

From volunteer intention to volunteer behavior: An empirical study on volunteer service participation among university students in China

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ABSTRACT

High participation yet low retention in university student volunteer service is associated with constraints on the effectiveness of practice-based education in higher education. Existing research has predominantly focused on the formation mechanisms of volunteer intention, whereas the intention–behavior transition and the underlying mechanisms of sustained participation remain insufficiently understood. Drawing on the Theory of Planned Behavior (TPB), this study integrates the Big Five personality traits to develop a “psychological cognition–volunteer intention–volunteer behavior” analytical framework. Based on a sample of 508 university students with volunteer service experience from 24 public undergraduate institutions in Guizhou Province, China, this study examines the mechanisms linked to university students’ volunteer behavior. The findings indicate that attitude, perceived behavioral control, and Big Five personality traits are positively associated with volunteer intention, with personality traits demonstrating the strongest explanatory power. Volunteer intention is positively associated with volunteer behavior, fully mediating the relationships between attitude, Big Five personality traits, and volunteer behavior, while exhibiting differentiated mediation pathways between perceived behavioral control and volunteer behavior. Subjective norm shows no significant association with volunteer intention yet is negatively associated with volunteer behavior, reflecting the “subjective norm paradox” in the indigenous campus context and suggesting that sustained university student volunteer participation is more closely linked to intrinsic value identification and perceived competence. This study broadens the explanatory boundaries of the Theory of Planned Behavior, providing theoretical support and practical reference for higher education institutions to address the predicament of short-term participation and optimize volunteer service education and mobilization support systems.

Keywords: University students, volunteer service, Theory of Planned Behavior, personality traits.

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INTRODUCTION

Volunteer service serves as a core vehicle for collaborative social governance, and university students represent a primary participant group in volunteer activities. Volunteer participation is widespread in China, yet the higher education sector is broadly characterized by a predicament of high participation, low retention, and high turnover: although many students hold willingness to participate, they often struggle to develop long-term stable service behavior, which is associated with constraints on

volunteer organization operations and the effectiveness of practice-based education (Lili and Yingjin, 2020; Mori, 2024).

Existing research has predominantly drawn on the Theory of Planned Behavior (TPB) to explain the formation mechanisms of volunteer behavior; however, this theory focuses on short-term immediate psychological cognitions, with insufficient attention to stable personality traits as enduring internal dispositions. Personality research

indicates that conscientiousness, agreeableness, and extraversion are positively associated with prosocial behavioral tendencies. Nevertheless, existing literature has largely examined TPB cognitive variables or personality traits separately, with few studies integrating situational cognitions and stable personality into a unified analytical framework for joint empirical examination (Forner et al., 2024; Gaber et al., 2022; Lorente et al., 2024). Moreover, although existing research has widely employed structural equation modeling, it has largely remained confined to linear estimation of independent net effects, offering limited attention to differentiated mediation pathways in the intention–behavior transition.

These limitations render existing findings insufficient for explaining the underlying mechanisms of high turnover in university student volunteer participation. They also point to the need to systematically clarify the hierarchical transmission logic between psychological cognition and behavior while accounting for personality dispositions. Accordingly, this study selects university students with volunteer service experience from 24 public undergraduate institutions in Guizhou Province as the sample, integrates TPB and the Big Five personality trait theory, develops an “individual traits–psychological cognition–volunteer intention–volunteer behavior” analytical framework, and employs structural equation modeling to examine direct effects and mediation mechanisms.

Centering on these objectives, this study focuses on two core questions.

First, what are the respective associations between the three cognitive components of TPB and the Big Five personality traits, and university students' volunteer intention and actual volunteer behavior?

Second, what is the mediating role of volunteer intention between various antecedent variables and volunteer behavior?

This study clarifies the transition pathways from volunteer intention to long-term service behavior from a linear net-effects perspective, broadens the explanatory boundaries of TPB in research on sustained volunteer participation, and offers theoretical support and actionable insights for higher education institutions to optimize volunteer service management models, improve support systems, and inform efforts to guide students' transition from short-term to sustained participation.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

The Theory of Planned Behavior (TPB) posits that attitude toward a behavior, subjective norms, and perceived

behavioral control jointly shape an individual's behavioral intention, which in turn is linked to actual behavior. This framework has been widely applied to prosocial behavior, civic participation, and volunteer service research (Ajzen, 1991; Hagger and Hamilton, 2024; Sari, 2022). Among these constructs, attitude is a well-established antecedent of volunteering intention (Hu et al., 2023; Tanveer et al., 2024). Subjective norms capture external pressures emanating from family, peers, schools, and public opinion. The influence of such social expectations is typically more salient in collectivist cultural contexts; for example, Trongmateerut and Sweeney (2013) found that Thai participants were more responsive to subjective norms than their American counterparts, a pattern likely to parallel volunteer dynamics among Chinese undergraduates.

Perceived behavioral control (PBC) represents perceived ease or difficulty of performing a behavior and is also a robust correlate of volunteer intention. Purnama et al. (2024) further showed that PBC is especially predictive of intentions for volunteer services requiring high time investment and sustained engagement.

Beyond cognitive predictors, trait theory highlights that the Big Five personality dimensions constitute stable dispositions shaping individuals' values, attitudes, and behavioral repertoires (Nasello et al., 2023). Within volunteer research, conscientiousness, agreeableness, and extraversion are consistently associated with prosocial engagement (Cornelis et al., 2013). Highly conscientious individuals tend to sustain long-term commitments; agreeable individuals show heightened sensitivity to others' needs; and extraverted individuals are more inclined toward socially embedded activities. Relative to transient cognitive appraisals, personality traits offer greater temporal stability and may therefore play a distinctive role in sustaining volunteer behavior. Prior evidence indicates that extraversion and conscientiousness are positively associated with university students' continued volunteering (Chen et al., 2024). Taken together, personality traits may be associated with both volunteering intention and subsequent volunteering behavior, either directly or indirectly via intention. Based on this integrated framework, the following hypotheses are proposed:

- H1. Attitude toward volunteer service is positively correlated with volunteering intention.
- H2. Subjective norms regarding volunteer service are positively correlated with volunteering intention.
- H3. Perceived behavioral control over volunteer service is positively correlated with volunteering intention.
- H4. Big Five personality traits are positively correlated with volunteering intention.
- H5. Attitude toward volunteer service is positively correlated with volunteering behavior.
- H6. Subjective norms regarding volunteer service are positively correlated with volunteering behavior.

H7. Perceived behavioral control over volunteer service is positively correlated with volunteering behavior.

H8. Big Five personality traits are positively correlated with volunteering behavior.

Within the Theory of Planned Behavior (TPB), behavioral intention is regarded as the core mediator linking antecedent variables and actual behavior; the stronger an individual's motivation to perform a behavior, the greater the effort they will devote to it (Ajzen, 1991). Recent empirical research on Chinese university students further confirms that attitude toward volunteer service, subjective norms, and perceived behavioral control all significantly and positively predict volunteer intention, which in turn effectively predicts actual volunteer behavior (Hu et al., 2023). From the perspective of Self-Determination Theory (SDT), intrinsic motivation (e.g., altruism, social identification) and external support (e.g., team atmosphere, interest stimulation) can effectively enhance individuals' volunteer intention and thereby facilitate behavioral engagement. Under uncertain circumstances (such as during the pandemic), volunteer enthusiasm also exerts a significant positive effect on sustained participation intention, whereas personal constraints produce inhibitory effects (Purwanto and Rostiani, 2023). Meanwhile, numerous studies have verified the direct driving effect of behavioral intention on actual behavior, and behavioral intention is widely recognized as a critical predictor of various activities including health behaviors

and entrepreneurial activities (Conner and Norman, 2024; Tsou et al., 2023). Accordingly, volunteer intention not only serves as a mediating pathway between antecedent factors (attitude, subjective norms, perceived behavioral control, and the Big Five personality traits) and volunteer behavior, but also exerts a direct positive influence on volunteer behavior itself. Hence, the following hypotheses are proposed, and the research model is presented in Figure 1:

H9. Volunteering intention is positively correlated with volunteering behavior.

Mediating role of volunteering intention

H10a. Volunteering intention mediates the positive relationship between attitude toward volunteer service and volunteering behavior.

H10b. Volunteering intention mediates the positive relationship between subjective norms and volunteering behavior.

H10c. Volunteering intention mediates the positive relationship between perceived behavioral control and volunteering behavior.

H10d. Volunteering intention mediates the positive relationship between Big Five personality traits and volunteering behavior.

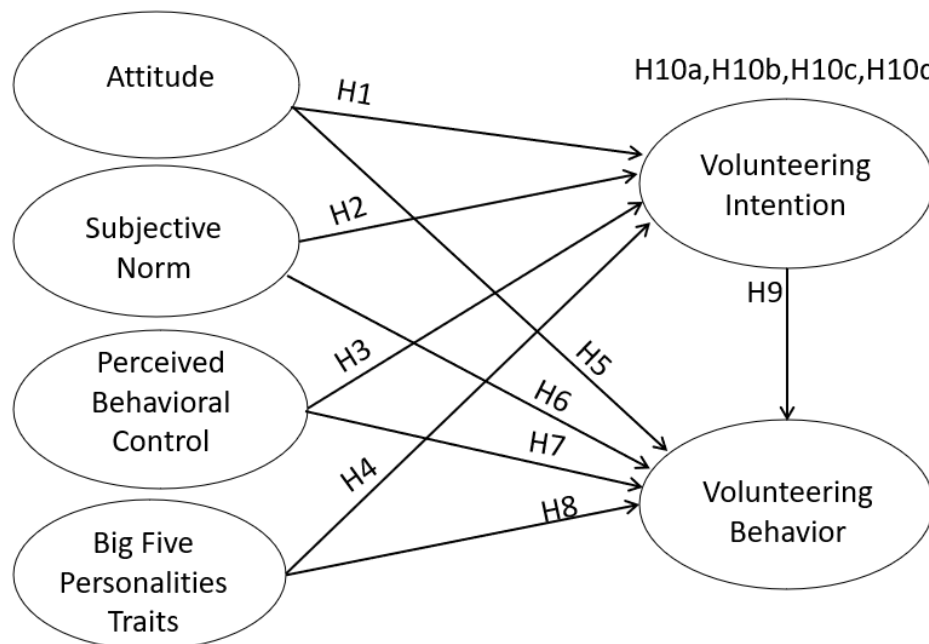


Figure 1. Conceptual theoretical research model linking TPB constructs, Big Five personality traits, volunteering intention and volunteering behavior.

RESEARCH DESIGN

Measurement of variables

All items were adapted from well-established international scales and modified to fit the context of university student volunteering in China. A 7-point Likert scale was used for all constructs, ranging from 1 (strongly disagree) to 7 (strongly agree).

Attitude toward volunteer service

This construct captures students' positive evaluations of the value and significance of volunteering. Items were adapted from Ajzen's TPB attitude scales and subsequent higher-education volunteer studies (Ajzen, 1991; Hu et al., 2023). The subdimensions include cognitive evaluation, egoistic attitude, and altruistic attitude. A sample item is: "Participating in volunteer service is meaningful."

Subjective norm

This construct measures perceived expectations and pressure from significant others or the broader social environment regarding participation in volunteer service. Items cover personal norms and social norms, revised with reference to Theory of Planned Behavior studies (Chen et al., 2023; Hu et al., 2023). A sample item is: "The attitudes and behaviors of my family influence my decision to take part in volunteer activities."

Perceived behavioral control

Perceived behavioral control (PBC) measures university students' subjective perceptions of their capabilities, available resources, and time availability for volunteering. Items cover the two dimensions of self-efficacy and perceived convenience (Hu et al., 2023), with a sample item: "My physical condition affects my participation in volunteer service."

Big Five personality traits

This construct captures stable individual dispositions, with a particular focus on conscientiousness, agreeableness, and extraversion—dimensions robustly linked to prosocial behavior. Items were adapted from established Big Five inventories (Chen et al., 2024) and simplified to fit the university student volunteering context, covering the full five dimensions: extraversion, openness to experience, agreeableness, conscientiousness, and neuroticism.

Volunteering intention

This construct captures the subjective probability of university students engaging in volunteer service,

measuring both their general willingness and intention for sustained future participation (Hu et al., 2023). Sample items include: "I am eager to participate in volunteer service activities" and "I have plans to continue taking part in volunteer service in the future."

Volunteering behavior

This reflects past actual volunteering, tapping participation frequency, duration, and self-reported effort (Yixing, 2022). A sample item is: "I invest considerable time and energy in volunteer service."

Sample and data collection

This study targeted undergraduate students with prior volunteer service experience across all 24 public undergraduate institutions in Guizhou Province. Public universities in the province are relatively homogeneous in terms of volunteer service institutional design, organizational management, and resource provision, and recruit students from diverse regions nationwide, supporting broader sample representativeness.

Sampling design

The study population comprised 349,320 full-time undergraduate students across 24 public undergraduate institutions in Guizhou Province. Baseline data were obtained from the Guizhou Provincial Department of Education and official publicly available quality reports. A target sample size of 600 was established. Probability proportional to size (PPS) sampling was employed to allocate questionnaire quotas according to each institution's share of total enrollment, covering all 24 institutions. To mitigate the risk of insufficient sample sizes at small-scale institutions, a minimum quota of 2 was set. Guizhou University, the largest institution, was allocated 59 questionnaires, while smaller institutions with calculated allocations below this threshold received the minimum quota. This sampling design adhered to probability sampling principles, accounting for institutional size and regional distribution, and was intended to limit structural sampling bias while supporting sample representativeness and empirical robustness.

Pilot study and questionnaire refinement

Pilot sample size was guided by two established social science conventions: Connolly recommends a pilot sample of approximately 10% of the planned main sample, and Van Teijlingen and Hundley advise a minimum of 30 cases to meet central limit theorem assumptions for exploratory

factor analysis (Connelly, 2008; Van Teijlingen and Hundley, 2001). Using convenience sampling, an online pilot survey was administered via Wenjuanxing to undergraduates at two public universities in Guiyang (Guiyang University and Guizhou Minzu University), yielding 251 usable responses.

Reliability and validity were assessed using SPSS 26.0. Reliability analysis indicated an overall Cronbach's α of 0.970. Across dimensions, α coefficients ranged from 0.856 to 0.969, all exceeding the 0.8 threshold for acceptable internal consistency. Validity assessment indicated a Kaiser-Meyer-Olkin (KMO) value of 0.961 and a significant Bartlett's test of sphericity ($\chi^2 = 11,196.699$, $df = 666$, $p < .001$), suggesting that the scale was suitable for factor analysis and that structural validity was acceptable.

Drawing on Church and Waclawski's item-refinement framework, each item was evaluated for clarity, relevance, and specificity, supplemented by qualitative feedback from pilot respondents (Church and Waclawski, 2017). Ambiguous, redundant, or poorly worded items were removed. After iterative revisions, the final instrument comprised 35 measurement items (Appendix A).

Formal survey administration and data quality

In the main survey, 800 questionnaires were distributed online according to PPS quotas. Invalid cases were excluded based on duplicate IP addresses, completion times under three minutes, straight-lining across ten or more consecutive items, and missing demographic data. This yielded 508 valid questionnaires, corresponding to an effective response rate of 63.5%.

The moderate response rate largely reflects the combined constraints of geographically dispersed quotas and the eligibility restriction to students with prior volunteer experience. Importantly, the retained sample closely mirrored the provincial distribution of institutional size and geography, and subsequent structural equation modeling produced acceptable fit indices. This suggests that non-response bias is unlikely to systematically distort the

observed relationships among core variables.

Data analysis methods

Data were analyzed using SPSS 27.0 and AMOS 26.0. First, SPSS was used to conduct descriptive statistics, reliability and validity tests, and common method bias assessment to ensure measurement quality. Second, structural equation modeling (SEM) was performed in AMOS to test the proposed hypotheses. The analysis proceeded in three steps: measurement model fit assessment, path coefficient estimation, and mediation effect testing. Mediation effects were examined using the bias-corrected bootstrap method with 5,000 resamples and 95% confidence intervals.

EMPIRICAL RESULTS

Descriptive statistics of respondents

As shown in Table 1, the demographic characteristics of the 508 participants are as follows: 161 males (31.7%) and 347 females (68.3%), a distribution broadly consistent with the current gender composition of universities in Guizhou Province. Regarding academic year, the sample comprised 265 freshmen (52.2%), 99 sophomores (19.5%), 85 juniors (16.7%), and 59 seniors or above (11.6%). In terms of field of study, 240 participants were enrolled in Science and Engineering programs (47.2%), and 268 in Humanities and Social Sciences (52.8%). Regarding political affiliation, 114 were CPC members (22.4%), 200 were CYL members (39.4%), and 194 were non-affiliated students (38.2%). Finally, concerning volunteer service experience, 110 participants had engaged in livelihood care activities (21.7%), 167 in cultural and educational outreach (32.9%), 115 in ecological development activities (22.6%), and 116 in event support services (22.8%).

Table 1. Demographic characteristics of the valid sample (N = 508).

Characteristics	Category	Count	Percentage (%)
Gender	Male	161	31.7
	Female	347	68.3
Academic Year	Freshman	265	52.2
	Sophomore	99	19.5
	Junior	85	16.7
	Senior & above	59	11.6
Field of Study	Science & Engineering	240	47.2
	Humanities & Social Sciences	268	52.8

Table 1. Continues.

Political Affiliation	CPC members	114	22.4
	CYL Member	200	39.4
	Non-affiliated students	194	38.2
Volunteer Service Type	Livelihood care	110	21.7
	Cultural & educational outreach	167	32.9
	Ecological development	115	22.6
	Event support services	116	22.8

Note. CPC = Communist Party of China; CYL = Communist Youth League.

Data quality analysis

Reliability analysis indicated that Cronbach's α values were 0.953 for attitude, 0.914 for subjective norms, 0.863 for perceived behavioral control, 0.882 for Big Five personality traits, 0.928 for volunteering intention, and 0.852 for volunteering behavior. All values exceeded the 0.8 threshold, indicating satisfactory internal consistency.

Collinearity among predictor variables was assessed in SPSS. Variance inflation factor (VIF) values were 2.259 for attitude, 1.202 for perceived behavioral control, 3.254 for Big Five personality traits, and 3.856 for volunteering intention, all below the conventional cutoff of 5.0, suggesting no severe multicollinearity.

Exploratory factor analysis returned a Kaiser–Meyer–Olkin (KMO) value of 0.961, and Bartlett's test of sphericity was significant ($\chi^2 = 17,263.227$, $df = 630$, $p < .001$),

meeting prerequisites for factor analysis. All scales were adapted from established instruments with demonstrated psychometric properties.

To address common method bias (CMB), Harman's single-factor test was conducted following (Podsakoff et al., 2003). The first unrotated factor explained 45.52% of the variance, below the 50% critical threshold, indicating that CMB is unlikely to pose a serious threat to the data.

Convergent validity and composite reliability testing

Convergent validity and composite reliability tests allow researchers to evaluate the quality and reliability of measurement instruments and ensure that these instruments can effectively measure the variables or constructs under investigation.

Table 2. Factor loadings, AVE, and CR of the latent constructs.

Scales and items		Items	Factor loadings	AVE	CR
Attitude (AT)	AT1	Q1	0.831	0.805	0.954
	AT 2	Q2	0.911		
	AT 3	Q3	0.942		
	AT 4	Q4	0.895		
	AT5	Q5	0.902		
Subjective Norm (SN)	SN1	Q6	0.828	0.690	0.916
	SN 2	Q7	0.872		
	SN 3	Q8	0.927		
	SN 4	Q9	0.889		
	SN5	Q10	0.596		
Perceived Behavioral Control (PBC)	PB1	Q12	0.682	0.567	0.867
	PB2	Q13	0.780		
	PB 3	Q14	0.736		
	PB 4	Q15	0.726		
	PB 5	Q16	0.832		

Table 2. Continues.

Big Five Personality Traits (BF)	BF1	Q17	0.828	0.685	0.914
	BF 2	Q18	0.909		
	BF 3	Q19	0.886		
	BF4	Q20	0.880		
	BF5	Q21	0.593		
Volunteering Intention (VI)	VI1	Q22	0.756	0.689	0.930
	VI 2	Q23	0.824		
	VI 3	Q24	0.839		
	VI 4	Q25	0.863		
	VI 5	Q26	0.885		
	VI6	Q27	0.807		
Volunteering Behavior (VB)	VB1	Q28	0.763	0.665	0.856
	VB2	Q29	0.859		
	VB 3	Q30	0.821		

Note. AVE = Average Variance Extracted; CR = Composite Reliability. Standardized factor loadings are displayed for each item.

As shown in Table 2, the average variance extracted (AVE) values for all latent constructs ranged from 0.567 to 0.805, exceeding the recommended threshold of 0.5. The composite reliability (CR) values ranged from 0.856 to 0.954, all surpassing the recommended threshold of 0.7. These results suggest adequate convergent validity and composite reliability for the scales.

Correlation analysis and discriminant validity analysis

This study employed Pearson correlation analysis and assessed discriminant validity using the Fornell–Larcker criterion, with the square roots of AVE presented as bolded diagonal values in Table 3. Descriptive statistics indicated that variable means ranged from 4.355 to 6.187, all

exceeding the 7-point scale midpoint of 4, with standard deviations ranging from 0.976 to 1.691. Correlation analysis revealed that attitude was positively correlated with Big Five personality traits ($r = 0.706$, $p < .001$), volunteering intention ($r = 0.689$, $p < .001$), and volunteering behavior ($r = 0.616$, $p < .001$). Subjective norms were positively correlated with perceived behavioral control ($r = 0.600$, $p < .01$). Big Five personality traits were positively correlated with volunteering intention ($r = 0.795$, $p < .001$) and volunteering behavior ($r = 0.733$, $p < .001$). Volunteering intention was positively correlated with volunteering behavior ($r = 0.828$, $p < .001$). Regarding discriminant validity, the square roots of AVE ranged from 0.753 to 0.897 and exceeded the off-diagonal correlations for each construct, satisfying the Fornell–Larcker criterion and indicating adequate discriminant validity.

Table 3. Pearson correlation and discriminant validity analysis.

	M	SD	AT	SN	PB	BF	VI	VB
AT	6.187	.976	.897					
SN	4.355	1.691	.091*	.831				
PB	4.831	1.312	.190***	.600***	.753			
BF	5.803	.995	.706***	.166***	.349***	.828		
VI	5.599	1.053	.689***	.204***	.347***	.795***	.830	
VB	5.514	1.053	.616***	.184***	.369***	.733***	.828***	.815

Note. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Bold values on the diagonal represent the square root of AVE for each construct. AT=Attitude, SN = Subjective Norms, PB=Perceived Behavioral Control, BF=Big Five Personality Traits, VI=Volunteering Intention, VB=Volunteering Behavior.

Path analysis of structural equation model

Confirmatory factor analysis suggested that the

measurement model achieved acceptable fit. This study subsequently employed AMOS to construct a structural equation model to examine the model fit, with evaluation

criteria referenced to (Fornell and Larcker, 1981). The results are presented in Table 4.

It is worth noting that the χ^2/df value of the structural model reached 4.041, which slightly exceeds the strict good-fit threshold of 3 but falls within the widely recognized acceptable range of 3 to 5. Given that the chi-square statistic is extremely sensitive to large sample sizes ($N > 500$) and tends to yield significant p-values ($p < .001$), it should not be used in isolation to reject the model fit (Bollen and Stine, 1992). Therefore, this study

comprehensively evaluated the model fitness by combining multiple incremental and absolute fit indices. As shown in Table 4, RMSEA was 0.077 ($< .08$), SRMR was 0.079 ($< .08$), and the incremental fit indices CFI (0.917), TLI (0.907), and IFI (0.917) all exceeded the 0.9 benchmark, while GFI, AGFI, and NFI all exceeded 0.8. Collectively, these indices indicate that the hypothesized structural model demonstrates acceptable fit and matches the collected empirical data well. The standardized path model is illustrated in Figure 2.

Table 4. Absolute and incremental fit indices of the structural model.

Fit index	χ^2/df	RMSEA	SRMR	GFI	AGFI	NFI	IFI	CFI	TLI
Accepted fit (Fornell, 1981)	≤ 5	< 0.08	< 0.08	> 0.8	> 0.8	> 0.8	> 0.8	> 0.8	> 0.8
Good fit	≤ 3	< 0.05	< 0.05	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9	> 0.9
Estimated value	4.041	0.077	0.079	0.826	0.809	0.893	0.917	0.917	0.907

Note. χ^2 = Chi-square value; df = Degrees of Freedom; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; GFI = Goodness-of-fit Index; AGFI = Adjusted Goodness-of-fit Index; NFI = Normed Fit Index; IFI = Incremental Fit Index; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index. Thresholds for acceptable fit: $\chi^2/df \leq 5$, RMSEA $< .08$, SRMR $< .08$, GFI/AGFI/NFI $> .8$, CFI/IFI/TLI $> .9$.

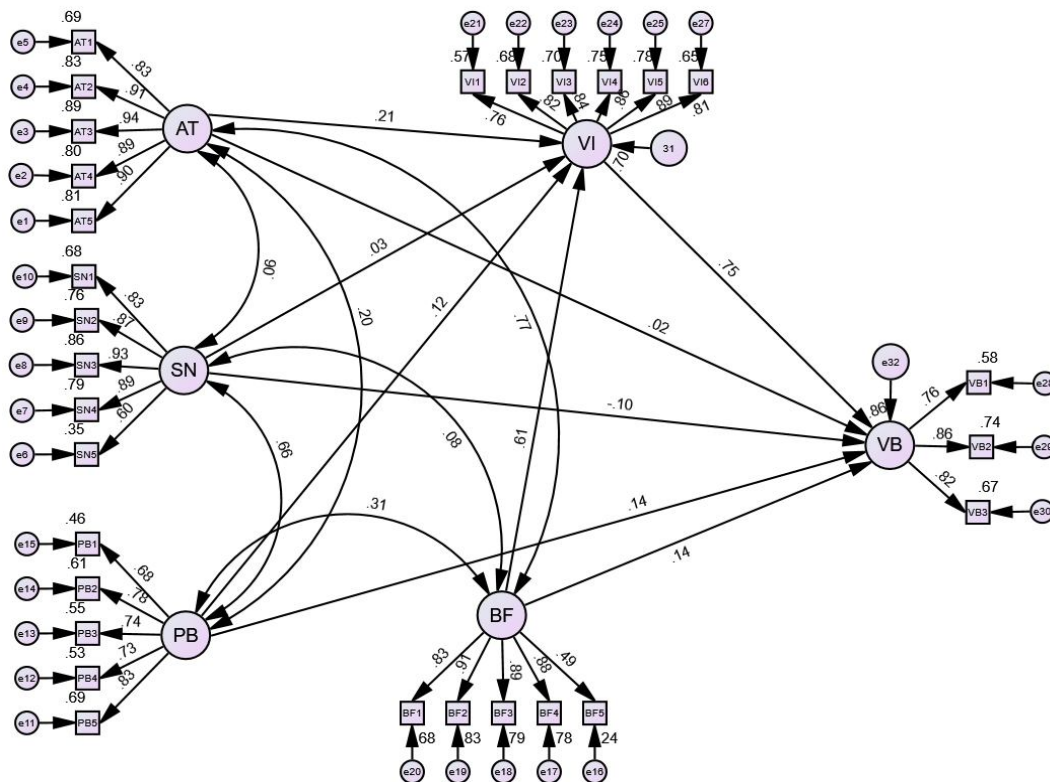


Figure 2. Standardized path coefficients of the structural equation model. $P < .05$, $P < .01$, $*P < .001$. Values on the paths are standardized β coefficients.

This study conducted path analysis using structural equation modeling (SEM) in AMOS. As illustrated in Figure 2 and detailed in Table 5, attitude was positively associated with volunteering intention ($\beta = 0.214$, $p < .001$), perceived behavioral control was positively associated with volunteering intention ($\beta = 0.122$, $p < .01$), and Big Five personality traits were positively associated with volunteering intention ($\beta = 0.611$, $p < .001$). Subjective norm showed no significant association with volunteering intention ($\beta = 0.033$, $p > .05$). Thus, H1, H3, and H4 received support, whereas H2 did not.

Furthermore, subjective norm was negatively associated

with volunteering behavior ($\beta = -0.100$, $P < .05$), perceived behavioral control was positively associated with volunteering behavior ($\beta = 0.143$, $P < .01$), and Big Five personality traits were positively associated with volunteering behavior ($\beta = 0.142$, $P < .01$). However, attitude showed no significant association with volunteering behavior ($\beta = 0.021$, $P > .05$). Thus, H6, H7, and H8 received support, whereas H5 did not.

Additionally, volunteering intention was positively associated with volunteering behavior ($\beta = 0.749$, $P < .001$). Therefore, H9 received support.

Table 5. Standardized path coefficients and hypothesis testing results for the structural model.

Hypothesis	Path	Standardized β	SE	Z (or t)	p	Support status
H1	AT $\rightarrow$ VI	0.214	0.050	4.293	0.000***	Supported
H2	SN $\rightarrow$ VI	0.033	0.036	0.778	0.436	Non-supported
H3	PB $\rightarrow$ VI	0.122	0.033	2.624	0.009**	Supported
H4	BF $\rightarrow$ VI	0.611	0.096	8.119	0.000***	Supported
H5	AT $\rightarrow$ VB	0.021	0.049	0.455	0.649	Non-supported
H6	SN $\rightarrow$ VB	-0.100	0.036	-2.519	0.012*	Supported
H7	PB $\rightarrow$ VB	0.143	0.033	3.235	0.001**	Supported
H8	BF $\rightarrow$ VB	0.142	0.084	2.27	0.023*	Supported
H9	VI $\rightarrow$ VB	0.749	0.072	11.006	0.000***	Supported

Note. SE = Standard Error; Z = Critical Ratio (Z-value). $P < .05$, $P < .01$, $*P < .001$. Support Status indicates whether the hypothesis was statistically supported based on $p < .05$.

Mediating effect test of volunteering intention

The bias-corrected Bootstrap method implemented in AMOS was used to test the significance of mediating effects with 5,000 bootstrap resamples. Four paths were numbered separately, where a (a_1 – a_4) $\times$ b and c' (c_1' – c_4')

represent the indirect effect paths and direct effect paths, respectively (Wen and Liu, 2020). This study calculated the mediating effect of volunteer intention in the relationships between attitude, subjective norms, perceived behavioral control, the Big Five personality traits and volunteer behavior. The results are displayed in Table 6.

Table 6. Bias-corrected bootstrap mediation effect decomposition (5,000 Resamples).

Model path	Parameter	Estimate	BootLLCI (95%)	BootULCI (95%)	p	Proportion of indirect effect
AT $\rightarrow$ VI $\rightarrow$ VB	Indirect effect	0.170	0.083	0.289	0.000***	88.08%
	Direct effect	0.022	-0.118	0.155	0.718	
	Total effect	0.193	0.048	0.346	0.012*	
SN $\rightarrow$ VI $\rightarrow$ VB	Indirect effect	0.022	-0.040	0.084	0.459	/
	Direct effect	-0.090	-0.169	-0.018	0.015*	
	Total effect	-0.068	-0.157	0.022	0.143	
PB $\rightarrow$ VI $\rightarrow$ VB	Indirect effect	0.068	0.012	0.134	0.016*	39.31%
	Direct effect	0.105	0.039	0.178	0.002***	
	Total effect	0.173	0.089	0.270	0.000***	
BF $\rightarrow$ VI $\rightarrow$ VB	Indirect effect	0.615	0.429	0.857	0.000***	76.21%
	Direct effect	0.191	-0.055	0.424	0.135	
	Total effect	0.807	0.608	1.031	0.001**	

Note: $*P < 0.05$, $**P < 0.01$, $***P < 0.001$, AT = Attitude, SN = Subjective Norm, PB = Perceived Behavioral Control, BF = Big Five Personality Traits, VI = Volunteering Intention, VB = Volunteering Behavior

In the relationship between attitude and volunteer behavior, the indirect effect was significant ($\beta = 0.170$, 95% CI [0.083, 0.289], $P < .001$), whereas the direct effect was not significant ($\beta = 0.022$, 95% CI [-0.118, 0.155], $P = .718$). The total effect was significant ($\beta = 0.193$, 95% CI [0.048, 0.346], $P = .012$). With the indirect effect accounting for 88.08% of the total effect, these results suggest a full mediation by volunteer intention. Thus, H10a is supported.

In the path from subjective norm to volunteer behavior, the indirect effect was not significant ($\beta = 0.022$, 95% CI [-0.040, 0.084], $P = .459$), while the direct effect was significant ($\beta = -0.090$, 95% CI [-0.169, -0.018], $P = .015$). The total effect was not significant ($\beta = -0.068$, 95% CI [-0.157, 0.022], $P = .143$). These results indicate that volunteer intention does not mediate the relationship between subjective norm and volunteer behavior. Thus, H10b is not supported.

Regarding perceived behavioral control, the indirect effect was significant ($\beta = 0.068$, 95% CI [0.012, 0.134], $P = .016$), and the direct effect remained significant ($\beta = 0.105$, 95% CI [0.039, 0.178], $P = .002$). The total effect was significant ($\beta = 0.173$, 95% CI [0.089, 0.270], $P < .001$). As the indirect effect accounted for 39.31% of the total effect, this suggests a partial mediation by volunteer intention. Thus, H10c is supported.

Finally, for the Big Five personality traits, the indirect effect was significant ($\beta = 0.615$, 95% CI [0.429, 0.857], $P < .001$), but the direct effect was not significant ($\beta = 0.191$, 95% CI [-0.055, 0.424], $P = .135$). The total effect was significant ($\beta = 0.807$, 95% CI [0.608, 1.031], $P = .001$). With the indirect effect accounting for 76.21% of the total effect, full mediation by volunteer intention is indicated. Thus, H10d is supported.

In summary, hypotheses H10a, H10c, and H10d regarding the mediating role of volunteer intention were supported, whereas H10b was not.

DISCUSSION

The endogenous logic of volunteer intention: The foundational role of personality traits

The empirical results indicate that Big Five personality traits exhibited the strongest positive association with university students' volunteer intention ($\beta = 0.611$), and that this association was linked to actual volunteer behavior entirely indirectly through volunteer intention. This finding suggests that, compared with short-term cognitive variables susceptible to situational fluctuations (such as attitude and perceived behavioral control), stable personality traits including conscientiousness, agreeableness, and extraversion serve as the underlying psychological foundation for sustained volunteer participation. This result is consistent with the proposition that personality traits are significantly associated with

prosocial motivation (Chen et al., 2024), while also challenging the traditional TPB analytical paradigm that overemphasizes situational cognitive variables. As individual dispositions formed through long-term socialization, personality traits are associated with stable intrinsic motivation for sustained altruistic behavior, offering insight into why significant heterogeneity in volunteer intention persists even under identical volunteer service promotion contexts.

Furthermore, this study identified an "institutional norm paradox" in the volunteer service context of western Chinese higher education institutions: subjective norm showed no significant positive association with volunteer intention, yet exhibited a significant negative association with sustained volunteer behavior. This contrasts with the proposition advanced by Trongmateerut and Sweeney (2013) that subjective norms are positively associated with volunteer motivation in collectivist cultures. Drawing on Psychological Reactance Theory, this study suggests that when volunteer service is rigidly tied to comprehensive assessment scores or graduation requirements, external institutional constraints reduce individual autonomous decision-making space, giving rise to psychological defense mechanisms to protect behavioral autonomy, which is subsequently associated with weakened spontaneous participation tendencies. This result suggests that sustained university student volunteer participation is closely linked to intrinsic altruistic identification. Reliance on administrative, task-oriented mobilization strategies may be associated with surface-level high registration rates, yet is unlikely to translate into long-term volunteer retention.

The mediating role of intention and the complexity of behavioral transition

This study identified a key mediating role for volunteer intention in the relationships among attitude, Big Five personality traits, and volunteer behavior, a pattern consistent with the core logic of TPB proposed by Ajzen (1991). However, diverging from the prevalent TPB assumption that intention fully mediates the effects of antecedent variables, this study found that perceived behavioral control (PBC) was associated with volunteer behavior through both direct and indirect pathways. This result is consistent with the view advanced by Purnama et al. (2024), suggesting that in volunteer contexts requiring high investment and sustained effort, PBC functions not merely as a motivational antecedent but also as a resource condition linked to reduced participation barriers and actual behavior. This finding broadens the explanatory boundaries of TPB in the domain of sustained prosocial behavior, offering insight into why some students maintain stable volunteer behavior despite moderate intention when sufficient resource support is available.

Notably, the direct effect of attitude on volunteer

behavior was not supported, and its association with volunteer behavior was entirely mediated by volunteer intention. This contrasts with the finding reported by Miller and Rice in their study on pro-environmental behavior, where attitude was directly associated with behavior (Miller and Rice, 2024). This contextual difference suggests that volunteer behavior is often associated with structural constraints such as organizational resource availability and time conflicts; even when individuals hold favorable attitudes, attitude is unlikely to be directly associated with actual behavior in the absence of a formed volunteer intention. Furthermore, the negative direct association between subjective norm and volunteer behavior offers further insight into the mechanism underlying the predicament of high participation yet low retention in higher education. The absence of a mediating role of intention for subjective norm (H10b was not supported) suggests that institutionally induced normative pressure does not undergo deliberative processing of intrinsic motivation and is instead associated with either automatic compliance or psychological reactance, which is subsequently linked to limited value internalization among passive participants tied to external assessment, and is unlikely to be associated with sustained volunteer behavior.

Theoretical contributions and extension to regional practice

Theoretical contributions

This study integrates the Theory of Planned Behavior (TPB) and the Big Five personality framework, addressing a limitation in prior research on volunteer service that has given insufficient attention to stable personality antecedents. Prior empirical studies have predominantly examined the formation of volunteer intention for one-time, short-term activities, offering limited insight into long-term attrition. By distinguishing between situational cognitive variables (attitude, perceived behavioral control, and subjective norm) and stable personality traits, this study examined differentiated mediation pathways, with full mediation observed for attitude and Big Five personality traits and partial mediation for perceived behavioral control. These findings broaden the explanatory mechanisms of antecedents to sustained volunteer behavior and offer a refined reference for mediation examination in subsequent prosocial behavior research drawing on TPB.

Regional variations and indigenous applicability

From the perspective of indigenous applicability, the sample is drawn from public undergraduate institutions in Guizhou Province, western China, which demarcates the

boundary conditions of these findings. In western institutions, relative constraints in funding for volunteer service, offline service channels, and professional training provisions render the direct association between perceived behavioral control and volunteer behavior more pronounced. By contrast, eastern institutions, characterized by abundant social resources, are expected to exhibit more pronounced associations between personality traits, intrinsic attitudes, and volunteer behavior. Furthermore, students in western institutions predominantly originate from county-level and rural areas, where volunteer service is often perceived as an obligatory task, which is associated with a more pronounced negative association between institutional subjective norm and volunteer behavior. These characteristics offer empirical grounding for context-specific volunteer education strategies tailored to different types of higher education institutions.

It is worth noting that this institutional norm paradox is not unique to western China. Ishola (2025), in an examination of youth volunteer mobilization in Nigerian higher education institutions, noted that collectivist-oriented institutional arrangements are associated with constraints on sustained volunteer participation, a pattern consistent with the negative association between subjective norm and volunteer behavior in this study. Although West Africa and Southwest China are situated in different developmental stages and cultural contexts, both regions exhibit a common pattern wherein rigid external normative binding is linked to reduced intrinsic motivation. This offers support for the cross-cultural explanatory relevance of the mechanisms examined in this study, while providing a comparative reference from western Chinese higher education institutions for understanding participation constraints in campus volunteer service in developing regions.

Practical implications

Drawing on the empirical findings regarding the mechanisms among the variables, higher education institutions should move beyond single-dimensional administrative mobilization approaches and develop multi-dimensional long-term incentive systems to address the predicament of frequent short-term participation yet insufficient long-term retention.

First, volunteer projects should be matched in a tiered manner according to personality traits. For students high in conscientiousness, agreeableness, and extraversion, priority should be given to long-cycle projects such as rural teaching support and regularized community assistance, so as to leverage the motivational potential of prosocial personality traits; for students with less pronounced prosocial tendencies, low-threshold, high-experience lightweight activities should be designed to gradually cultivate positive attitudes, thereby limiting the risk of

psychological resistance associated with high-intensity tasks. This approach is consistent with the view advanced by Nasello, suggesting that supportive task environments are associated with the activation of prosocial potential within personality traits, enabling the transition from personality strengths to sustained action (Nasello et al., 2023).

Second, rigid ties to assessment should be loosened and intrinsic altruistic identification cultivated. The mandatory linkage between volunteer service hours and merit evaluation or comprehensive assessment scores should be moderately reduced, and institutional designs that treat volunteer service as task-based metrics should be limited, thereby reducing psychological reactance. Higher education institutions may reinforce altruistic value identification through volunteer sharing sessions, role-model presentations, and service outcome feedback, guiding students to transition from indicator-driven participation to participation based on value identification, so that sustained participation is more closely anchored in intrinsic motivation.

Third, supporting conditions should be optimized and perceived behavioral control strengthened. Higher education institutions should expand diversified online and offline channels, flexibly adjust activity schedules, and improve pre-service training, safety provisions, and transportation subsidies, thereby reducing objective barriers to participation. Although organizational-level support may not directly moderate the antecedent pathway of subjective norm, it is associated with greater efficiency in the transition from attitude and personality traits to volunteer intention (Anwar et al., 2024), subsequently reducing bottlenecks in the transition from volunteer intention to sustained volunteer behavior, and offering support for efforts to mitigate high volunteer turnover.

Limitations and future directions

This study is subject to clear sample and methodological boundaries. First, the survey is confined to public undergraduate institutions in Guizhou Province, excluding private institutions, vocational colleges, and student populations in central and eastern China; caution is warranted when generalizing these findings beyond the current sample. Second, drawing on the Theory of Planned Behavior (TPB), variables are assumed to follow a sequential ordering from intention to behavior (Ajzen, 1991); however, the cross-sectional design precludes rigorous examination of this temporal sequence and cannot rule out the possibility that behavior may reciprocally shape attitude and self-efficacy. Third, although the effective response rate of 63.5% falls within the acceptable range for social science research, a potential risk of non-response bias remains. This study addressed these concerns through multiple rounds of data cleaning and sample weighting aligned with provincial

enrollment structure; scale reliability and validity, together with model fit indices, met accepted standards, suggesting robustness in the core path relationships.

Future research may be extended in three directions. First, coverage of regions and institutional types may be expanded to examine cross-sample robustness. Second, multi-wave longitudinal designs may be employed to examine the dynamic interplay between volunteer intention and volunteer behavior and to clarify temporal sequencing. Third, different project types, such as short-term event-based volunteer service and regularized volunteer service, may be distinguished to examine contextual differences in variable effects, offering more refined empirical evidence for volunteer project management.

CONCLUSIONS

This study integrates the Theory of Planned Behavior (TPB) and the Big Five personality framework to systematically examine the mechanisms underlying sustained volunteer behavior among university students. The core findings suggest that, first, Big Five personality traits demonstrated the strongest explanatory power for volunteer intention and were associated with volunteer behavior entirely indirectly through volunteer intention, indicating a foundational role for personality traits in sustained volunteer participation. Second, although volunteer intention serves as a key mediator connecting cognitive evaluation and behavior, perceived behavioral control diverges from the classic TPB assumption and is associated with volunteer behavior through both direct and indirect pathways, suggesting the particular relevance of resource support in sustained volunteer service contexts. Finally, subjective norm was negatively associated with sustained volunteer behavior, a pattern consistent with the “institutional norm paradox” in administrative mobilization within higher education, wherein external assessment pressure is associated with weakened intrinsic participation motivation.

In summary, the transition from short-term participation to long-term commitment in university student volunteer service is closely linked to the cultivation of intrinsic altruistic identification and the improvement of organizational support conditions. This study not only broadens the explanatory boundaries of the Theory of Planned Behavior in collectivist cultural contexts but also offers insight into the mechanisms underlying the predicament of high attrition among volunteers in higher education institutions in developing regions. Future volunteer education strategies should move beyond single-dimensional indicator-based assessment and develop long-term incentive mechanisms grounded in personality-advantage matching and endogenous value activation.

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APPENDIX A QUESTIONNAIRE

Part I. Basic Information

1. Your gender
A Male B Female
2. Your grade
A Freshman B Sophomore C Junior D Senior or above
3. Your major
A Humanities and Social Sciences B Science and Engineering
4. Your political affiliation
A Communist Party of China member (including probationary members)
B Communist Youth League member
C Masses
5. What types of voluntary service activities have you participated in during your university studies?
A People's Livelihood Care (including social welfare, assistance for the elderly and disabled, emergency rescue, and health care-related services)
B Culture, Education and Communication (including education support, cultural publicity, and campus public welfare-related services)
C Ecological Development (including environmental protection, sustainable development, rural revitalization, and grassroots governance-related services)
D Event Support (including services related to large-scale events and competitions)

Part II. Scale Items

Please indicate the extent to which you agree with each statement.

1 = Strongly Disagree 2 = Disagree 3 = Somewhat Disagree 4 = Neutral 5 = Somewhat Agree 6 = Agree 7 = Strongly Agree

Attitude (Items 1–5)

1. Participating in volunteer service is meaningful.
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
2. Participating in volunteer service is enjoyable.
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
3. Volunteering helps me gain recognition, realize my self-worth, and feel satisfied and accomplished.
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
4. Volunteering helps me learn new knowledge, develop practical skills, make new friends, and improve communication skills.
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7
5. Volunteering enables me to help others and contribute to society.
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Subjective Norm (Items 6–11)

6. My family's attitudes and behaviors influence whether I participate in volunteer activities.
☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

7. My relatives' attitudes and behaviors influence whether I participate in volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

8. My classmates' and friends' attitudes and behaviors influence whether I participate in volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

9. My teachers' attitudes and behaviors influence whether I participate in volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

10. Public figures' examples influence whether I participate in volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

11. I feel I have a responsibility to volunteer and help others.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Perceived Behavioral Control (Items 12–16)

12. My physical condition affects my ability to volunteer.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

13. My financial situation affects my ability to volunteer.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

14. Whether I have relevant skills or expertise affects my ability to volunteer.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

15. Whether I have enough free time affects my ability to volunteer.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

16. Transportation convenience and task difficulty affect my ability to volunteer.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Personality traits (Items 17–21)

17. During volunteer service, I communicate well, am proactive, optimistic, friendly, and capable of critical and innovative thinking.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

18. During volunteer service, I am empathetic, strictly follow rules, and am willing to help others.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

19. During volunteer service, I am curious and imaginative, and I enjoy embracing new ideas.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

20. During volunteer service, I am responsible, conscientious, and down-to-earth.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

21. During volunteer service, I feel anxious and worried, and I take preventive actions before things happen.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Volunteering intention (Items 22–27)

22. I am willing to actively seek and follow information about volunteering to enhance my understanding.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

23. I have a strong desire to participate in volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

24. I have plans to continue volunteering in the future.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

25. Whenever I have free time, I will join volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

26. I am willing to actively recommend volunteering to my classmates and friends and encourage them to join.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

27. I use social media (e.g., WeChat, Weibo, TikTok) to follow, share, or like volunteering-related content to support and promote volunteer activities.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

Volunteering behavior (Items 28–30)

28. I devote a great deal of effort to my volunteer work.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

29. I use my skills to help volunteer projects run smoothly.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7

30. I do my utmost to contribute to the volunteer team.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7