Article

Study on the Effect of Association Participation on Academic Achievement of College Students

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Abstract: Does participation in student organizations correlate with college students 'academic achievement? Academic circles hold three conflicting perspectives: the "affirmative theory", "negative theory", and "indifferent theory". To examine these divergent views, we propose research hypotheses from three perspectives: educational psychology, campus social capital, and cultural-social reproduction. Using the CFPS 2014-2020 unbalanced panel data, we conduct generalized structural equation modeling with robustness tests. Results reveal that academic aspirations, academic efficacy, and study time investment significantly enhance students' academic achievement. Overall organizational participation positively promotes all four dimensions: academic aspirations, efficacy, study time, and achievement attainment. Longitudinal participation shows stronger effects than cross-sectional participation. Within longitudinal participation, "student party members" demonstrate the strongest impact, followed by "student leaders", while "student league members" show the weakest. The combined effects of family cultural capital, economic capital, and social capital remain minimal. These findings support the "affirmative theory" while rejecting the "negative theory" or "indifferent theory", emphasizing the acquired nature of academic achievement rather than the deterministic perspective of cultural-social reproduction.

Keywords: academic achievement; club participation; campus social capital; cultural-social reproduction

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1. Research Background and Problems

Academic achievement serves as a crucial benchmark for evaluating college students 'learning outcomes and an essential basis for holding universities accountable. Talent forms the foundational and strategic pillar of Chinese-style modernization, calling for enhanced cultivation of top-tier talents. Academic excellence remains a core indicator determining whether students can stand out. While focusing on knowledge acquisition, students should actively participate in diverse club activities, including ideological-political education, academic research, innovation and entrepreneurship, cultural-sports engagement, volunteer services, and peer support, to achieve well-rounded development. This raises an intriguing question: Does involvement in student organizations contribute to students' academic success?

In this regard, there are three conflicting views in academia: (1) The "Affirmative View". As the saying goes, "Virtue precedes talent." Participation in extracurricular activities helps students develop good physical and mental qualities, overcome psychological challenges in learning, and thereby achieve better academic performance. Research shows that in the United States, students who participate in extracurricular activities demonstrate higher levels of learning motivation and achievement; in Italy, extracurricular activities and other soft skills facilitate students 'self-regulated learning and motivation stimulation, thereby enhancing academic performance; in China, class leaders' academic achievements are significantly better than those of non-leaders, and even high school club

participation affects college students 'academic performance [1-4]. (2) The "Negative View". This is because extracurricular activities may occupy students' limited time. Excessive extracurricular or club activities may impact academic achievement, and different types of student clubs and their effects at various academic stages may also vary [5,6]. (3) The "Neglect View". The cultural reproduction theory proposed by French sociologist Pierre Bourdieu has exerted extensive influence in explaining differences in college students 'academic achievements. This theory emphasizes that cultural capital significantly impacts the academic growth of elite university students, which essentially represents the reproduction of social inequality in higher education [7]. A meta-analysis of 41 quantitative studies on domestic and international cases revealed that family background moderately influences college students' academic achievement, ranked from greatest to least significant factors: family economic capital, family cultural capital, and family social capital [8]. From the perspective of the indifference school, club participation is irrelevant to the achievement of academic success.

To test the above perspectives, this paper attempts to explore the subjective internal mechanisms of academic achievement attainment from the perspective of educational psychology, investigate the role of the external factor "family capital" and its further specific mechanisms from the perspective of cultural-social reproduction, and examine the types of club participation and their connections with these subjective internal mechanisms from the perspective of campus social capital. Based on the proposed research hypotheses, this paper will employ the four-period unbalanced panel data from the China Family Panel Studies (CFPS) covering 2014-2020 to test the aforementioned three viewpoints.

2. Literature Review and Research Hypothesis

2.1. Autonomous Learning and Academic Achievement of College Students

Educational psychology attaches importance to the direct role of cognition, emotion, will, and other factors in learning, and emphasizes the importance of autonomous learning factors such as academic expectation, academic efficacy, and learning time investment to academic achievement.

First, learning attitude. It refers to the formation of a lasting positive or negative predisposition toward learning, or a well-prepared mental state for academic pursuits [9]. A proactive learning attitude can enhance professional orientation, improve exam performance, and facilitate classroom interactions or discussions, thereby effectively boosting college students' academic achievements [10]. Notably, higher self-regulated academic expectations not only stimulate positive learning attitudes but also propel children from disadvantaged socioeconomic backgrounds to attain outstanding academic accomplishments [11].

Secondly, academic self-efficacy. Inspired by Bandura, the theory of academic self-efficacy emphasizes students' learning tendencies in specific academic contexts, including planning future actions, setting goals, pursuing appropriate challenges, persevering through failures, and effectively coping with setbacks [12,13]. Universities constitute high-pressure learning environments filled with academic stress and exam-related pressures [14]. In such stressful situations, strong academic self-efficacy indicates that students possess sufficient wisdom and skills to manage these academic challenges. Consequently, higher academic self-efficacy tends to correlate with greater academic achievement [15-17].

Thirdly, studying time investment. Research shows that effective time management helps secure sufficient study time, which significantly impacts academic achievement [18]. In most English-speaking countries, Asian immigrant children outperform their peers academically primarily because they invest more study hours from childhood compared to their non-immigrant counterparts [19]. During the COVID-19 pandemic, many universi-

ties worldwide were forced to implement campus lockdowns. With limited time and energy for studying, some American college students experienced heightened psychological distress, which consequently disrupted their academic progress [20].

Based on the above educational psychology perspective, it can be expected that academic expectation, academic efficacy, learning time investment, and academic achievement of college students have a significant positive correlation.

2.2. Cultural-Social Reproduction: The Role of Family Capital

Family capital encompasses three dimensions: cultural capital, economic capital, and social capital. When these elements significantly influence children's academic performance, it indicates the realization of unequal cultural-social reproduction in education. As one of the most prominent theoretical perspectives in educational sociology, cultural-social reproduction theory addresses this phenomenon. However, when examining college students' academic achievement, the mechanisms through which these three components interact prove more complex than commonly assumed.

First, family cultural capital. In Bourdieu's view, in French elite universities, students who inherit more cultural capital from their families are more likely to accumulate greater cultural capital and achieve better academic performance [7]. However, Bourdieu's theory faces challenges when applied to explain the academic achievements of Chinese university students. Empirical studies in China reveal that, on one hand, objectified cultural capital is primarily reflected in whether families provide sufficient cultural resources, production resources, or learning opportunities. Attending cram schools during primary and secondary school stages helps improve academic performance [21,22], but at the university level, objectified cultural capital such as family book collections shows no significant impact [23]. On the other hand, institutionalized cultural capital is mainly manifested through parents 'educational attainment. Parents' academic qualifications have a significant positive impact on high school students 'academic performance, but this effect is not significant for university students [24,25]. This study anticipates that "parents' educational attainment" as an institutionalized cultural capital does not directly affect university students 'academic achievements, but may influence their children's academic expectations.

Secondly, household economic capital. Its impact on academic achievement exhibits a dual nature. On one hand, university enrollment constitutes a human capital investment supported by financial resources. Without adequate economic backing, high school students may either struggle to gain admission or face challenges such as financial difficulties, student loan repayments, or forced work-study arrangements after enrollment [26,27], which could hinder academic progress. On the other hand, strong family financial support may also have adverse effects. Research on Japanese college students reveals that receiving substantial monetary allowances from parents or earning significant income through part-time jobs might actually lower academic performance [28]. Without considering the moderating effect of family economic capital, this study predicts that household economic capital does not directly influence college students' academic achievement, but may reduce their time investment in learning.

Thirdly, family social capital. Family social capital, such as trust in schools, active communication with teachers, and participation in parent-teacher conferences, significantly influences the academic efforts, educational aspirations, and academic performance of Chinese adolescents [29]. However, since most Chinese college students study away from home, parents 'general social capital is difficult to integrate into university campuses, making it challenging to influence their own academic efforts, educational aspirations, and academic performance. The research by Xiao Ru and Cheng Yangguo found that parents 'education level, occupational status, and social connections affect children's likelihood of serving as student leaders in universities, while family economic status has

minimal impact [30]. This study anticipates that family social capital does not directly affect college students' academic achievements but may increase their participation in student organizations.

Based on the above cultural-social reproduction perspective analysis, the following hypotheses can be proposed:

Hypothesis 1: The more family cultural capital, the higher the academic expectation of college students.

Hypothesis 2: The more family economic capital, the less time college students spend studying.

Hypothesis 3: The more family social capital, the stronger the participation of college students in social groups.

2.3. "Vertical" and "Horizontal" Participation of Social Organizations and Their Mechanisms

Educational psychology emphasizes the importance of students 'self-directed learning for academic achievement. Educational sociology should place greater emphasis on students' personal capital than on family capital. China has long emphasized the comprehensive development of college students, focusing on moral education, physical education, and student club participation. The latter, as a social capital factor, should positively impact students' academic performance. Regarding social capital, Putnam defines it as comprising "trust," "reciprocity," and "networks" [31]. Accordingly, campus social capital can be categorized into "campus trust," "campus reciprocity," and "campus networks." The "campus network" can further be divided into "campus interpersonal networks" and "campus club networks." Campus interpersonal networks involve connections among classmates, counselors, and academic advisors, while campus club networks include "vertical club participation" and "horizontal club participation" -the latter two being the focus of this study.

On one hand, "vertical association participation" mainly involves four scenarios: student Party branches, university Communist Youth League organizations, departmental student unions, and class collectives. It should be noted that these are not "associations" in the practical sense but rather "networks of associations" in the theoretical sense. This is because they are neither "government organizations" nor "economic entities," but all involve vertical relationships between the Party, state, universities, departments, faculty members, and students, with their interactions characterized by vertical coordination, formalized behavior, and primarily bridging relationships. Research findings indicate that (1) in terms of academic performance aspects such as academic expectations, academic efficacy, study time, and academic achievements, most ideological and political researchers qualitatively conclude that there are significant differences between "student Party members" and "non-member students", while empirical studies also support the exemplary role of student Party members in academic achievement [32-36]. (2) Regarding "Communist Youth League" participation, most Chinese college students are categorized under this organizational type. Recent higher education policies emphasize that, in addition to formal coursework, extracurricular activities should be incorporated into student evaluation, with "second classroom transcripts" playing a key role in assessing overall student development. However, empirical research remains relatively scarce regarding whether "student League members" and "non-member students" differ in academic achievement. (3) The term "student cadres" typically refers to students holding positions in college (department) student unions or class collectives, a category that has garnered more academic attention. Analysis of Beijing's 2008 cohort of college students revealed that serving as student cadres has a stable positive impact on academic performance, primarily because such roles help enhance learning motivation. Based on the analysis of these three scenarios, this paper argues that the identities of student Party members, League members, and student cadres play a normative role in exerting "exemplary leadership" on

academic achievement [37]. This is achieved through maintaining high academic expectations, strong academic efficacy, and sufficient study time, thereby contributing to improved academic performance.

On the other hand, "horizontal association participation" primarily involves two scenarios: (1) Formal student associations. These organizations refer to officially recognized campus social groups under the administration of Communist Youth League committees or relevant academic departments. They maintain a certain degree of institutionalization in structure and activities, focusing on establishing peer-to-peer connections within specific clubs. Their interactions are characterized by equal status and informal dynamics, with academic impact mainly influenced by organizational purposes and activity orientation. Research indicates that academic clubs enhance professional practical skills, research capabilities, innovative competencies, and learning outcomes [38-41]. (2) Informal bonding associations. Primarily consisting of hometown associations, alumni groups, and religious organizations, these groups prioritize information exchange and emotional connections, featuring horizontal interactions and prominent relational bonds. While they may serve as beneficial supplements to ideological education activities in universities, they could potentially disrupt academic life, limit social interactions, propagate negative values, disrupt normal campus order, and even foster "anti-campus culture" [42]. This study focuses on the first category of horizontal association participation, noting that members of such associations lack the "model leader" consciousness associated with vertical association engagement, resulting in relatively weaker academic expectations, self-efficacy, time investment, and achievement levels compared to vertical association participants.

Based on the above analysis of campus social capital, the following hypotheses can be proposed:

Hypothesis 4-a: The stronger the participation of college students in social groups, the higher their academic expectations.

Hypothesis 4-b: The stronger the college students' participation in social groups, the stronger their academic efficacy.

Hypothesis 4-c: The stronger the participation of college students in social groups, the more time they devote to study.

Hypothesis 4-d: The stronger the participation of college students in social groups, the higher their academic achievement.

Hypothesis 5: The effect of college students' participation in vertical associations is greater than that of horizontal associations.

Based on the above analysis, the analytical framework of this paper is as follows (see Figure 1).

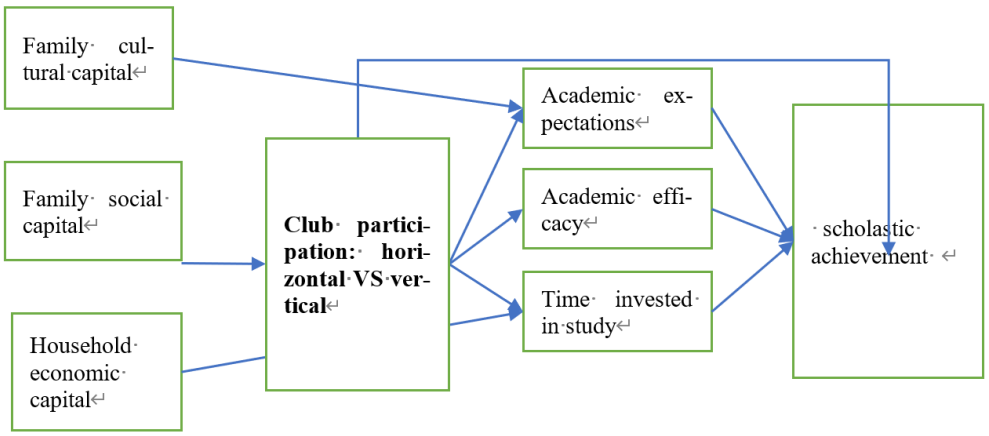

Figure 1. Analytical framework for college students' academic achievement.

3. Data Sources, Variable Measurement, and Analysis Methods

3.1. Data Sources

The data in this paper are derived from the 2014-2020 "China Family Panel Studies" (CFPS) conducted by Peking University. CFPS is a national multi-stage randomized tracking survey that collects data on individuals, families, and communities. The 2010 baseline survey was excluded due to the lack of measurement of "professional rankings," and the 2012 survey was similarly excluded due to the absence of "study time" measurements.

The study focuses on "undergraduate and junior college students". Assuming these individuals enrolled in 2014, they remained enrolled until the 2016 survey and graduated by the 2020 survey. This means most subjects only participated in two waves of panel data. As new undergraduates joined the sample, four non-homogeneous panel datasets were constructed for 2014, 2016, 2018, and 2020. Given that variable defaults are common in longitudinal studies, appropriate mean, median, or integer imputations were applied to the original data. Ultimately, 2,251 undergraduate and junior college students were included in the analysis.

3.2. Variable Measurement

3.2.1. Academic Achievement

While academic performance, innovation and entrepreneurship capabilities, successful graduation with a degree, and further education all represent academic achievements, this study specifically examines "academic ranking". The fourth cohort of the China Family Panel Studies (CFPS) survey asked respondents: "What was your academic ranking in your major last semester?" Options included "top 10%,11%-25%,26-50%,51-75%, bottom 24%, university does not publish rankings, or not applicable". The analysis first excluded "not applicable" responses, retaining 1,711 cases with clear academic rankings. For "top talent" analysis considerations, the measurement primarily adopted a binary variable "top 10% academic ranking" (0 for no, 1 for yes), with "top 25% academic ranking" used for robustness checks.

3.2.2. Club Participation

(1) Vertical Club Participation. This includes three criteria: membership in political or ideological student organizations, affiliation with youth-oriented student groups, and student leadership positions. The total vertical participation is calculated by summing these three indicators. (2) Horizontal Club Participation. This is measured using the “number of club memberships” data directly from the China Family Panel Studies (CFPS). It should be noted that CFPS defines “student leadership positions” as including roles such as class president, vice-president, organizational committee member, academic committee member, publicity officer, labor committee member, life committee member, sports committee member, branch cadres of student groups, and student union leaders, but excludes club leadership roles. Therefore, using CFPS’s “number of club memberships” data for horizontal participation measurement is appropriate. (3) Combining the above two indicators yields the “total club participation count.” Additionally, while “reciprocity” and “trust” are considered general forms of social capital among college students, their correlation with campus social capital remains weak, and their impact on academic achievement is minimal. Consequently, they are excluded from this analysis.

3.2.3. Moderating Variables

(1) Academic Expectations. The China Family Panel Studies (CFPS) questionnaire asks "What educational level do you expect to attain?" with options ranging from "primary school" to "doctoral degree." This was directly used as a continuous variable to construct the "Expected Educational Level" indicator. (2) Academic Self-Efficacy. CFPS surveys participants with statements like "How competent do you consider yourself as a student?"

where "1" indicates poor competence and "5" signifies exceptional competence, also treated as a continuous variable. (3) Study Time Investment. CFPS collects weekend and weekday study hours (in hours/day). These were combined and logarithmically transformed to create the "Daily Study Hours Index" metric.

3.2.4. Family Capital

(1) Cultural Capital. Institutionalized family cultural capital is measured by the "highest educational attainment of parents". The higher education level of either parent is used for measurement, which not only ensures a more accurate assessment but also helps reduce missing values, as some college students may not have both parents with higher education. (2) Economic Capital. The CFPS "Family Economic Survey" provides per capita household income data, which is log-transformed for analysis. (3) Social Capital. Membership in social organizations includes political organizations, youth-oriented groups, religious associations, trade unions, and professional or workers' associations. These are converted into discrete variables within the [0,1] range. The measurement of "trust" and "reciprocity" follows similar methods to student assessments. These three components are combined to form the Family Social Capital Index, a general social capital indicator.

3.2.5. Control Variables

It includes gender, age, whether it is a public undergraduate institution, whether it is full-time, and the year of the survey (Table 1).

Table 1. Variable distribution.

variable	Number of cases	mean	standard deviation	least value	crest value
Whether to publish the results	2,251	0.76	0.43	0	1
score ranking	1,711	3.74	0.97	1	5
Top 10% by grades	1,711	0.25	0.43	0	1
Expected educational attainment	2,251	5.77	0.74	3	8
Academic efficacy	2,251	3.17	0.65	1	5
Daily Learning Hours Index	2,251	2.31	0.50	0.00	3.89
Total number of community participation	2,251	1.81	1.21	0	10
(1) Number of horizontal associations involved	2,251	0.70	0.94	0	8
(2) Number of vertical organization participation	2,251	1.11	0.63	0	3
Whether a member of the Chinese Communist Party	2,208	0.29	0.45	0	1
Whether a member of the Communist Youth League	2,251	0.04	0.19	0	1
Whether student cadres	2,251	0.79	0.41	0	1
The maximum years of education of parents	2,251	9.89	5.03	0	20
Family social capital index	2,251	9.55	1.06	0.00	14.34
Household per capita income logarithm	2,251	1.32	0.86	0.00	2.67
age	2,251	21.35	3.23	12	43
sex	2,251	0.46	0.50	0	1

Whether it is a public undergraduate institution	2,246	0.50	0.50	0	1
Whether a full-time student	2,251	0.91	0.28	0	1
Duration of surveys	2,251	2017.13	2.29	2014	2020

3.3. Analytical Methods

The primary consideration is whether the "unpublished school rankings" constitute a sampling selection bias. Among the samples, 540 cases (23.99% of the total) exhibited this pattern. If the non-disclosure of rankings were purely random, no sampling selection bias would exist; otherwise, the Heckprobit model for ordinal data should be employed. Analysis using the Heckprobit model revealed minimal differences from standard ordinal models, as ρ=-0.06 was statistically insignificant. This suggests that sample omission is predominantly random, justifying the decision to abandon the sampling selection model. Examination of the five ranking tiers ("top 10%,11%-25%,26%-50%,51%-75%, bottom 24%") showed their respective proportions: 25.25%,33.55%,32.09%,7.71%, and 1.40%. The score skewness favors higher rankings. Given the low degree of sample omission, this bias can be partially attributed to "score inflation" [43].

This study employs Generalized Structural Equation Modeling (GSEM) for path analysis. Based on research hypotheses and methodological considerations, the path analysis comprises three equations: (1) Logistic regression analysis with binary dependent variable "top 10% academic ranking" as the outcome, and independent variables including expected educational attainment, academic self-efficacy, logarithm of daily study hours, total club participation count, three family capital indicators, and five control variables; (2) Multivariate linear regression analysis with "expected educational attainment", "academic self-efficacy", and logarithm of daily study hours as dependent variables, and total club participation count, three family capital indicators, and control variables as independent variables; (3) Poisson regression analysis with total club participation count as dependent variable, and three family capital indicators and control variables as independent variables. To achieve an acceptable over-saturated model, paths below the 0.05 significance threshold were excluded. Model fit comparisons using the BIC criterion revealed a 23-degree reduction in degrees of freedom, a 53-point decrease in model fit values, and a 74-point drop in BIC score after removing insignificant paths. The refined over-saturated model demonstrates enhanced acceptability and suitability for subsequent analyses.

In the path analysis process, the core explanatory variable "total number of social organization participation" can be fully replaced with either "horizontal vs. vertical participation numbers" or exclusively with "horizontal participation numbers" and "student Party members/student League members vs. student cadres". The path analysis can also be conducted using similar approaches. Of course, all such analyses should undergo robustness testing [44].

4. Findings

4.1. Path Analysis of "Top 10% in Grades": "Total Number of Club Participation"

Table 2 shows the path analysis results with "top 10% of grades" as the dependent variable. Since the paths below 0.05 are not significant, most of the remaining paths are significant.

Table 2. Path analysis on "top 10% of grades": "total number of club participation".

	1. Top 10% of the rankings (0 if no, 1 if yes)	2 Expected educational level	3. Academic efficacy	4. Daily study hours index	5. Total number of community participation
	Logit regression	Multiple linear regression			Poisson regression
Expected educational attainment	0.28**				
Academic efficacy	0.44**				
Daily Learning Hours Index	0.88**				
Total number of community participation	0.25**	0.05**	0.04**	0.02**	
The maximum years of education of parents	\	\	\	\	\
Family social capital index	\	\	\	\	0.05**
Household per capita income logarithm	\	\	\	-0.04**	\
Gender (female 0, male 1)	-0.49**	-0.06*	\	-0.06**	\
age	0.05*	\	0.02**	-0.01**	-0.06**
Whether it is a public undergraduate institution (no 0, yes 1)	-0.41**	0.71**	-0.05*	0.09**	0.13**
Full-time (No 0, Yes 1)	\	0.18**	0.18**	0.48**	0.48**
Year of survey: 2014					
2016	\	-1.00*	-0.14**	\	0.12**
2018	\	0.03	-0.18**	\	0.14**
2020	\	0.07*	-0.20**	\	0.002
constant term	-7.39**	5.36**	2.63**	2.38**	1.30
sample capacity	1,601	2,583	2,634	2,648	2,666

Note: var (e. Expected Education Level) = 0.38; var (e. Academic Self-Efficacy) = 0.43; var (e. Daily Study Hours Index) = 0.22. * and ** indicate significance at the 0.05 and 0.01 levels respectively; \ "\" indicates that the path coefficient has been excluded.

The analysis of control variables revealed that males were 39% less likely than females to rank in the top 10% of academic performance, while students at public undergraduate institutions showed a 34% lower rate compared to those at non-public institutions. For every additional year of age, the likelihood of ranking in the top 10% increased by 5%. No significant differences were observed between full-time and part-time students, nor across different survey years, regarding performance rankings in the top 10%.

The logit regression equation for "top 10% academic performance" in Column 1 of Table 2 reveals that "expected educational attainment", "academic self-efficacy", and "daily study hours index" all demonstrate statistical significance at the 0.01 level. Each one-unit increase in these three factors corresponds to a 32%,55%, and 141% higher probability of achieving top 10% academic standing, respectively. This robust evidence strongly supports the positive correlation between academic aspirations, self-efficacy, study time investment, and college students' academic achievement.

The three variables of family capital demonstrated weak effects, which were generally consistent with expectations. First, they showed no significant correlation with the "ratio of students ranking in the top 10%" and were excluded from the path analysis. Second, among the three mediating variables, including "expected educational attainment", only the "daily study hours index" and "logarithmized per capita household income" exhibited significant negative correlations, while the other eight potential paths were all insignificant and excluded. Consequently, Hypothesis 1 regarding family cultural capital was not supported, whereas Hypothesis 2 about family economic capital was validated. Thirdly, a one-unit increase in the "family social capital index" led to a 0.05 increase in "total community participation quantity", thus supporting Hypothesis 3 concerning family social capital.

The "total number of club memberships" serves as a strong explanatory variable. A one-unit increase in this indicator boosts the percentage of students ranking in the top 10% by 28%, while "expected educational attainment", "academic self-efficacy", and "daily study hours index" show corresponding increases of 0.05,0.04, and 0.02, respectively. These findings strongly support Hypotheses 4-a, b, c, and d regarding the direct and indirect effects of club participation.

4.2. The Effect Difference between "Horizontal Association Participation vs Vertical Association Participation" and "Student Party Members, Student League Members vs Student Cadres"

Table 3 replaces "total social participation" with "horizontal vs. vertical social engagement levels". The results for control variables, three mediating variables including "educational attainment expectations", and three moderation variables related to family capital are largely consistent with those in Table 2, though they were omitted for space-saving purposes. Table 3 reveals that both direct and indirect effects demonstrate significantly higher vertical social engagement than horizontal engagement. This finding strongly supports Hypothesis 5.

Table 3. Path analysis on "top 10% of academic performance": "horizontal VS vertical number of club participation" (table omitted).

	1. Top 10% in grades (0 if no, 1 if yes)	2 Expected educational level	3. Academic efficacy	4. Daily study hours index	5. Number of horizontal associations involved	6. Number of vertical association participation
	Logit regression	Multiple linear regression			Poisson regression	
Number of vertical associations	0.50**	0.14**	0.07**	0.08**		
Number of horizontal associations	0.15*	\	0.03*	\		
sample capacity N	1,601	2,641	2,634	2,731	2,703	2,752

Note: * and ** represent the significance at 0.05 and 0.01 levels, respectively; "" means that the path coefficient is excluded.

Table 4 builds upon Table 3 by replacing "vertical participation in student organizations" with the comparison between "student Party member status" and "student League member status versus student leadership status". The results for other variables remain largely consistent with those in Tables 2 and 3, with all variables being omitted due to space constraints. The coefficient values in Table 4 reveal that the overall effect is strongest

for "student Party members", followed by "student leaders", while "student League members" show the weakest impact. This finding deepens our understanding of vertical participation patterns in student organizations.

Table 4. Path analysis on "top 10% of grades": "student Party member, student League member VS student cadres".

	1. Top 10% of grades: 0 no; 1 yes	2 Expected educational level	3. Academic efficacy	Daily study hours index 4	Number of 5 horizontal associations involved	6. Whether he is a student party member	7. Number of student members	8. Whether he is a student leader
	Logit regression	multiple linear regression			poisson regression	logit regression		
Student membership	0.58*	0.36**	0.20*	0.20**				
Student membership	\	0.21**	\	0.07**				
Whether student cadres	0.58**	0.09**	0.10**	0.08**				
sample capacity N	1,601	2,641	2,634	2,731	2,703	2,816	2,816	2,752

Note: * and ** indicate that the results are significant at 0.05 and 0.01 levels, respectively; "" indicates that the path coefficient is excluded.

4.3. Robustness Test

Regarding the analysis results of Tables 2 to 4, three robustness tests were conducted. First, the dependent variable was replaced with "whether academic performance ranks in the top 25%". Path analysis results similar to those in Table 2 showed that the path coefficients for various club participation indicators remained largely consistent, though with smaller values. Notably, in the robustness analysis based on Table 5, the path coefficients for "student members" and "student cadres" were even statistically insignificant. This indicates that using "top 10% academic performance ranking" yields better fitting results. In summary, these findings collectively support the robustness of the conclusions drawn in Tables 2 and 3.

Second, panel data testing. The introduction of lagged variables represents a distinctive advantage of panel data over cross-sectional data. In the regression equations for "top 10% academic rankings" presented in Tables 2-4, the lagged variable "L. Top 10% academic rankings" was introduced. The results showed that the sample size decreased from 1,711 to 240, with three self-learning indicators either becoming statistically insignificant or showing negative values. Given the reduced sample size and the inconsistency in results, combined with the correlation between the lagged variable "L. Top 10% academic rankings" and other explanatory variables, it was reasonable to exclude lagged variables from the GSEM analysis in Tables 2-4. Additionally, the random effects test revealed that panel analysis performed no better than mixed models.

Third, non-recursive model testing. The "top 10% academic ranking" and "total club participation" may exhibit mutual causality. To address this, we incorporated "total club participation" and self-directed learning indicators as independent variables in the regres-

sion equation for the "top 10% academic ranking" model, while including "top 10% academic ranking" and family capital indicators in the regression equation for "total club participation". The analysis employed ADF estimation. However, the non-recursive model showed poor fit, partly due to a sharp decline in cross-period sample size. Although further investigation is needed regarding their mutual causality, the GSEM analysis results remain generally acceptable.

5. Discussion and Summary

In the relationship between student club participation and academic achievement, three conflicting academic perspectives exist: the "affirmative theory", "negative theory", and "neglect theory". To examine these theories, this study explores the subjective internal mechanisms of academic achievement acquisition and self-directed learning from an educational psychology perspective, investigates the impact of family capital and its linkage mechanisms through a cultural-social reproduction lens, and analyzes club participation types and their connections with these subjective mechanisms from a campus social capital perspective. Using four balanced panel data phases from the CFPS 2014-2020 dataset, we conducted generalized structural equation modeling (GSEM). Results reveal that higher academic expectations, stronger academic self-efficacy, and greater study time investment correlate with better academic achievement, with club participation serving as a strong explanatory variable. Students with higher club engagement demonstrate greater academic aspirations, stronger self-efficacy, increased study time commitment, and improved academic performance. Family cultural capital shows no direct or indirect effects, while family economic capital negatively correlates with study time. Family social capital, however, positively correlates with club participation. These findings support the "affirmative theory" and reject both the "negative theory" and "neglect theory". The study's conclusions validate the acquired and self-determined nature of academic achievement, while challenging the deterministic orientation underlying cultural-social reproduction theory. This finding holds significant practical implications. In the new era, college students have replaced migrant workers as the primary source of the new labor force and a crucial foundation for high-quality population development. The state requires active play of the role of university associations to guide students to excel in academic learning and comprehensive development. The findings of this paper provide strong support for this.

This study has several limitations. First, academic performance and rankings represent only one dimension of educational achievement. Other aspects, such as innovation and entrepreneurship capabilities, graduation success, degree attainment, and further education, deserve deeper exploration. Second, the measurement of club participation focuses solely on "club" type while ignoring variations in engagement methods and intensity. Third, cultural capital analysis emphasizes institutionalized forms like parental education levels, neglecting embodied and objectified cultural capital. Regarding family social capital, the embeddedness of the campus is overlooked. Consequently, this study inadequately tests cultural-social reproduction theory. Finally, it lacks non-reciprocal analysis between academic rankings and club participation, emphasizing correlation over causation. To address these shortcomings, more comprehensive tracking data and in-depth analytical improvements are required.

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