The Effect of Perseverance on College Students' Academic Performance—An Intermediary Model with Moderation

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Abstract: *Perseverance, as a typical positive psychological trait, can effectively explain the differences in students' academic performance. In this study, 295 students from Tibetan University were surveyed by questionnaire to explore the specific mechanisms of perseverance's influence on college students' academic performance. The results of the study showed that the effect of perseverance on college students' academic performance showed a moderated model, and learning engagement fully mediated the relationship between perseverance and academic performance, with passion playing a significant positive moderating role in the first and second half of the mediated model.*

Keywords: *perseverance; academic engagement; passion; academic performance*

1. Introduction

"Sincerity is the key to success, and gold and stone are the key to success. Perseverance, as an essential and important personality trait in traditional Chinese culture, has always been a good quality that Chinese people are proud of. In recent years, with the development of positive psychology, the relationship between perseverance and academic performance has become one of the most widely discussed topics in domestic and international psychology. 2007 Duckworth et al. found a significant correlation between perseverance and GPA scores in a survey of 139 undergraduate psychology students at the University of Pennsylvania based on the Grit-O[2]. This was followed by a number of quantitative empirical studies that also confirmed a significant positive effect of perseverance traits on academic performance[3,5,6].

However, previous research has focused on the predictive effects of perseverance on academic performance, subjective well-being, and individual health, and less research has been conducted on its mechanisms of action[15]. A large number of studies have shown that perseverance has a significant positive effect on academic performance[1], but the exact mechanism of the effect is unclear. There is also a moderating effect of individual differences in the prediction of behavioral performance by perseverance traits.

Schaufeli first introduced the concept of learning engagement as a positive, fulfilling state of mind associated with learning[10].

Phillips 2011 found that the perseverance trait can improve an individual's academic performance through positive emotions, expectations, deliberate practice, and commitment[13].

2018 Jiang, Wen, Jiang, Prize, et al. found that learning engagement fully mediates the relationship between perseverance personality and academic achievement[14]. Individuals with high perseverance all have higher behavioral involvement[18]. This results in superior academic feedback.

Passion is defined as a state of intense emotion elicited by personal value preferences that can motivate personal behavioral intentions[21].

When Duckworth first introduced the concept of perseverance, he believed that it encompassed two aspects: perseverance in working toward a goal for a long period of time, and maintaining the same passion for that goal.[1]. However, with further research on perseverance in recent years, scholars have found that the Grit-S developed by Duckworth (2009) does not fully align with the definition of perseverance, as the Grit-S only measures one dimension of perseverance and ignores the dimension of passion[4,7,8].

In 2011 Phillips suggested that there may be moderating effects of individual differences in the effects

of perseverance on individual performance, such as individual ability or metacognition [13].

This was followed by the 2018 Jachimowicz study which found that the predictive power of the perseverance trait on individual behavior can be enhanced when perseverance is combined with passion [9].

1.1. The moderating role of passion in the relationship between perseverance traits and learning engagement

Jachimowicz. J.M suggests that passion is essential for the perseverance trait to function, and that when passion and perseverance are combined they can greatly increase an individual's engagement in the activity. Perseverance helps individuals to commit to their goals, while passion provides the focus needed to achieve them. Individuals with high perseverance may not perform better when they pursue less enthusiastic goals. When individuals are engaged in work they love, perseverance can increase their engagement[9].

As students learn more interesting learning content, higher levels of perseverance traits will help them become more engaged in their learning.

1.2. The moderating role of passion in the relationship between learning engagement and academic performance

Jachimowicz mentioned that passion has a beneficial effect on behavioral performance through a key mechanism (input), so that individuals will invest more cognitive resources and effort into the task, and individuals will be more focused and more likely to achieve the goals they are passionate about[9].

Similarly, there is a large body of research, both nationally and internationally, that confirms the positive impact of passion on all three dimensions of individual learning engagement (energy, commitment, and focus)[20]. Individuals who are more passionate about their work are more attentive and immersed. Students who are more passionate about their learning activities also do better academically.

Based on the above studies and results, this study intends to investigate the moderating role of passion in perseverance trait and academic engagement as well as the moderating role of passion in academic engagement and academic performance.

Based on previous research we set up a moderated mediation model to explore the mechanism of perseverance on academic performance. The specific research hypotheses are as follows.

Hypothesis 1: There is a significant positive effect of perseverance trait on academic performance, learning engagement positively predicts academic performance, and perseverance trait has a significant positive effect on learning engagement.

Hypothesis 2: The mediating effect of learning inputs is significant.

Hypothesis 3: Passion moderation is significant in the relationship between perseverance traits and learning engagement.

Hypothesis 4: The moderating effect of passion in the relationship between learning engagement and academic performance is significant.

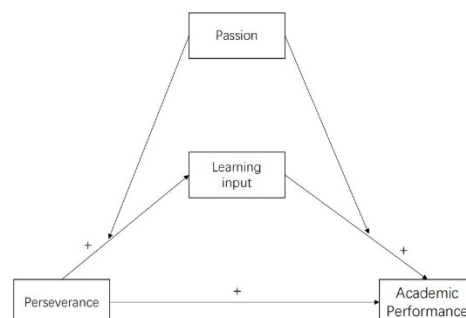Based on the assumptions, the model of this study is shown in Figure 1.

Figure 1: Hypothetical model

2. Study design

2.1. Subjects of investigation

In this study, a random sample of 298 students from Tibetan University was surveyed by questionnaire method, and 295 questionnaires were collected after entering and counting, among which 3 were invalid, with a recovery rate of about 97.98%. The percentages of male and female were 35.96% and 64.04% respectively, mainly concentrated in freshmen (27.74%), juniors (35.27%) and seniors (30.46%) students. Since the data collection site is a place where liberal arts majors are concentrated, 86.99% were students majoring in liberal arts. The sample was predominantly Han Chinese (78.77%), with minority ethnic groups accounting for (21.23%).

2.2. Measurement tools

2.2.1. Perseverance Scale

In view of the previous studies, the Grit-C scale, which contains three dimensions of perseverance, persistence of effort, and strength of will, was selected to measure the perseverance trait of individuals in China.[15] The internal consistency coefficient of the Grit-C was 0.945, and the internal consistency coefficients of the three dimensions were 0.907, 0.892, and 0.844, respectively.

2.2.2. Passion Scale

In their study, Sigmundsson et al. designed a well-developed scale to measure individuals' level of passion for the performance of the work or study in which they were involved. The scale has 8 questions with a 5-point scale that measures the level of passion that an individual holds for learning or work, with higher scores reflecting a higher level of passion, and in a previous study by Sigundasson, the scale had a post-test reliability of 0.92. Given the reliability of the scale and the fact that it can be effectively combined with this study's perseverance scale, this study used the scale to measure passion level.

2.2.3. Learning Input Scale

Learning engagement was measured using the Utrecht Work Engagement Scale developed by Schaufeil et al. 2006, with 17 questions. This scale was used in the previous study by Schaufeil to measure a confidence level of 0.84[10]. This scale was used in the study of the effect of perseverance on academic performance by Jiang Wen, Jiang Prize, et al.[14], and therefore, will be used in this study. The content of the scale will be used in this study.

2.2.4. Academic Performance

A comprehensive quantitative student score administered by the university is used as a measure of student academic performance. To make the data more objective, the algorithm of the U.S. Academic GPA will be used to rank the student's composite quantitative score in terms of class performance and to account for the position of the student's performance in the class. Because of the positive measure used in the scale, the inverse measure of the student's academic GPA level will be used to ensure that academic performance is consistent with it. This data will be used as a measure of the student's academic performance.

2.3. Research procedures and analytical ideas

The questionnaire will be collected first, and the specific data entry and data analysis after the questionnaire collection will be performed using SPSS 26.0 as well as the macro program Process 3.3.

The analysis is divided into preliminary correlation test and model validation. The correlation analysis will analyze perseverance, academic performance, learning engagement and passion to confirm that there is a strong correlation between the three variables, and then the next step of model validation can be conducted. Model validation was divided into mediated model testing and moderated mediated model testing. According to the mediated effects test method and the mediated model test with adjustment proposed by Zhonglin Wen 2004 and integrated by Baojuan Ye and Zhonglin Wen 2014[16], the model significance tests were conducted using the bias-corrected nonparametric percentile Bootstrap method. The specific operations were implemented by SPSS Process 3.3.

3. Data Analysis

3.1. Descriptive statistics and correlation analysis

As shown in Table 1, there is a significant positive relationship between academic performance and perseverance, commitment to learning and passion. Perseverance is significantly and positively correlated with commitment to learning, and perseverance is significantly and positively correlated with passion. Commitment to learning was significantly and positively correlated with passion. All the variables used have significant positive correlations and can be tested in a model of correlation.

Table 1: Correlation analysis

	Perseverance	Academic Performance	Learning input	Passion
Perseverance	1			
Academic Performance	.352**	1		
Learning input	.641**	.415**	1	
Passion	.525**	.269**	.505**	1
M	3.75	9.54	4.61	3.73
SD	0.63	14.14	1.03	0.67
**. Significant correlation at the 0.01 level (two-tailed).				
*. Significant correlation at the 0.05 level (two-tailed).				

3.2. Intermediary model test with conditioning

According to the hierarchical test steps proposed by Professor Zhonglin Wen in 2014, when testing the mediated model with moderation it is necessary to first test the mediated model and then determine whether the mediated model with moderation holds[19]. Previously, the correlations between perseverance, academic performance and passion and commitment to learning have been tested to be significant. Therefore, the rest of the model analysis was conducted following the test proposed by Zhonglin Wen.

3.2.1. Intermediary model testing

First test the intermediary.

The results obtained in Table 2 are the regression coefficients associated with the stratified regression test of mediating effects. Equation one, shown is the total effect of perseverance on academic performance in the model, $R^2 = 0.12$, the explanatory power of the model is 12%, and the positive effect of perseverance on academic performance is significant. Equation two, $R^2 = 0.41$, model explanatory power of 41%, This equation presents the first half of the path of the model, the positive effect of perseverance on academic engagement is significant. Equation three, $R^2 = 0.19$, model power 19%, this equation presents the second half of the path of the model, after including learning engagement as a mediating variable, perseverance has a significant positive effect on academic performance and learning engagement has a significant positive effect on academic performance.

Table 2: Mediated effects test regression coefficients

	Equation I			Equation II			Equation 3		
	Academic Performance			Learning input			Academic Performance		
	β	se	t	β	se	t	β	se	t
Perseverance	7.95	1.24	6.40***	17.92	1.26	14.20***	3.29	1.57	2.11*
Learning input							0.26	0.06	4.65***
F	40.89***			201.73***			32.70***		
R²	0.12			0.41			0.19		

Note: *p<0.05; **p<0.01; ***p<0.001, all bilateral

Table 3: Decomposition of total, direct and mediated effects

	β	Boot SE	Boot LLCI	Boot ULCI
Total effect	7.953	1.654	4.931	11.405
Direct effect	3.294	1.462	0.560	6.284
Mediating effects of learning inputs	4.659	1.238	2.435	7.319

Table 3 presents the direct, indirect, and total effects of the model under Bootstrap test. The total, direct, and indirect effects Bootstrap test confidence intervals do not contain 0 and are all significant. The indirect effect was significant with β=4.659, indicating an indirect effect of 4.659. The direct effect was significant indicating that the path of perseverance-learning engagement-academic performance showed partial mediation. The mediation effect accounted for 58.58% of the total effect. The results of the mediation model validation are shown in Figure 2.
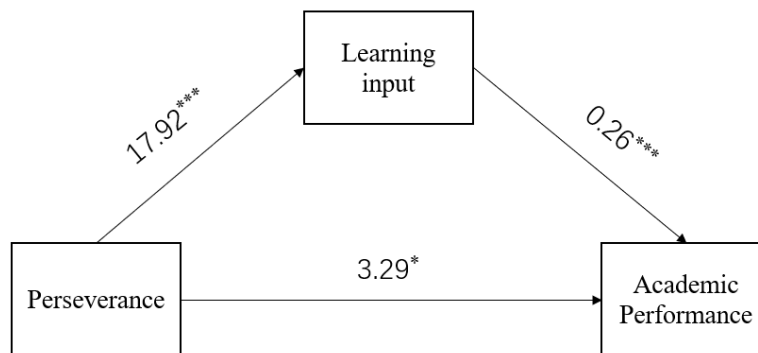

Figure 2: Mediation effect

3.2.2. Intermediary model test with conditioning

According to Chung-Lin Wen, testing the mediating model with conditioning requires estimating the parameters of the three regression equations[19]. As the mediating model has been demonstrated previously, in this section we present the results of the remaining two components of the test only. Equation 1 estimates the moderating effect of passion between perseverance and academic engagement; Equation 2 estimates the moderating effect of passion between academic engagement and academic performance and the moderating effect of the residual effect between perseverance and academic performance.

The results of the model tests are as follows, and Table 4 presents the results of the stratified regression analysis. Equation 1, with 49% model power of description, is significant, while equation 2, with 23% model power of description, is significant. Of the three paths of mediating effects, the first half of the path (β=14.96, p<0.01) as well as the second half of the path (β=0.25, p<0.01) were significant, but the direct effect path was not significant (β=2.54, p>0.05). Assertiveness trait positively influenced academic performance through mediating variables, assertiveness had a positive effect on learning engagement, and learning engagement had a positive effect on academic performance, and hypothesis 2 was tested. Of the three moderating paths after the involvement of passion, the first half path moderating effect term (β = 0.07, p < 0.01) moderated significantly, and hypothesis 3 was verified. The moderating effect term on the second half of the path was significant (β = 0.02, p < 0.01) and the moderating effect was significant, and hypothesis 4 was verified. The moderating effect term on the direct path was not significant. The moderating effect was significant in the first and second half of the perseverance-learning engagement-academic performance with a positive moderating effect. To sum up, the results of the regression coefficients of the model are shown in Figure 5.

Table 4: Mediated model tests with moderation

| | Equation I | | | Equation II | | |
| | Learning input | | | Academic Performance | | |
	β	se	t	β	se	t
Constants	-0.07	0.04	-1.59	-0.09	0.06	-1.54
Perseverance	0.53	0.05	10.81***	0.11	0.07	1.51
Learning input				0.31	0.07	4.13***
Passion	0.28	0.05	5.56***	0.07	0.07	1.13
Perseverance x Passion	0.13	0.03	4.89***	0.02	0.04	0.47
Learning engagement x passion				0.16	0.05	3.19**
F	92.90***			16.79***		
R²	0.70			0.48		

Note: *p<0.05; **p<0.01; ***p<0.001, all bilateral

Table 5: Bootstrap test for mediating effects with moderation

Result Type	Indicators	Effect Value	Boot SE	Boot LLCI	Boot ULCI
There is a moderating mediating effect	Effect1 (passion = M-1SD)	0.0604	0.0361	-0.0393	0.1085
	Effect2 (passion = M)	0.1638	0.0477	0.0709	0.2603
	Effect3 (passion = M+1SD)	0.3091	0.0893	0.145	0.5013
Comparison of mediating effects with regulation	Effect2-Effect1	0.1034	0.0409	0.0473	0.2109
	Effect3-Effect1	0.2487	0.0889	0.115	0.4687
	Effect3-Effect2	0.1453	0.0503	0.0651	0.26

The results of further Bootstrap tests are shown in Table 5, where the mediating effects are significant when the passion is at the mean as well as at positive one standard error, with confidence intervals not containing 0. These mediating effects are compared two by two there were significant differences.

To further explain the moderating effect of passion, a simple slope test was conducted. As can be seen from Figure 3, the positive predictive effect of perseverance on learning engagement in the perseverance-learning engagement path is significant at $\beta simple=0.400$ (SE=0.055,t=7.275,p< flat for negative one standard error of passion, which indicates that when individuals are at low passion levels, learning engagement increases by 0.400 standard deviations for every one standard deviation increase in perseverance standard deviation; $\beta simple=0.670$ (SE=0.058,t=11.499,p<0.01,CI[0.555,0.784]) at one standard error of positive passion, the positive prediction of perseverance on learning engagement is significant when passion is at high levels, which indicates that when individuals are at high passion levels, each standard deviation increase in perseverance increases learning engagement by 0.670 standard deviations; $\beta simple=0.535$ (SE=1.383,t=10.811,p<0.01,CI[12.233,16.679]) when passion is equal to the mean, which indicates that academic performance increases by 14.956 standard deviations for each standard deviation increase in learning engagement when individuals are at the standard passion level The positive prediction of perseverance for academic engagement was significant when passion was at all three levels. And $\beta simple\ (M+SD) - \beta simple\ (M-SD) =18.727-11.185=7.542$, compared to low passion levels, the positive predictive effect of perseverance on academic engagement increased by 7.542 standard deviations at high passion levels.
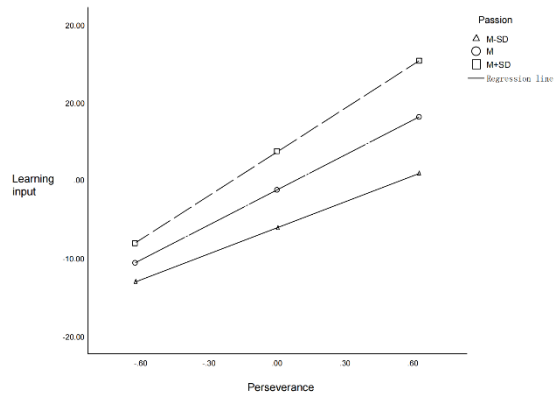
Figure 3: The moderating role of passion in perseverance-learning engagement

From Figure 4, it can be seen that in the learning engagement-academic performance path, βsimple=0.122 (SE=0.066,t=1.863,p>0.05,CI[-0.068,0.251]) for passion negative one standard error, which indicates that when individuals are at low passion level, academic performance increases for each standard deviation increase in learning engagement increases by 0.122 standard deviations; at a positive one standard error of passion, βsimple=0.373 (SE=0.078,t=4.816,p< 0.01,CI[0.220,0.586]), which indicates that academic performance increases by 0.373 standard deviations for each standard deviation increase in learning engagement when individuals are at high passion levels; βsimple=0.248 when passion equals the mean (SE=0.060,t=4.130,p<0.01,CI[0.130,0.366]), which indicates that academic performance increases by 0.248 standard deviations for each standard deviation increase in learning engagement when individuals are at standard passion levels. The predictive effect of learning engagement on academic performance is not significant at low passion level, but at high passion level, the positive predictive effect of learning engagement on academic performance becomes significant. βsimple (M+SD) − βsimple (M-SD) =0.373-0.122=0.251, the positive predictive effect of learning engagement on academic performance increases by 0.251 standard errors at high passion level.
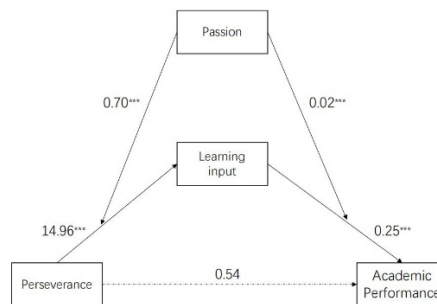

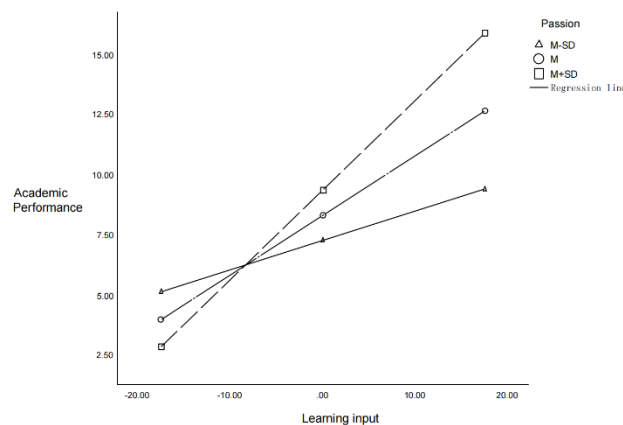*Figure 4: The moderating role of passion in learning engagement-academic performance*

Figure 5: Conclusion model

4. Discussion

A moderated mediation model was set up in this study to examine the mediating role of learning engagement between perseverance and academic performance and whether this role was moderated by passion through a questionnaire survey of 292 students in Tibetan universities. The study verified all hypotheses of H1-H4 and successfully validated the model. In this regard, the following discussion was also developed.

4.1. The relationship between perseverance and academic performance

In the previous correlation analysis, the relationship between perseverance and academic performance was found to be significantly and positively correlated. From the results of the Bootstrap test for mediating effects, the total effect of perseverance on academic performance was also significant, and perseverance had a significant positive effect on academic performance. Perseverance could explain why people's individual achievement and performance differed significantly with no significant differences in cognitive ability[1]. This study also reaffirms that the Grit-C is cross-culturally adaptable and that the perseverance scale with Chinese cultural connotations is a good predictor of individual behavioral performance.

Like running a marathon, learning is a long-term process and maintaining academic success is a constant battle that requires students to put in the effort and energy over time and to overcome obstacles and challenges.[14]. The stronger a student's perseverance, the longer his or her behavior will last and the better his or her academic performance will be.

Carol Dweck has proposed a "growth mindset", which suggests that the trait of perseverance is not static, but changes as students learn and face challenges, and that students who have experienced more challenges are more likely to choose to persevere in the face of failure. Students who experience more challenges are more likely to choose to persevere in the face of failure[12]. Therefore, teachers can guide students' behavior in their daily learning so that they can experience more learning and challenges in order to develop the perseverance trait.

4.2. The mediating role of learning inputs

The results of the stratified regression test showed that the positive effect of perseverance on academic performance was significant with or without the inclusion of mediating variables, and the results of the Bootstrap mediation test showed that both direct and indirect effects were significant and the model showed partial mediation. Such results suggest that there are other intermediate variables in the mechanism by which perseverance affects academic performance, in addition to learning engagement as a mediator.

Thereafter, moderating variables were added to conduct moderated mediation tests, and the results of the hierarchical regression tests showed that the positive effect of perseverance on academic performance was not significant, and the positive effect of perseverance could not be directly on academic performance, but needed to be mediated by some effective mediating variables. The positive predictive effect of perseverance on academic engagement was significant, and the positive predictive effect of academic engagement on academic performance was also significant. The results of further moderated mediation Bootstrap test also showed that the indirect effects were significant throughout the model's mechanism of action, but the direct effects were not significant, and the resulting model showed full mediation. This suggests that perseverance affects academic performance exclusively through academic engagement, and that individuals with high perseverance have a motivational orientation to immerse themselves in goal-oriented activities, pursue meaning in their lives, and are able to maintain a high level of involvement in academic activities[14]. The perseverance trait can effectively influence students' engagement in learning, which in turn affects their academic performance, and the effect of perseverance on academic performance must be mediated through engagement in learning.

The model obtained from this finding is the same as the results validated by Jiang et al. Students with high levels of perseverance are more likely to find a state of learning, become engaged in learning and maintain their behavior. In turn, the more engaged students are in the learning process, the easier they are to understand the content they are learning, the more efficient they are in their learning, and the higher academic achievement they achieve.

4.3. The moderating effect of passion

Based on the results of the regression data analysis of the mediated model with moderation we also know that the moderating effect term on the direct effect of perseverance and academic performance is not significant, so passion as a moderating variable acts exclusively on academic performance through a mediating variable. Previously, Jachimowicz found through meta-analysis that passion needs to have a beneficial effect on behavioral performance through a key mechanism, learning engagement [9]. The results obtained in the present study confirm this claim.

Jachimowicz mentioned that the relationship between perseverance and individual performance is stronger when individuals are more passionate about a task. Jachimowicz mentioned that the relationship between perseverance and performance is stronger when individuals are more passionate about a task, and that this positive effect is mediated by learning engagement in the relationship between perseverance and academic performance[9]. This study confirms that the moderating effect of passion is consistent with the finding that passion effectively moderates the effect of perseverance on learning engagement and also moderates the effect of learning engagement on academic performance, and that the indirect effect of the Bootstrap test does not contain a 95% confidence interval of 0 when passion is added, and that the indirect effect is statistically significant. When individuals have passion, the quality of perseverance effectively promotes their goal achievement, longer persistence, and more effective engagement, and individuals' related performance is enhanced because of these factors[9].

The positive effect of passion on perseverance is positive when input is the effective medium. However, passion as a moderating variable must pass through the medium of input, and passion does not directly moderate the mechanism of action between perseverance and academic performance. Students with high levels of perseverance cannot conclude that they are doing well because they are passionate about it, and students with low levels of perseverance cannot conclude that they are not doing well because they are not passionate about it. However, it is certain that students who are passionate are more engaged in their studies, and that a more engaged state of learning can help them achieve better academic performance.

In a further simple slope analysis, we find:

First, in the perseverance-learning engagement pathway, the predictive effect of perseverance on learning engagement is increased when passion is one standard deviation positive compared to perseverance when passion is one standard deviation negative. Perseverance may not lead to better performance when individuals pursue goals they are less passionate about, whereas higher perseverance traits enhance performance when individuals pursue areas they are passionate about[17]. The positive moderating effect of passion allows the perseverance trait to better facilitate students' focus on their learning. Students are more likely to exhibit positive behavioral attitudes toward things they are interested in, and this state of focus is spontaneous.

Second, in the learning engagement-academic performance path, the positive predictive effect of learning engagement on academic performance is higher when passion is one standard deviation positive than when passion is one standard deviation negative, and the positive predictive effect of learning engagement on academic performance is insignificant when passion is one standard deviation negative. Passion has a significant positive effect on all three dimensions of individual engagement, with individuals showing more focus and immersion in more passionate domains[11] and effective engagement, improving individual behavioral performance[17].

The combination of the two conclusions once again shows that when students become extremely interested in the objective they are learning, the more engaged they will also be in the learning task. In their daily teaching work, then, while developing students' perseverance, teachers need to consider how to design content that inspires and engages students. Students also need to tap into their passions when they are engaged in learning and find what they are passionate about.

4.4. Inspiration for teaching and learning

Perseverance can effectively influence students' academic performance, so theoretical research on enhancing students' willpower should be emphasized, and teachers should focus on daily cultivation of students' perseverance traits. Perseverance can effectively influence students' commitment to learning and thus their academic performance. Teachers can adopt appropriate teaching methods in their daily teaching activities, such as heuristic teaching, problem-based teaching, and contextualized teaching, to enrich students' learning experiences, enhance students' learning experiences, develop students'

independent thinking and deep thinking skills, and conduct immersion learning. Passion is also effective in regulating the mechanism of model action. In daily teaching life, teachers should be good at stimulating students' passion for learning and finding more lively and interesting teaching methods.

4.5. Research Outlook and Shortcomings

4.5.1. Identification of new problems and future research perspectives

The results of the hierarchical regression test of the mediated model showed that before the moderating variable was added to the model, the direct effect between perseverance and academic engagement and academic performance was partially mediated and was significant. The results of the regression test of the mediated model with moderation showed that after the inclusion of the moderating variable, the direct effect was not significant and perseverance needed to have an effect on academic performance through learning engagement and then. Previously, Jachimowicz mentioned that passion affects individual performance through the important mechanism of input[9]. Is it because passion must act through the mechanism of engagement to affect the direct effect of perseverance on academic performance in the mediated model with moderation?

In the results measured by Jiang, the same learning engagement was used as a mediating variable between perseverance and academic performance, and the mediation model presented a full mediation. This is explained by the tendency of persevering individuals to "promote positivity", i.e., persevering individuals show more positive behavioral performance in learning activities, have more positive task-oriented affective responses, are more internally motivated, and use more cognitive strategies, which affect academic achievement[14]. Could this then suggest that perseverance must influence academic performance by affecting a particular affective response of students? The partial mediating effects revealed by the mediating model test then suggest that there are other mediating variables besides input that influence the relationship between perseverance and academic performance, and that this mediating variable should also be an internal affective response of the student.

4.5.2. Research deficiencies

The present study once again validates the feasibility of Grit-C and validates the mediated model with moderation, filling the gap of previous studies on the pathway mechanism of the effect of perseverance on academic performance. However, it is important to note that the current study also has many limitations and shortcomings in many areas, the main ones being as follows.

First, this study is a cross-sectional study, and due to the nature of cross-sectional studies, the causal relationship between perseverance, learning engagement, and academic performance is not entirely reliable; students' perseverance traits develop dynamically, and it cannot be ruled out that individuals with high perseverance traits may also have low learning engagement in a fast-food culture.

Second, the subjects selected in this study were all from Tibetan universities and the sample size was limited, so it may be one-sided and not representative of the college student population in all regions. The sample collection can also be expanded in future studies.

Third, all were conducted using questionnaires, which may suffer from common methodological bias.

Fourth, the study did not further explore the effects of passion as other influencing mechanisms or other mediating variables that may exist, and the reasons for the insignificant direct effect of passion addition were not explored in depth. This needs to be explored in depth in subsequent studies.

Fifth, the study does not explore whether there are other control variables that influence the path mechanism of the model. Then the effect of different model structures on other variables should also be explored.

5. Conclusion

This study was conducted on 292 students at Tibetan University to reveal the impact of perseverance trait on academic performance of college students and its pathway mechanism, and the following conclusions can be drawn.

(1) Perseverance showed a positive correlation with academic performance; perseverance showed a positive correlation with learning engagement; learning engagement showed a positive correlation with academic performance; passion showed a positive correlation with perseverance; passion showed a

positive correlation with learning engagement.

(2) Perseverance positively predicted academic performance and learning engagement partially mediated this positive predictive effect.

(3) When passion was added as a moderating variable, perseverance positively predicted academic performance and learning engagement played a fully mediating role in this positive predictive effect.

(4) Passion has a moderating role in the relationship between perseverance and learning engagement and this moderating role is a positive one.

(5) Passion has a moderating role in the relationship between learning engagement and academic performance, and this moderating role is a positive one.

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