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Research Paper

Relationship Between of an Individual Self-Esteem, Locus of Control and Academic Achievement: A Cohort Bases Data-Driven Statistical Study

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ABSTRACT

The study of key factors influencing academic performance is of critical importance in the contemporary educational landscape. Academic achievement is not solely determined by cognitive abilities but is also significantly shaped by psychological factors. Among these, self-esteem and locus of control are two essential constructs that play a crucial role in influencing an individual's academic outcomes. The present study investigates the relationships among self-esteem, locus of control, age, and academic performance, with particular emphasis on mediation and moderated mediation mechanisms. Drawing on established psychological and educational frameworks, the study explores whether locus of control functions as a mediator in the relationship between self-esteem and academic performance and whether age moderates these associations. A quantitative analytical approach was employed, integrating correlation analysis, regression modeling, structural equation modeling, and moderated mediation techniques to examine both direct and indirect pathways among the variables. The study further evaluates conditional relationships to understand how these psychological constructs interact within an academic context. The findings contribute to the growing body of literature by clarifying the role of individual psychological factors in shaping academic outcomes. Specifically, the study underscores the importance of self-related constructs while critically examining the extent to which intermediary and contextual variables influence these relationships.

Keywords: *Self-Esteem, Academic Performance, Locus of Control, Mediation Analysis and Moderated Mediation*

"If you have no confidence in self, you are twice defeated in the race of life. With confidence, you have won even before you have started."

——— Marcus Mosiah Garvey Jr,
Jamaican political activist

Academic achievement is a central concern in educational psychology, as it reflects not only students' intellectual abilities but also their motivation, personality characteristics, and psychological adjustment to the learning environment. In recent

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years, increasing attention has been given to non-cognitive factors that influence students' academic performance and adaptation to academic demands. Among these factors, self-esteem and locus of control have emerged as significant psychological variables affecting students' learning behavior, academic engagement, and overall success in higher education.

Self-esteem refers to an individual's overall evaluation of their own worth and competence **Rosenberg, 1965**. It plays a crucial role in shaping students' confidence, emotional well-being, and resilience when facing academic challenges. Students with high self-esteem tend to demonstrate greater motivation, persistence, and adaptive coping strategies, whereas those with low self-esteem may experience anxiety, self-doubt, and reduced academic engagement. In the context of college and university education, self-esteem is particularly important as students are required to adapt to new academic expectations, social environments, and future career planning.

Another important personality variable influencing academic outcomes is locus of control, a concept introduced by **Rotter (1966)** within the framework of social learning theory. Locus of control refers to an individual's belief about the extent to which life events and outcomes are contingent upon their own actions (internal locus of control) or are determined by external forces such as luck, fate, or powerful others (external locus of control). Students with an internal locus of control are more likely to assume responsibility for their academic performance, set realistic goals, and actively engage in learning activities. In contrast, students with an external locus of control may attribute academic success or failure to factors beyond their control, leading to reduced effort and lower academic achievement.

Self-esteem and locus of control are important psychological constructs that influence students' academic achievement, shaping their motivation, confidence, and approach to learning. Prior research by Sterbin and Rakow [1996] suggests that students with higher self-esteem and a more internal locus of control tend to demonstrate better academic performance and greater responsibility for their outcomes. Adolescent self-esteem and locus of control evolve over time and are influenced by factors such as age and gender, reflecting important developmental patterns in psychological growth. By Chubb et al. [1997] shown that in their paper longitudinal evidence indicates that variations in these constructs can significantly impact behavioral outcomes and academic adjustment during adolescence. Self-esteem has been identified as a significant factor influencing academic achievement among adolescents, affecting their motivation, persistence, and overall performance in educational settings. Empirical findings by Alves-Martins et al. [2002] suggest a positive association between higher self-esteem and better academic outcomes, highlighting its role in students' academic success. Self-esteem, along with gender, plays a crucial role in influencing the academic achievement of undergraduate students, with variations observed across different demographic groups. Research indicates by Naderi et al. [2009] that higher levels of self-esteem are generally associated with improved academic performance, although gender differences may moderate this relationship. Locus of control has been found to vary with age, as observed by Knoop [1981], indicating that individuals' perceptions of control over life events may change across different stages of development. These variations are also associated with psychological and behavioral factors that influence decision-making and personal outcomes. Academic performance and students' expectations of their grades are influenced by multiple factors, as demonstrated by Borges et al. [1980], including gender, age, locus of control, and self-esteem. These variables interact to shape how students perceive and estimate their academic outcomes. Locus of control and self-esteem are key

predictors of students' life satisfaction and academic performance, as indicated by Khaleghinezhad et al. [2016], highlighting their significant role in both psychological well-being and educational outcomes. These factors jointly contribute to shaping students' overall adjustment and success in academic environments. Self-esteem and a sense of personal control play crucial roles in the academic achievement process, as discussed by Ross and Broh [2000], influencing students' engagement, effort, and persistence in their studies. These psychological factors contribute significantly to shaping educational outcomes and long-term academic success. Academic achievement among college students has been closely associated with their locus of control, as highlighted by Mathur [2014], suggesting that individuals with a stronger sense of internal control tend to perform better academically. This relationship underscores the importance of personal belief systems in shaping educational success. The relationship between attributional style, self-esteem, locus of control, and academic achievement has been explored by Ruibytė [2007], indicating that these psychological constructs are interrelated and collectively influence students' academic outcomes. Such findings emphasize the combined effect of cognitive and personality factors on educational performance. Self-esteem and locus of control have been identified as significant predictors of academic achievement, as demonstrated by Suraj et al. [2024], particularly among graduate students where these psychological factors strongly influence learning outcomes. Their combined effect highlights the importance of both self-perception and perceived control in determining academic success. Locus of control has been shown to be significantly associated with academic achievement and learning styles, as reported by Althubaiti et al. [2025], particularly among pre-professional medical students. The findings suggest that students' perceived control over outcomes can influence both their learning approaches and overall academic performance. Locus of control, along with resilience, plays a crucial role in shaping students' academic achievement, as highlighted by Arsini and Rusmana [2023], indicating that psychological strength and perceived control jointly contribute to better educational outcomes. These factors help students adapt to challenges and enhance their academic performance.

Statistical power analysis is a fundamental aspect of research design, as emphasized by Cohen [2013], enabling researchers to determine adequate sample sizes and ensure the reliability and validity of their findings. Proper consideration of power helps in minimizing Type II errors and strengthening empirical conclusions. Mediation analysis plays a crucial role in understanding the mechanisms underlying relationships between variables, as explained by Sathyanarayana and Mohanasundaram [2025], particularly within the framework of structural equation modeling. It helps in identifying indirect effects and provides deeper insights into causal pathways in empirical research.

Despite the growing body of research on self-esteem and locus of control, there remains a need to further explore how these personality characteristics interact with each other and how they collectively influence academic performance and future aspirations among college and university students. Understanding these relationships is essential for identifying students who may be at risk of learning and adaptation problems and for designing effective psychological and educational interventions.

The present study aims to investigate the relationship between self-esteem, locus of control, and academic achievement among college and university students. The primary purpose of the research is to examine the interrelation between self-esteem and locus of control, analyze how these personality traits are associated with students' future aspirations, and determine

how these variables are reflected in students' academic performance. By addressing these objectives, the study seeks to provide a comprehensive understanding of the psychological factors influencing academic success in higher education.

The study also focuses on identifying specific features of self-esteem and locus of control among college and university students and examining their combined effect on academic grades. Such an analysis is expected to contribute to a deeper understanding of students' learning behavior and adaptation problems, thereby offering valuable insights for educators, counselors, and academic institutions.

By integrating standardized psychological measures with a structured academic performance scale, the present study aims to provide reliable and meaningful insights into the relationship between self-esteem, locus of control, future aspirations, and academic achievement. The findings of this research are expected to have important implications for educational psychology, student counseling, and academic support programs, contributing to the enhancement of students' academic success and psychological well-being.

Research Gap

Although a substantial body of literature has examined the influence of psychological characteristics on academic achievement, several important limitations remain in existing research. Earlier studies have generally focused on the independent effects of psychological variables such as self-esteem and locus of control on students' academic performance. While these studies provide valuable insights, they often rely on simple correlation or regression analyses and rarely explore the complex mechanisms through which these psychological variables interact with each other to influence academic outcomes. One important limitation of previous research is the lack of investigation into the potential mediating role of locus of control in the relation-ship between self-esteem and academic achievement. According to Rotter's Social Learning Theory, individuals' beliefs about control over life events significantly influence their behavior and performance outcomes. However, empirical studies examining whether locus of control acts as a mediator between self-esteem and academic performance remain relatively limited. Another gap in the literature concerns the role of demographic factors such as age in shaping students' psychological characteristics and academic outcomes as a moderator. As students progress through their academic journey, their sense of responsibility, confidence, and control over academic outcomes may evolve. Despite this, relatively few studies have examined whether age moderates the relationship between locus of control and academic achievement. Furthermore, many previous studies have focused on Western educational settings, leaving a need for empirical research that examines these psychological constructs within diverse college and university environments. In addition, limited research has integrated standardized psycho-logical instruments such as the Rosenberg Self-Esteem Scale and Rotter's Locus of Control Scale with structured measures of academic performance within a single analytical framework. Therefore, the present study aims to address these gaps by examining the interrelationship be-tween self-esteem, locus of control, and academic achievement among college and university students in West Bengal, India, while also investigating the mediating role of locus of control and the moderating effect of age. By applying statistical modeling techniques to psychological constructs, the study seeks to provide a more comprehensive understanding of the psychological factors influencing academic success in higher education.

Objectives of the Study

The present study aims to examine the relationships among self-esteem, locus of control, age, and academic achievement within a comprehensive analytical framework. The specific objectives of the study are as follows:

1. To examine the effect of self-esteem on academic achievement.
2. To analyze the influence of self-esteem on locus of control.
3. To investigate the effect of locus of control on academic achievement.
4. To assess the mediating role of locus of control in the relationship between self-esteem and academic achievement.
5. To evaluate the moderating effect of age on the relationship between locus of control and academic achievement.
6. To examine whether there exists a significant difference in locus of control, self-esteem, and academic achievement across different age groups.
7. To analyze the presence of a moderated mediation effect, wherein age influences the indirect relationship between self-esteem and academic achievement through locus of control.

Research Hypotheses

Based on the objectives of the study, the following hypotheses are formulated:

1. **H1:** Self-esteem has a significant effect on academic achievement.
2. **H2:** Self-esteem has a significant effect on locus of control.
3. **H3:** Locus of control has a significant effect on academic achievement.
4. **H4:** Locus of control mediates the relationship between self-esteem and academic achievement.
5. **H5:** Age moderates the relationship between locus of control and academic achievement.
6. **H6:** There are statistically significant differences in locus of control, self-esteem, and academic achievement between younger and older age groups.
7. **H7:** There is a moderated mediation effect of age on the indirect relationship between self-esteem and academic achievement via locus of control.

METHODOLOGY

Research Design

The present study adopted a quantitative, cross-sectional research design to examine the relationships among self-esteem, locus of control, age, and academic achievement. The study further investigated mediation and moderated mediation mechanisms using regression-based and structural equation modeling approaches.

Participants

The study was conducted among 107 college and university students selected through a survey-based data collection method. The participants were drawn from different academic back-grounds and age groups within the university. Participation in the study was voluntary, and respondents were assured that their responses would remain confidential and used solely for research purposes. The sample size of 107 participants is considered adequate for the present study, given the nature of the statistical techniques employed. Previous methodological literature by Sim et al. [2022] suggests that regression, mediation, and structural equation modeling analyses can yield reliable and valid results with moderate sample sizes, particularly when the model is relatively simple and involves a limited number of observed variables. Also previous research by Fritz and MacKinnon [2007] indicates that

the lower quartile of sample sizes in mediation studies is approximately 107, suggesting that moderate sample sizes are commonly employed in such analyses. Therefore, the use of 107 participants is appropriate and justified for examining the proposed relationships among self-esteem, locus of control, age, and academic performance.

Self-Esteem Measurement

Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES) developed by Rosen-berg (1965). The scale consists of 10 statements designed to measure an individual's global self-worth and overall evaluation of self. Participants responded to the items using a Likert-type scale indicating their level of agreement with each statement. The responses were aggregated to obtain an overall self-esteem score denoted as **RSE_SCORE**. Higher scores represent higher levels of self-esteem.

Locus of Control Measurement

Locus of control was measured using Rotter's Locus of Control Scale developed by Rotter (1966). The scale consists of 29 statements, including 23 diagnostic items and 6 filler items. Each item presents two alternative statements representing internal and external control orientations. Responses were scored according to Rotter's standard scoring method, where external responses were assigned a value of 1 and internal responses were assigned a value of 0. The total score represents the degree of externality of the individual. Higher scores indicate a stronger external locus of control. The total locus of control score is represented as **Score** in the dataset.

Academic Achievement Measurement

Academic achievement was assessed using an Academic Performance Scale consisting of 8 items developed specifically for this study. The scale measures students' academic engagement, study habits, and perceived academic performance. Responses were aggregated to obtain an overall academic performance score represented as **Academic_Score**. Higher values represent better academic performance.

Descriptions of the variables

- **Gender:** Gender was recorded in nominal scale, where the respondent had the options for Male, Female, Other and Prefer not to say.
- **Age:** Age was recorded in years and used both as a continuous and categorical variable (Younger (Age <= 21) and Older (otherwise) for moderation analysis.
- **Self-Esteem (RSE_SCORE):** Self-esteem was measured using a standardized scale (e.g., Rosenberg Self-Esteem Scale). Higher scores indicate higher levels of self-esteem.
- **Locus of Control (Score):** Locus of control was assessed using a composite score, where higher values represent a tendency toward external locus of control. For categorical analysis, the variable was classified into three groups: Internal, Mixed, and External.
- **Academic Achievement (Academic_Score):** Academic performance was measured using students' academic scores, treated as a continuous variable.

Data Analysis

Data analysis was conducted using R R Core Team [2025] statistical software. Descriptive statistics were computed to summarize the central tendency and variability of the variables.

Pearson's product-moment correlation analysis was performed to examine the bivariate relationships among self-esteem, locus of control, and academic achievement.

Simple and multiple linear regression analyses were conducted to assess the predictive relationships among variables. Specifically, self-esteem was tested as a predictor of both locus of control and academic achievement, and locus of control was examined as a predictor of academic achievement.

Mediation Analysis

To examine whether locus of control mediates the relationship between self-esteem and academic achievement, mediation analysis was conducted using both regression-based approaches and structural equation modeling (SEM) with the lavaan package in R. The indirect effect was computed as the product of the path coefficients, and its statistical significance was evaluated using the Sobel test.

Moderation Analysis

Moderation analysis was conducted to test whether age moderates the relationship between locus of control and academic achievement. Mean-centered variables were used to reduce multicollinearity, and an interaction term (LOC × Age) was included in the regression model.

Group Comparison Analysis

To examine whether locus of control differs across age categories, participants were divided into two groups based on their age. Specifically, respondents aged 21 years or below were classified as the *Younger* group, while those above 21 years were categorized as the *Older* group.

An independent samples *t*-test (Welch's *t*-test) was conducted to compare the mean locus of control scores between the two age groups. This test was chosen as it does not assume equal variances between groups and is robust for unequal sample distributions. The analysis was performed using a two-tailed significance test at the 5% level of significance.

The dependent variable in this analysis was locus of control (Score), while the grouping variable was age category (Younger vs. Older). The results of this analysis help determine whether age-based differences exist in locus of control among the participants.

Moderated Mediation Analysis

A moderated mediation model was estimated to examine whether the indirect effect of self-esteem on academic achievement through locus of control varies as a function of age. In the moderated mediation model, X represents self-esteem (RSE_SCORE), M represents locus of control (Score), and Z represents age; accordingly, interaction terms ($X \times Z$ and $M \times Z$) were included in the mediator and outcome models, respectively.

Conditional indirect effects were computed at low ($-1 \times SD$), mean, and high ($+1 \times SD$) levels of the moderator (age). The index of moderated mediation was calculated to formally test the presence of moderated mediation.

All statistical tests were two-tailed, and a significance level of $\alpha = 0.05$ was adopted.

RESULTS AND INTERPRETATION

Initially, descriptive statistics were computed to summarize the basic characteristics of the data, including measures of central tendency (mean) and dispersion (standard deviation, range), along with skewness for all variables. This preliminary analysis provided an overall under-standing of the distribution and variability of self-esteem, locus of control, age, and academic performance. In addition, frequency distributions and percentages were calculated for categorical variables such as gender to facilitate further analysis. The results of the descriptive analysis are presented below in Table 1.

Table 1: Descriptive Statistics of Study Variables

Variable	N	Mean	SD	Min	Max	Skewness
Age	107	21.64	3.37	17	36	1.50
Score (LOC)	107	12.69	2.89	7	20	0.42
RSE_SCORE	107	22.44	3.37	15	34	0.73
Academic_Score	107	31.86	4.36	22	40	-0.17

Source: All tables are made by authors' own simulation and analysis

Descriptive statistics were computed for Age, Locus of Control (Score), Self-Esteem (RSE_SCORE), and Academic Achievement (Academic_Score). The mean age of the participants was M =21.64 years (SD = 3.37). The mean locus of control score was M = 12.69 (SD = 2.89), indicating a tendency towards a mixed locus of control. The mean self-esteem score was M = 22.44 (SD = 3.37), while the mean academic score was M = 31.86 (SD = 4.36).

The skewness values indicated that Age (*skew* = 1.50) was positively skewed, while Academic Score (*skew* = −0.17) was approximately symmetric. Overall, the variables exhibited acceptable distributional properties for further parametric analysis.

The sample included participants of different genders. The distribution of gender in the dataset is presented in Table 2. This distribution provides an overview of the composition of the sample and ensures representation across gender categories for subsequent analysis.

Table 2: Gender Distribution of Participants

Gender	Frequency	Percentage (%)
Male	47	43.93
Female	59	55.14
Perfer Not to say	01	0.93
Total	107	100

Now, participants were categorized into three groups based on their locus of control scores: Internal (n = 5), Mixed (n = 76), and External (n = 26). The majority of participants fell into the Mixed category, indicating a balanced attribution style between internal and external control.

To examine the bivariate relationships among the key study variables, Pearson's correlation analysis was performed. This analysis helps in understanding the strength and direction of linear associations between self-esteem, locus of control, and academic achievement.

Pearson correlation analysis revealed that in the Table 3

Table 3: Pearson Correlation Matrix

Variable	RSE_SCORE	Score (LOC)	Academic_Score
RSE_SCORE	1		
Score (LOC)	0.13	1	
Academic_Score	0.295**	0.07	1

** $p < 0.01$

- Self-esteem was not significantly correlated with locus of control, $r = 0.13$, $p = 0.181$.
- Locus of control was not significantly correlated with academic achievement, $r = 0.07$, $p = 0.460$.
- Self-esteem was positively and significantly correlated with academic achievement, $r = 0.295$, $p = 0.002$.

These findings suggest that higher self-esteem is associated with better academic performance, whereas locus of control does not show a significant direct relationship with either variable.

To further examine the predictive relationships among the study variables, simple linear regression analyses were conducted as shown in the Table 4. These analyses were used to assess the direct effects of self-esteem and locus of control on academic achievement, as well as the influence of self-esteem on locus of control.

Table 4: Simple Linear Regression Results

Model	Predictor	β	SE	t	p-value	R^2
Academic Score	Intercept	23.311	2.733	8.530	< 0.001	0.08698
	RSE Score	0.381	0.120	3.163	0.002**	
Locus of Control	Intercept	10.190	1.880	5.420	< 0.001	0.01695
	RSE Score	0.111	0.083	1.345	0.181	

Note: ** $p < 0.01$.

A simple linear regression analysis was conducted to examine the effect of self-esteem on academic achievement. The results indicated that self-esteem significantly predicts academic achievement, $\beta = 0.381$, $t(105) = 3.163$, $p = 0.002$. The model was statistically significant, $F(1, 105) = 10.00$, $p = 0.002$, explaining approximately 8.70% of the variance in academic achievement ($R^2 = 0.08698$). This suggests that higher levels of self-esteem are associated with higher academic performance among students.

A second regression analysis was performed to assess whether self-esteem predicts locus of control. The findings from Table 5 revealed that self-esteem does not significantly predict locus of control, $\beta = 0.111$, $t(105) = 1.345$, $p = 0.181$. The overall model was not statistically significant, $F(1, 105) = 1.81$, $p = 0.181$, with a very low proportion of explained variance ($R^2 = 0.01695$). These results indicate that self-esteem has a weak and non-significant relationship with locus of control in the present study.

Table 5: Effect of Locus of Control on Academic Achievement

Outcome	Predictor	*β*	SE	t	p-value	R^2
Academic Score	Intercept	30.478	1.911	15.953	< 0.001	
	Score	0.109	0.147	0.742	0.460	0.0052

Note: $p > 0.05$ indicates non-significance.

A simple linear regression analysis was conducted to examine the effect of locus of control on academic achievement. The results indicated that locus of control does not significantly predict academic achievement, $\beta = 0.109$, $t(105) = 0.742$, $p = 0.460$. The overall regression model was not statistically significant, $F(1, 105) = 0.55$, $p = 0.460$, explaining only 0.52% of the variance in academic achievement ($R^2 = 0.0052$). These findings suggest that locus of control has a negligible and non-significant influence on students' academic performance in the present study.

To examine the combined effect of multiple predictors on academic achievement, a multiple linear regression analysis was performed. This approach allows for the assessment of the unique contribution of each predictor while controlling for the influence of other variables in the model.

Table 6: Multiple Regression Analysis Predicting Academic Achievement

Outcome	Predictor	*β*	SE	t	p-value	$_R2$
Academic Score	Intercept	22.782	3.105	7.338	< 0.001	
	RSE Score	0.375	0.122	3.076	0.003**	0.08815
	Score	0.052	0.142	0.364	0.716	

Note: ** $p < 0.01$.

From the Table 6 we can see that the overall model was statistically significant, $F(2, 104) = 5.03$, $p = 0.008$, explaining approximately 8.82% of the variance in academic achievement ($R^2 = 0.08815$).

The results revealed that self-esteem is a significant positive predictor of academic achievement, $\beta = 0.375$, $t(104) = 3.076$, $p = 0.003$. In contrast, locus of control does not significantly predict academic achievement when controlling for self-esteem, $\beta = 0.052$, $t(104) = 0.364$, $p = 0.716$. These findings indicate that self-esteem independently contributes to academic performance, whereas locus of control does not have a significant unique effect.

To examine the underlying mechanism linking self-esteem and academic achievement, a mediation analysis was conducted using structural equation modeling (SEM). This approach enables the simultaneous estimation of direct, indirect, and total effects among the variables within a unified framework.

Table 7: Structural Equation Model Path Estimates

Path	Estimate	SE	z-value	p-value	Std. Estimate
RSE → Score (a)	0.111	0.082	1.358	0.174	0.130
Score → Academic (b)	0.052	0.140	0.369	0.712	0.034
RSE → Academic (c)	0.375	0.120	3.120	0.002**	0.290

Table 8: Direct, Indirect, and Total Effects

Effect Type	Estimate	SE	z-value	p-value	Std. Estimate
Indirect Effect (a×b)	0.006	0.016	0.357	0.721	0.004
Direct Effect (c)	0.375	0.120	3.120	0.002**	0.290
Total Effect	0.381	0.119	3.193	0.001**	0.295

Note: ** $p < 0.01$.

The results indicated that the direct effect of self-esteem on locus of control was not statistically significant, $a = 0.111$, $z = 1.358$, $p = 0.174$. Similarly, the effect of locus of control on academic achievement was also non-significant, $b = 0.052$, $z = 0.369$, $p = 0.712$ as shown in the Table 7. However, from the Table 8 we can see that the direct effect of self-esteem on academic achievement was found to be statistically significant, $c = 0.375$, $z = 3.120$, $p = 0.002$.

The indirect effect of self-esteem on academic achievement through locus of control was not significant, = 0.006, $z = 0.357$, $p = 0.721$, indicating the absence of a mediation effect. Furthermore, the total effect of self-esteem on academic achievement was statistically significant, = 0.381, $z = 3.193$, $p = 0.001$.

Overall, these findings suggest that self-esteem has a direct positive influence on academic achievement, while locus of control does not mediate this relationship.

To further validate the mediation findings obtained from structural equation modeling, a Sobel test was performed to assess the significance of the indirect effect. This test provides an additional statistical confirmation of whether the mediator carries the influence of the independent variable to the dependent variable.

To examine the significance of the indirect effect of self-esteem (RSE_SCORE) on academic performance through locus of control (Score), a Sobel test was conducted.

Table 9: Sobel Test Results for Mediation Effect

Effect	Estimate	SE	Z-value	p-value
Indirect Effect (*a* × *b*)	0.0058	0.0165	0.352	0.721

The results from Table 9 indicate that the indirect effect of self-esteem on academic performance via locus of control is not statistically significant ($z = 0.352$, $p = 0.721 > 0.05$). This suggests that locus of control does not mediate the relationship between self-esteem and academic performance.

Further, regression results showed that self-esteem significantly predicted academic performance ($\beta = 0.381$, $p < 0.01$), whereas its effect on locus of control was not significant ($\beta = 0.111$, $p > 0.05$). Additionally, locus of control did not significantly predict academic performance when controlling for self-esteem ($\beta = 0.052$, $p > 0.05$). Therefore, the mediation hypothesis is not supported.

To further explore conditional relationships among the study variables, a moderation analysis was conducted to examine whether age influences the strength of the relationship

between locus of control and academic achievement. This analysis helps determine whether the effect of locus of control on academic performance varies across different levels of age.

Table 10: Moderation Analysis: Effect of Age on LOC → Academic Achievement

Predictor	*β*	SE	t	p-value	Significance
Intercept	31.872	0.408	78.069	< 0.001	***
Self-Esteem (SE_c)	0.365	0.124	2.941	0.004	**
Locus of Control (LOC_c)	0.070	0.145	0.485	0.629	NS
Age (Age_c)	0.097	0.122	0.789	0.432	NS
LOC × Age	0.027	0.041	0.645	0.520	NS

Model Fit: $R^2 = 0.098$, Adjusted $R^2 = 0.063$, F (4, 102) = 2.776, $p = 0.031$.
Note: *** $p < 0.001$, ** $p < 0.01$, NS = Not Significant.

The variables were mean-centered prior to analysis, and an interaction term between locus of control and age was included in the regression model.

From the Table 10 we can see that the overall regression model was statistically significant, F (4, 102) = 2.78, $p = 0.031$, explaining approximately 9.82% of the variance in academic achievement ($R^2 = 0.098$).

The results indicated that self-esteem had a significant positive effect on academic achievement, β = 0.365, t(102) = 2.941, $p = 0.004$. However, locus of control (β = 0.070, p = 0.629) and age (β = 0.097, $p = 0.432$) did not significantly predict academic achievement.

Importantly, the interaction effect between locus of control and age was not statistically significant, β = 0.027, t(102) = 0.645, $p = 0.520$. This indicates that age does not moderate the relationship between locus of control and academic achievement.

Overall, the findings suggest that while self-esteem remains a significant predictor of academic performance, neither locus of control nor age, nor their interaction, significantly influences academic achievement.

To examine whether age-related differences exist in key study variables, participants were categorized into two groups based on their age, and group comparisons were conducted.

Independent samples *t*-tests were employed to assess differences in locus of control, self-esteem, and academic performance between younger and older participants.

Table 11: Distribution of Participants by Age Group

Age Group	Frequency (N)	Percentage (%)
Younger (Age ≤ 21)	57	53.27
Older (Age > 21)	50	46.73
Total	107	100.00

Participants were categorized into two age groups based on their chronological age. Individuals aged 21 years or below were classified as the *Younger* group, while those above 21 years were categorized as the *Older* group as shown in the Table 11. This categorization

was implemented to facilitate group-based comparisons and to examine potential age-related differences in the study variables.

Table 12: Independent Samples t-test for Locus of Control by Age Group

Variable	Group	Mean	t	df	p-value	95% CI
Score	Younger	12.947	-0.986	105	0.327	[-1.648, 0.554]
	Older	12.400				

Note: $p > 0.05$ indicates no significant difference between groups.

The results indicated that there was no statistically significant difference in locus of control between younger participants (M = 12.95) and older participants (M = 12.40), $t(105) = -0.986$, $p = 0.327$ as shown in Table 12.

The 95% confidence interval for the mean difference ranged from −1.648 to 0.554, which includes zero, further confirming the absence of a significant difference. These findings suggest that age group does not have a significant effect on locus of control in the present sample.

To examine whether significant differences exist across age groups (Younger vs. Older), independent samples t-tests were conducted for self-esteem (RSE_SCORE) and academic performance.

Table 13: Independent Samples t-test for Self-esteem Across Age Groups

Variable	Group	Mean	t	df	p-value	95% CI
Self-esteem	Older	22.70	0.736	93.51	0.463	[-0.830, 1.809]
	Younger	22.21				

The results indicate from Table 13 that there is no statistically significant difference in self-esteem between the Older (M = 22.70) and Younger (M = 22.21) age groups ($t = 0.736$, $p = 0.463 > 0.05$). The 95% confidence interval for the mean difference ranges from −0.830 to 1.809, which includes zero, further confirming the absence of a statistically significant difference.

This finding suggests that self-esteem levels remain relatively stable across age groups within the sample. The inclusion of zero within the confidence interval indicates that the true population difference could be negligible or even non-existent. Therefore, age does not appear to influence self-esteem in a meaningful way in this study, and self-esteem operates independently of age-related group differences.

Table 14: Independent Samples t-test for Academic Performance Across Age Groups

Variable	Group	Mean	t	df	p-value	95% CI
Academic Performance	Older	32.84	2.206	100.05	0.030	[0.185, 3.495]
	Younger	31.00				

The results reveal a statistically significant difference in academic performance between the two age groups ($t = 2.206$, $p = 0.030 < 0.05$). The Older group (M = 32.84) demonstrates higher academic performance compared to the Younger group (M = 31.00). The 95%

confidence interval for the mean difference ranges from 0.185 to 3.495, which does not include zero, confirming the statistical significance of the result from Table 14.

This confidence interval indicates that the true difference in academic performance between the two age groups is likely to fall within this range, suggesting a meaningful and positive advantage for older students. This may be attributed to factors such as greater academic experience, maturity, or improved learning strategies among older individuals.

Overall, while Locus of control and self-esteem does not differ significantly across age groups, academic performance shows a clear and statistically significant age-related difference. This highlights that age may influence academic outcomes even when psychological attributes re-main stable.

Lastly, we investigate the underlying mechanisms among the study variables, a moderated mediation framework was employed. This approach allows for the simultaneous examination of both mediation and moderation effects within a unified analytical model.

A moderated mediation analysis was conducted to examine whether age moderates the indirect effect of self-esteem on academic performance through locus of control. Interaction terms ($X \times Z$ and $M \times Z$) were included in the mediator and outcome models.

Table 15: Mediator Model (Locus of Control as Outcome)

Predictor	Estimate	SE	t-value	p-value
Intercept	0.022	0.277	0.079	0.937
Self-esteem (X)	0.102	0.083	1.234	0.220
Age (Z)	0.010	0.087	0.111	0.912
Interaction (X×Z)	0.052	0.031	1.692	0.094

The interaction term between self-esteem and age was marginally significant ($p < 0.10$) form Table 15, suggesting a weak moderating effect of age on the relationship between self-esteem and locus of control.

To assess the direct and interaction effects on academic performance, an outcome model incorporating self-esteem, locus of control, age, and their interaction terms was estimated.

This model enables the evaluation of both main effects and the moderating role of age in the relationship between locus of control and academic achievement.

Table 16: Outcome Model (Academic Performance as Outcome)

Predictor	Estimate	SE	t-value	p-value
Intercept	31.872	0.408	78.069	< 0.001
Self-esteem (X)	0.365	0.124	2.941	0.004
Locus of Control (M)	0.070	0.145	0.485	0.629
Age (Z)	0.097	0.122	0.789	0.432
Interaction (M×Z)	0.027	0.041	0.645	0.520

The results indicate that self-esteem has a significant positive effect on academic performance ($p < 0.01$) from Table 16, whereas locus of control and age do not have significant effects. The interaction between locus of control and age is also not significant; this is also highlighted in Figure 1.

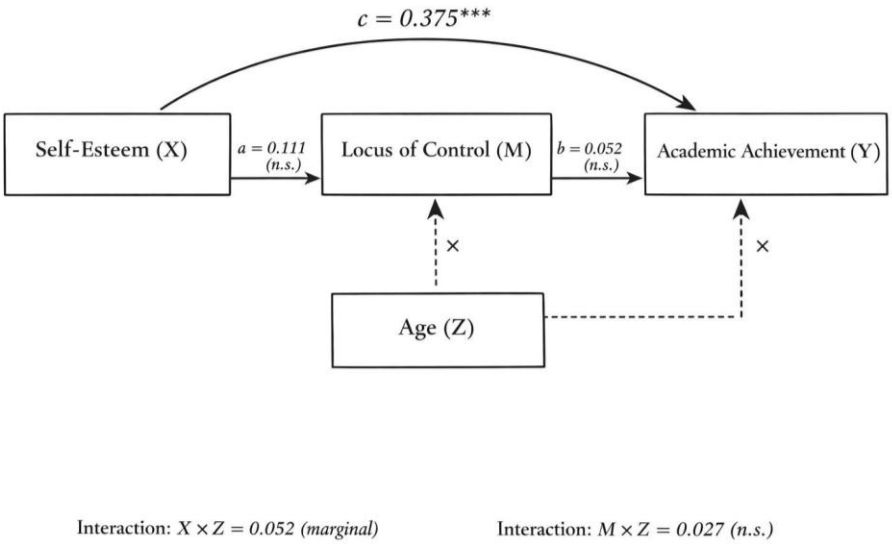

Figure 1: Final structural model depicting the direct and indirect relationships among study variables. Standardized coefficients (β) are reported. Non-significant paths are indicated as (n.s.).

Source: Figure are based on authors' own analysis

To further explore the nature of the indirect effect across different levels of the moderator, conditional indirect effects were estimated at low, mean, and high levels of age.

This analysis provides insight into whether the strength of the mediation effect varies as a function of age.

Table 17: Conditional Indirect Effects at Different Levels of Age

Level of Age	Indirect Effect
Low (−1*SD*)	0.0015
Mean	0.0072
High (+1*SD*)	0.0446

Although the indirect effect increases with age, it remains statistically non-significant as shown in Table 17.

To formally assess whether the indirect effect varies as a function of the moderator, the index of moderated mediation was computed.

This index provides a direct test of the presence and magnitude of moderated mediation within the proposed model.

Table 18: Index of Moderated Mediation

Statistic	Value
Index of Moderated Mediation	0.0064

The index of moderated mediation is small (0.0064) from Table 18, indicating that the moderated mediation effect is negligible.

Overall, the results suggest that self-esteem significantly influences academic performance directly, but locus of control does not act as a mediator in this relationship. Furthermore, age does not significantly moderate either the direct or indirect relationships. Although a slight increase in indirect effect is observed at higher levels of age, the effect is not statistically meaningful.

Overall Hypothesis Testing

Based on the objectives of the study, the following hypotheses were tested:

1. **H1:** Supported. Self-esteem significantly predicted academic achievement (= 0.381, $p = 0.002$). Thus, higher self-esteem leads to better academic performance.
2. **H2:** Not Supported. Self-esteem did not significantly predict locus of control (= 0.111, $p = 0.181$).
3. **H3:** Not Supported. Locus of control did not significantly predict academic achievement (= 0.052, $p = 0.716$).
4. **H4:** Not Supported. The indirect effect of self-esteem on academic achievement through locus of control was not significant (= 0.006, $p = 0.721$).
5. **H5:** Not Supported. The interaction between locus of control and age was not significant (= 0.027, $p = 0.520$), indicating no moderation.
6. **H6:** Partially Supported. There was no significant difference in locus of control ($t = -0.986$, $p = 0.327$) or self-esteem ($t = 0.736$, $p = 0.463$) between younger and older participants. However, a significant difference was observed in academic achievement ($t = 2.206$, $p = 0.030$), indicating that older participants had higher academic scores than younger participants.
7. **H7:** Not Supported. The index of moderated mediation was not significant (= 0.0064, $p = 0.652$), indicating absence of moderated mediation.

DISCUSSION

The present study aimed to examine the relationships among self-esteem, locus of control, age, and academic performance, with a particular focus on mediation and moderated mediation mechanisms. The findings provide important insights into the psychological determinants of academic achievement.

First, the results revealed that self-esteem has a significant positive effect on academic performance. This suggests that students with higher levels of self-esteem tend to perform better academically. This finding is consistent with prior psychological research, which emphasizes the role of positive self-evaluation in enhancing motivation, persistence, and overall academic engagement. Individuals with higher self-esteem are more likely to exhibit confidence in their abilities, which may translate into better learning outcomes and academic success. This finding supports Self-Efficacy Theory, where belief in one's abilities enhances motivation and persistence. High self-esteem also reduces anxiety and promotes better concentration and problem-solving.

In contrast, locus of control was not found to significantly predict academic performance. Al-though theoretical frameworks often suggest that an internal locus of control is associated with better achievement outcomes, the present findings do not support this assumption within the given sample. One possible explanation is that the variability in locus of control

among participants was not substantial enough to produce a detectable effect. Alternatively, other unmeasured psychological or environmental factors may play a more dominant role in influencing academic performance. Based on Rotter [1966]'s theory, internal control usually leads to better outcomes. However, this result suggests that external factors like environment, teaching methods, or family support may have a stronger influence than personal control beliefs.

The mediation analysis further indicated that locus of control does not mediate the relationship between self-esteem and academic performance. The indirect effect was small and statistically non-significant, suggesting that the influence of self-esteem on academic outcomes operates primarily through a direct pathway rather than through locus of control. This finding challenges the assumption that locus of control acts as a key psychological mechanism linking self-esteem to performance and highlights the need to consider alternative mediators such as motivation, self-efficacy, or study habits. This indicates that self-esteem directly affects performance without depending on control beliefs. Other factors like Intrinsic Motivation and study habits may act as stronger mediators in academic success.

With respect to moderation, age did not significantly influence the relationships among the variables. Although a marginal interaction effect was observed in the mediator model, it was not strong enough to support a meaningful moderating role. Similarly, the interaction between locus of control and age in predicting academic performance was non-significant. These findings indicate that the relationships among self-esteem, locus of control, and academic performance are relatively stable across different age groups within the sample. From Developmental Psychology, this suggests that participants are likely within a similar developmental stage, leading to minimal variation in psychological functioning across age.

The moderated mediation analysis also failed to provide evidence for conditional indirect effects. Although the indirect effect showed a slight increasing trend at higher levels of age, the magnitude remained small and statistically non-significant. The index of moderated mediation was negligible, further confirming that age does not play a significant role in altering the in-direct pathway. Thus, the hypothesized moderated mediation model was not supported. This reflects stability in psychological processes, indicating that age does not significantly change how self-esteem influences academic performance in this context.

Overall, the findings suggest that self-esteem is a robust predictor of academic performance, whereas locus of control and age do not significantly contribute to either direct or indirect effects in this context. These results underscore the importance of focusing on self-esteem as a key psychological factor in educational settings. The results emphasize the practical importance of enhancing self-esteem in students, as it plays a central role in motivation, emotional well-being, and academic achievement.

CONCLUSION

The present study investigated the direct, mediating, and moderating relationships among self-esteem, locus of control, age, and academic performance. The findings clearly indicate that self-esteem plays a significant and positive role in predicting academic achievement, highlighting its importance as a central psychological construct in educational research. From a psychological standpoint, this aligns with the humanistic perspective of Maslow [1943], who emphasized esteem needs as essential for competence and achievement.

Similarly, Rogers [1995] proposed that a positive self-concept fosters growth and effective functioning. Students with high self-esteem are more confident, resilient, and motivated, which enhances their academic engagement and persistence.

However, locus of control was not found to significantly influence academic performance, nor did it mediate the relationship between self-esteem and academic outcomes in this research. This finding appears to diverge from Rotter [1966] theory, which suggests that individuals with an internal locus of control are more likely to achieve success due to a sense of personal responsibility. The lack of significance here may indicate that general control beliefs are insufficient without task-specific confidence. In this context, Bandura [1977] concept of self-efficacy be-comes crucial, as it focuses on beliefs about one's capability to perform specific tasks, which may more directly influence academic outcomes than locus of control.

Furthermore, age did not emerge as a significant moderator in either the direct or indirect relationships, indicating that these associations remain consistent across different age groups. This can be understood through Erikson [1963] 's stages of psychosocial development, particularly the stage of industry versus inferiority, where children develop competence through achievement. The stability of results suggests that once self-esteem is formed, its influence on academic performance remains relatively constant, regardless of age differences within the sample.

The absence of significant mediation and moderated mediation effects points to the need for exploring alternative mechanisms that may better explain how self-esteem influences academic performance. Theories such as Self-Determination Theory by Deci and Ryan [2008] highlight the roles of intrinsic motivation, autonomy, and competence in driving performance. Additionally, cognitive and behavioral factors like learning strategies, goal orientation, and environ-mental influences (e.g., parental and teacher support) may interact with self-esteem to influence academic success. Future research may consider incorporating additional variables such as self-efficacy, motivation, learning strategies, and socio-environmental factors to develop a more comprehensive understanding of academic success. Despite these limitations, the study contributes to the existing literature by empirically testing a comprehensive model involving mediation and moderated mediation and by demonstrating the dominant role of self-esteem in academic achievement. Psychologically, this supports the idea that self-esteem is not merely an outcome of success but also a causal factor. Interventions based on Rogers [1957] client-centered approach or Bandura and Walters [1977]'s social learning principles—such as positive reinforcement, modeling, and supportive environments—can effectively enhance students' self-esteem and, in turn, their academic performance. From a practical perspective, the findings suggest that interventions aimed at enhancing students' self-esteem may be effective in improving their academic performance.

In conclusion, while self-esteem emerges as a key determinant of academic success, the roles of locus of control and age appear to be limited in this paper. These findings emphasize the importance of fostering positive self-perceptions in students and provide valuable insights for future psychological research and educational practices.

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Conflict of Interest

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