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ORIGINAL ARTICLE

Predicting Academic Progress Based on Executive Functions, Creative Thinking, And Academic Enthusiasm, With the Mediating of The Emotional Atmosphere of The Family

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Abstract

Aim: The present research was conducted with the aim of developing a structural model for predicting academic progress based on executive functions, creative thinking, and academic enthusiasm, with the mediation of the emotional atmosphere of the family. The method used in this research is a correlation and structural equation model. The statistical population of the research included all students of the second secondary school in Brojen, Iran, in 2023-2024, of whom a sample of 200 was selected via random cluster sampling. The results showed that the hypothesized model has a good fit and the variables of emotional atmosphere of the family, executive functions, creative thinking, and academic enthusiasm have a positive and significant correlation with the variable of academic achievement. Therefore, as the emotional atmosphere of the family, executive functions, creative thinking and academic enthusiasm among students improve, the level of academic progress is also improved.

***Keywords**: Academic enthusiasm, academic achievement, creative thinking, family emotional atmosphere, executive functions*

Introduction

Investigating factors affecting academic progress is relatively complex and difficult because this concept has very wide dimensions. Researchers can analyze factors affecting academic achievement at three levels: educational, intra-individual, and family. Educational factors such as suitable educational facilities and atmosphere, educational planning and teaching style and teacher's behavior are effective in students' academic progress. Besides educational and intrapersonal factors, family factors also affect academic progress. A positive attitude towards lessons, teachers, and education is one variable that influences the level of education and the amount of a person's income in the future (Kauchi, 2023). Borekci and Uyangor (2018) found that exam anxiety, academic procrastination, and family attitudes are significant predictors of academic achievement. Some studies have predicted academic progress based on executive functions. Latzman et al. (2010) found that specific dimensions of executive functions, such as cognitive flexibility, control, and inhibition, are related to different academic domains. Similarly, Dias et al. (2022) identified inhibition as a key predictor of reading performance. Another variable that correlates with academic achievement is creative thinking. Creative thinking is a powerful predictor of academic success (Sternberg, 2018; Akpur, 2020; Zakrzewska & Avsec, 2016). On the other hand, academic enthusiasm (internal interest in course materials and assignments) has a positive relationship with academic progress (Jansen, Schroeders and Lüdtke, 2016). Although various studies have introduced three variables (executive functions, creative thinking, and academic enthusiasm) as predictors

of academic progress, none of these studies have used executive functions, creative thinking, and academic enthusiasm to predict academic progress while considering the mediator role of the family's emotional atmosphere. Since no study has been conducted research to predict academic progress based on executive functions, creative thinking, and academic enthusiasm, we designed and implemented this research to develop a structural model. This model predicts academic progress by considering the mediating role of the family's emotional atmosphere in students.

Methodology

The method used in this research is a correlation and structural equation model. The statistical population of the research included all students of the second secondary school in Brojen, Iran, in 2023-2024, of whom a sample of 200 was selected via random cluster sampling.

Research tool

The Family Emotional Climate Questionnaire (FECQ): This scale was created by Hillburn (1964) . It has 8 subscales including: affection, caressing, validating, shared experiences, giving gifts, encouraging, trusting and feeling safe. Dinkelmann and Buff (2016) confirmed the construct validity of this scale and its reliability was 0.84 Reported.

Cognitive Abilities Questionnaire (Nejati, 2012)
This has 37 items that measure working memory, inhibitory control and selective attention, decision making, planning, sustained attention, social cognition and cognitive flexibility. The reliability of the questionnaire was obtained by Cronbach's alpha method of 83.3.

Academic enthusiasm questionnaire
This questionnaire was designed by Schaufeli et al. (2002) and has 17 items. The authors reported the reliability of the whole questionnaire as 0.73. The internal consistency of the dimensions of the questionnaire was calculated as 0.78 for enthusiasm scale, 0.91 for dedication to education and 0.73 for attraction to education.

Creative thinking test
This test was created by Abedi (1993) based on Torrance's theory about creativity and has 60 questions that evaluate the four components of fluidity, expansion, innovation and flexibility. The correlation between this test and the Torrance test is 0.46 and the Cronbach's alpha coefficient of this tool is reported as 0.86.

Educational progress questionnaire
This questionnaire was created by Pham and Taylor (1999) and has 48 items that measure academic performance in 5 areas related to academic achievement; It measures self-efficacy, emotional influences, planning, lack of outcome control, and motivation. Saffarieh, Rezaei, & Mohammadifar (2022) reported the reliability of the questionnaire as 0.904.

Results

Figure 1. shows the results of the final review of the structural equation model of the relationship between executive functions, creative thinking, academic enthusiasm and academic progress with the mediation of family emotional atmosphere among secondary school students. As it is evident, the relationship between academic enthusiasm and academic achievement has been removed in the current model, which means that the significance level obtained from this relationship has been calculated as 0.235, which is higher than the significance level of 0.05, while other relationships in the current model are significant. were and their relationships are included.

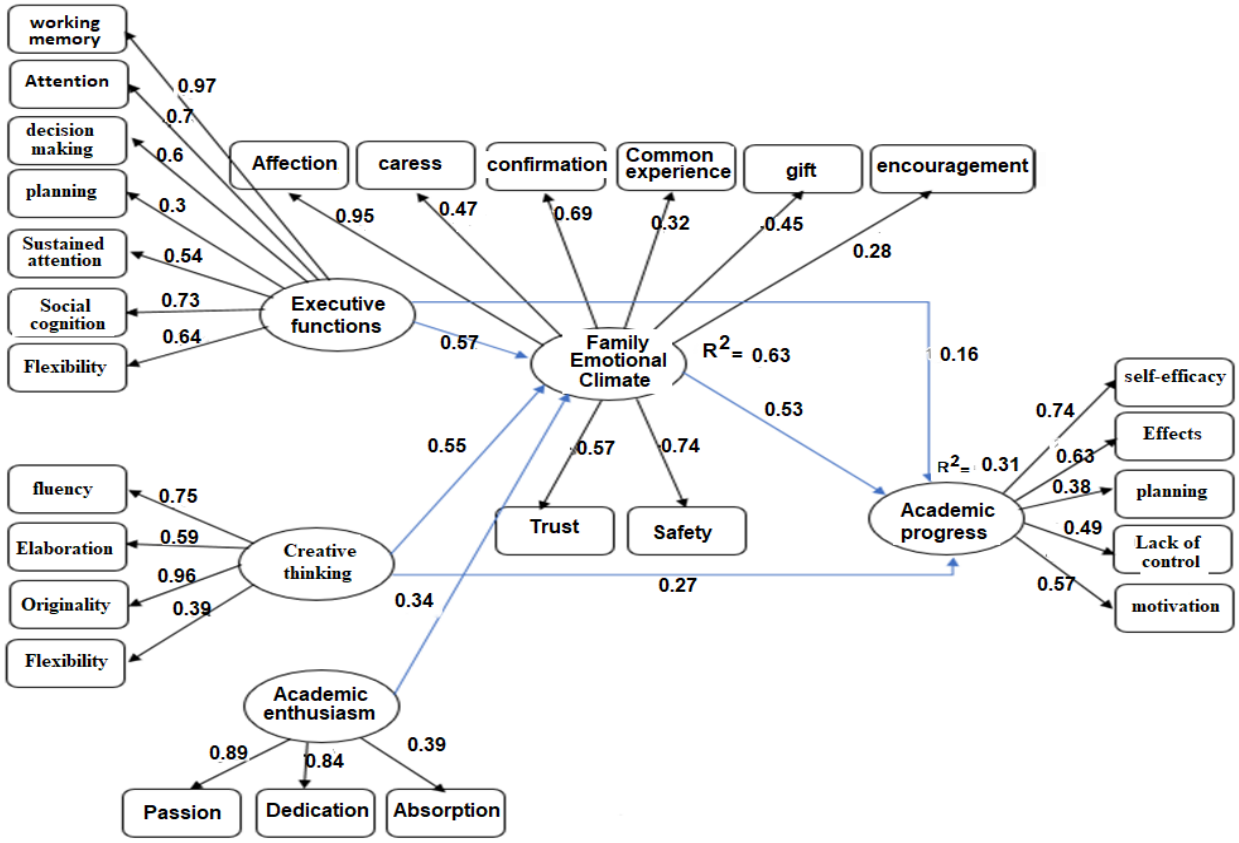

Figure 1. Testing the research model with standardized path coefficients

Table 1 shows the results of examining the standard and non-standard direct coefficients of the relationship between executive functions, creative thinking, academic enthusiasm and the academic progress of students with the mediation of the emotional atmosphere of the family. The results show that the exogenous variables of executive functions (β=0.568,T=10.58), creative thinking (β=0.552,T=8.782) ,academic enthusiasm (β=0.341,T=4.972) have a significant and positive effect on the mediating variable of the family's emotional atmosphere because the calculated t is greater than 1.96. This means that as executive functions, academic enthusiasm and creative thinking increase among students, the emotional atmosphere of the family also increases. The results also show that the exogenous variable of executive functions (β=0.16,T=2.835), creative thinking (β=0.27,T=3.027) and the mediating variable of family emotional atmosphere (β=0.525,T=4.686) has a significant and positive effect on the endogenous variable of academic achievement. therefor , by increasing the level of executive functions, creative thinking and emotional atmosphere of the family, the level of academic progress of students is also improved.

Table 1. Standardized coefficients, t value, and significance level

Research variables	b	β	S.E	t	P
Executive functions → emotional atmosphere of the family	0.298	0.568	0.028	10.58*	0.0001
Creative thinking → emotional atmosphere of the family	0.102	0.552	0.012	8.782*	0.0001
Academic enthusiasm → the emotional atmosphere of the family	0.032	0.341	0.033	4.972*	0.002
Emotional atmosphere of the family → academic progress	0.118	0.525	0.042	4.686*	0.001
executive functions → academic progress	0.499	0.160	0.072	2.835*	0.021
Creative thinking → academic progress	0.296	0.270	0.098	3.027*	0.001

*T value>1.96

Discussion and conclusion

The results of the analysis showed that the proposed model has a good fit. This model could predict academic progress based on executive functions, creative thinking and academic enthusiasm with mediating the emotional atmosphere of the family. The exogenous variables of executive functions, creative thinking and academic enthusiasm have a significant and positive effect on the mediating variable of family emotional atmosphere. This means that as executive functions, academic enthusiasm and creative thinking increase among students, the emotional atmosphere of the family also becomes more favorable. The results also showed that the exogenous variable of executive functions, creative thinking and the mediating variable of family emotional atmosphere have a significant and positive effect on the endogenous variable of academic achievement, so with the increase in the amount of executive functions, creative thinking and the family emotional atmosphere becoming more favorable, The level of academic progress of students is also improved. The results are in line with the study of Wall et al. (2023) which examines the relationship between executive performance and academic progress and the role of socio-economic status in students. It is also consistent with the research of Quintana (2023) who identified executive functions and motivation as direct causes of academic progress and the results of Zhao et al. (2023) who examined the relationship between executive functions and creative thinking of teenagers.

In short, the emotional atmosphere of the family can affect the progress and academic enthusiasm of students through various mechanisms such as increasing parental participation and support, modeling a positive attitude towards learning, reducing stress and anxiety, encouraging creative activities and improving executive functions.

Considering the optimal fit of the proposed model in the current research, we recommend education officials to use this model in planning and providing solutions to improve academic progress.

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