


Modeling the relationship between academic passion and disciplinary behavior towards the academic success of physical education: mediated by learning attention

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ABSTRACT

Background: Academic success is the ultimate goal that students must achieve, but the factors that influence it are still unclear. **Objectives:** This study aims to explore the mediating role of attention to learning in the relationship between academic passion and disciplinary behavior on the academic success of physical education students at the high school level. **Methods:** The quantitative research method with a cross-sectional design was carried out on 456 high school students in Subang city. Data collection used a structured questionnaire that included a Passion Scale to measure academic passion, a Self-Discipline Scale to assess disciplinary behavior, an Attention in Learning Scale to measure attention to learning, and a multidimensional instrument to evaluate academic success. **Results:** The findings of the study showed that academic passion had a significant effect on attention to learning ($\beta = 0.42$; $p < 0.001$). Disciplined behavior also showed a significant influence on attention to learning ($\beta = 0.38$; $p < 0.001$). Academic passion showed that significantly influence academic success ($\beta = 0.23$; $p < 0.001$). Disciplined behavior also showed a significant influence on academic success ($\beta = 0.19$; $p < 0.001$). Learning attention showed a significant influence on academic success ($\beta = 0.51$; $p < 0.001$). In addition, we observed a significant effect of academic passion on disciplined behavior. ($\beta = 0.58$; $p < 0.001$). **Conclusion:** This study confirms that academic passion and disciplinary behavior contribute to the academic success of physical education students through direct and indirect mechanisms via the mediation of attention to learning.

Keywords: Academic passion; disciplined behavior; attention; academic success; physical education

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INTRODUCTION

Physical education is an integral component in the education system that not only focuses on developing physical abilities, but also acts as a catalyst for the holistic development of students. Kang et al. (2024) affirms that school-based sports act as a catalyst for the holistic well-being of students through a wellness framework that includes physical, emotional, intellectual, social, spiritual, and occupational dimensions. This concept of holistic well-being emphasizes the interconnectedness

between various aspects of student development in achieving optimal overall well-being. Physical education and sport as the backbone of entire communities in the twenty-first century, which benefits all domains of human development including physical and mental, cognitive, psychosocial, and moral health (Habyarimana et al., 2022). The physical inactivity of today's society can be traced back to individuals who have been deprived of their fundamental rights to physical education and participation in school sports. It is claimed that academic passion and disciplinary behavior are crucial variables that affect learning attention and academic achievement in the context of physical education. Understanding the dynamics of the relationship between these variables is fundamental in optimizing the learning process and improving physical education outcomes.

Current trends show that academic passion has been considered as an important element in the long-term physical education learning process (Mylonopoulos & Theoharakis, 2023; Uğraş et al., 2024). According to the dualistic model, passion has two types: harmonious passion and obsessive passion (Sverdlik et al., 2022; Zhang et al., 2024). Conceptually, harmonious passion can be defined as a type of passion characterized by students feeling happy, satisfied, and tending to be able to control themselves when engaging in learning activities they enjoy. Meanwhile, obsessive passion is a type of passion that refers to the behavior of students who cannot control or are addicted to being involved in learning activities (Wang et al., 2025). Essentially, academic passion is a crucial pedagogical tool for producing highly engaged students (Chen & Zhao, 2024). In the context of high school physical education instruction, academic passion can be a powerful tool for fostering strong motivation to learn (Akbaruddin et al., 2025; Bento et al., 2024; Yukhymenko-Lescroart, 2021). Further, Yukhymenko-Lescroart, (2022) in his research, it is revealed that there are theoretical and empirical foundations that show that academic passion are interrelated and can cross the domain of achievement in influencing academic outcomes.

Disciplinary behavior in the context of physical education is not only related to compliance with rules, but also includes self-regulation, consistency in practice, and commitment to learning goals. Disciplinary behavior is currently receiving special attention, this is because this aspect has significant benefits (Karlberg et al., 2024). However, in reality, data and facts from several previous international studies show that undisciplined behavior among students in the classroom has been a challenge for teachers for years and is a major obstacle to the effectiveness of learning for teachers (Caldarella et al., 2023; Ijaz et al., 2024). Basically, high discipline behavior can produce positive student behavior, for example being on time when coming to school, never being absent, doing all the movement tasks given by the teacher and obeying all the rules at school (L'Écuyer et al., 2025). Furthermore, student disciplinary behavior has been reported to be associated with good or bad learning outcomes at school (Rodriguez & Welsh, 2022). High levels of disciplinary behavior can also be an effective stimulus for students to engage in positive activities at home, such as diligent reading and a tendency to choose studying over watching television or playing with smartphones (Rodriguez & Welsh, 2022). However, on the other hand, when disciplinary behavior is low among students, this will trigger negative behaviors, such as running away from school, fighting teachers, not doing assignments, disturbing other students while studying and ultimately can lead to dropping out of school (Hasanov & Brandišauskienė, 2025).

Attention is a very important fundamental cognitive component that is currently being explored in educational contexts (Ling et al., 2022). In theory, learning attention can be defined as a student's ability to maintain sustained focus on an activity (Infantes-

Paniagua et al., 2021), including in sports or physical education learning sessions (Kurtoğlu et al., 2025). Learning attention can be a parameter for teachers to assess students' interest, seriousness, and duration in class. The higher the level of learning attention, the better the learning outcomes (Ling et al., 2022). Meanwhile, low levels of learning attention among students are very dangerous for them and can result in decreased motivation and engagement in class.

Academic success in physical education is not only measured through the achievement of grades, but also includes the development of holistic competencies that include physical, cognitive, affective, and social aspects (Barbosa et al., 2020; Latino & Tafuri, 2023). Essentially, academic success is a parameter that every student must achieve at school (Lambert et al., 2022). The academic success aspect also serves as a benchmark for determining whether the teaching program implemented by teachers is successful (Hagen et al., 2022). Conversely, students who fail to achieve high academic performance indicate that teachers have failed to teach them (Tannoubi et al., 2023). Furthermore, literature shows that academic success can be a predictor of student failure or success in their future lives (Hagen et al., 2022). Considering the importance of academic success for students, the factors that can influence it really need to be explored further (Tannoubi et al., 2025). Thus, to the best of our knowledge, there is still a lack of research reporting on modeling the relationship between academic passion and disciplined behavior on academic success mediated by learning attention. In addition, another gap is that there is still very limited previous research that tries to analyze each relationship between variables in students at the high school level. Therefore, the main objective of our current research is to analyze the modeling of the relationship across each variable in this study. Our hypothesis is that all variables have a significant relationship.

METHOD

Design

This study uses a quantitative approach with a cross-sectional study design to explore the relationship between academic passion, disciplinary behavior, learning attention, and academic success of physical education students.

Participants

The sampling technique in this study uses multistage cluster sampling with a probability sampling approach to ensure the representativeness of the physical education student population. The target population of the study includes high school students who take physical education subjects in the Subang city with an age range of 15-18 years. The first stage of sampling involves stratification of schools based on accreditation status and geographic location to ensure adequate variation of institutional characteristics. School selection is carried out randomly from each stratum with a predetermined proportion based on population distribution. The second stage involves the random selection of classes from each selected school, taking into account grade level and study program as stratification factors. The determination of the sample size using formula with a confidence level of 95% and a margin of error of 5%, resulted in a minimum sample of 384 respondents. The inclusion criteria include students who actively participate in physical education learning for at least one semester, aged 15-18 years, and provide informed consent to participate. The exclusion criteria include students with medical conditions that limit participation in physical activity and students who are absent when data collection is performed. Our current study was approved by the Ethics Committee of Universitas Negeri Subang (number: UNSUB-345/15/16/2025).

Measures

The measurement of academic passion uses an adaptation of the Passion Scale developed based on the Dualistic Model of Passion with modifications in the context of physical education. This scale consists of 12 items that measure two dimensions of passion, namely harmonious passion and obsessive passion with a 5-point Likert scale response range from 1 “strongly disagree” to 5 “strongly agree” (Akbaruddin et al., 2025).

In this research, to measure the level of discipline behavior among students during physical education learning sessions, you can use the Self-Discipline Scale (Nuryadi et al., 2024). This instrument has been modified and validated, so that it has 15 items from several dimensions, such as: (i) self-regulation (5 item), (ii) consistency (5 item), and (iii) commitment to learning activities (5 item). Learning attention was operationalized through the Attention in Learning Scale developed specifically for this study, covering 28 items that measure cognitive focus, sustained attention, and selective attention in the context of physical education learning (Kurtoğlu et al., 2025). Academic success is measured by assessing students’ average test scores at school, particularly for physical education (Tannoubi et al., 2023). Higher scores indicate higher academic success (Tannoubi et al., 2023).

Data Collection

The data collection process was carried out through a survey method using a structured questionnaire that was administered directly to respondents in a classroom setting. The data collection period lasts for four weeks in the even semester of the school year to ensure consistency of learning conditions and avoid temporal bias. The research instrument is in the form of a self-report questionnaire that has gone through a content validation process by a panel of experts and trials on a small sample to ensure the reliability and validity of the instrument.

Data collection is guided by trained researchers who provide standard explanations of the research objectives, filling procedures, and data confidentiality guarantees. Questionnaire filling time allocated for 45 minutes in a single learning session to ensure respondents can fill out quietly without rushing. The research ethics protocol is strictly applied by asking for approval from the principal, subject teachers, and parents of students before the implementation of data collection. The questionnaire is prepared in Indonesian with a readability level appropriate for high school students, equipped with clear filling instructions and sample answers. Quality control is carried out through real-time filling completeness checks and direct clarification if there is ambiguity in student responses.

Data Analysis

Our study using a two-stage approach with AMOS 24.0 software for the implementation of Structural Equation Modeling (SEM). The first stage involves descriptive analysis to explore sample characteristics, data distribution, and identification of outliers and missing data patterns. Normality test multivariate is performed using Mardia’s coefficient to ensure the normal distribution assumptions are met prior to SEM analysis. The second stage is a confirmatory analysis through the two-step approach recommended by Anderson and Gerling, starting with a measurement model evaluation to test the validity and reliability of latent constructs. The structural model was then evaluated to test the hypothetical relationships between latent constructs in the proposed research model. The goodness of fit model was evaluated using multiple fit indices including the Chi-square test, Comparative Fit Index (CFI),

Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The criteria for accepting the model refer to the cut-off values that have been established in the SEM literature, namely CFI and TLI ≥ 0.95 , RMSEA ≤ 0.06 , and SRMR ≤ 0.08 . The mediation analysis was conducted to examine the role of attention learning as a mediator in the relationship between academic passion and disciplinary behavior on academic success. The significance of indirect effects was tested using a bootstrap procedure with 5.000 bootstrap samples and a 95% confidence interval to obtain a robust and unbiased estimate.

RESULTS AND DISCUSSION

Table 1 shows and explains the categories, frequencies and percentages of the characteristics of the participants in this study. Meanwhile, **Table 2** shows the mean value of each variable ranging from 3.83 to 4.18. Meanwhile, the standard deviation value ranges from 0.62 to 0.76. Furthermore, the values for each variable range from Skewness (-0.08 to 0.23), Kurtosis (-0.41 to -0.52), V-Aiken (0.76 to 0.05) and Cronbach's α (0.85 to 0.92). The results of the analysis of Aiken's validity and Cronbach's α reliability show that the instruments for academic passion, disciplined behavior, learning attention and academic success are very adequate.

Table 1. Demographic Characteristics of Participants

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Man	217	47.6
	Woman	239	52.4
Age	15 years	98	21.5
	16 years	156	34.2
	17 years	142	31.1
	18 years	60	13.2
Class	X	156	34.2
	XI	163	35.8
	XII	137	30.0

Table 2. Descriptive Statistics

Variable	Mean	Std. Deviation	Skewness	Kurtosis	V-Aiken	Cronbach's α
Academic Passion	4.18	0.74	0.23	-0.41	0.79	0.89
Disciplined Behavior	4.02	0.68	-0.15	-0.52	0.95	0.92
Attention to Learning	3.94	0.62	-0.08	-0.46	0.80	0.90
Academic Success	3.83	0.76	-0.12	-0.49	0.92	0.85

The results of the bivariate correlation test (see **Table 3**) showed that there was a relationship between each variable, for example academic passion and disciplined behavior ($r = 0.58^{***}$), academic passion and attention to learning ($r = 0.64^{***}$), and academic passion and academic success ($r = 0.52^{***}$). Meanwhile, a significant correlation was also found between disciplined behavior and attention to learning ($r = 0.61^{***}$), and disciplined behavior with academic success ($r = 0.49^{***}$). Meanwhile, we observed a significant correlation between attention to learning and academic success ($r = 0.67^{***}$).

Table 3. Correlation Matrix Between Each Variables

Variable	1	2	3	4
1. Academic Passion	-			
2. Disciplined Behavior	0.58***	-		
3. Attention to Learning	0.64***	0.61***	-	
4. Academic Success	0.52***	0.49***	0.67***	-

Note: *** $p < 0.001$.

Evaluation of Measurement Models

The measurement model for the academic passion construct shows a good fit indicator with a chi-square value (χ^2) = 187.45 (df = 98, $p < 0.001$), although statistically significant yet the ratio $\chi^2/df = 1.91$ is still within acceptable limits. The comparative conformity index shows values of CFI = 0.94 and TLI = 0.93, which is close to the minimum threshold of 0.95 but still within the acceptable range for the measurement model. The RMSEA value = 0.045 (90% CI: 0.036-0.054) indicates a good approximation error and is below the 0.06 threshold. The SRMR showed a very good value of 0.042 and was well below the threshold of 0.08, indicating a small residual. In addition, we observed that CR obtained values of 0.91, while AVE had values of 0.58. The measurement model for disciplined behavior showed an excellent conformity indicator with chi-square (χ^2) = 156.78 (df = 87, $p < 0.001$) and a ratio of $\chi^2/df = 1.80$. The conformity index shows CFI = 0.96 and TLI = 0.95, both of which exceed the minimum threshold and show excellent conformity. RMSEA = 0.042 (90% CI: 0.032-0.051) indicates excellent approximation error, while SRMR = 0.038 indicates minimal residual. In addition, we observed that CR obtained values of 0.93, while AVE had values of 0.64 (see **Table 4**).

The learning to attention measurement model showed excellent performance with chi-square (χ^2) = 134.29 (df = 76, $p < 0.001$) and an excellent ratio of $\chi^2/df = 1.77$. The conformity index shows CFI = 0.96 and TLI = 0.95, both of which show excellent conformity and exceed the minimum criteria. RMSEA = 0.041 (90% CI: 0.031-0.050) indicates an excellent approximation error, while SRMR = 0.035 indicates a very small residual. In addition, we observed that CR obtained values of 0.92, while AVE had values of 0.61. The academic success measurement model showed the best fit indicator with chi-square (χ^2) = 142.67 (df = 82, $p < 0.001$) and a ratio of $\chi^2/df = 1.74$. CFI = 0.97 and TLI = 0.96 indicate excellent conformity, while RMSEA = 0.040 and SRMR = 0.037 indicate minimal error. In addition, we observed that CR obtained values of 0.90, while AVE had values of 0.59 (see **Table 4**).

Table 4. Measurement Model Evaluation Results

Construct	χ^2	Df	χ^2/df	CFI	TLI	RMSEA	SRMR	CR	AVE
Academic Passion	187.45***	98	1.91	0.94	0.93	0.045	0.042	0.91	0.58
Disciplined Behavior	156.78***	87	1.80	0.96	0.95	0.042	0.038	0.93	0.64
Attention to Learning	134.29***	76	1.77	0.96	0.95	0.041	0.035	0.92	0.61
Academic Success	142.67***	82	1.74	0.97	0.96	0.040	0.037	0.90	0.59

Note: *** $p < 0.001$; CR = Composite Reliability; AVE = Average Variance Extracted.

Structural Model Analysis

The structural pathway from academic passion to learning attention showed a standardized coefficient (β) of 0.42 ($t = 8.67$, $p < 0.001$), indicating a significant and substantial positive influence. The pathway from disciplined behavior to attention to learning showed a coefficient (β) of 0.38 ($t = 7.94$, $p < 0.001$), confirming the hypothesis that disciplinary behavior contributes significantly to attention ability in learning. The direct influence of academic passion on academic success showed a coefficient (β) of 0.23 ($t = 4.78$, $p < 0.001$), which is smaller compared to indirect influences through attention learning. The pathway from disciplined behavior to academic success showed a direct coefficient (β) of 0.19 ($t = 3.94$, $p < 0.001$), indicating a significant but moderate positive influence. Attention to learning as a mediator showed the strongest influence on academic success with a coefficient of (β) 0.51 ($t = 10.23$, $p < 0.001$), confirming its central role in the model. The correlation between academic passion and disciplinary behavior in the

structural model showed standardized coefficient (β) value of 0.58 ($t = 12.45, p < 0.001$), consistent with the previous correlation analysis (see **Table 5** and **Figure 1**).

Table 5. Structural Path Coefficients and Their Significance

Structural Pathways	Standardized Coefficients β	Standard Error	t-value	p-value	Status
Academic Passion → Learning Attention	0.42	0.048	8.67	< 0.001	Significant
Disciplined Behavior → Learning Attention	0.38	0.048	7.94	< 0.001	Significant
Academic Passion → Academic Success	0.23	0.048	4.78	< 0.001	Significant
Disciplined Behavior → Academic Success	0.19	0.048	3.94	< 0.001	Significant
Learning Attention → Academic Success	0.51	0.050	10.23	< 0.001	Significant
Academic Passion → Discipline Behavior	0.58	0.047	12.45	< 0.001	Significant

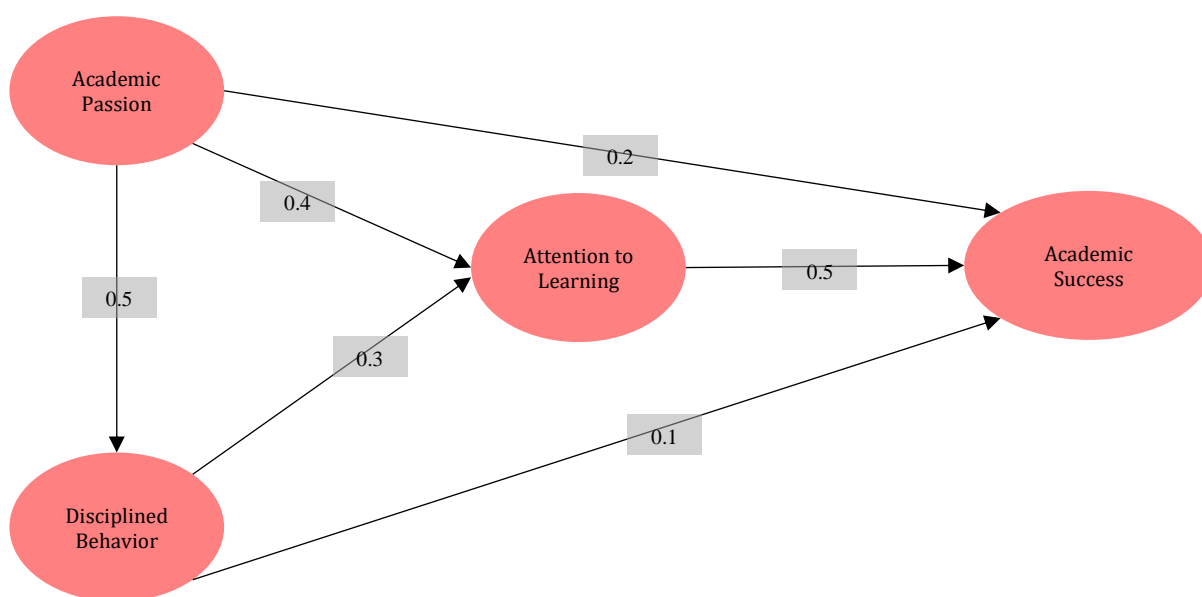


Figure 1. Path Model of the Relationship between Variables

The main objective of our current research is to analyze the modeling of the relationship across each variable in this study. The findings of this study confirm the hypothesis that academic passion has a significant influence on the learning attention and academic success of physical education students. This is because academic passion has the power to produce students with a high level of enthusiasm for learning activities in physical education classes (Akbaruddin et al., 2025; Kovácsik et al., 2021). The findings of our current study align with and support previous studies that reported that academic passion can influence motivation levels, engagement, and even improve academic achievement from low to high levels (Chen & Zhao, 2024). On the other hand, subsequent findings also show that high academic passion will produce students with much higher academic interest and ultimately there will be changes in aspects of better critical thinking (Wang et al., 2025). Basically, students with harmonious or obsessive passion types (Yin et al., 2023), both have a role and contribute to learning attention and academic success, for example, harmonious passion can create students with happy behavior,

without any coercion and can control the desire to participate in all learning activities in physical education classes. Meanwhile, obsessive passion results in students with addictive behavior, infatuation, and an inability to control their urge to engage continuously in learning activities (Shebani et al., 2025). These two types of passion are the main factors that can influence higher levels of learning attention and academic success, according to the findings of our current study.

Disciplinary behavior was shown to have a significant influence on learning attention and academic success. This is due to the benefits of high levels of disciplinary behavior in students. Our current study found that most participants (students) had high levels of disciplinary behavior, which led them to display positive behaviors such as studying diligently, following teacher instructions, not disturbing other students, and taking assignments seriously (Welsh, 2024). These factors are the primary drivers of disciplinary behavior's relationship with learning attention and academic success. Meanwhile, another finding suggests that low disciplinary behavior has the potential to negatively impact not only students but also teachers (Mowen et al., 2020). Meanwhile, David et al. (2020) report found that disciplinary behavior can be a strong predictor of academic success or failure in school. Therefore, given the importance of disciplinary behavior for students, a positive and sustainable approach between teachers and students is needed to ensure that disciplinary behavior among students remains positive or high (Hasanov & Brandišauskienė, 2025).

Attention to learning has been shown to play a powerful mediator in the relationship between academic passion and disciplined behavior and academic success. Our current findings indicate that students with high levels of attention tend to stay longer and engage more actively in classroom learning sessions with teachers. This is also supported by previous research, which found that higher levels of attention are a powerful way to produce students with long-term learning engagement (Ling et al., 2022). Thus, the longer students undergo learning sessions, the more teaching materials they can learn (Kurtoğlu et al., 2025), so that this is the main factor in changing student learning outcomes from low to higher. Meanwhile, another study shows data that is in line, where the level of attention of a student when participating in learning activities will be the final determinant in achieving their learning outcomes, meaning that students with a high level of attention will acquire more knowledge and skills while students with a low level of attention will tend to joke easily with their friends, not focus and ultimately find it difficult to understand the teaching material taught by the teacher (Infantes-Paniagua et al., 2021).

CONCLUSION

We conclude and confirm that academic passion and disciplinary behavior are both closely related to the quality of academic success, but this is demediated by the variable attention to learning. In our current study, we observed that there are still limitations of the study, including: (i) participants or samples are limited and only come from one area or city, (ii) the instruments for academic passion, disciplinary behavior, attention to learning, and academic success were designed with questions intended for high school students, (ii) In addition, this study did not analyze the differences in academic passion, disciplinary behavior, attention to learning, and academic success between rural and urban students. Therefore, future research is expected to address all limitations in our current study. In addition, future research is expected to use longitudinal or experimental methods.

Meanwhile, the practical implications of our current research are that the results can serve as a reference for measuring students' abilities related to academic passion, disciplinary behavior, attention to learning, and academic success. Furthermore, it is hoped that meaningful physical education sessions can simultaneously improve academic passion, disciplinary behavior, attention to learning, and academic success.

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CONFLICT OF INTEREST

We confirm that there is no conflict of interest in our current study.

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