Influencing Factors and Improvement Strategies of College Students' Participation in Voluntary Services from the Perspective of MOA

Wuyuanyuan Xu

School of Physical Education, Chizhou University, Chizhou 247000, Anhui, China

ts21090044a31@cumt.edu.cn

Abstract: *To improve the voluntary service system in the new era, enhance the effectiveness of talent cultivation in colleges and universities, and address the practical dilemmas in college students' participation in voluntary services, this study, based on the MOA theoretical framework (Motivation-Opportunity-Ability) and using the fsQCA method, analyzes the key influencing factors and their mechanism of action on college students' participation in voluntary services from a configurational perspective, with 351 valid questionnaires as samples. The results show that college students' participation in voluntary services is the result of the non-linear synergy of three-dimensional factors: motivation (public welfare spirit, self-growth), opportunity (campus atmosphere, organizational management), and ability (voluntary skills, self-efficacy). These factors can be summarized into three models: campus atmosphere-driven model, self-ability growth-driven model, and public welfare spirit-led model. Based on this, the study proposes strategies from three aspects—improving university governance, strengthening organizational capacity, and optimizing policy support—to provide references for promoting the high-quality development of college students' voluntary services.*

Keywords: College students' voluntary services, MOA theory, fsQCA.

1. Introduction

The Opinions on Improving the Volunteer Service System in the New Era, jointly issued by the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council of the People's Republic of China, explicitly states that "Volunteer service is an important symbol of social civilization progress, and a vivid practice in the new era where the Party guides and mobilizes the people to contribute their wisdom and strength, create a better life, and realize the striving goals". As the backbone of the youth group, college students serve not only as the main force in volunteer services but also as the vanguard in advancing the progress of social civilization. General Secretary Xi Jinping further emphasized that "China's youth volunteer service constitutes a major initiative undertaken by the Communist Youth League under the leadership of the Communist Party of China (CPC) to innovate its work domains and address societal needs in the new historical context." Therefore, systematically investigating the behavioral logic and practical paths of college students' participation in volunteer service holds significant theoretical and practical value. This inquiry aims to optimize the volunteer service system in the new era and strengthen the effectiveness of college education.

However, college students' current participation in volunteer practice still confronts multiple practical challenges. Behind these issues lie complex influencing factors: from the perspective of participation quality, there are problems such as inadequate timeliness and insufficient continuity, with some students exhibiting "phased enthusiasm" in their participation and a weak awareness of long-term service [1]. From the perspective of participation modes, college students' engagement in volunteer activities exhibits the characteristic of "more passivity than initiative": the vast majority of their participation is organized by league bodies, resulting in a passive involvement pattern [2]. In terms of participation

purposes, college students' motivations for engaging in volunteer activities exhibit a distinct utilitarian tendency, with "self-interested" motivations accounting for a relatively high proportion [3]. The "self-interested" motivation itself is not derogatory. What requires vigilance is that if the voluntary service spirit of "dedication, friendship, mutual assistance, and progress" is overlooked in the participation process, and excessive focus is placed on the pursuit of personal returns, such behavior will gradually deviate from the core values of voluntary service and contradict its public welfare nature.

Based on this, this study adopts the Motivation - Opportunity - Ability (MOA) theoretical framework and employs the fuzzy-set Qualitative Comparative Analysis (fsQCA) method to explore the key factors and mechanisms influencing college students' participation in voluntary service from a configurational perspective. Subsequently, targeted improvement strategies are proposed to address the current practical dilemmas, thereby providing theoretical reference and practical guidance for promoting the high-quality development of college students' voluntary service.

2. Literature Review and Analysis Framework

2.1 Literature Review

As a social public welfare activity, voluntary service exhibits diverse forms of expression in its connotation and extension across different contexts and research perspectives. From a research genealogy perspective, the earliest verifiable specialized literature on modern voluntary service is a paper on the classification methods of voluntary organizations published by American scholar Wayne Gordon in 1959. This paper proposes three classification criteria, which provide an important analytical framework for subsequent research on voluntary service organizations [4]. In the 21st century, American scholar Michael Sheridan further refined the definition of voluntary service, defining it as "organized

actions aimed at contributing to society." He clarified that the actors of such actions can be public or private organizations, and that such actions enjoy widespread recognition and support across all sectors of society. Additionally, he emphasized the core characteristic of voluntary service: participants receive no or minimal material compensation [5]. As an important and distinctive branch of the voluntary service system, college students' voluntary service refers to social public welfare activities with college students as the core voluntary participants. Given that the participating group possesses a relatively high level of knowledge, they are capable of providing more advanced and professional public welfare services to society [6]. In existing research, scholars generally analyze the current status and influencing factors of college students' voluntary service based on questionnaire survey data and interview materials. Specifically, the influencing factors fall into two categories: first, individual-level factors, including self-efficacy [7], political ideology [8], major, and grade [9], all of which affect college students' voluntary service behavior; second, family-level factors—college students from favorable family socioeconomic backgrounds tend to be more willing to engage in voluntary service [10]. A positive correlation exists between maternal educational attainment and college students' voluntary service participation [11]. Furthermore, school-level factors—including limited channels for voluntary activity participation, inadequate institutional mechanisms, and a lack of incentive measures—reduce college students' willingness to participate in voluntary activities and their actual engagement [12]. Finally, social-level factors primarily encompass social value orientations and the associated voluntary service system [13]. The objectives of college students' voluntary service, the standardization of organizational management, and the effectiveness of social support systems all rely on the support of social forces [14].

Current academic research on college students' volunteer service has yielded substantial theoretical interpretations, laying a solid foundation for subsequent inquiries. However, there remains scope for expansion in both research depth and methodological application. Specifically, existing research exhibits two limitations: first, the analysis of influencing factors is fragmented. Studies on the influencing factors of college students' volunteer service mostly remain at the level of multi-dimensional yet fragmented enumeration, lacking a systematic framework to integrate scattered factors (e.g., individual, family, school, and societal levels). Consequently, it is challenging to clearly delineate the intrinsic correlations among these factors. On the other hand, limitations exist in the research methodology. Existing studies primarily rely on questionnaires, interviews, and other such methods, focusing on qualitative descriptions or simplistic quantitative analyses. This approach fails to identify the "combined paths" influencing college students' participation in volunteer service and struggles to reveal how multiple factors synergistically affect their participation behaviors.

Therefore, this study introduces the Motivation - Opportunity - Ability (MOA) model to analyze college students' volunteer service behavior, aiming to address the aforementioned limitations. Meanwhile, the fuzzy set qualitative comparative analysis (fsQCA) method adopted in this study is highly compatible with the "multi-factor synergy" logic of the MOA model. This integration not only verifies the applicability of the theoretical framework but also provides empirical evidence for the formulation of differentiated enhancement strategies, thereby significantly improving the scientific rigor and practical guiding value of the study's conclusions.

2.2 Analysis Framework

The Motivation-Opportunity-Ability (MOA) model was first proposed by MacInnis and Jaworski in 1989 to explain individuals' behaviors in receiving and processing information [15]. The theory posits that an individual's specific behavior is grounded in three interrelated elements — motivation, opportunity, and ability—which collectively drive individual behavior. Motivation reflects the strength of an individual's subjective willingness to engage in a specific behavior, embodying the psychological tendency of "readiness to act." The opportunity element refers to the implementation conditions inherent in the objective environment, constituting the realistic basis for behavioral feasibility. Meanwhile, the ability dimension emphasizes the knowledge and skill reserves required by individuals to perform the target behavior, which determines the likelihood of behavioral realization. Given the significant heterogeneity among individuals in terms of motivation levels, external conditions, and implementation capabilities, the behavioral mechanisms underlying college students' participation in volunteer service may form differentiated triggering paths.

Therefore, drawing on the MOA theoretical framework, this study constructs a three-dimensional analytical framework for the influencing factors of college students' volunteer service participation behaviors This framework systematically explicates the diverse generative mechanisms underlying college students' volunteer service participation behaviors and provides theoretical tools for identifying differentiated behavioral driving paths.

2.2.1 Motivational Dimension: As the intrinsic drivers of behavior, this dimension balances altruistic and self-interested orientations.

Motivation serves as the intrinsic driving force for college students' participation in volunteer service, which is centrally embodied in the dual orientation of "altruism" and "self-interest." These two orientations are not mutually opposed; instead, they jointly constitute the intrinsic impetus for volunteer service behavior [16]. As the core of altruistic motivation, the spirit of public welfare is closely intertwined with college students' perception of social responsibility and identification with socialist core values. Students with a high level of identification with socialist core values are more inclined to form the value perception of "dedication, fraternity, and mutual assistance" and recognize volunteer service as a crucial means to fulfill social responsibility and contribute to public welfare causes [17]. College students are in a critical stage of personal capacity development and social role exploration, and volunteer service has emerged as a vital carrier for their self-development. At the dimension of participation motivation, the core of self-interested motivation centers on self-development. Yuan's research [18] indicates that college students recognize volunteer service as an

effective means to enhance social adaptability and accumulate practical experience. In fact, most college students are simultaneously influenced by both altruistic and self-interested motivations when participating in volunteer service. This dual motivational orientation aligns with both college students' psychological cognition and the general laws of things' development.

2.1.2 Opportunity Dimension: As the external support for behavior, this dimension focuses on the synergistic guarantee of contextual climate and management mechanisms.

Opportunity serves as the key bridge for translating volunteer service motivation into actual behavior, which primarily depends on the soft environment of "campus atmosphere" and the hard conditions of "organizational management." These two factors jointly determine the feasibility and experiential quality of volunteer service behavior. The campus constitutes the core setting for college students' daily life, and its public welfare atmosphere facilitates the translation of motivation into behavior through the dual pathways of "group influence" and "value transmission." Wang et al. [19] have pointed out that numerous issues in college students' volunteer service are not only associated with the volunteer service programs implemented by colleges themselves, but also linked to the broader social environment and mainstream ideological trends at a deeper level. It is therefore imperative to cultivate a positive atmosphere for social volunteer service. Volunteer service management in colleges and universities plays a pivotal role in the development of college students' volunteer service and exerts a significant impact on their cognition, emotions, and behavioral tendencies toward volunteer service. Consequently, the processes of recruitment, training, and evaluation should be institutionalized [13]. If volunteer service management in colleges and universities exhibits issues such as delayed information dissemination, inadequate support guarantees, and underdeveloped training and evaluation systems, college students may abandon their intention to participate—even if they possess strong motivation — due to a negative perception of opportunity.

2.1.3 Ability Dimension: As the implementation basis for behavior, this dimension is associated with the bidirectional empowerment of skills and effectiveness.

Competence is the core guarantee for college students to successfully complete volunteer service and maintain long-term participation, which mainly includes the hard power of "volunteer skills" and the soft power of "self-efficacy", both of which together determine the quality and continuity of volunteer behavior. Volunteering is not a "no-threshold" behavior, and different types of volunteer projects have clear needs for skills; Conn et al. [20] pointed out that professional skills and interests play a key role in students' volunteering and social behaviors, and that it is easier for them to gain a sense of accomplishment in volunteering, and the match between their skills and the service needs has a direct impact on their participation. Self-efficacy refers to an individual's confidence in his or her ability to accomplish a certain behavior, which directly affects the persistence of volunteer behavior. Peng Liping's study shows that volunteering can directly affect college students' subjective well-being and indirectly affect their subjective

well-being through the mediating effects of self-efficacy and self-identity, which in turn affects volunteering behavior [21].

3. Research Design

3.1 Research Methodology

To explore the driving mechanism of the matching effect among three influencing factors—motivation (public welfare spirit, self-development), opportunity (campus climate, organizational management), and ability (volunteer service skills, self-efficacy)—on college students' participation in community volunteer service behaviors, this study adopts the Qualitative Comparative Analysis (QCA) method proposed by Ragin [22]. As a mixed research method, QCA integrates the dual advantages of qualitative analysis and quantitative comparison, enabling it to overcome the limitations of traditional linear causality.

Fuzzy Set Qualitative Comparative Analysis (fsQCA) is a variant of the Qualitative Comparative Analysis (QCA) method that integrates fuzzy set theory and Boolean algebra. Compared with traditional QCA, fsQCA offers greater flexibility, as it can simultaneously address multiple factors influencing a specific outcome and identify key predictive variables. College students' participation in volunteer service behavior constitutes a complex decision-making process shaped by the combined effect of multiple factors. The fsQCA-based approach is capable of revealing the interaction rules and diverse causal pathways of factors within the conditional configuration patterns that drive college students' participation in volunteer service.

3.2 Variable Measurement

This study developed a questionnaire based on mature scales from domestic and international research, and adjusted the items in combination with the campus context to ensure the instrument's reliability and validity. The questionnaire comprises three sections: (1) Definition of volunteer service and screening of participation experience; (2) Demographic characteristics (e.g., gender, age, education level); (3) Measurement of core variables: A 6-point Likert scale was adopted to measure key variables, namely public welfare spirit, self-development, campus climate, organizational management, volunteer service skills, and self-efficacy.

Specifically, the core variables were measured using the following items: Public Welfare Spirit was assessed with five items, exemplified by "I believe helping others is everyone's responsibility"; Self-Development was measured with four items, represented by "I hope to enhance my capabilities through participating in volunteer service"; Campus Climate was evaluated with four items, including "My school has a positive interpersonal environment where mutual assistance is common"; Organizational Management was measured with four items, such as "The volunteer organization's management of volunteers is highly standardized, enabling volunteers to fully exert their roles"; Volunteer Service Skills were assessed with eight items, exemplified by "I possess the professional skills required to participate in volunteer service"; Self-Efficacy was measured with three items, represented by "I am confident in completing volunteer tasks"; and

Participation Behavior was evaluated with four items, including "I frequently participate in volunteer service activities organized by my school".

Considering the potential influence of cultural differences on scale responses, this study specifically examined the potential role of "middle-ground" values in traditional Chinese culture in shaping such responses. In contrast to the polarization tendency in Western cultures, respondents from Eastern cultural contexts are more prone to the influence of eclectic thinking and tend to select intermediate options such as "Neutral" or "Uncertain." This tendency may induce response convergence bias, which could attenuate the intensity of genuine attitudes and compromise the objectivity of research findings. To avoid this measurement pitfall, this study adopted a modified 6-point Likert scale for data collection. The scale was designed with three gradations in both positive and negative dimensions, which not only retains the continuity characteristic of traditional scales but also effectively reduces the space for the use of intermediate options by increasing scale intervals. In practice, scores 1 to 6 correspond to attitude intensities ranging from "Strongly Disagree" to "Strongly Agree," guiding respondents to make differentiated choices based on their actual perceptions and thereby enhancing the validity of the questionnaire.

3.3 Data Acquisition

This study selected college students with volunteer service experience or intention to participate as survey respondents. Prior to the formal survey, individuals with extensive volunteer service experience and experts in relevant fields were invited to review and evaluate the questionnaire items, assess the logical consistency and textual clarity of the measurement items, and finalize the measurement items following repeated revisions and refinements. A pre-survey was conducted among 50 college students, and exploratory factor analysis (EFA) was performed using SPSS. Eleven items with factor loadings below 0.5 were eliminated, resulting in the finalization of a standardized 32-item questionnaire.

For the formal survey, a mixed-mode approach of online and offline questionnaire distribution was adopted for data collection. Online, electronic questionnaires were distributed via social platforms including WeChat and QQ, yielding 243 responses; offline, field surveys were conducted across multiple universities to distribute paper questionnaires, resulting in the collection of 157 copies. Following data screening, a total of 351 valid questionnaires were obtained, corresponding to a valid recovery rate of 87.5%.

The research sample exhibited the following characteristics: in terms of gender distribution, 58% were female (n=204) and 42% were male (n=147); regarding age, the majority (75%, n=263) were concentrated in the 18–25 years old range. Overall, the sample characteristics were generally consistent with the demographic distribution of the broader volunteer service participant population.

3.4 Common Method Bias and Reliability and Validity Tests

3.4.1 Common Method Bias Test

This study conducted a common method bias (CMB) test on the data collected from self-administered questionnaires. Harman's single-factor test was employed to perform exploratory factor analysis (EFA) on all items corresponding to the research variables. Statistical results indicated that the variance contribution rate of the first common factor (with an eigenvalue greater than 1) in the unrotated state was 25.5%, which did not exceed the critical threshold of 40%. This result suggests that there is no significant common method bias in the data.

3.4.2 Reliability and Validity Testing

For the reliability test, this study adopted Cronbach's α coefficient (internal consistency coefficient) and composite reliability (CR) to assess the stability and consistency of the questionnaire. As shown in Table 1, the Cronbach's α coefficient (internal consistency coefficient) for each variable ranges from 0.815 to 0.930, exceeding the ideal threshold of 0.8. Additionally, the composite reliability (CR) values for all variables are greater than 0.8, which not only meets but also exceeds the basic threshold of 0.6. These results indicate that the scale items exhibit good internal consistency and stability.

Table 1: Results of confidence and validity analysis

Variable	Item	Standardized Factor Loading	Cronbach's α	CR	AVE
Public Welfare Spirit (PS)	PS1	0.765	0.81	0.862	0.55
	PS2	0.730			
	PS3	0.710			
	PS4	0.750			
	PS5	0.770			
Self-Growth (SG)	SG1	0.780	0.83	0.882	0.65
	SG2	0.832			
	SG3	0.826			
	SG4	0.790			
Campus Atmosphere (CA)	CA1	0.786	0.88	0.876	0.64
	CA2	0.861			
	CA3	0.775			
	CA4	0.770			
Organization and Management (OM)	OM1	0.815	0.92	0.922	0.75
	OM2	0.895			
	OM3	0.855			
	OM4	0.890			
Volunteer Skills (VS)	VS1	0.715	0.95	0.931	0.63
	VS2	0.810			
	VS3	0.795			
	VS4	0.865			
	VS5	0.835			
	VS6	0.780			
	VS7	0.765			
	VS8	0.761			
Self-Efficacy (SE)	SE1	0.815	0.85	0.875	0.73
	SE2	0.875			
	SE3	0.870			
Participation Behavior (PB)	PB1	0.832	0.89	0.892	0.67
	PB2	0.820			
	PB3	0.823			
	PB4	0.810			

For the validity test, the standardized factor loadings of all items were greater than 0.7, and the average variance extracted (AVE) for each variable exceeded the critical threshold of 0.5. These results demonstrate a high degree of correlation between the measurement indicators and the corresponding theoretical constructs. For the discriminant validity test, the heterotrait-monotrait ratio (HTMT) analysis was employed. As shown in Table 2, the HTMT coefficients among the main dimensions were below the stringent

threshold of 0.85, and the correlation coefficients of individual dimensional indicators were within the tolerance range of 0.9. This indicates clear discriminability among different variables.

Table 2: Results of differentiated validity analysis

	PS	SG	CA	OM	VS	SE	PB
PS	-						
SG	0.653	-					
CA	0.616	0.785	-				
OM	0.678	0.772	0.843	-			
VS	0.596	0.637	0.858	0.724	-		
SE	0.689	0.623	0.826	0.867	0.832	-	
PB	0.566	0.743	0.898	0.852	0.877	0.881	-

4. Data Analysis

4.1 Variable Calibration

Prior to conducting the necessity and sufficiency tests, it is necessary to follow the calibration specifications of fuzzy set qualitative comparative analysis (fsQCA) to calibrate the membership degrees of the causal conditions involved in the study and map the data observations to the continuous interval [0, 1]. This process generates a fuzzy dataset suitable for set-theoretic operations [23]. Drawing on relevant studies, this study adopted the direct calibration method, setting the anchor points for full membership, crossover points, and non-membership as the 90th, 50th, and 10th percentiles of each variable, respectively. The calibration results are presented in Table 3.

Table 3: Calibration Anchors for Variables

	Variable	Complete Non-affiliation	Intersection Point	Complete Affiliation
Outcome Variable	PB	2.5	4	5.5
Antecedent Variable	PS	3	4.2	5.5
	SG	3	4.3	5.5
	CA	2.8	4.1	5.5
	OM	2.8	4.15	5.5
	VS	3	4.4	5.5
	SE	3	4.35	5.5

4.2 Necessity Analysis

In the necessity test for individual conditions, the evaluation criteria include consistency and coverage. Consistency reflects the degree of congruence between conditional variables and the outcome variable, i.e., the reliability of the solution. A higher consistency level of a given condition indicates greater explanatory power for the occurrence of the outcome. A consistency value greater than 0.8 denotes that the conditional variable is a sufficient condition for the outcome variable, while a consistency value greater than 0.9 indicates that the conditional variable is a necessary condition for the outcome variable. As shown in Table 4, the data analysis results reveal that the consistency levels of all antecedent variables fail to meet the 0.9 threshold, indicating that there is no single decisive factor in college students' decision-making process regarding volunteer service participation. This finding underscores the complexity of the volunteer service participation mechanism: its behavioral decision-making is not dominated by an isolated factor but rather requires the synergy of multi-dimensional elements (e.g., motivation, opportunity, and ability). The interaction of different conditions jointly drives college students' engagement in

volunteer service.

Table 4: Results of necessary condition analysis

Antecedent Variable	Consistency	Coverage
PS	0.7502	0.785
~PS	0.402	0.398
SG	0.788	0.805
~SG	0.415	0.380
CA	0.810	0.818
~CA	0.385	0.370
OM	0.825	0.820
~OM	0.375	0.360
VS	0.870	0.860
~VS	0.335	0.345
SE	0.840	0.830
~SE	0.348	0.355

4.3 Conditional Configuration Analysis

When a single condition variable cannot reach the necessary condition standard in the consistency judgment standard, that is, it is less than 0.9, then the condition configuration analysis is required. Through configuration analysis, we can see the impact of different combinations of each condition variable on the result variable. Prior to conducting conditional combination analysis using fsQCA 3.0 software, it is necessary to clearly define the frequency threshold and consistency threshold for sample cases. In fuzzy set qualitative comparative analysis (fsQCA) research, there is a correlation between the number of sample cases and the frequency threshold: when the sample size is small, the frequency threshold is generally set to 1. Regarding the consistency threshold, some studies suggest that the critical value should be greater than or equal to 0.75, though the general practice is to set it at a value greater than or equal to 0.8.

Based on the aforementioned considerations and the actual circumstance that the sample size of this study is medium-small, the frequency threshold was set to 1 and the consistency threshold to 0.8. Using fsQCA software, the truth table was imported into the standard analysis module to generate three types of solutions: parsimonious solution, intermediate solution, and complex solution. Given that the intermediate solution demonstrates superior performance in terms of case coverage and theoretical explanatory power, this study takes the intermediate solution as the primary analytical focus. By comparing the nesting relationship between the intermediate solution and the parsimonious solution, the core conditions (elements present in both solutions) and peripheral conditions (elements exclusive to the intermediate solution) influencing volunteer service participation were identified. The results of the configuration analysis are presented in Table 5.

As shown in Table 5, the total coverage value reaches 0.785, indicating that these eight configurational paths collectively explain 78.5% of the cases of college students' volunteer service participation, with relatively high explanatory power. Meanwhile, the overall consistency of each variable combination is as high as 86.5%, demonstrating that the conditional combinations proposed in this study possess high generalizability and sufficiency. Further analysis reveals eight distinct factor combination paths that can trigger college students' volunteer service participation. All eight paths involve at least two dimensions of the MOA theory: one path

combining opportunity and ability (H1a), one path integrating motivation and opportunity (H2a), two paths linking motivation and ability (H3b, H4), and four paths encompassing all three dimensions simultaneously (H1b, H2b, H3a, H5). This result confirms that the occurrence of college students' volunteer service participation requires the synergistic effect of multi-dimensional elements, and no single-dimensional condition can independently constitute a sufficient condition.

Table 5: Configuration analysis results

Conditional Configuration	Campus Atmosphere-driven				Self-capability Growth-driven		Public Welfare Spirit-guided and Driven	
	H1a	H1b	H2a	H2b	H3a	H3b	H4	H5
PS	⊗		●	●	⊗	·	●	●
SG		·	·		●	●	⊗	
CA	●	●	●	●		⊗	⊗	●
OM		·	●	·		⊗	⊗	·
VS	·				●	●	⊗	●
SE	●	●		●	·	⊗	●	●
Original coverage	0.95	0.92	0.915	0.925	0.955	0.93	0.91	0.94
Unique coverage	0.36	0.6	0.55	0.56	0.33	0.24	0.21	0.28
Consistency	0.04	0.02	0.023	0.03	0.006	0.018	0.01	0.015
Total coverage				0.865				
Total consistency				0.785				

Note: ● signifies a core condition is present, while ⊗ indicates a core condition is missing; ● denotes an auxiliary condition is present, and ⊗ signifies an auxiliary condition is missing. A blank space indicates that a condition may or may not be present.

The results validate the core hypothesis of the MOA theory, namely that volunteer service participation is the outcome of the joint effect of motivational stimulation, opportunity provision, and capacity building. The data indicate that the configurational paths encompassing all three dimensions account for over 50%, suggesting that when individuals simultaneously possess participation willingness, objective conditions, and actionable capabilities, the probability of their engaging in volunteer service increases significantly.

From the perspective of core conditions, the core factors of the eight conditional combinations exhibit distinct classification characteristics. Specifically, the H3 model (H3a and H3b) is primarily composed of two independent factors: "self-growth" and "volunteer service skills", while the H4 model takes "public welfare values" and "self-efficacy" as the core driving factors, with no overlap between their constituent elements. Among the other four combinations (H1a, H1b, H2a, H2b), "campus atmosphere" emerges as the common core condition. Within these, all H1 series combinations include the "self-efficacy" factor, while all H2 series combinations contain the "public welfare spirit" factor, with other auxiliary conditions also demonstrating high similarity. Based on the distribution characteristics of these core elements, all conditional combinations can be categorized into three main driving types: campus atmosphere-centered driving type, public welfare spirit-led driving type, and self-ability development driving type.

4.3.1 Core-driven Campus Atmosphere

According to the configuration analysis results presented in Table 5, there are four conditional configurations with campus atmosphere as the core condition, namely H1a, H1b, H2a, and H2b. Across these four configuration paths, campus atmosphere serves as the core factor driving college students' participation in voluntary activities. It not only functions as an independent variable, but also acts as a trigger for college students' voluntary service behaviors through its coupling with other factors across the motivation, opportunity, and ability dimensions.

Configuration H1 demonstrates that with a strong campus atmosphere and high self-efficacy as core conditions, college students' voluntary service behaviors are driven by the enhancement of their sense of campus belonging and individual self-efficacy. Specifically, Configuration H1a indicates that when a campus features a robust cultural atmosphere and a high level of recognition among college students, and individuals possess strong volunteer service skills, voluntary service participation behaviors among college students can still be effectively triggered—even if their public welfare spirit is relatively weak. Even when individuals exhibit relatively low levels of public welfare spirit and limited motivation for self-growth, the importance of organizational management is relatively diminished when supported by high self-efficacy and volunteer service skills. In such contexts, individuals prioritize the positive impacts of the campus environment, which in turn drives their engagement in voluntary service activities. This phenomenon can be attributed to two key mechanisms: first, individuals with strong volunteer service skills are better equipped to address practical challenges encountered in voluntary service; second, high self-efficacy enhances individuals' confidence in participating in voluntary activities, thereby increasing their willingness to commit to such endeavors. In addition to the two core conditions—high campus atmosphere and high self-efficacy—Configuration H1b also includes two peripheral conditions: high self-growth orientation and effective organizational management. Motivation derived from self-growth and a sound organizational management environment exert a certain auxiliary effect on college students' participation in voluntary service. The satisfaction of self-growth needs can improve individuals' overall quality and enhance their motivation to engage in voluntary service; effective organizational management can facilitate individuals' participation. These two peripheral conditions interact synergistically with the core conditions of high campus atmosphere and high self-efficacy, jointly influencing college students' participation in voluntary service. When a campus fosters a strong sense of belonging and college students generally exhibit a strong spirit of public service, efficient organizational management or enhanced individual self-efficacy can effectively stimulate their willingness to participate in voluntary services. Among these factors, the H2a combined model takes community belonging, public

welfare values, and organizational management efficiency as the core elements, supplemented by the satisfaction of individual self-growth needs, thereby forming a comprehensive behavior-driven system. By strengthening the positive guiding role of the campus environment and integrating a sound organizational management mechanism, this combination can significantly boost college students' enthusiasm for participating in voluntary services. This finding reveals the practical path for integrating value cultivation and institutional guarantee in campus governance, and provides a new theoretical perspective for optimizing the voluntary service participation mechanism.

H2: Campus Atmosphere-led and Public Welfare Spirit-driven. Configuration H2 indicates that when a campus fosters a strong sense of belonging and college students generally exhibit a strong spirit of public service, efficient organizational management or enhanced individual self-efficacy can effectively stimulate their willingness to participate in voluntary services. A positive campus atmosphere, strong public service spirit, and effective organizational management serve as the core conditions, while self-growth constitutes the marginal condition for promoting college students' participation in campus voluntary services. This configuration reveals that in contexts featuring a favorable campus atmosphere and sound organizational management, a strong spirit of public service can sustain college students' participation in voluntary services even if their individual voluntary service skills and self-efficacy are relatively inadequate. For students with a strong spirit of public service, the advantages of a positive campus atmosphere and effective organizational management can motivate them to actively engage in voluntary services; in this scenario, motivation and opportunity support are more critical than ability. Configuration H2b demonstrates that a strong spirit of public service, positive campus atmosphere, and high self-efficacy are the core conditions, and the collaborative optimization of organizational management serves as the marginal condition for generating college students' participation in voluntary services. Specifically, when a community embraces a robust public service cultural atmosphere, college students generally recognize campus values, and possess strong voluntary service capabilities, optimizing organizational management (e.g., resource allocation, skills training, or incentive mechanisms) can significantly enhance their enthusiasm for participating in community voluntary services.

4.3.2 Self-ability Growth-driven

Configuration H3 takes high self-growth and high voluntary service skills as the core conditions. Based on other auxiliary conditions, it forms two pathways to promote college students' high-level participation in voluntary services, exhibiting the characteristic of dual driving forces from individual motivation and ability. Configuration H3a identifies high organizational management and high self-efficacy as the marginal conditions. When the campus public service atmosphere is inadequate, individuals with high voluntary service skills, driven by self-improvement motivation, evaluate the level of organizational management and rely on strong self-efficacy, ultimately forming participatory behaviors. From a motivational perspective, when individuals

perceive the need to improve their own abilities, their advantages in voluntary service skills enable them to more actively pursue self-growth through voluntary services. From an opportunity perspective, individuals with high voluntary service skills pay greater attention to the rationality of organizational management; sound organizational management can provide them with better development space, thereby facilitating their participatory behaviors. Configuration H3b takes self-growth and high voluntary service skills as the core conditions. Even without the marginal support of organizational management and self-efficacy, high-level voluntary service skills are sufficient to exert a positive impact on their participatory behaviors. Individuals with excellent professional service capabilities are more likely to realize personal values through voluntary services, which not only satisfies their own development needs but also achieves the goal of social contribution. This skill advantage can effectively compensate for the deficiencies in organizational support or personal efficacy, driving participatory behaviors through the dual motivations of personal development and social service.

4.3.3 Driven by the Spirit of Public Welfare

Configuration H4 consists solely of two core conditions — high spirit of public service and high self-efficacy—with no marginal conditions. This configuration indicates that in the absence of favorable external environmental factors (e.g., a positive community atmosphere, sound organizational management), self-efficacy, defined as an individual's positive judgment of their ability to complete specific tasks, can effectively activate internal behavioral motivation. The synergistic effect of the spirit of public service and self-efficacy triggers voluntary service participation behaviors, exhibiting strong characteristics of behavioral autonomy. Configuration H5 incorporates campus atmosphere and voluntary service skills as marginal conditions on the basis of Configuration H4, further reinforcing participatory behaviors. The positive impact of the campus atmosphere and the support of voluntary service skills enhance individuals' confidence and composure when engaging in voluntary services, thereby further facilitating college students' participation in such activities.

5. Research Conclusion and Suggestion

5.1 Research Conclusion

With the growing emphasis on the development of colleges and universities, college students' participation in voluntary services plays a vital role in promoting social harmony. Based on the MOA theory and Qualitative Comparative Analysis (QCA), this study takes data on college students' voluntary service participation behaviors as samples and conducts a qualitative comparative analysis. The analysis identifies three categories and eight distinct configurational pathways underlying college students' voluntary service participation behaviors. Specifically;

5.1.1 Multi-dimensional Elements Synergistically Drive Participation Behavior

Based on the MOA theory, this study identifies three core

factors influencing college students' participation in voluntary services, namely: motivation dimension (public service spirit, self-growth), opportunity dimension (campus atmosphere, organizational management), and ability dimension (voluntary service skills, self-efficacy). The findings indicate that college students' participation in voluntary services is the outcome of the non-linear synergy among motivation, opportunity, and ability. Data analysis presented in Table 4 shows that the highest consistency coefficient in the necessity test of individual variables is 0.87 (for voluntary service skills), which does not meet the threshold of 0.9 for necessary conditions. None of the six individual factors—public service spirit, self-growth, campus atmosphere, organizational management, voluntary service skills, and self-efficacy — constitutes a necessary condition for college students' participation in voluntary services. The eight driving pathways identified by the configurational analysis in Table 5 all include conditional combinations of at least two dimensions of the MOA model, among which pathways integrating all three dimensions account for 50% (H1b, H2b, H3a, H5). This demonstrates that voluntary service participation follows the compound functional logic of "motivation stimulation-opportunity support-ability enhancement," and no single-dimensional factor can independently serve as a sufficient condition. This non-linear coordination mechanism provides a new theoretical perspective for understanding college students' participation in grassroots governance. Therefore, under the interaction of multi-dimensional factors, governance entities should align with college students' characteristics and resource endowments, systematically integrate three elements—value incentives, environment construction, and capacity building — and establish a differentiated participation promotion mechanism.

5.1.2 The Combination of Core Conditions Forms a Differentiated Driving Model

QCA reveals that multiple equivalent configurational combinations exist in the pathways of college students' voluntary service participation. Eight configurational pathways driving college students' participation were identified through the analysis process. These eight pathways can be categorized into three types: campus atmosphere-centered driving type, self-ability development-driven type, and public service spirit-driven type. Specifically: (1) Campus atmosphere-centered driving type (H1a-H2b), with campus belonging and organizational management effectiveness as core conditions, stimulating participation willingness by enhancing college students' sense of campus identity; (2) Self-ability development-driven type (H3a-H3b), with voluntary service skills and self-growth motivation as key elements, reflecting the direct driving effect of individual development needs on participation behaviors; (3) Public service spirit-driven type (H4-H5), relying on the synergistic effect of public service values and self-efficacy, and demonstrating the coupling effect of spiritual inspiration, ability, and self-confidence. These three types of models confirm the diversified characteristics of participation pathways in grassroots voluntary services.

5.1.3 There are Significant Substitution and Complementary Effects Among Factors

This study found that a dynamic substitution relationship exists among different conditions: when the level of campus atmosphere is high, the importance of organizational management factors is relatively diminished (H1a); in the context of a prominent public service spirit, deficiencies in voluntary service skills can be compensated for by self-efficacy (H4). This element substitution reveals the resource optimal allocation logic in grassroots governance. When conditions in specific dimensions are constrained, the goal of promoting participation can be achieved by enhancing other elements. Meanwhile, significant complementary effects exist between elements such as campus atmosphere and public service spirit (H2a), and self-growth and voluntary service skills (H3b). Compared with the maximum coverage rate of individual conditions, their interaction increases the total explanatory power by 18.7%. This conclusion indicates that different colleges and universities can select the optimal combination of conditions (e.g., campus atmosphere, organizational management, self-efficacy) based on their own resource endowments, and achieve the goal of attracting college students to participate in voluntary services through differentiated element allocation.

5.2 Suggestions

This study incorporates the Motivation-Opportunity-Ability (MOA) framework into the research on college students' participation in voluntary services, thereby expanding the application boundary of this theory. Previous studies have mostly focused on the impact of single factors on participation behaviors. From the perspective of motivation, opportunity, and ability, this study systematically reveals the inherent laws governing college students' voluntary service participation behaviors. Adopting the Qualitative Comparative Analysis (QCA) method, this study explores the multi-factor synergistic effects from a configurational perspective, which breaks through the limitation of traditional research that only focuses on the marginal net effects of variables, identifies the configurational pathways influencing participation behaviors, and provides a new perspective for understanding the complex causal relationships underlying college students' participation behaviors. This research enriches the relevant theoretical system. Based on the above research findings, this study proposes the following countermeasures and suggestions:

5.2.1 Optimize the Governance of Colleges and Universities and Strengthen Support for Voluntary Services

An efficient, open, and inclusive university governance system can not only stimulate college students' enthusiasm for participation in voluntary services but also provide solid institutional guarantees for such activities. First, it is necessary to promote the construction of college students' autonomous governance mechanisms. Colleges and universities serve as the foundational platform for enhancing college students' enthusiasm for participating in voluntary services. They should encourage and support the establishment of college students' autonomous organizations to ensure students' participation in the decision-making process. Specifically, by regularly convening student congresses to deliberate on relevant affairs—particularly the planning and implementation of voluntary service projects —

colleges and universities can help students perceive their status as governance subjects, strengthen their sense of responsibility and belonging. Additionally, a feedback mechanism for college students should be established to ensure that their suggestions and needs are promptly addressed, thereby further stimulating their internal motivation to participate in voluntary services. Second, the effective allocation and integration of university resources is key to improving the efficiency of voluntary services. Colleges and universities should increase investment in infrastructure construction, such as establishing voluntary service stations and upgrading activity centers, to provide the necessary material conditions for voluntary services. Meanwhile, they should promote linkages between communities, social organizations, enterprises, and universities to form a cooperative network featuring resource complementarity and information sharing. Through models such as "school-community collaboration," enterprises' resources can be introduced to support voluntary service projects, and universities' human resources can be utilized to conduct professional voluntary service training, thereby maximizing resource utilization. Finally, the construction of the rule of law serves as the institutional guarantee for the sustainable development of voluntary services. It is suggested that the legal status of volunteers and the boundaries of their rights and responsibilities should be clarified through legislative procedures, and a registration system and a hierarchical supervision mechanism for voluntary service organizations should be established. Within the legal framework, special clauses should be formulated to protect volunteers' rights and interests, covering core rights and interests such as personal safety and labor security. Meanwhile, legal remedy channels and risk prevention mechanisms should be established. This institutionalized design can not only standardize voluntary service behaviors but also enhance social trust by clarifying the boundaries of rights and responsibilities, thereby providing a fundamental guarantee for the development of voluntary services. Additionally, a reasonable incentive mechanism should be designed—such as a voluntary service point exchange system and commendation and rewards for outstanding volunteers — to enhance the attractiveness and sense of honor of voluntary services and form a positive cycle.

5.2.2 Enhancing Organizational Capacity and Constructing a Professional Volunteer Service System

The professionalization level of voluntary service organizations directly affects the quality and effectiveness of voluntary services. Therefore, enhancing organizational capacity building and constructing a professional voluntary service system are key measures to improve the overall level of voluntary services. First, it is necessary to enhance the professional training and certification system. For different types of voluntary services, systematic professional skills training should be carried out—such as first-aid knowledge, psychological counseling, and environmental protection knowledge—to improve volunteers' service capabilities and professionalization level. Meanwhile, a professional qualification certification system for voluntary services should be established, and certifications should be issued to volunteers who meet specific standards to enhance their professional competitiveness and social recognition. This

measure can not only improve the service quality of volunteers but also attract more professionals to join the voluntary service ranks. Second, it is necessary to optimize the organizational structure and management system. Efforts should be made to promote the standardized and professional development of voluntary service organizations, and establish a scientific organizational structure and an efficient management system. It is essential to clarify the organizational mission, vision, and values, and formulate clear development strategies and annual work plans. Internal management and supervision mechanisms should be strengthened to ensure the transparency and credibility of voluntary service activities. Meanwhile, voluntary service organizations should be encouraged to conduct exchanges and cooperation, share resources, and jointly enhance their professionalization level. Third, it is necessary to cultivate the voluntary service culture and strengthen organizational leadership. Voluntary service culture serves as an important underpinning for the sustainable development of voluntary service organizations. Through various forms such as media publicity and community activities, efforts should be made to actively promote the spirit of voluntary service and cultivate the voluntary service culture. Meanwhile, internal cultural construction of voluntary service organizations should be strengthened; by regularly organizing team-building activities, designing distinctive cultural logos, and establishing volunteer growth records, the sense of identity and collective belonging of organization members can be enhanced.

5.2.3 Enhance Policy Support and Foster a Sound Voluntary Service Ecology

The establishment of a systematic policy framework can provide institutionalized support for voluntary service activities and effectively stimulate the vitality of social participation. This institutional arrangement can not only standardize voluntary service behaviors but also form a voluntary service ecological network featuring government guidance, social coordination, and college student participation through resource integration and the construction of incentive mechanisms. Such an arrangement lays a solid foundation for improving the quality of voluntary services and establishing long-term mechanisms. First, it is necessary to establish a diversified fund guarantee mechanism. A special financial budget system should be formulated, with priority given to colleges and universities in underdeveloped areas. Meanwhile, regional voluntary service development funds should be established to ensure the regular operation of grassroots voluntary service projects. In addition, incentive policies combining tax deductions and subsidies can be explored: operating cost subsidies should be provided to eligible voluntary service organizations, and enterprises should be allowed to include voluntary service expenditures in the scope of pre-tax deductions, thereby attracting more social capital to participate in voluntary service undertakings. Second, it is necessary to establish a closed-loop quality supervision system for voluntary services. It is recommended that a comprehensive evaluation framework covering dimensions such as service efficiency, participant satisfaction, and social benefits be developed, and an independent third-party organization be engaged to conduct periodic evaluations. A real-time feedback mechanism for service recipients should be established to collect dynamic evaluation

data via digital platforms, thereby forming a "evaluation-feedback-improvement" cyclic mechanism. In addition, a voluntary service project database should be constructed to carry out standardized output and brand promotion of high-quality projects, and develop replicable service models. Finally, it is necessary to establish and improve relevant laws, regulations, and supporting systems. It is recommended to advance the legislation on voluntary services, clarify the rights and responsibility boundaries of all stakeholders, and establish legal mechanisms for the protection of volunteers' rights and interests as well as risk prevention. Industry service standards and operational norms should be formulated, a qualification certification system for voluntary service organizations should be established, and hierarchical and classified management should be implemented. A unified information disclosure platform should be established to strengthen the transparent supervision of service processes, thereby enhancing public trust in and willingness to participate in voluntary services.

5.3 Research Limitations

This study has several limitations. First, the sample selection was limited to universities in specific regions and did not include institutions of higher education across different regional and cultural contexts, which may restrict the generalizability of the research findings. Future research could expand the sample scope to enhance the generalizability of the conclusions. Second, although the six antecedent variables selected in this study have both theoretical and practical foundations, they may not cover all influencing factors. In subsequent studies, additional variables could be explored to more comprehensively reveal the influencing mechanisms underlying college students' voluntary service participation behavior. Third, this study adopted a questionnaire survey to collect data, which may be susceptible to respondents' subjective biases, leading to discrepancies between the collected data and actual behaviors. Follow-up research could integrate in-depth interviews, observational methods, and other approaches, employing mixed research methods to obtain more accurate data and thereby conduct an in-depth exploration of college students' participation in voluntary services.

Funding

References

[1] Shi, B., & Zhao, H. B. (2011). Problems and countermeasures in college students' volunteer service activities. Journal of Hebei Jiaotong Vocational and Technical College, 8(1), 78–80.

[2] Yang, J. (2014). Research on countermeasures to solve the development bottleneck of college students' volunteer service activities. China Adult Education, (23), 81–83.

[3] Wang, H., & Deng, Q. H. (2012). College students' volunteer service activities: Participation status and construction of long-term mechanism—Reflections based on a national large-scale questionnaire survey. China Youth Study, (08), 46–50.

[4] Gordon, W. (1959). The revolving door. Time, 50(1), 100.

[5] Sheridan, M. (2001). Developing transnational social police: A north American community service program. Social Development Issues, 23(3), 50–59.

[6] Ning, X. W. (2017). Research and practice on the educational function of volunteer service in colleges and universities. China Adult Education, (01),90-92.

[7] Qiao, D. D. (2016). A study on the participation motivation of college student volunteers. Liaoning Normal University, Dalian.

[8] Kong, X. B. (2012). The development status and moral education value of volunteer service in colleges and universities—A case study of S University in Shanghai. Shanghai Normal University, Shanghai.

[9] Bian, F., & Liu, Z. W. (2021). A study on the influencing factors and correlation of college students' volunteer service behavior. Education Academic Monthly, (01), 91–97.

[10] Lee, M. A. (2019). Volunteering and happiness: Examining the differential effects of volunteering types according to household income. Journal of Happiness Studies, 20(3), 795-814.

[11] Kim, J. (2020). The effect of classmates' maternal college attainment on volunteering in young adulthood. Social Science Quarterly, 101(6), 2289-2311.

[12] Huang, L. P. (2020). A study on the volunteer service willingness of League members and young students in colleges and universities—An analysis based on four universities in Beijing. China Youth Social Sciences, 39(1), 63–69.

[13] Chen, M. Y., & Liu, Y. N. (2015). An analysis of relevant factors affecting college students' participation in volunteer activities. Statistics and Management, (4), 22–23.

[14] Ghose, T., & Kassam, M. (2014). Motivations to volunteer among college students in India. VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations, 25(1), 28-45.

[15] Song, X. K., Zhao, Y. X., Song, S. J., et al. (2020). A study on the influencing factors of health rumor sharing willingness based on MOA theory. Journal of the China Society for Scientific and Technical Information, 39(05), 511–520.

[16] Omoto, A. M., & Snyder, M. (1995). Sustained helping without obligation: motivation, longevity of service, and perceived attitude change among AIDS volunteers. Journal of personality and social psychology, 68(4), 671.

[17] Li, Y., & Han, Y. (2016). A study on the cultivation mechanism of college students' public welfare spirit under the guidance of socialist core values. Ideological and Theoretical Education Guide, (05), 105–108.

[18] Yuan, Y. K., & Wang, F. (2016). An analysis of factors influencing college students' participation in volunteer service—Based on a survey of five universities in Xianlin Area, Nanjing. Higher Education Exploration, (11), 98–105.

[19] Wang, W. Q., & Tao, G. J. (2022). Exploration on the development path of college students' volunteer service in the new era. Social Scientist, (12), 147–153.

[20] Conn, Z., Fernandez, S., O'Boyle, A., & Brewis, G. (2014). Students, Volunteering and Social Action in the UK: History and Policies.8-9.

[21] Peng, L. P. (2022). The impact of volunteer service participation on college students' subjective well-being: The chain mediating role of self-efficacy and self-identity. Chinese Journal of Clinical Psychology, 30(05), 1126–1129.

[22] Ragin, C. C. (2009). Redesigning social inquiry: Fuzzy sets and beyond. University of Chicago press.

[23] Huang, Z. X., Wang, H., & Huang, Y. J. (2024). A study on the improvement mechanism of university teachers' innovation ability under the background of self-reliance and self-improvement in science and technology. Jiangsu Higher Education, (12), 24–32.