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Transcending Belief: Exploring the Impact of Belief in a Just World on Self-Regulated Learning in Chinese Adolescents Using Latent Transitions Analysis

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Introduction: While numerous studies have investigated the correlations between Belief in a Just World (BJW) and various variables, research on its stability and changes among different individuals, particularly in China, remains limited.

Methods: This study aims to identify the classification and trajectories of BJW among Chinese adolescents using a person-oriented approach, including latent profile analysis and latent transition analysis. It also examines the impact of social status on BJW and its influence on self-regulated learning. The longitudinal data were collected from 756 Chinese high school students (35.71% male, Mage = 16.00, age range = 14–19).

Results: Three distinct BJW profiles were identified: High-level BJW (~33%), Moderate-level BJW (~51%), and Low-level BJW (~14%). The findings indicate that membership in moderate and high BJW profiles was relatively stable, while the low-level BJW profile showed moderate stability. Higher perceptions of BJW were associated with higher subjective social status. Additionally, students in the High-level BJW profile exhibited the highest levels of self-regulated learning, even after controlling for gender, residence, class cadre, and parental educational levels.

Discussion: These results suggest that subjective social status can enhance Belief in a Just World, which in turn fosters better self-regulated learning skills. The study offers insights into the role of BJW and provides implications for interventions aimed at improving BJW and associated outcomes.

Keywords: belief in a just world, self-regulated learning, social status, justice motive theory

Introduction

Achieving educational equity is paramount to ensuring that all students have equal access to opportunities and resources, irrespective of their background or socioeconomic status.[1] It entails addressing disparities in quality education, resources, and support systems to create an environment where every student can flourish and realize their full potentials.[2] While there is a strong emphasis on providing equitable educational opportunities regardless of geographical location or family circumstances, challenges persist in attaining true educational equity. Ongoing efforts are crucial for addressing disparities and enhancing access to quality education for all students across China. The essence of educational equity lies in nurturing a genuine passion for learning among students. Therefore, understanding how students' perceptions of justice in their world influence their learning, particularly during adolescence, is imperative.

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Belief in a Just World

Belief in a Just World (BJW) is defined as the belief that individuals generally receive what they deserve in a just world.[3] According to justice motive theory, BJW serves as a cognitive resource or structure that helps people perceive the in-world and out-world as orderly, stable, and balanced.[4] This perception provides individuals with a sense of power, control, and deservingness. Once the belief that people get what they deserve and deserve what they get is established, they tend to trust that everyone would behave justly and the world will treat everyone justly. Thus, people would set and pursue long-term goals and rewards, under the motives of BJW.[5] For example, BJW was positively predict well-being, and life satisfaction, and hold good mental health, resilience.[6,7]

BJW, as the personal resource, could also instruct people to use adaptive minds and behaviors, when confronting unjust challenges and life events (e.g, assimilation function, trust function, motive function).[8] First, the assimilation function could enlighten people to re-evaluate unjust things in their circumstances as just. For example, students with a strong BJW thought that their endeavors matched to their grades, and they earned just treats in interpersonal relationships, such as teacher-student, peers, and parent-child relations.[9] Second, the trust function means that people would think that they are treated justly from others and then give more trust to others. Even if one experienced unjustly or someone did not get punished, people still had strong confidence in waiting justice under the impact of strong BJW. For example, students with a strong BJW would take more self-regulated behaviors, like reducing leisure time, to obtain better academic achievements and the positive feedback might cultivate intrinsic motivation and enhance advantaged behaviors.[9] Third, the motive function compels people to behave justly to maintain a just world together. Lerner considered that BJW manifested a personal contract, which would implant the justice concepts into individuals' minds and put it into action.[4,8] For example, students with stronger wills of BJW would present less cyber-bullying perpetration, as the unjust behavior infringes the principle of the personal contract.[10]

Obviously, many previous studies on BJW have been conducted within the western cultural contexts, which may not fully capture the nuances of other cultural settings., In Chinese culture, for example, the concept of justice is reflected in the traditional saying says that good will be rewarded with good and evil with evil; it is only a matter of time. This principle aligns with Western beliefs about justice.[5,8] However, China's collective society presents unique characteristics, such as a tendency to focus on the equitable distribution of wealth rather than its overall scarcity. This distinction is evinced in traditional Chinese ideology (eg, the Analects), which prioritize social harmony and collective well-being,[11] potentially influencing how BJW is perceived and manifested in this context. Meanwhile, traditional Chinese culture prefers the holistic thinking and individuals would blame external factors, including social injustice or other people, which is associated with low BJW.[12] Thus, Chinese people with lower socioeconomic status correlate with low BJW, because they might experience more injustice when confronting with the enlarged disparity between rich and poor.[13] Chinese education also plays an important role in forming and maintaining students establish belief that is in line with Chinese Taoism.[14] For example, teachers typically use a clear system of rewards and punishments, which helps students develop the BJW and fosters intrinsic motivation for learning.[15]

In addition to the cultural factor influencing BJW, it is essential to consider the methodological approaches used in existing research. Most studies on BJW have employed variable-centered analyses, focusing on mean scores to examine the effect of BJW on outcome variables or related factors eg.[16] While these approaches provide valuable insights into the causes and consequences of BJW, they often overlook individual differences and variations within the population. To address this limitation, person-centered analysis such as latent profile analysis (LPA) and latent transition analysis (LTA), offer a more nuanced understanding by capturing both homogenous and heterogenous attributes of participants. These methods allow for measurement error, and be probably to discover the nature of subgroups as a data-driven approach.[17–19] LPA and LTA concentrates on the identification of subgroups based on the similar characteristic of adolescents and the trajectory of change over time, no matter remaining in the same profile, or transition from one profile to another. In sum, LPA and LTA could provide comprehensive and multiple perspectives for the study on BJW.

Belief in a Just World and Self-Regulated Learning in Adolescents

Individuals with strong BJW tend to exhibit more confidence in the future, leading to a greater willingness to invest in it, ultimately benefiting from a positive adaptive function.[20] This belief system fosters the idea that efforts will be rewarded,

promoting the pursuit of long-term goals.[21,22] Studies have demonstrated that BJW directly influences students' learning behaviors and significantly predicts academic performance.[23,24] For instance, researchers revealed a positive correlation between BJW and college students' learning satisfaction through gratitude and engagement, underscoring the importance of creating a fair learning environment.[9] Moreover, Münscher found that students who believed in a personal just world tended to achieve better grades.[23] While existing research has explored the correlation between BJW and student achievement and satisfaction, there remains a gap in understanding the relationship between BJW and SRL (self-regulated learning), a vital learning type during education.

SRL encompasses cognitive, meta-cognitive, motivational, and behavioral strategies that empower individuals to effectively plan, monitor, and assess their learning processes.[25] Adolescence marks a crucial period for refining self-regulatory skills as individuals transition towards greater independence and responsibility in their learning and decision-making.[26] During adolescence, the development of SRL is intricately linked to academic achievement, social-emotional skills,[27] and overall adaptability.[28] Additionally, SRL nurtures a sense of autonomy and self-efficacy, empowering adolescents to take ownership of their learning and adopt a proactive approach to their educational journey.[29] Research has revealed that individuals who strongly endorse the BJW are more inclined to perceive fair treatment from others, such as classmates and teachers eg,[6] a phenomenon attributed to the assimilation function eg,[8,30] Additionally, BJW is particularly crucial for disadvantaged students in forming positive perceptions of their teachers over time.[31] These positive relationships are essential for fostering a conducive atmosphere for self-regulated learning, contributing to goal-setting, task persistence, and overall academic performance.[23] Within the realm of SRL, this belief can enhance students' capacity to set meaningful goals, monitor progress, and adjust strategies accordingly.[32] Furthermore, prior studies have shown a direct positive correlation between BJW and students' learning behavior and academic performance.[24] Based on these findings, it is evident that BJW could potentially influence self-regulated learning processes, thereby enhancing students' learning outcomes and overall educational journey.

The Variation in BJW and Its Reliance on Social Status in Adolescents

Numerous studies have documented a decline in BJW among adolescents.[33,34] According to Kohlberg's Theory of Moral Development, high school students transition from the conventional to the post-conventional level, which necessitates a reduction in their BJW to better navigate the complexities of society.[34,35] This shift is crucial for their adaptation, as their abstract-logic thinking becomes more sophisticated, and they encounter more instances of injustice, leading them to realize that the world is not always fair.[36] As they progress to the post-conventional level, where moral development reaches its highest stage, adolescents become deeper in comprehension of justice, fairness, and ethical principles, more flexible in their thinking and better equipped to deal with unjust situations.[35,37] Consequently, adolescents' sense of BJW tends to increase again when they cultivate more intricate notions of justice, internalize societal norms and moral values related to fairness and then rebuild their belief in a fair world. As they regain this belief, they start to feel that they are being treated fairly and view the world as meaningful, predictable, and controllable.[5]

Additionally, previous researchers found that parent-child attachment, school climate, nationalist ideology could contribute to molding individuals' perceptions of justice and fairness.[38,39] Additionally, research by Westfall et al illustrates how factors like self-rated attractiveness and social status can influence the endorsement of BJW,[40] indicating that personal characteristics and social standing shape beliefs about justice and fairness. Existing research has demonstrated that social status (SS) is likely to be a significant factor influencing BJW during adolescence.[41] This period of development is characterized by heightened sensitivity to social dynamics, and individuals' perceptions of justice and fairness are often shaped by their relative standing within social hierarchies.[42] It was found that individuals from different socioeconomic backgrounds may have diverse life experiences and exposures to social inequalities, shaping their perceptions of justice and fairness.[43] According to social identity theory,[44] higher SS individuals may benefit from increased access to resources, opportunities, and social privileges, influencing their beliefs about a just world. SS can also impact individuals' sense of control and agency within society,[41] strengthening their endorsement of a just world belief. Conversely, lower SS individuals facing barriers and adversity may struggle to uphold strong beliefs in justice and fairness. Social comparison processes also shape BJW, with SS influencing the nature of these comparisons.[45] Moreover, societal narratives and cultural norms regarding meritocracy and equality of opportunity may differ across socioeconomic

strata, influencing interpretations of events and outcomes,[46] potentially contributing to variations in BJW endorsement. Other studies have also indicated that economic inequality is more pronounced in China,[47] potentially posing challenges for adolescents in achieving upward social mobility and academic success.[48] As a result, further research is warranted to investigate the potential shifts in BJW and their correlation with SS among adolescents.

Current Study

Utilizing a person-oriented approach, the study identifies profiles of BJW and examines their distinct associations with SRL. To comprehend the underlying mechanisms and contextual factors influencing BJW, the study conducts a longitudinal investigation of shifts in BJW profiles over time. Specifically, the study addresses four research questions and proposes related hypotheses: Firstly, what distinct profiles of BJW can be delineated? Given the anticipated variation in levels of BJW among adolescents, as identified in previous research,[49] we expect to observe the existence of subgroups based on BJW (H1). Secondly, how do these profiles evolve across three time points? Drawing from Kohlberg's Theory of Moral Development, which suggests a progression in moral reasoning from self-interest to principles of justice and fairness and previous study,[35,36,50] we anticipates fluctuations and developments in adolescents' understanding and BJW over time. This intricate process underscores the multifaceted nature of adolescent cognitive and moral development as they navigate societal norms, personal experiences, and moral quandaries. Consequently, it is hypothesed that adolescents will transition between various BJW profiles over time (H2). Additionally, the study seeks to explore the influence of social status, on the formation of these profiles, hypothesizing that students with a higher subjective social status (SSS) are more likely to belong to the profile characterized by high BJW (H3). Furthermore, the study aims to investigate how these profiles diverge concerning SRL after controlling for salient demographic variables. According to previous research,[23] we hypothesize that students with high levels of BJW will exhibit the highest levels of SRL (H4).

Methods

Participants and Procedure

The sample for this study comprised of tenth and eleventh-grade students (aged 14–19) from Wenshan Zhuang and Miao Autonomous Prefecture, Yunnan Province, China, who participated in a longitudinal three-wave design study. Initially, 1050 high school students took part in the wave-1 survey. Subsequently, 892 participants completed the wave-2 survey four months later, followed by 788 participants who completed the wave-3 survey after another four months. Following the removal of invalid responses (eg, failed attention checks), 756 valid responses were retained, with 35.71% being male. The average age of participants was 16.00 (SD_{age} = 0.83). Each participant spent approximately 15 minutes completing the scale during each survey wave. Prior to the survey, participants were informed of its voluntary nature and their right to withdraw without facing consequences. Prior to participation, students were asked about their willingness to take part in the survey. Those who expressed interest were required to submit written informed consent forms from their parents or legal guardians.

Measures

Belief in a Just World

The Belief in a Just World scale consisted of six items related to general beliefs about justice in the world ("I believe that most of the things that happen in my life are fair".) and seven items concerning personal beliefs about being treated fairly ("I am confident that justice always prevails over injustice").[51–53] Each item was rated on a 6-point scale, ranging from "very much in disagreement = 1" to "very much in agreement = 6". The scale demonstrated high internal consistency with coefficient alphas of 0.85, 0.90, and 0.91 at T1, T2, and T3, respectively, which are all higher than the desired statistical power 0.8.[54]

Subjective Social Status

The Subjective Social Status Questionnaire is a single-factor construct comprising seven items that assess various aspects like academic achievement, family conditions, popularity, social skills, talent level, emotional well-being, and overall

image temperament.[55] Participants indicated their position on a 10-rung "ladder", with higher rungs indicating a higher subjective social status. Each step on the ladder corresponded to a numerical value reflecting its elevation (eg, the topmost rung coded as 10 and the lowest as 1). The questionnaire exhibited good internal consistency with coefficient alphas of 0.83, 0.85, and 0.86 at T1, T2, and T3, respectively, which are all higher than 0.8.[54]

Self-Regulated Learning

The Autonomous Learning Questionnaire was adapted from the Self-Regulated Learning Scale,[56] consisting of 15 items divided into three subscales: plan (eg, "I can organize my study tasks reasonably"), behavior implementation and monitoring (eg, "I can arrange my study time reasonably during self-directed learning"), and self-evaluation and self-reflection (eg, "I know the means to improve my learning effectiveness"). Each item was rated on a 5-point scale, ranging from "strongly disagree = 1" to "strongly agree = 5". The questionnaire demonstrated high internal consistency with coefficient alphas of 0.88, 0.91, and 0.92 at T1, T2, and T3, respectively, which are all higher than 0.8.[54]

Covariates

Additional demographic variables such as gender, class cadre, residence, father's educational level, and mother's educational level were assessed through self-report items (refer to Table S1).

Analysis Strategy

Preliminary analyses, including descriptive statistics, reliability assessments, and attrition analysis, were conducted using SPSS 29.0. Measurement invariance, latent profile analysis (LPA), and latent transition analysis (LTA) were performed using Mplus 8.8.[57] The robust maximum likelihood estimator (MLR) with Full Information Maximum Likelihood (FIML) was utilized to handle missing data.[58] Longitudinal measurement invariance was assessed to examine the scale's reliability across each time point.[59] The study employed LPA and LTA to analyze cross-sectional and longitudinal data separately.

The LPA analysis aimed to establish models with consistent profile counts across three distinct time points. Both free and equal means and variances were estimated in LPA solutions.[60] Statistical indicators and theoretical relevance were used to identify the most appropriate latent profile. Lower values of Akaike's Information Criterion (AIC), Consistent Akaike Information Criterion (CAIC), Bayesian Information Criterion (BIC), and adjusted Bayesian Information Criterion (ABIC) indicated better model fit. The Vuong-Lo-Mendell-Rubin test (VLMR), Lo-Mendell-Rubin adjusted LRT test (aLMR), and Bootstrap Likelihood Ratio Test (BLRT) were employed to compare models with different profile counts. The "elbow plots" were utilized to determine the optimal model, where the slope flattens beyond a certain point.[61] Additionally, entropy values were considered as an indicator of classification quality, with closer values to 1 indicating better classification quality.[62]

Following LPA, longitudinal profile measurement invariance was utilized to determine the consistency of profile number and type across different time points.[63] Configural Similarity assessed whether the same number of latent profiles was identified across groups, while Structural Similarity evaluated whether profile structures remained stable Dispersion Similarity checked for consistency in variation within profiles, and Distributional Similarity assessed whether the proportional magnitudes of profiles remained consistent across all groups. AIC, CAIC, BIC, and ABIC were selected to determine the most suitable model, where lower values of at least two out of three indicators could confirm the profile similarity hypothesis.[63] Following the selection of the most similar model, it was converted into a longitudinal LTA model to examine the stability of profiles and their transitions over time. The final longitudinal LTA model could include predictors (predictive similarity) or outcomes (explanatory similarity) to explore the relationships between the profiles. As recommended by Asparouhov and Muthén,[64] LTA analysis was conducted using the manual auxiliary 3-step approach. The assessment involved using SSS to predict profiles concurrently estimated at each time point. Additionally, SRL was considered as an outcome variable to investigate how different bjw profiles influence it. Odds ratios (OR) were calculated to demonstrate how the likelihood of belonging to a specific profile relative to a reference profile changes with each incremental increase in the predictor. Predictive similarity and explanatory similarity were evaluated with equal constraints at all time points.

Results

Preliminary Analyses

Attrition analysis comparing dropouts at Time 1 and Time 2 with the final sample revealed no significant differences in Belief in a Just World (T1: $t = -1.66$, $p > 0.05$; T2: $t = -0.72$, $p > 0.05$). The data were found to be missing not completely at random based on the significant result of Little's MCAR test, $\chi^2(1723) = 1.10$, ($p < 0.01$). Maximum likelihood estimation was used, with full information maximum likelihood for the missing data.[65]

The bivariate correlation analyses showed that SRL was statistically and significantly correlated with both the BJW and SES, as well as a range of demographic variables (see Table 1). Furthermore, additional analyses were conducted on the components of each variable and the demographic factors (see Table S2). Importantly, all correlation coefficients were below 0.75, consistent with the recommendations outlined by Tsui et al[66]

Latent Profiles Solution

The determination of the optimal latent profile model was based on fit indices and theoretical coherence. Fit indices, including AIC, CAIC, BIC, and ABIC, demonstrated improvement with an increase in profiles at all time points, although the improvement plateaued after the third profile (as shown in Table 2). The VLMR, aLMR, and BLRT tests favored the three-profile model, especially at each time point, signaling that the third-profile model provided the best solution due to a balanced distribution of participants across profiles.[67] Additionally, the elbow plots revealed a flattening improvement curve after the third profile solution at all time points (Figure S1a–c). Thus, based on both fit indices and theoretical interpretations, the third-profile model was selected as the final latent model across all time points, thereby supporting H1. As illustrated in Figure 1, the three profiles were labeled as low level of BJW, middle level of BJW, and high level of BJW, indicating that students represent relatively low, moderate, and high beliefs about fairness and just treatment in the world. The distributional characteristics of demographic variables such as gender, class cadre, residence, and the educational levels of both fathers and mothers across the different profiles at various time points are presented in Table S3. Equal constraints were employed for the means and variances of latent profiles as the free constraints did not converge. The subsequent analysis compared the three-profile solutions across the three time points using equal constraints in terms of configural similarity, structural similarity, dispersion similarity, and distributional similarity. The evaluation of model fit and comparison regarding configural invariance and weak invariance confirmed that the constructs were consistent across different times, meeting the criteria of at least two indicators per construct for partial strong invariance.[68] This indicated that all variables were longitudinally invariant (refer to Table S4).

Based on AIC, CAIC, BIC, ABIC, and partial distributional similarity, which entailed similar numbers, means, variances, and group sizes at each time, the final model was supported. The lower values of CAIC and BIC compared to the previous model indicated a better fit (see Table 3). Subsequently, the final model of partial distributional similarity was retained for interpretation and subsequent analysis phases. Profile 1 represented low levels of belief in a just world, encompassing 12.83%, 16.67%, and 15.08% of participants at time points 1, 2, and 3, respectively. Students in this profile did not believe that they lived in a fair world or that they were treated fairly. Profile 2 indicated moderate levels of belief in a just world, comprising 51.59%, 51.19%, and 53.18% of participants across the three time point. Adolescents in this moderate BJW group were likely to perceive the world as relatively fair and to experience fairness to some degree. Profile 3 denoted high levels of belief in a just world, identified by 35.58%, 32.14%, and 31.74% of participants at time points 1, 2, and 3, respectively. Adolescents with high BJW tend to believe that justice and fairness were prioritized in the world and that everyone would ultimately receive fair treatment.

Latent Transitions Between Profiles

The final latent profile model was transformed into a latent transition model using the manual auxiliary three-step approach.[63,64,69] Transition probabilities from the Latent Transition Analysis (LTA) model are detailed in Table 4 and illustrated in Figure 2. The results indicated that the low levels of BJW profile were relatively unstable during two transitions, with stability rates of 57.8% and 55.8%. Participants in the low level were likely to transition to the moderate level profile from time 1 to time 2 (40.5%) and from time 2 to time 3 (37.1%), but rarely ascended to high level of BJW

Table 1 Correlations Among Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender													
1. Class cadre	0.049												
1. Residence	−0.027	−0.137***											
1. Fa' E	−0.004	−0.048	0.176***										
1. Ma' E	−0.025	−0.092*	0.284***	0.385***									
1. T1BJW	0.071	−0.051	0.056	0.062	0.064								
1. T2BJW	0.077*	−0.028	0.030	0.034	0.036	0.617***							
1. T3BJW	0.060	−0.101**	0.074*	0.033	0.071*	0.492***	0.564***						
1. T1SSS	−0.098**	−0.170***	0.215***	0.129***	0.214***	0.247***	0.211***	0.213***					
1. T2SSS	−0.095**	−0.220***	0.166***	0.147***	0.205***	0.217***	0.228***	0.205***	0.749***				
1. T3SSS	−0.031	−0.172***	0.161***	0.157***	0.210***	0.197***	0.222***	0.277***	0.657***	0.759***			
1. T1SRL	0.089*	−0.042	0.007	0.048	0.044	0.330***	0.271***	0.259***	0.344***	0.285***	0.283***		
1. T2SRL	0.037	−0.051	−0.009	0.005	0.000	0.331***	0.413***	0.297***	0.301***	0.341***	0.284***	0.644***	
1. T3SRL	0.092*	−0.067	0.060	0.050	0.095***	0.241***	0.260***	0.320***	0.298***	0.303***	0.343***	0.528***	0.555***

Note: $N = 756$, ***$p < 0.001$, **$p < 0.01$, *$p < 0.01$.

Abbreviations: Fa' E, father's educational level; Ma' E, mother's educational level; T1, time 1; T2, time 2; T3, time 3; BJW, belief in a just world; SSS, subjective social status; SRL, self-regulated learning.

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Table 2 Results from the Latent Profile Analysis Models

Model	LL	Scaling	#fp	AIC	CAIC	BIC	aBIC	Entropy	VLMR	aLMR	BLRT
Time 1											
1	−15,775.976	0.9123	26	31,603.952	31,750.281	31,724.281	31,641.721	Na	Na	Na	Na
2	−14,979.006	1.1788	40	30,038.012	30,263.133	30,223.133	30,096.117	0.811	<0.001	<0.001	<0.001
3	−14,747.169	1.3084	54	29,602.337	29,906.251	29,852.251	29,680.779	0.816	<0.05	<0.05	<0.001
4	−14,628.642	1.3731	68	29,393.284	29,775.991	29,707.991	29,492.063	0.835	0.0823	0.0844	<0.001
5	−14,537.949	1.4171	82	29,239.897	29,701.396	29,619.396	29,359.013	0.851	0.1689	0.1726	<0.001
Time 2											
1	−15,477.759	0.9453	26	31,007.518	31,153.847	31,127.847	31,045.287	Na	Na	Na	Na
2	−14,292.888	1.1558	40	28,665.776	28,890.897	28,850.897	28,723.881	0.869	<0.001	<0.001	<0.001
3	−13,906.992	1.2657	54	27,921.983	28,225.897	28,171.897	28,000.425	0.868	<0.001	<0.001	<0.001
4	−13,768.670	1.7087	68	27,673.341	28,056.048	27,988.048	27,772.120	0.834	0.5974	0.5990	<0.001
5	−13,652.511	1.4295	82	27,469.022	27,930.522	27,848.522	27,588.138	0.843	0.1706	0.1715	<0.001
Time 3											
1	−15,002.280	0.9687	26	30,056.559	30,202.888	30,176.888	30,094.328	Na	Na	Na	Na
2	−13,763.870	1.2317	40	27,607.741	27,832.863	27,792.863	27,665.846	0.856	<0.001	<0.001	<0.001
3	−13,303.560	1.2765	54	26,715.120	27,019.034	26,965.034	26,793.562	0.884	<0.001	<0.001	<0.001
4	−13,145.757	1.3712	68	26,427.514	26,810.221	26,742.221	26,526.293	0.857	0.0483	0.0493	<0.001
5	−13,046.965	1.4741	82	26,257.930	26,719.429	26,637.429	26,377.045	0.870	0.6248	0.6262	<0.001

Abbreviations: LL, Model LogLikelihood; #fp, Number of free parameters; Scaling, scaling factor associated with MLR loglikelihood estimates; AIC, Akaïke Information Criteria; CAIC, Constant AIC; BIC, Bayesian Information Criteria; ABIC, Sample-Size adjusted BIC; VLMR, Vuong-Lo-Mendell-Rubin likelihood ratio test; aLMR, adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT, bootstrap likelihood ratio test.

(1.7% and 7.1% stability rates). For moderate level of BJW, the majority (66.7% and 70.7%) tended to remain in the same profile, with some transitioning to low (16.7% and 16.5%) or high (9.9% and 19.4%) levels across the two time transitions. In contrast, high level of BJW showed consistent pattern in transitions, with most participants staying in the high-level profile (62.7% and 67.0%) and a percentage moving to the moderate-level profile (37.3% and 30.7%). Notably, none of the high-level profiles shifted to the low profile from time 1 to time 2, and only 3.1% transitioned to the low-level profile from time 2 to time 3. H2 was supported.

Predictors of Belief in a Just World Profiles

Predictive similarity was used to examine predictors of profile membership and the consistency of results across the three time points. The predictive similarity model was based on partial distributional similarity, comparing a profile-specific freely estimated model, a freely estimated model, and an equally constrained model. Evaluation of fit indices (refer to Table 4) indicated that lower values of AIC and BIC favored the equal relations model. Odds ratios (ORs) for SSS impacting transitions between profiles across all time points were presented in Table 5. Under the influence of SSS, adolescents at low levels of BJW were more likely to transition to high levels of BJW from time 1 to time 2 (OR = 1.473) and from time 2 to time 3 (OR = 1.330). They also significantly transitioned to moderate level only from time 1 to time 2 (OR = 1.320) but not from time 2 to time 3. When influenced by SSS, students in the moderate-level BJW profile demonstrated a higher likelihood of transitioning to a high level of BJW profile both from time 1 to time 2 (OR = 1.116) and from time 2 to time 3 (OR = 1.245). In the high BJW profile, SSS influenced students to maintain their high belief in

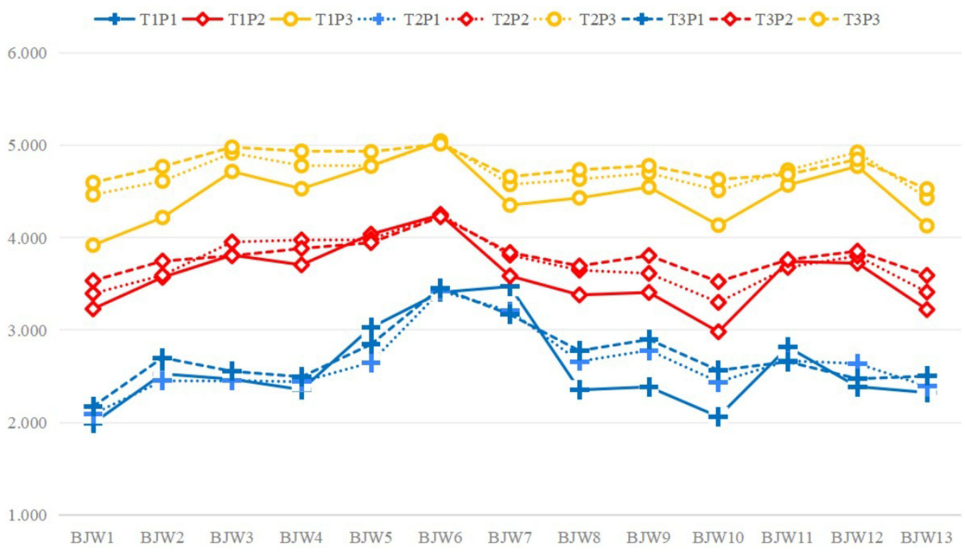

Figure 1 Profiles of belief in a just world across three times.
Abbreviations: BJW, belief in a just world; T1, time 1; T2, time 2; T3, time 3; P1, low-level belief in a just world; P2= moderate-level belief in a just world; P3, high-level belief in a just world.

a just world rather than transitioning to the low or moderate profile (OR = 0.679, 0.752; OR = 0.896, 0.803) across all times. Thus, H3 was supported.

Outcomes of Belief in a Just World Profiles

In assessing variations in SRL among different profiles, explanatory similarity models were employed based on the partial distributional LTA model. Outcomes were estimated by comparing models with free relations and models with equal constraints to ensure the consistency of the explanatory model across all time points. Furthermore, two versions of the explanatory similarity model were assessed, one without controlling for gender, residence, class cadre, father's educational level, and mother's educational level, and the other with these covariates included. As shown in Table 3, when covariates were accounted for, the explanatory similarity model outperformed other models in terms of AIC, CAIC, BIC, and ABIC at time 1, time 2, and time 3.

Table 3 Transition Probabilities for Final Latent Transition Analyses

Latent Statuses	Profile 1	Profile 2	Profile 3
Transition Probabilities (T1→T2) Time 2 Latent Status			
Profile 1	0.578	0.405	0.017
Profile 2	0.167	0.667	0.165
Profile 3	0.000	0.373	0.627
Transition Probabilities (T2→T3) Time 3 Latent Status			
Profile 1	0.558	0.371	0.071
Profile 2	0.099	0.707	0.194
Profile 3	0.023	0.307	0.670

Note. Profile 1, 2, 3 respectively represent low, moderate, and high levels of belief in a just world.

Table 4 Results from Latent Profile Analyses and Latent Transition Analyses

	LL	Scaling	#fp	AIC	CAIC	BIC	aBIC	Entropy
Configural similarity	−42000.493	1.2631	152	84,304.986	85,160.448	85,008.448	84,525.785	0.849
Structural similarity	−42084.956	1.3802	84	84,337.911	84,810.667	84,726.667	84,459.932	0.852
Dispersion similarity	−42212.162	1.5779	58	84,540.323	84,866.750	84,808.750	84,624.576	0.849
Partial dispersion similarity	−42124.601	1.4475	71	84,391.202	84,790.793	84,719.793	84,494.339	0.853
Distributional similarity	−42224.103	1.6497	54	84,556.206	84,860.120	84,806.120	84,634.648	0.849
Partial distributional similarity	−42135.972	1.4983	67	84,405.944	84,783.023	84,716.023	84,503.270	0.852
Latent Transition Analysis [a]	−2021.211	0.9367	14	4070.423	4149.216	4135.216	4090.76	0.805
Predictive Similarity (subjective social status)								
Profile-Specific Free Relations with Predictors	−1976.958	0.8576	34	4021.915	4213.268	4179.268	4071.304	0.809
Free Relations with Predictors	−1980.404	0.9730	22	4004.808	4128.625	4106.625	4036.766	0.808
Equal Relations with Predictors	−1988.542	0.9396	18	4013.085	4114.390	4096.390	4039.232	0.806
Explanatory similarity (self-regulated learning)								
Free relations with Outcome (without covariates)	−3909.574	1.0696	26	7871.148	8017.477	7991.477	7908.917	0.808
Equal relations with Outcome (without covariates)	−3930.122	1.1611	20	7900.244	8012.804	7992.804	7929.296	0.807
Free relations with Outcome (with covariates)	−3601.262	1.1011	44	7290.525	7538.159	7494.159	7354.441	0.807
Equal relations with Outcome (with covariates)	−3548.468	1.1002	41	7178.937	7409.687	7368.687	7238.495	0.806

Note: [a]Based on partial distributional similarity.
Abbreviations: LL, Model LogLikelihood; #fp, Number of free parameters; Scaling, scaling factor associated with MLR loglikelihood estimates; AIC, Akaïke Information Criteria; CAIC, Constant AIC; BIC, Bayesian Information Criteria; ABIC, Sample-Size adjusted BIC.

SRL was integrated as an outcome variable in the LTA model, and the results are detailed in Table 6. Through MODEL CONSTRAINT analysis, mean differences between pairs of profiles were examined using the multivariate delta method.[70,71] The mean levels of SRL across profiles remained consistent over the three time points, indicating profile stability. Both models with and without covariates supported the explanatory similarity models and yielded similar outcomes. The results revealed that SRL levels were significantly higher in Profile 3 (High-level BJW) compared to Profile 2 (Moderate-level BJW) and Profile 1 (Low-level BJW) at all three time points. Students in the high BJW profile exhibited the highest SRL, significantly outperforming students in the moderate-level and low-level groups. Moderate-level BJW students showed moderate SRL performance, while low-level group students demonstrated the lowest SRL performance. Therefore, the findings suggested that a high belief in a just world, encompassing beliefs in personal situations and the outer world, may contribute to higher SRL across time points. Additionally, students who transitioned from the moderate-level BJW at time 1 to the high profile at time 2 or time 3 displayed significantly better SRL performance than those who shifted to the low profile ($t = 4.412$, $p < 0.001$ and $t = 4.073$, $p < 0.001$, respectively). Thus, H4 was supported.

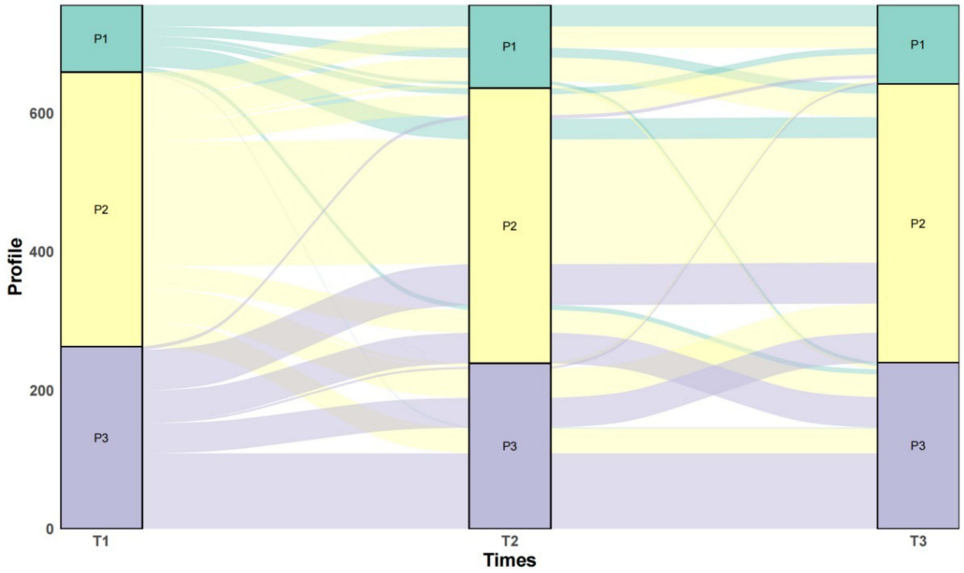

Figure 2 Transition probabilities from Time 1 to Time 2 to Time 3. P1 = low-level belief in a just world; P2= moderate-level belief in a just world; P3 = high-level belief in a just world.

Discussion

While previous literature has explored the association between belief in a just world and academic achievement, few studies have examined the dynamic variation of BJW, its antecedent such as SSS, and the impact on SRL, a crucial aspect of learning. This study aimed to illustrate the dynamic evolution of BJW among adolescents, with a focus on how SSS contributes to the dynamic mechanism of BJW by using LTA. The finding indicated that BJW profiles exhibited moderate stability but were susceptible to the influence of SSS. Moreover, high BJW levels were linked to the highest levels of SRL. This research has addressed the four research questions and supported the corresponding hypotheses, thereby expanding on the existing literature by delineating BJW profiles and examining their transitions, antecedent, and predictive value.

Table 5 Odds Ratios of Individual Covariates Associated with Transitions of Latent Belief in a Just World Profiles

Predictors	Latent profiles	Profile 1	Profile 2	Profile 3
Subjective social status	Transition Probabilities Odds Ratios (T1→T2)			
	Profile 1	1.000	**1.320 (1.152, 1.514)**	**1.473 (1.267, 1.713)**
	Profile 2	**0.757 (0.660, 0.868)**	1.000	**1.116 (1.010, 1.232)**
	Profile 3	**0.679 (0.584, 0.789)**	**0.896 (0.812, 0.990)**	1.000
Subjective social status	Transition Probabilities Odds Ratios (T2→T3)			
	Profile 1	1.000	1.069 (0.939, 1.216)	**1.330 (1.147, 1.543)**
	Profile 2	0.936 (0.822, 1.065)	1.000	**1.245 (1.123, 1.380)**
	Profile 3	**0.752 (0.648, 0.872)**	**0.803 (0.724, 0.891)**	1.000

Note: Profile 1, 2, 3 respectively represent low, moderate, and high levels of belief in a just world. Bold text symbolizes the significant result.

Table 6 Belief in a Just World and Self-Regulated Learning

	Profile 1 *M* [CI]	Profile 2 *M* [CI]	Profile 3 *M* [CI]	Significant test
Without covariates[a]				
Self-regulated learning	2.828	3.184	3.489	P3 > P2 > P1
	[2.721–2.934]	[3.142–3.227]	[3.429–3.549]	
With covariates				
Self-regulated learning	2.868	3.100	3.333	P3 > P2 > P1
	[2.689–3.047]	[2.938–3.263]	[3.166–3.500]	

Notes: [CI]: 95% confidence interval; [a] Covariates are subjective social status, gender, class cadre, residence, father's educational level and mother's educational level. Profile 1, 2, 3 respectively represent low, moderate, and high levels of belief in a just world.

Abbreviation: *M*, mean.

The Three BJW Profiles and Their Dynamic Development

This study revealed that adolescents could be classified into three distinct profiles —low, moderate, and high BJW—at three different time points, reflecting varying perceptions of fairness based on their overall experiences and views. Similarly, Bartholomaeus identified three latent profiles among adults: meritocrats, moderates, and egalitarians.[72] Meritocrats reported high general BJW, as well as high levels of distributive and procedural justice and belief in equality of opportunity. In contrast, egalitarian had low views, while moderates exhibited moderate levels, though they generally reported lower BJW compared to meritocrats. Compared to the substantial proportion of adults with low justice beliefs reported by Bartholomaeus,[72] the present study found that only a small percentage of Chinese adolescents exhibited low BJW. This difference in proportions may be attributed to various factors, including differing political backgrounds, SSS, age, and cultural contexts.[73,74] In China, cultural beliefs that emphasize the link between individual effort and deserved rewards, coupled with an institutional system that has fostered trust in judicial fairness, may contribute to why a significant number of Chinese adolescents demonstrate moderate to high levels of BJW.[15,75]

Additionally, students with low levels of BJW are more likely to transition to moderate levels, reflecting a gradual shift in their perception of fairness. Those with moderate levels of BJW tend to remain at the same level, though some do transition to higher levels over time. Most adolescents with high levels of BJW stay within the high-level group, with a portion moving to the moderate-level profile. Over the span of just eight months, we observed a notable transformation towards higher BJW levels across all profiles, which aligns with the "increase hypothesis" proposed by.[36] This progression can be further understood through the lens of Kohlberg's Theory of Moral Development,[35] which outlines the stages of moral reasoning that are particularly relevant during adolescence. As adolescents progress through the post-conventional stages of moral reasoning, they begin to internalize abstract moral principles and consider societal values and norms. Specifically, the transition from stage four (law and order orientation) to stage five (social contract orientation) marks a shift where adolescents start to internalize ethical principles and recognize the importance of individual rights in creating a just society. This evolution towards more complex moral reasoning contributes to the development of a stronger belief in a just world, as adolescents increasingly emphasize accountability and the consequences of actions. The observed rise in BJW among most of the adolescents suggested that they have largely completed this transitional period and have entered stage five, where they are better equipped to flexibly cope with injustices. However, a very small number of adolescents with initially high BJW levels did experience a slight decline to moderate level, indicating mild fluctuations during adolescence. This decline may reflect the natural transition period of moral reasoning, where adolescents temporarily lower their BJW as they grapple with the complexities of justice during stage four, before eventually reinforcing a stronger BJW as they move into stage five.

The Role of SSS in Shaping BJW Profiles Among Adolescents

Furthermore, the study identified SSS as a significant influencer of BJW transitions, aligning with the "positive experience-driven" hypothesis and social identity theory.[36,44] This theory suggests that individuals' beliefs and behaviors are influenced by their perceived social status. Our findings show that adolescents at low levels of BJW were more likely to transition to high levels of BJW when influenced by higher SSS. This transition reflects how improved SSS can enhance adolescents' perceptions of fairness. Adolescents with moderate levels of BJW also exhibited a higher likelihood of moving to high BJW profiles under the influence of SSS, demonstrating the positive impact of SSS on elevating BJW. In contrast, adolescents with high BJW levels were more likely to maintain their high belief in a just world rather than transitioning to lower profiles. This aligns with previous research indicating that individuals from higher socioeconomic backgrounds often exhibit higher initial BJW levels, particularly in personal BJW. Those from more advantaged backgrounds may encounter systemic injustices in a more abstract manner and feel less threatened by them.[76] Conversely, Kraus et al found that individuals with low subjective social class tend to lack psychological resources, leading to lower perceptions of personal control and consequently lower BJW.[77] Additionally, by focusing on individuals' perceptions of their social standing rather than objective SES indicators, this study offers a fresh perspective on the psychological underpinnings of justice beliefs. Additionally, by delving into the influence of SSS on BJW transitions, the study enhances previous research by uncovering the positive effects of SSS on adolescents' belief development.[41] That is, adolescents with higher SSS are more likely to transition to a higher BJW profile, building upon the insights through LTA.

However, this study, along with previous findings, diverges from earlier research conducted on adults from Western cultures. For example, studies in the United States have indicated that individuals from minority or lower socioeconomic groups tend to endorse BJW more than their wealthier counterparts, showcasing variations in beliefs about justice across different populations.[74] Similarly, research on Brazilian students has revealed that those from disadvantaged backgrounds perceive the world as fair to a greater extent than their more privileged peers.[49] The disparities in findings between studies on Chinese adolescents and those on Western adults can be attributed to cultural differences and the age groups under examination. Cultural values significantly shape individuals' beliefs and perceptions of justice,[78] with collectivistic cultures like China emphasizing harmony and social cohesion, potentially influencing conceptions of justice differently than individualistic Western societies.[79] The United States' emphasis on individualism and personal responsibility may impact how justice is understood across diverse racial and socioeconomic groups.[80] Furthermore, adolescents and adults occupy distinct developmental stages with varying life experiences, leading to contrasting perspectives on justice. Adolescents, navigating identity formation and societal awareness, may exhibit heightened sensitivity to fairness issues and injustices, shaping their beliefs uniquely.[81] Adults, particularly those from underprivileged backgrounds, may have developed coping strategies and beliefs to navigate societal challenges, impacting their perceptions of justice.[82]

Profiles of BJW and SRL

This study identified three distinct BJW profiles at each time point, revealing that adolescents in the "high" BJW profile exhibited the most favorable SRL outcomes. By presenting the close association between BJW and SRL while controlling for factors like gender and SSS, this longitudinal study expands on previous cross-sectional research linking BJW to academic achievement.[83] Additionally, the study elucidates the mechanism through which BJW influences SRL using LTA, capturing the dynamic interplay between beliefs about justice and self-regulated learning behaviors over time. This study also meticulously controlled for various demographic and socio-economic factors to isolate the impact of BJW on adolescents' SRL. The robust relationship uncovered underscores the crucial role of BJW in shaping SRL behaviors, independent of gender, subjective social status, and parental educational levels.

In China, the influence of Confucianism on notions of fairness and justice is profound, with Confucians advocating for these values as virtues,[84] shaping the beliefs of the Chinese population.[85] This cultural backdrop instills confidence in individuals, fostering greater self-regulated learning (SRL) behaviors. Justice motive theory suggests that students with a strong BJW also possess high levels of self-efficacy, enabling them to effectively tackle study-related challenges and enhance their SRL.[86] Research has also shown that BJW contributes to psychological resilience and adaptive capabilities

in adolescents,[87] thereby improving SRL outcomes. Chinese adolescents often face demanding academic responsibilities, which could strain their SRL capacities.[88] However, individuals with high BJW, believing in the fairness of the world, are more inclined to aid others.[16,89] Moreover, those with strong BJW are more likely to foster positive peer interactions, playing roles as supportive friends that bolster interpersonal trust and relationships.[7] Enhanced peer relationships provide adolescents with greater support, leading to positive emotional experiences that, in turn, enhance SRL behaviors.[90] Additionally, individuals with a high BJW also emphasize the importance of effort and determination in achieving success.[4] This perspective underscores the intrinsic connection between fairness, effort, and success, potentially influencing adolescents' SRL abilities. For example, the emphasis on effort as a key determinant of success can drive adolescents to adopt effective self-regulation strategies.[91] They may exhibit higher levels of goal setting, time management, and task persistence, all essential components of SRL.

Limitations and Implications

Limitations of the study should be acknowledged, including the use of self-reported measures for BJW and SRL, the sample's limited representation from one high school with skewed gender distribution, and the need to explore additional factors like cultural context, motivation, and social support to enhance the study's comprehensiveness. By delving into these factors and their interactions with BJW and SRL, future research can provide a more nuanced understanding of the mechanisms underlying adolescents' beliefs in justice and their impact on self-regulated learning.

The implications of this study are profound in shedding light on the intricate relationship between BJW, SSS, and SRL among adolescents. Firstly, the identification of moderate stability in BJW profiles with susceptibility to SSS underscores the significance of longitudinally monitoring adolescents' belief systems and social perceptions. Proactive strategies focusing on tracking and addressing shifts in BJW beliefs can play a pivotal role in supporting students' well-being and academic success. Secondly, the findings suggest that nurturing a strong belief in a just world may prove beneficial in fostering higher levels of SRL. Educators and policymakers can explore integrating approaches to nurture students' BJW beliefs as a means to bolster their self-regulation skills and overall academic performance. By emphasizing the importance of justice beliefs in the educational context, institutions can potentially enhance students' learning outcomes and holistic development. Lastly, understanding the predictive value of BJW profiles and their impact on SRL offers valuable insights for crafting individualized support programs for students. Tailoring interventions based on students' belief profiles and social perceptions can optimize their learning experiences and outcomes, catering to their unique psychological needs and learning styles.

Conclusion

In conclusion, this study reveals the dynamic nature of BJW among adolescents and its association with SRL. The findings suggest that BJW profiles show moderate stability but are influenced by SSS, highlighting the external factors that shape adolescents' justice beliefs. Furthermore, higher levels of BJW were positively correlated with increased levels of SRL. By delineating BJW profiles, transitions, and their impact on SRL, this research contributes to a deeper understanding of how psychological beliefs intersect with learning processes. These insights can inform interventions aimed at enhancing academic achievement and well-being in adolescents.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics Declarations

Written informed consent was obtained from each participant and their parents or legal guardians, following a research protocol approved by the Institutional Review Board of the South China Normal University (SCNU, Guangzhou, China) (Reference No.: SCNU-PSY-2022-251) and carried out following The Code of Ethics of the World Medical Association (The Declaration of Helsinki).

Informed Consent

Written informed consent was obtained from each participant and their parents or legal guardians included in the study.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no conflict of interest. The work has not been published previously.

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