-0.249*	1	
Academic Engagement	0.144*	0.137*	0.350*	-0.235*	1

*p<0.01

As shown in Table 2, the correlation coefficients between the variables are positive and significant at the 0.01 level.

Table 3 reports the direct effects, t-statistics, and significance levels for the variables in the tested model.

Table 3

Results of Direct Effects in the Tested Model

Path	Path Coefficient	t-Statistic	Significance Level	Explained Variance
On Academic Engagement from:				29%
Family Functioning	0.20	2.327	0.02	
Basic Psychological Needs	0.04	0.493	0.622	
Positive Academic Emotions	0.34	4.430	0.001	
Negative Academic Emotions	-0.19	-2.821	0.005	
On Positive Academic Emotions from:				20%
Family Functioning	0.32	5.585	0.001	
Basic Psychological Needs	0.26	4.991	0.001	
On Negative Academic Emotions from:				14%
Family Functioning	-0.37	-5.461	0.001	
Basic Psychological Needs	0.03	0.631	0.528	

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As shown in Table 3, family functioning has a positive and significant effect on academic engagement (path coefficient = 0.20, t = 2.327). Positive academic emotions also have a significant positive effect on academic engagement (path coefficient = 0.34, t = 4.430). In contrast, negative academic emotions have a significant negative effect on academic engagement (path coefficient = -0.19, t = -2.821). Basic psychological needs do not have a significant effect on academic engagement.

Family functioning significantly positively influences positive academic emotions (path coefficient = 0.32, t = 5.585). Basic psychological needs significantly positively influence positive academic emotions (path coefficient = 0.26, t = 4.991). Family functioning has a significant negative effect on negative academic emotions (path coefficient = -0.37, t = -5.461). Basic psychological needs do not have a significant effect on negative academic emotions.

According to the tested model and Table 3, 29% of the variance in academic engagement, 20% of the variance in positive academic emotions, and 14% of the variance in negative academic emotions are explained by the study variables.

One feature of structural equation modeling is examining the indirect effects of variables on one another. Table 4 presents the results of indirect effects.

Table 4

Results of Indirect Effects in the Tested Model

Path	Path Coefficient	t-Statistic	Significance Level
Mediating Role of Positive Academic Emotions in:			
Family Functioning → Academic Engagement	0.11	3.471	0.01
Basic Psychological Needs → Academic Engagement	0.09	3.313	0.01
Mediating Role of Negative Academic Emotions in:			
Family Functioning → Academic Engagement	*0.07*	2.506	0.05
Basic Psychological Needs → Academic Engagement	-0.006	0.615	0.538

As shown in Table 4, positive academic emotions significantly mediate the effect of family functioning (path coefficient = 0.11, t = 3.471) and basic psychological needs (path coefficient = 0.09, t = 3.313) on academic engagement. Negative academic emotions significantly mediate the effect of family functioning on academic engagement (path coefficient = 0.07, t = 2.506). However, the mediating effect of negative academic emotions on the relationship between basic psychological needs and academic engagement is not significant.

Table 5 details the goodness-of-fit indices for the structural equation model, including absolute, comparative, and parsimonious fit indices.

Table 5

Goodness-of-Fit Indices for the Tested Model

Fit Indices	GFI	AGFI	SRMR	CFI	NFI	NNFI	χ^2/df	PNFI	RMSEA
Obtained Values	0.921	0.894	0.048	0.905	0.901	0.891	2.813	0.71	0.066
Acceptable Threshold	>0.90	>0.80	<0.05	>0.90	>0.90	>0.90	<3	>0.60	<0.08

As shown in Table 5, the obtained goodness-of-fit indices meet the acceptable thresholds, indicating that the data fit the proposed structural model well.

Figure 1 illustrates the tested model for the study hypotheses with standardized coefficients for each path.

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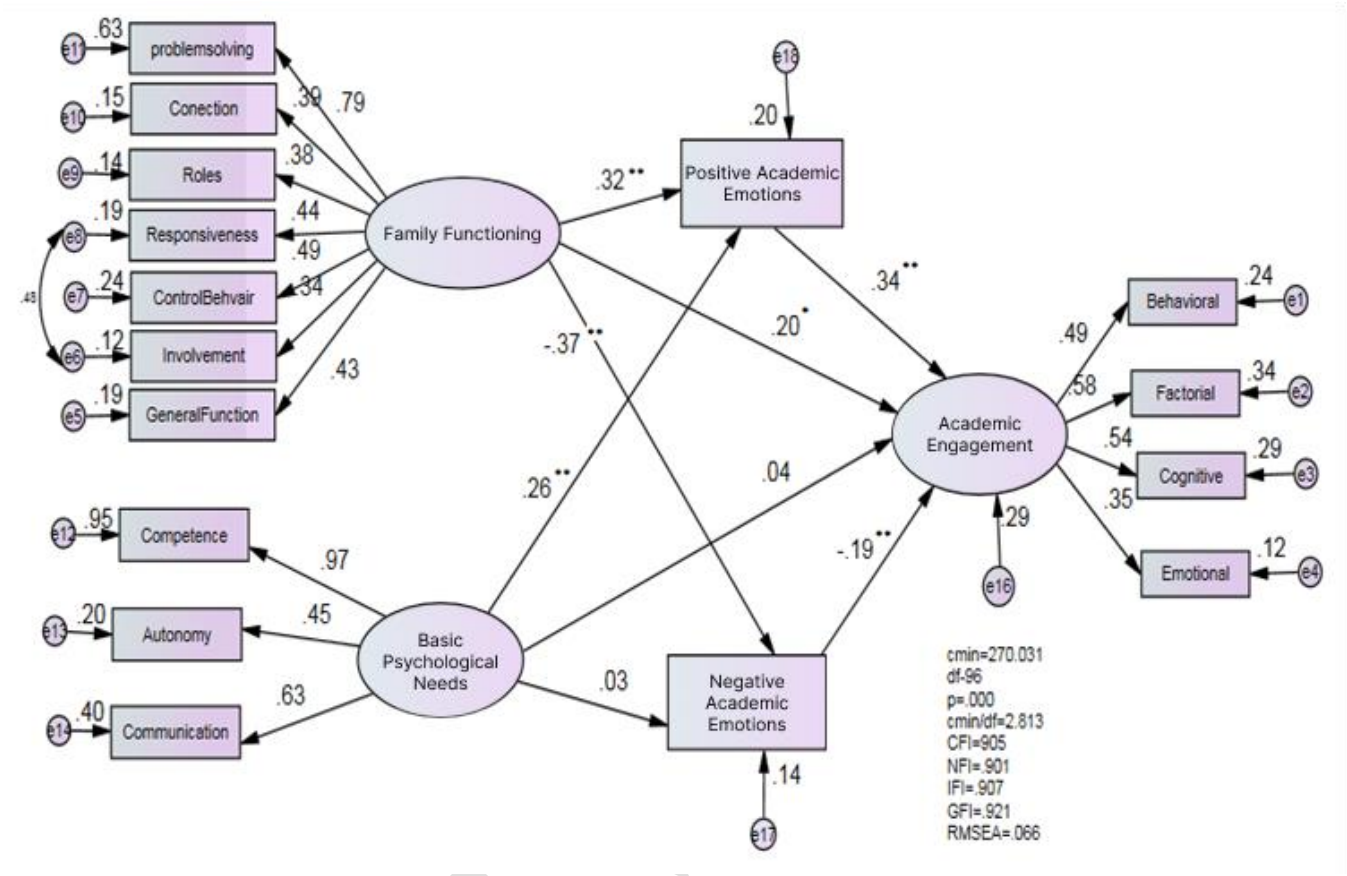
Figure 1

Tested Model of Academic Engagement Based on Family Functioning and Basic Psychological Needs Mediated by Academic Emotions



4. Discussion and Conclusion

The present study aimed to examine the impact of family functioning, basic psychological needs, and academic emotions on students' academic engagement in the post-COVID era using structural equation modeling. Overall, the results of the goodness-of-fit indices for the tested model indicated that the proposed model fits well and explains 29% of the variance in students' academic engagement during the post-COVID era.

The structural equation model results revealed that family functioning positively and significantly impacts positive academic emotions and academic engagement but negatively and significantly influences negative academic emotions. Therefore, positive family functioning increases positive academic emotions and students' academic engagement. This finding aligns with the results of prior studies (Amalia & Latifah, 2019; Badamiyan et al., 2023; Bayanfar et al., 2021; Carmona-Halty et al., 2021; Madihi & Nakhai, 2019; Saati-Masoomi et al., 2021).

Family functioning is a critical aspect of the home environment that affects children's physical, social, and emotional well-being and, consequently, their academic performance. Families play a central role in shaping children's interactions and significantly influence the development of their psychological characteristics (Petrocelli et al., 2003). This system impacts children directly, through the emotional atmosphere at home, and indirectly, through family attitudes toward issues and social dynamics (Walrond-Skinner, 2014). Family events and functionality can be key determinants of students' academic engagement.

A nurturing and stimulating family environment allows children to learn and thrive, leading to higher positive academic emotions and engagement. Families that set clear rules and boundaries, especially regarding technology use, but remain flexible are more likely to adapt effectively to changes. Healthy families strive to maintain stability while adapting to life's events. Healthy functioning helps families cope with adverse changes.

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Family functioning is rooted in interpersonal communication within the family. Warm interactions foster intimacy and affection, reducing family discord. When family members show love, affection, and appreciation, help during challenges, and celebrate successes, positive academic emotions and engagement significantly increase. Students with high family functioning demonstrate greater happiness, participation in social activities, psychological well-being, and social self-esteem, all contributing to higher levels of positive academic emotions and engagement.

The results also indicated that basic psychological needs do not directly explain academic engagement in the sample group. However, indirectly, through positive academic emotions, they significantly impact academic engagement. This finding diverges from prior studies (Benlahcene et al., 2021; Eskandari & Sadoughi, 2021; Mirzaei-Fandakht et al., 2020), but aligns with some other research (Bordbar & Yousefi, 2016; Sadeghi & Barzgar, 2019; Samadieh et al., 2023; Zhen et al., 2017).

Thus, fulfilling basic psychological needs enhances positive academic emotions, subsequently boosting academic engagement. Meeting students' needs for autonomy, competence, and relatedness creates positive emotions that increase engagement. Students who feel supported by their teachers and learning environments exhibit higher achievement, intrinsic motivation, perceived competence, and self-worth, leading to positive academic emotions and greater engagement.

The findings also showed that positive academic emotions significantly and positively impact academic engagement, while negative academic emotions have a significant negative impact. These results align with prior studies (Amalia & Latifah, 2019; Bayanfar et al., 2021; Camacho-Morles et al., 2021; Carmona-Halty et al., 2021; Saati-Masoomi et al., 2021).

Students with positive academic emotions invest more time and effort in studying, resulting in higher engagement. Positive emotions like enjoyment, hope, and pride promote engagement, flexible cognitive strategies, and self-regulation. Conversely, active negative emotions like anger, anxiety, and shame hinder cognitive resources and self-regulation, while passive negative emotions like fatigue and hopelessness diminish motivation and access to cognitive resources, reducing engagement. Pekrun (2006) identified emotions as crucial factors influencing motivation and academic engagement. Research shows that emotions significantly affect learning by either facilitating or hindering it (Pekrun, 2006).

In summary, the findings highlight that family functioning and students' basic psychological needs increase positive academic emotions and, consequently, academic engagement. Better family communication, interaction, relationship maintenance, decision-making, and problem-solving positively influence positive academic emotions, reduce negative emotions, and enhance engagement. Additionally, fulfilling basic psychological needs fosters self-confidence and self-worth, leading to positive emotions and higher engagement.

5. Limitations & Suggestions

Based on these findings, it is recommended that families consider their children's perspectives, beliefs, and roles in decision-making, particularly regarding academic matters. Furthermore, school administrators, vice principals, and teachers should address students' basic psychological needs to enhance their intrinsic motivation, psychological well-being, and positive academic emotions.

This study was limited to a sample of high school students in Tehran, making generalization to other age groups and student populations challenging. Future research should explore other factors affecting academic engagement during the post-COVID era, such as dependency on virtual spaces, smartphones, and students' sleep quality.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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