

Relationships Between College Students' Belief in a Just World and Their Learning Satisfaction: The Chain Mediating Effects of Gratitude and Engagement

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Purpose: This paper reveals the mechanism of the influence of belief in a just world on college students' learning satisfaction, and provides reference for further improving the quality of talent training in higher education.

Methods: By convenient sampling method, 131,894 college students from 348 undergraduate universities in China were investigated on the belief in a just world scale, gratitude scale, learning engagement scale and learning satisfaction scale. Then, SPSS, AMOS and other software were used to analyze the data.

Results: 1) Belief in a just world, gratitude, learning engagement and learning satisfaction are positively correlated. 2) Belief in a just world can not only directly and positively predict college students' learning satisfaction, but also indirectly and positively predict college students' learning satisfaction through gratitude and learning engagement respectively. 3) Gratitude and learning engagement play a chain mediating role between belief in a just world and learning satisfaction.

Conclusion: Belief in a just world positively predicts college students' learning satisfaction through gratitude and learning engagement, suggesting that colleges and universities should create a fair learning environment and enhance college students' sense of gratitude, so as to improve college students' belief in a fair world and gratitude level, thus promoting their learning engagement and finally improving their learning satisfaction.

Keywords: college students, belief in a just world, gratitude, learning engagement, learning satisfaction

Introduction

In recent years, high-quality education has become the core theme of higher education schools worldwide,¹ while college students' learning satisfaction has been regarded as the origin point of higher education quality evaluation.² Learning satisfaction was first proposed by Tough, who believed that learning satisfaction is the perception and attitude that emphasizes meeting learners' learning needs during the learning process.³ Later, Martin expanded the meaning of learning satisfaction, defining it as a measurement index of whether learners achieve expected learning outcomes.⁴ According to Guo et al, learning satisfaction is the emotional dimension of learning outcomes, representing affective learning outcomes.⁵ Since learning satisfaction is of great value to the quality of talent training, domestic and foreign researchers have conducted many studies on the influencing factors of college students' learning satisfaction. Including mainly teachers' teaching level,⁶ learning atmosphere,⁷ and learning engagement on college students' learning satisfaction in particular,^{8,9} the predictive effect of learning engagement on college students' learning satisfaction has attracted most researchers' attention. Kuh believes that learning engagement helps develop students' ability for continuous learning and personal development and can be used as a representative of the quality of higher education.^{10,11} It can be seen that learning engagement is of great value to learning satisfaction. Many studies have confirmed a significant

positive correlation between learning engagement and learning satisfaction; the more learning engagement, the higher learning satisfaction.¹²

Considering the critical effect of learning engagement on learning satisfaction, the mechanism of learning engagement should be explored before discussing how to improve learning satisfaction. Skinner et al improved the self-system model of motivational development, namely the SSMD model, which found that learning engagement, as an intermediary variable, influenced learning satisfaction.¹³ SSMD model can better explain learning engagement from internal and external influence mechanisms. In this model, the internal system refers to the fact that emotional engagement influences behavioral engagement, and the external system refers to the environment influencing engagement by itself, producing results. However, the model is missing some key variables, such as beliefs and emotions. Belief is the conscious tendency of an individual who holds certainty firmly about certain concepts of the rules of life. As a cognitive activity, belief is an important part of the individual motivation system, guiding individual behaviour and bringing great power to individual motivation.¹⁴ As a form of belief, belief in a just world represents individual cognitive factors.¹⁵ It has a positive adaptive function for individuals,¹⁶ which has recently attracted more attention. Previous studies have shown that belief in a just world has a direct impact on students' learning behaviour, and it significantly positively predicts students' academic performance.¹⁷⁻¹⁹ In terms of emotion, emotion is an individual's special attitude towards the reflected content, which has a unique subjective experience and external performance and influences an individual's behavioral response.^{14,20} Gratitude, as a positive emotional trait,²¹ has become the focus of people's attention under the background of advocating moral education. Many researchers have found that gratitude also positively impacts academic performance.²²

On the basis of above theoretical analysis and empirical research, learning engagement positively affects learning satisfaction. At the same time, belief in a just world and gratitude may positively impact learning engagement. In addition, cognition determines the generation of emotions.²³ A cognitive activity like belief in a just world positively impacts gratitude. Previous studies have confirmed that belief in a just world positively predicts gratitude.²⁴ Therefore, there may be a chain mediation between belief in a just world, gratitude, learning engagement and learning satisfaction. According to the Cognitive Appraisal Theory of Lazarus,²⁰ cognition affects emotions, affects individual behavioral responses, and produces behavioral results. Belief in a just world may affect learning engagement through gratitude, thus influencing learning satisfaction.

To sum up, belief in a just world and gratitude, as important cognitive and emotional factors respectively, would have an impact on college students' learning engagement and learning satisfaction. However, the current SSMD model does not include the impact of these two individual variables, belief in a just world and gratitude, on learning engagement and satisfaction, indicating that the role of just world belief and gratitude in learning engagement and learning satisfaction has been neglected. Based on the above research results, it is found that the SSMD model should incorporate two factors, namely belief in a just world and gratitude, which would improve the influencing mechanism of learning engagement and provide a new vision for improving learning satisfaction. In view of this, this study intends to explore how belief in a just world and gratitude affect learning engagement and learning satisfaction, and the chain mediating role that gratitude and learning engagement play between just world belief and learning satisfaction, so as to provide references for high-quality education in universities.

Literature Review

The Relationship Between Belief in a Just World and Learning Satisfaction

The belief in a just world (BJW) was proposed by Lerner et al, which refers to people's belief that the world they live in is just, generally, they can get what they deserve. This belief makes people believe that efforts will be rewarded.²⁵ BJW is one of the people's basic psychological needs, which creates a sense of security and trust. Lerner also proposed the Just World Hypothesis to explain further the significance of belief in a just world to people.²⁶ Without such a belief, it is difficult for individuals to commit to pursuing long-term goals and even to carry out social regulation behavior in daily life.²⁷

Dalbert believes that BJW is a personal resource to cope with challenges and key life events.²⁸ People with strong beliefs have more confidence in the future and are more willing to invest in the future. As a kind of "psychological

contract”,²⁹ BJW makes individuals believe that their efforts will be rewarded, which can promote the pursuit of long-term goals.^{30–32} Many studies have confirmed that belief in a just world makes individuals willing to invest time and energy in goals, which can positively predict academic performance.^{17–19} The stronger the belief in a just world, the better the students’ grades. Therefore, the belief in a just world is important to college students learning. In addition, many studies have shown that belief in a just world, as an important psychological resource, plays a positive adaptive function and psychological buffer function for individuals and can improve their positive emotions and subjective well-being.^{16,33,34} Previous studies have also confirmed that belief in a just world enables individuals to have a sense of security and control over life, which provides a meaningful explanatory framework for individual life. It is positively correlated with life satisfaction and has a positive predictive effect on life satisfaction.^{35,36}

Academic achievement, subjective well-being and life satisfaction are related to students’ learning needs and effects evaluation. School life is an important part of a college student’s life, and academic achievement is the main goal of college students’ school life. Subjective well-being reflects students’ evaluation of school life quality. Previous studies have proved that belief in a just world positively predicts students’ academic achievement, subjective well-being and life satisfaction. Therefore, college students belief in a just world may affect their learning satisfaction.

Hypothesis 1: Belief in a just world positively influences learning satisfaction.

The Mediating Effect of Gratitude

According to the theory of emotional traits, gratitude is a positive emotional trait, which refers to the psychological tendency of individuals to understand or respond to the help of others with gratitude so that they can obtain a positive emotional experience.²¹ Based on the social exchange theory, individuals are responsible and obligated to repay the benefactor after receiving favors from others.³⁷ The concept of just world belief also contains the influence of gratitude: individuals believe that others should be rewarded for their efforts, and individuals should be grateful to others, that is, “good people deserve good things”. Previous studies have shown that belief in a just world correlates significantly positively with gratitude.²⁴ The stronger the belief in a just world, the more inclined individuals are to respond to the help of others with gratitude behaviour. The belief in a just world has a significant positive predictive effect on gratitude.^{33,38}

Fredrickson proposed Broaden-and-Build Theory of Positive Emotions, incorporating gratitude into positive emotions and believed that gratitude could help individuals improve their coping ability to produce positive results and improve their evaluation of life quality.³⁹ On the one hand, studies have proved that gratitude is closely related to life satisfaction and positively predicts life satisfaction. People with high gratitude also have high life satisfaction.^{40–43} In addition, gratitude is an important personal factor that helps college students cope more positively with study and life.⁴⁴ Individuals with a high level of gratitude have a higher sense of reward and a clearer goal in life. Learning motivates them to pursue their academic goals with a heart of gratitude and persevere to achieve outstanding academic achievement.

On the other hand, gratitude is positively correlated with academic performance. Gratitude is an important predictor of the academic performance of college students. The higher the degree of gratitude, the better the academic performance.^{22,45} Gratitude positively impacts life satisfaction and academic performance. College students’ campus life quality and academic performance are related to their evaluation of learning outcomes so gratitude may affect their academic satisfaction. Although previous research shows that belief in a just world can promote gratitude, there is a lack of discussion on the relationship between belief in a just world, gratitude and learning satisfaction.

Hypothesis 2: Gratitude has a significant positive predictive effect on learning satisfaction.

Hypothesis 3: Belief in a just world positively affects college students’ learning satisfaction through gratitude.

Mediating Effects of Learning Engagement

Learning engagement refers to a continuous and positive emotional state displayed by individuals during learning. Concentration, vitality and dedication are the main characteristics of learning engagement.⁴⁶ Learning engagement includes the time, energy and degree students invest in cognition, emotion and behaviour.⁴⁷ Cognitive engagement refer to that learners' intrinsic learning motivation, and they use deep learning methods and strategies to learn. Emotional engagement refers to those individuals who are interested in learning and gain satisfaction from learning. In addition, emotional engagement also includes teacher-student relationships, student-student relationships and so on. Behavioral engagement refers to the behaviour of learners to participate in learning-related activities inside and outside the classroom.^{1,48}

Previous studies have found that learning engagement may be influenced by belief in a just world. Lerner et al believe that belief in a just world is a basic psychological tendency which can promote people's pursuit of long-term goals.^{27,49} This belief gives people more confidence in the future.^{29,50} The stronger the belief in a just world, the more efficiently an individual can manage their time, increasing the amount of time devoted to study and reducing the amount of time spent playing.⁵¹ However, when individuals perceive injustice, they will reduce their motivation to learn and show no concern for academic progress and achievements.⁵² Therefore, belief in a just world would promote the improvement of learning motivation, make individuals pay more attention to the implementation of academic goals, effectively manage time, and increase the investment of learning time, which in turn improve academic achievement.

Hypothesis 4: Belief in a just world positively affects learning engagement.

Kuh believes that learning engagement, as a representative of the quality of higher education, helps to promote students' continuous learning and ability development.^{10,11} Kahu points out that learning engagement is an evolving concept encompassing a range of student behaviors related to academic achievement and student satisfaction.⁸ Many previous studies have confirmed that learning engagement positively correlates with learning satisfaction, and learning engagement is a significant predictor of learning satisfaction. The higher the learning engagement, the higher the students' academic achievement, ability and learning satisfaction.^{5,8,9,12} Therefore, the relationship between belief in a just world, learning engagement and learning satisfaction should be revealed.

Hypothesis 5: Belief in a just world positively affects learning satisfaction through learning engagement.

Chain Mediating Effect of Gratitude and Learning Engagement

Gratitude and learning engagement are both hot topics in the field of education in recent years. This study explores the mediating effects of these two factors on the relationship between belief in a just world and learning satisfaction. Gratitude, as a positive emotional trait, can broaden the thinking and positive emotions of individuals and enable individuals to perceive things with an optimistic attitude. Accordingly, it would improve students' adaptability and stimulate positive behaviours in learning and life,³⁹ further promoting individual learning engagement. On the other hand, gratitude can reduce individual learning burnout,⁵³ increase an individual's investment in learning activities, and improve academic achievement. There is a significant positive correlation between gratitude and learning engagement. Gratitude has a significant positive impact on learning engagement. The higher the degree of gratitude, the higher the learning engagement.^{34,54,55} Therefore, gratitude and learning engagement may have a chain mediating effect between belief in a just world and learning satisfaction.

Because of the lack of research on the relationship between belief in a just world, gratitude, learning engagement and learning satisfaction, this study intends to explore this. It mainly takes the 3P model proposed by Biggs and the cognitive evaluation theory of Lazarus as the theoretical basis.^{20,56} To explore the relationship among belief in a just world, gratitude, learning engagement and learning satisfaction. The 3P model refers to the Presage-Process-Product of college learning. Biggs et al pointed out that the early variables in the 3P model include students' characteristics, the process variables mainly refer to students' learning input, and the outcome variables refer to students' performance and achievement.⁵⁷ Early variables determine how students treat a certain task and thus affect their

learning outcomes. Early-stage, process, and outcome variables interact to become a dynamic system.⁵⁷ In this study, belief in a just world and gratitude are both personal traits;^{15,21} that is, the two are preliminary variables; while learning engagement is a process variable, which is affected by early variables and the outcome variables;^{8,12,58} Learning satisfaction is one of the forms of learning outcomes,⁵⁹ namely, learning satisfaction is the outcome variable. Lazarus' Cognitive Appraisal Theory holds that individual emotions are influenced by cognition, and emotions need cognitive guidance to produce behavioral responses. Consequently, cognition affects emotion and further affects the individual's behaviour reaction, and finally makes the individual produce the behaviour result. Based on this study, belief in a just world is seen as a cognitive factor, gratitude is taken as a positive emotion, learning engagement acts as a behavioral response, and learning satisfaction is a behavioral outcome.

Hypothesis 6: Belief in a just world influences learning engagement through gratitude and thus influences learning satisfaction.

Based on the above six hypotheses, this study constructed a hypothesis model (see Figure 1).

Method

Participants

The study sampled 131,894 students from 348 undergraduate institutions in mainland China. In order to cover institutions in different regions of the country and with different academic reputations, we are inviting a wide range of institutions and students to participate in this online survey in 2022. In each sample institution, participating institutions and respondents were selected using convenience sampling. In this study, a lie detector question was inserted into the questionnaire as a method of screening valid questionnaires to obtain the above sample size. In the sample, students from "double first-class" universities accounted for 8.7%, regular undergraduate students accounted for 53.9%, newly established undergraduate students accounted for 34.0%, and independent college students accounted for 3.4%. Males accounted for 29.1%, and females accounted for 70.9%; Freshmen accounted for 40.2%, sophomores accounted for 24.6%, juniors accounted for 23.0%, seniors and above accounted for 12.2%; Humanities and social sciences accounted for 59.0%, science, industry, agriculture and medicine accounted for 41.0%. The average age of the subjects was 20.66 (± 1.38) years.

Measures

Belief in a Just World Scale

The General Just World Belief Scale developed by Dalbert is one of the most widely used research tools, comprising 6 items.⁶⁰ Based on the literature and interviews with university teachers and students, this study revised the General Belief in a Just World Scale compiled by Dalbert. Two questions in the original scale were deleted, four were retained, and the expressions of the reserved questions were adjusted to conform to the Chinese cultural background. The revised scale

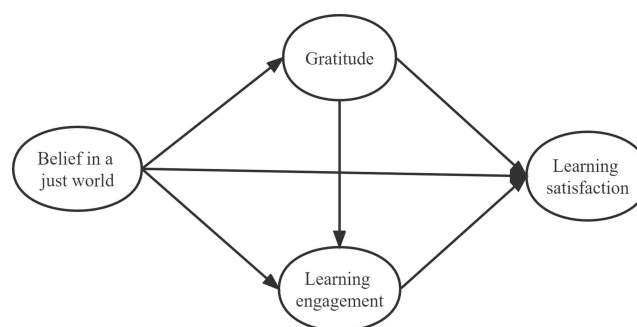


Figure 1 Hypothesized model of the relationship among just world belief, gratitude, learning engagement and learning satisfaction of college students.

was scored on a 5-point Likert scale, ranging from 1 “completely disagree” to 5 “completely agree”, with higher scores indicating stronger belief in a just world.

Gratitude Scale

Based on a literature review and interviews with university teachers and students, this study revised the gratitude scale compiled by McCullough et al,²¹ deleting 3 questions and keeping 3. Localized adjustments were made to the statements of the retained questions. The revised scale uses a 5-point Likert scale, ranging from 1 “completely disagree” to 5 “completely agree”, with a higher score indicating a higher degree of gratitude.

Learning Engagement Scale

The learning engagement scale used in this study is mainly from the College Student Learning Scale compiled by Guo et al.⁵ Because belief in a just world and gratitude already contain cognitive and emotional components in this study, to avoid repetition, the learning engagement scale uses the behavioral engagement sub-scale, which does not include cognitive and emotional engagement. It only examines the participants’ behavioral engagement in learning. Behavioral engagement includes three aspects, among which in-class learning engagement includes two topics, teacher-student interaction engagement and peer interaction engagement include three topics, respectively.

Learning Satisfaction Scale

The learning satisfaction scale used in this study was adapted on the basis of the College Student Learning Scale compiled by Guo et al.⁵ The adjusted learning satisfaction scale has 7 items, and the 5-point Likert scale is used to score from 1 “completely disagreeable” to 5 “completely agreeable”. The higher the total score, the higher the learning satisfaction.

Data Analysis

Firstly, confirmatory factor analysis was used to test the scale’s construct validity. Secondly, descriptive statistics and correlation analysis were performed on variables. Finally, the structural equation model explored the relationship between belief in a just world, gratitude, learning engagement and learning satisfaction. In the model analysis, the bias-corrected Bootstrap method was used to test the mediating effect of the model. In addition, a multi-group structural equation model was adopted to analyze the model’s applicability. Before the formal data processing and analysis, the Harman single-factor test was used to conduct the common method bias,⁶¹ and the common factor number was set as 1. AMOS was used for confirmatory factor analysis, and the fitting results were as follows: $\chi^2 / df = 5642.02$, RMSEA = 0.21, CFI = 0.57, NNFI = 0.53, GFI = 0.40. The poor model fit indicates no serious common method bias problem in this study.

Results

Confirmatory Factor Analysis

To test the reliability and validity of the measurement tools, confirmatory factor analysis, including 8 first-order factors, is first performed. The results shows that the fitting index of the measurement model is good: $\chi^2 / df = 500.30$, RMSEA = 0.06, CFI = 0.97, NNFI = 0.96, GFI = 0.93. The load value of each factor is not less than 0.7, and the t value reveals significance at the 0.001 level. The AVEs of all constructs are over 0.50, and the square root of AVEs is greater than the correlation coefficients between factors, indicating good discriminant validity. The Cronbach’s α coefficient and combined reliability of all factors are greater than 0.70, indicating that the reliability of factors is good. In conclusion, the reliabilities and validities of this research tool are acceptable and can be further analyzed (See [Table 1](#)).

Descriptive Statistics and Correlation

[Table 1](#) also shows each variable’s mean, standard deviation and correlation coefficient. College students scored 3.99 points on belief in a just world, 3 points higher than the theoretical median, indicating that the overall self-evaluation of college students on their belief in a just world tends to be positive, but it needs to be further improved. In the aspect of gratitude, the average score of students is 4.06, indicating that students have a high degree of gratitude and can respond to the help of others with gratitude emotions and behaviours. In terms of learning engagement, college students put the highest engagement in in-class learning ($M=4.02$), indicating that college students put more time and energy into in-class

Table 1 Correlation Matrix, Reliabilities, Validities, and Descriptive Statistics (N=131894)

Scales	1	2	3	4	5	6	Cronbach's α	CR	AVE	CFA Loadings Range (Mean)
1. Belief in a just world	0.83						0.90	0.90	0.69	0.77–0.87(0.83)
2. Gratitude	0.81	0.90					0.93	0.93	0.82	0.89–0.92(0.90)
3. In-class learning engagement	0.47	0.46	0.76				0.73	0.74	0.58	0.75–0.78(0.76)
4. Teacher-student interaction engagement	0.38	0.36	0.57	0.89			0.91	0.92	0.79	0.82–0.93(0.89)
5. Peer interaction engagement	0.49	0.50	0.56	0.53	0.85		0.88	0.89	0.72	0.82–0.89(0.85)
6. Learning satisfaction	0.56	0.54	0.42	0.35	0.45	0.89	0.96	0.96	0.79	0.86–0.93(0.89)
Mean	3.99	4.06	4.02	3.26	3.89	3.77				
SD	0.77	0.77	0.69	0.96	0.74	0.78				

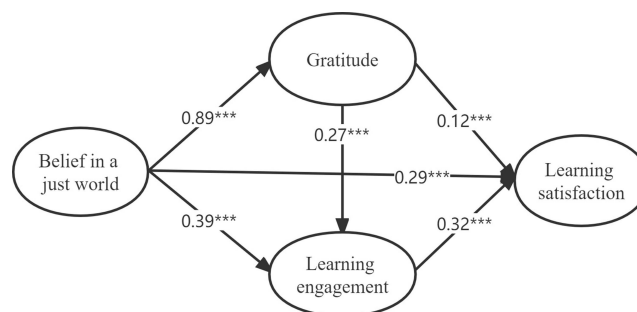
Notes: Mean values for scales are total scores divided by number of items. In the triangular matrix of columns, the correlations between variables are significant at the 0.001 level, and bold type figures on the diagonal line are the square roots of average variance extracted (AVE).

learning. Teacher-student interaction engagement (M=3.26) was slightly higher than the theoretical median value. However, the score of learning engagement was the lowest, indicating that students' self-evaluation of teacher-student interaction engagement tended to be positive. However, it was necessary to enhance teacher-student interaction and communication further. The peer interaction engagement (M=3.89) was higher than the theoretical median value, indicating that the peer interaction and communication of college students were sufficient.

The results of correlation analysis showed that belief in a just world, gratitude, learning engagement and their dimensions were positively correlated with learning satisfaction. Except for in-class learning engagement, teacher-student activity engagement and peer interaction engagement, which were moderately correlated with belief in a just world, gratitude and learning satisfaction, all the other variables were strongly correlated.

Mediating Effects of Gratitude and Learning Engagement Between Belief in a Just World and Learning Satisfaction

This study, AMOS23.0 was used to construct a structural equation model to analyze and test the mediating effects of gratitude and learning engagement between belief in a just world and learning satisfaction. The results showed that the fitting index of the model was good: $\chi^2 / df = 638.08$, $p < 0.01$, RMSEA = 0.07, NNFI = 0.96, CFI = 0.97. As shown in Figure 2, belief in a just world positively predicts learning satisfaction ($\beta = 0.29$, $p < 0.001$), so hypothesis 1 is valid, that is, BJW can directly affect learning satisfaction. BJW positively predicted gratitude ($\beta = 0.89$, $p < 0.001$), and gratitude positively predicted learning satisfaction ($\beta = 0.12$, $p < 0.001$). Therefore, Hypotheses 2 and 3 were valid, indicating that belief in a just world would impact learning satisfaction through the mediating effect of gratitude. BJW positively predicted learning engagement ($\beta = 0.39$, $p < 0.001$). Therefore, Hypotheses 4 and 5 are valid, indicating that learning engagement has a mediating effect between belief in a just world and learning satisfaction. These results confirm that while BJW directly predicts learning satisfaction, BJW can predict learning satisfaction through gratitude and learning engagement, respectively, and can also

**Figure 2** Chain mediating effect of Gratitude and Learning engagement between Belief in a just world and Learning satisfaction.

predict learning satisfaction through the chain mediating effect of gratitude \rightarrow learning engagement ($\beta=0.27$, $p < 0.001$). Therefore, hypothesis 6 is valid. In other words, this model is a chain mediation model, and gratitude and learning engagement partially mediate between just world belief and learning satisfaction.

This study further used the Bootstrap method with deviation correction to test the mediating effect (sampled 2000 times), and the results are shown in Table 2. As can be seen from Table 2, the 95% confidence interval of path 1 does not include 0; that is, gratitude has a significant mediating effect between BJW and learning satisfaction, with a mediating effect value of 0.11. The 95% confidence interval of path 2 did not include 0; that is, the mediating effect of learning engagement between BJW and learning satisfaction was significant, and the mediating effect value was 0.12. The 95% confidence interval of path 3 does not include 0; that is, the chain mediating effect of gratitude and learning engagement between BJW and learning satisfaction is significant. This indicates that BJW can also affect learning satisfaction through gratitude and engagement, and the mediating effect value is 0.08. Finally, the total indirect effect is the sum of the three mediating effects equal to 0.31. The 95% confidence interval of path 4 did not include 0, indicating that after adding gratitude and learning engagement, the direct effect of BJW on learning satisfaction was still significant, and the direct effect value was 0.29.

In the model, BJW explained 79.8% of the variation in gratitude, BJW and gratitude together explained 41.9% of the variation in learning engagement, and BJW, gratitude and learning engagement together explained 41.6% of the variation in learning satisfaction.

Multiple Group Analysis

In order to verify the applicability of the model, the restrictions of variables such as gender, grade, discipline and school type were added to the path coefficients of the model respectively, and the multi-group structural equation model was used for analysis. The results show (see Table 3) that there is no significant difference in the fitting index between the restricted and unrestricted models with the above variables ($\Delta IFI < 0.005$, $\Delta NFI < 0.005$, $\Delta RFI < 0.01$, $\Delta TLI < 0.01$), indicating that the model in this study is universal in different populations.

Table 2 Mediating Effect Test

Paths		Standardized Effect Estimates	Effect Size	95% Confidence Interval	
				Lower Limit	Upper Limit
Path 1	Belief in a just world \rightarrow Gratitude \rightarrow Learning satisfaction	0.11	18.64%	0.09	0.12
Path 2	Belief in a just world \rightarrow Learning engagement \rightarrow Learning satisfaction	0.12	20.34%	0.12	0.13
Path 3	Belief in a just world \rightarrow Gratitude \rightarrow Learning engagement \rightarrow Learning satisfaction	0.08	13.56%	0.07	0.08
Path 4	Belief in a just world \rightarrow Gratitude \rightarrow Learning satisfaction	0.29	49.15%	0.27	0.30
	Total indirect effect	0.31	52.54%	0.29	0.32
	Total effect	0.59		0.59	0.60

Table 3 Multi-Group Analysis

Variables	ΔIFI	ΔNFI	ΔRFI	ΔTLI
Gender	0.003	0.003	-0.003	-0.003
Grade	0.001	0.001	-0.006	-0.006
Discipline	0.001	0.001	-0.005	-0.005
School type	0.002	0.002	-0.005	-0.005

Discussion

Mainly on Biggs' 3P model "presage-process-product" and Cognitive Appraisal Theory of "cognition → emotion → behaviour → result" by Lazarus, this study took college students as subjects, taking belief in a just world as prediction variables, gratitude and learning as intermediary variables. A chain mediating effect model with learning satisfaction as an outcome variable. The results show a significant positive correlation between belief in a just world and learning satisfaction. Gratitude and learning engagement have a chain mediating effect between belief in a just world and learning satisfaction.

The Effect of Belief in a Just World on Learning Satisfaction

This study finds that belief in a just world can directly and positively predict learning satisfaction. The results support hypothesis 1, it is similar to previous studies on the relationship between BJW and academic performance, subjective well-being, and life satisfaction.^{36,62,63} The mechanism that belief in a just world plays a role mainly includes the personal resource hypothesis and psychological buffer hypothesis. It can enhance the ability of individuals to solve learning problems and relieve the pressure of individuals facing learning difficulties. All these studies verified that BJW has a positive function for individuals.^{28,38,64} It can be seen from the above research that belief in a just world can improve individuals' positive emotions and enable individuals to have positive self-perception and satisfaction,⁶⁵⁻⁶⁷ reducing the influence of negative psychology,^{63,68} and promoting individuals to obtain higher learning satisfaction.

The Mediation Effect of Gratitude

In this study, we found that gratitude positively predicted learning satisfaction and mediated between belief in a just world and learning satisfaction, which supported hypotheses 2 and 3. This indicates that belief in a just world can indirectly affect college students' learning satisfaction through gratitude. The research result supports the social exchange theory.³⁷ Namely individuals have the responsibility and obligation to repay others for their favors.

In addition, the results of this study also support the Theory of Emotion and the Broaden-and-Build Theory. According to the Trait Gratitude Theory,²¹ gratitude refers to the positive emotional experience of individuals who respond to others' favors with gratitude. Gratitude is a positive emotional trait of individuals. Individuals with a high degree of gratitude experience more gratitude and can show kindness more strongly,⁶⁹ perceive more care from teachers and classmates, and obtain better emotional learning results. Based on the Broaden-and-Build Theory,³⁹ gratitude can promote individual coping capacity, help achieve positive learning outcomes and improve learning satisfaction. The results of this study not only support the above theory, but also are similar to previous studies in which gratitude positively predicts life satisfaction and academic performance.^{22,41,70} Therefore, gratitude shows a mediating effect on the influence of belief in a just world on college students' learning satisfaction: it is not only influenced by BJW, but also significantly predicts college students' learning satisfaction.

The Mediation Effect of Learning Engagement

This study shows that in addition to gratitude, learning engagement also partially mediates the effect of belief in a just world on learning satisfaction. Specifically, belief in a just world positively affects learning engagement and indirectly affects learning satisfaction through the mediating effect of learning engagement. The results support hypotheses 4 and 5. Besides the improvement for individuals, belief in a just world can improve individuals' trust in teachers, increase teacher-student interaction, reduce deviant behaviours such as tardiness and truancy,⁶² and thus improve individuals' engagement in learning. On the other side, engagement can effectively improve learning satisfaction. Which enable students to identify with the purpose and meaning of learning; when they hold a positive learning attitude, they are willing to put time and effort into learning, enhance the sense of learning immersion and achievement, perceiving teachers and peer support to improve learning satisfaction.

The Chain Mediating Roles of Gratitude and Learning Engagement

This study finds that gratitude and learning engagement are closely related, and they are in the middle of the influence path of “belief in a just world → gratitude → learning engagement → learning satisfaction”, which play a chain mediating role in the process of BJW influencing learning satisfaction. The results support hypothesis 6. This indicates that gratitude and learning engagement not only have independent mediating effects between BJW and college students’ learning satisfaction but also indirectly affect learning satisfaction by influencing learning engagement. This suggests that enhancing the belief in a just world can further improve the degree of gratitude of college students. High gratitude promotes learning engagement, so the higher the learning satisfaction. The stronger the belief in a just world, the stronger the willingness of college students to help others with gratitude to show a higher tendency of gratitude. Furthermore, college students with a higher degree of gratitude are more willing to pay time and energy on the process of daily learning. They actively pursue academic goals so that they can gain learning gratification, as well as the support of teachers and classmates, showing high learning satisfaction.

As integration and expansion of Gratitude and Learning Engagement Research^{34,55,71} and learning engagement and learning satisfaction relevant study,^{8,9,72} to explore the chain mediating effect of gratitude and learning engagement, this study links gratitude and learning engagement with belief in a just world, enriching and deepens the research field of the internal mechanism of college students’ learning satisfaction. The results support the 3P model proposed by Biggs and the Cognitive Appraisal Theory of Lazarus,^{20,56} indicating that gratitude is an important factor in the influence of belief in a just world on college students’ learning satisfaction. It not only directly affects learning satisfaction but also indirectly affects learning satisfaction by influencing learning engagement.

Implications and Limitations

Although previous studies have confirmed the predictive effect of belief in a just world and gratitude on life satisfaction, there is still a lack of research on the impact of BJW and gratitude on college students’ learning satisfaction and its mechanism. From the perspective of educational psychology, 3P model and cognitive evaluation theory are integrated for the first time in this study, as a common theoretical basis to explore the effects of just world belief and gratitude on learning engagement and learning satisfaction, and investigate the influence mechanism of gratitude and learning engagement on just world belief and learning satisfaction of college students. This study highlights certain novelty in research ideas, design and content, enriching the relevant theories of BJW, gratitude, learning engagement and satisfaction, which provides a reference for future research.

In terms of practice, the findings of this study have implications for higher education. First, the impact of BJW on college students’ learning satisfaction suggests that college educators should pay more attention to educational fairness to build a fair environment for students. That is, teachers should treat students with a just attitude, and enhance their perceived justice,⁷³ to promote their learning satisfaction. Second, college students’ gratitude and engagement perform a chain mediating role in the process of BJW influencing learning satisfaction, which gives higher educators prompts to cultivate gratitude consciousness of students, guiding students to respond to others’ kindness with hard work. Eventually, this positive mood will increase students’ learning engagement and perception of teachers and students’ support and self-identity, improving the evaluation of the learning performance.

Although this study has expanded the understanding of the relationship between BJW and college students’ learning satisfaction, it still has some shortcomings. First of all, the cross-sectional design of this study makes it impossible to draw causal inferences based on the results of this study. Experimental and longitudinal follow-up studies are needed to explore the causal relationship between variables further to explain the long-term impact of BJW on learning satisfaction. Secondly, This study only explores the mediating role of gratitude and learning engagement, and there may be other mediating variables between belief in a just world and learning satisfaction, such as emotional intelligence and self-efficacy,^{74,75} which need to be further explored in subsequent studies. Finally, the subjects of this study are undergraduate students, not vocational students. Future studies can study the relationship between vocational students’ belief in a just world and learning satisfaction, and compare with undergraduates.

Conclusion

Through the above investigation and discussion, the following conclusions are drawn:

Firstly, Belief in a just world significantly positively predicts college students' learning satisfaction.

Secondly, Gratitude and learning engagement mediate between belief in a just world and learning satisfaction, respectively.

Thirdly, Gratitude and learning engagement play a chain mediating role between belief in a just world and learning satisfaction.

In conclusion, the above findings suggest that higher educators should pay attention to improving college students' belief in a just world and gratitude level, By creating a just learning environment for college students, guide them to increase their learning engagement with gratitude, achieve better learning results, making their own contributions to the society.

Ethical Statement

Our study complies with the Declaration of Helsinki. Our study was approved by the Research Ethics Committee of Xiamen University and Nanjing Vocational College of Tourism, with all participants providing informed consent.

Disclosure

The authors declare that they have no conflicts of interest in this work.

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