The influence of community social capital on pre-service teachers' career calling: the mediating role of career exploration and the moderating effect of agreeableness

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Introduction: This study aims to explore the mechanism by which community social capital influences pre-service teachers' career calling, while also examining the mediating role of career exploration and the moderating effect of agreeableness.

Methods: Data were collected from 455 pre-service teachers at a local undergraduate normal college in Guangdong Province, and a structural equation model was employed for analysis.

Results: The findings revealed a significant positive relationship between community social capital and career calling, with career exploration serving as a mediating variable between them. Additionally, agreeableness moderated the relationship between community social capital and career exploration.

Discussion: These results provide valuable theoretical and practical support for colleges and universities in developing community service-learning education programs that enhance pre-service teachers' career exploration, address their individualized requirements, and cultivate their career calling.

KEYWORDS

community social capital, career exploration, career calling, pre-service teachers, agreeableness

1 Introduction

In recent years, work as a calling has become a hot topic in career development and organizational behavior (Chen et al., 2023). *Career calling* is defined as a deep sense of meaning and direction that individuals feel throughout their careers, often closely related to the desire to make a meaningful contribution to society (Dik and Duffy, 2009). Individuals with a strong sense of career calling perform better in their professional roles and experience greater satisfaction and happiness in their personal lives (Dik et al., 2009). Teachers are not only transmitters of knowledge, but also guides and role models on the path of students' development. Career calling plays a vital role in teachers' professional development, which is critical to understanding teachers' motivation and ethical values for engaging in education (Ye et al., 2024). It influences teachers' career choices, career commitment, job performance, and educational impact (Bullough and Hall-Kenyon, 2012), enhances teachers' professional self-efficacy, improves job satisfaction (Shang et al., 2022a,b), strengthens teachers' psychological capital to face difficulties and frustrations in order to be positively engaged in their work, and have a positive effect on the prevention of occupational burnout (Zhao et al., 2022).

Pre-service teachers refer to individuals who are undergoing teacher training but have not yet formally become teachers (Iyer et al., 2018; Ye et al., 2024). In this study, 'pre-service teachers' specifically denotes university students who are receiving teacher education during their college years and are preparing to enter the teaching profession. At this stage of career preparation, pre-service teachers are shaping their cognitions, attitudes, and beliefs regarding the profession (Ye et al., 2024). A strong sense of career calling gained from their studies and practice can enhance their future professional identity, increase their self-esteem, and boost their professional pride (Creed et al., 2020), and are more likely to experience a sense of accomplishment and satisfaction, improve their professional self-efficacy, and promote them to be more actively engaged in learning (Shang et al., 2022a,b), more proactively adapt to professional requirements, stimulate innovative behavior, and constantly explore new teaching methods and strategies to improve their professional adaptability (Huang and Zhang, 2024). It also enhances the professional commitment of pre-service teachers, prompting them to be more explicit about their career development goals and development paths of "what kind of teacher I want to be," making them more determined and motivated when facing professional challenges, and willing to work hard to achieve their career goals (Shan and Bi, 2021). Thus, effectively improving the clarity of future teachers' career calling in the education process can promote their work readiness, which is crucial for shaping the core values of future teachers and providing motivation for continuous development (Lau et al., 2020).

In China, within a cultural context that values collectivism, teachers are expected to play significant roles in advancing collective and societal welfare (Ye et al., 2024; Zhang et al., 2015). The development of a sense of career calling is an important goal of teacher education (Shan and Bi, 2021). Currently, among pre-service teachers in China, issues such as weak learning motivation, learning burnout, and low willingness to choose rural teaching positions, among others, are present. The underlying cause of these issues is a lack of understanding of the profound significance of learning and career development (Shang et al., 2022a; Zhao et al., 2022). Therefore, it is crucial to mobilize resources and cultivate a sense of career calling in 'future teachers' to provide them with continuous motivation for their growth (Watson et al., 2017).

As noted above, both domestically and internationally, the cultivation of a sense of career calling is regarded as a crucial aspect of preservice teacher education. However, research on the mechanisms underlying the emergence and development of career calling is relatively limited (Dalla Rosa et al., 2019; Duffy et al., 2023). Work as Calling Theory (WCT), proposed by Duffy et al. (2023), explains the development of career calling and provides a theoretical foundation for empirical research. This paper uses work as a calling theory as a theoretical framework to explore the developmental process of pre-service teachers' career calling, to bridge the theoretical gap, enrich and develop WCT, and inform the practice of educators and career counseling practitioners.

2 Theoretical foundation and hypotheses

2.1 The influence of community social capital on career calling

Social capital is a broad concept that has been defined from various perspectives by different scholars. Bourdieu (2011) focused on how social capital is transmitted across social strata, Coleman (1994) examined the differences in educational outcomes through social capital, and Putnam (2000) primarily concentrated on civic engagement and democratic governance. Despite the diversity of definitions, they all involve two core elements: social networks and resources. This study adopts Lin's definition of social capital, which refers to the resources that individuals and groups can obtain and mobilize through social networks for specific purposes (Lin, 2002). Social capital plays a crucial role in academic and career success, providing resources and advantages for the growth of youth (Aydoğmuş and Koyuncuoğlu, 2021). Within the context of a community, social capital is referred to as *community social capital*. It encompasses the resources and advantages obtained through the network of interactions between individuals or groups and community members, including shared norms, mutual trust, and the degree of cooperation (Israel et al., 2001). Individuals can gain resources, support, and opportunities through participation in community networks and activities (Flanagan et al., 2015; Search Institute, 2021), thereby enhancing social connections and promoting personal growth.

Community service-learning is a method of community engagement for college students (Kuh, 2008). It is a reflective and relational teaching strategy that combines course learning with community service, designed to help students better understand and apply classroom knowledge through hands-on activities, improve their ability to solve real-world problems, promote their concern for and participation in social issues, and foster civic awareness and a sense of social responsibility (Heffernan, 2001). Through this participatory process, pre-service teachers build trusting, mutually supportive, and reciprocal relationships with mentors, peers, and community members, which contributes to the holistic development of community and individual social support systems, and enriches community and individual social capital (Tinkler and Tinkler, 2020). It is evident that the social capital acquired through community interactions positively facilitates their growth and professional development. Consequently, community service learning is an essential component of pre-service teacher education (Chambers and Lavery, 2012).

Dik and Duffy (2009) identified three dimensions of career calling, which are specific career choices made by individuals guided by internal or external forces, a sense of purpose and meaning of work, and prosocial contributions. Community service-learning has a positive impact on students' cognitive, affective, civic, and social development (Waldstein and Reiher, 2001). It is not only an educational tool, but also a social tool (Flanagan et al., 2015), a supportive environment can be formed in the process of interacting with the community, which is an important factor affecting the development of college students' career calling (Duffy et al., 2018). First, community service-learning emphasizes the integration of theory and practice. Pre-service teachers enter authentic socio-educational teaching situations and learn by experiencing, belonging, and sharing collaboratively (Márquez-García et al., 2020), which helps to develop an understanding of the role of the teacher, comprehend the goals of teaching and learning, and continue to develop professional self-efficacy and build a professional identity (Adarlo and Pelias, 2021). Pre-service teachers deepen their understanding of the knowledge, skills, attitudes, responsibilities, expectations, and challenges of the teaching profession through community engagement, and enhance their confidence in learning and practicing through interpersonal support and feedback, contributing to their professional and career development.

Second, community service-learning is a cyclical learning process, including learning, applying, and reflecting. In a multicultural context, meeting the educational needs of a diverse student population is an integral part of teacher effectiveness (Chang et al., 2011). Through actual participation in community service, pre-service teachers can apply and reflect on what they have learned in real situations, providing an education oriented to values such as empathy, civic responsibility, social justice, and fairness, helping future teachers to pay more attention to the inclusiveness, diversity, and differences of education, and develop enterprise skills (Iyer et al., 2018). For example, in actual service practice, pre-service teachers can have a deeper understanding of the background, strengths, and motivations of learners, continuously improve their teaching methods and strategies, and enhance their teaching ability and sense of social justice (Tinkler and Tinkler, 2020; Tinkler et al., 2019).

Third, community service-learning focuses on the needs of community development, linking social benefits, community participation, and responsible citizenship to ensure the interests of students, universities, and communities (Chupp and Joseph, 2010). It is a reciprocal partnership established between universities and communities through meaningful services, which can have a positive impact on students' improvement of knowledge and skills, changes in attitudes and behaviors, enhance their sense of social responsibility and civic awareness, and bring lasting benefits to student's personal growth and social development (Pak, 2020), boost pre-service teachers' professional happiness and promote prosocial behavior motivation (Chiva-Bartoll et al., 2020), and enhance professional commitment (Asenjo et al., 2021).

In summary, pre-service teachers' involvement in community service-learning is a process of searching for career calling and practicing career calling. The social capital obtained in this process may promote the development of career calling. Therefore, the first hypothesis of this study is proposed:

Hypothesis 1 (H1): Community social capital will have a positive influence on pre-service teachers' career calling.

2.2 The mediating role of career exploration

Career exploration is defined as exploratory behaviors and cognitive development processes related to career development that involve exploration of the self and the environment and encompass both breadth and depth of exploration (Kracke, 1997; Stumpf et al., 1983). The primary sources of information acquisition by the individual are the self and the environment, which is reflected in the individual's behavior of active acquisition of information related to career choice and development, as well as a series of psychological activities related to their interests, abilities, values and personality traits (Porfeli and Skorikov, 2010). Through specific actions and reflections, they learn about and evaluate different career options and ultimately determine their desire to pursue career values, beliefs, and goals to make informed career choices (Crocetti et al., 2013). Career exploration can occur at different life stages and is especially important during adolescence and young adulthood, playing a pivotal role in self-identity construction and career readiness (Cheung, 2015).

Networks and resources are important career resources (Hirschi, 2012), which individuals can develop and maintain through career behaviors such as social interaction, career exploration, and learning to achieve career goals (Hirschi and Koen, 2021). Community service-learning focuses on the interaction between pre-service teachers and the community. The social capital accumulated in this process is an important resource for the professional development of pre-service teachers (Tinkler and Tinkler, 2020). The service-learning philosophy aligns with John Dewey's concept that "education is life itself," advocating learning from life and experience, and encouraging students to integrate learning activities with practical life experiences (Dewey, 1986). Students' engagement in community service-learning goes through a process similar to the four interrelated stages of learning cycle theory: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 2014). The Learning Cycle theory proposed by Kolb is widely used in the curriculum development of service-learning, which provides a theoretical basis for deeply understanding how pre-service teachers engage in career exploration through service-learning and develop a career calling aligning with themselves and the external environment.

On the one hand, individuals can achieve deep self-insight through community service-learning. Through experiential learning, pre-service teachers can observe, apply and reflect on the knowledge and skills they have learned in a real environment, effectively stimulate their interest and learning motivation, and cultivate practical and innovative abilities (Huisman and Edwards, 2011). In order to adapt to the diverse needs of service recipients and complex practice environments, pre-service teachers need to discover and solve problems promptly, to gain a sense of accomplishment in serving others and promote the transformation of value orientation and core competencies (Iyer et al., 2018). Service promotes learning, and learning further promotes service. Meaningful community exploration can stimulate future teachers' curiosity, promote their interest and enthusiasm for in-depth exploration, and effectively cultivate their positive and transformative creativity (Desmet and Roberts, 2022).

On the other hand, individuals achieve multi-level exploration of the outside world through community service-learning. By engaging in practical interactions with diverse groups and environments in community service-learning, pre-service teachers need to reflect critically, add to their knowledge, and refine their strategies in order to adjust their job roles when facing diverse community needs and demographic groups from different backgrounds (Resch and Schrittesser, 2023; Tinkler et al., 2019). For example, in teaching practice, in order to cater to students with different family backgrounds and personality traits, pre-service teachers need to assess differentiation and carry out diversified educational planning in order to bridge the gap between theory and practice for successful teaching and learning services. Community engagement also provides valuable cultural immersion for pre-service teachers to develop positive attitudes toward different cultures, learn to be respectful and tolerant, enhance community involvement, and positively impact their long-term development (Pak, 2020). In particular, problem-solving-based community exploration enhances teacher candidates' civic knowledge, skills, attitudes, and values, and promotes the development of their self-concept and self-identity. Overall, community service bridges the gap between civic and professional identities, enabling teacher candidates to better fulfill their civic and social responsibilities in their future careers (Akin, 2021).

In summary, community service-learning plays a positive role in college students' understanding of social issues, personal insight, and cognitive development (Yorio and Ye, 2012). One of the functions of community service-learning is career exploration, which is a crucial way for pre-service teachers to explore their career calling (Miller, 2012). The theoretical model of career calling theory (WCT) points out that individuals who perceive calling can achieve P-E fit through career exploration, thereby enhancing work meaning and career commitment, and the social support provides the necessary resources and support in this process (Duffy et al., 2018, 2023). This is consistent with the fact that pre-service teachers gradually establish a more profound sense of meaning and identity construction in learning and career development through community service-learning. Therefore, the following research hypotheses are proposed:

> *Hypothesis 2 (H2):* Community social capital will have a positive influence on career exploration.

> *Hypothesis 3 (H3):* Career exploration will have a positive influence on career calling.

> *Hypothesis 4 (H4):* Community social capital will have a positive influence on career calling through career exploration.

2.3 The moderating effect of agreeableness

The Five-Factor Model (FFM) is a widely used theoretical framework in psychology for describing and understanding individual personality traits. The model consists of five dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness (Goldberg, 1992; John et al., 2008). These dimensions are widely used in various research areas, including students' learning motivation, academic performance, psychological health, social relationships, life satisfaction, well-being, and career development.

Agreeableness is a crucial dimension in the five-factor model, involving an individual's friendliness, cooperation, trust, and sympathy (McCrae and John, 1992). Agreeableness is considered a component of social behavior and is related to needs, expressive behavior, and impulse control tendencies in personal relationships. A high level of agreeableness is manifested as friendliness, cooperation, and helpfulness, which is conducive to establishing and maintaining social relationships, thereby enhancing the individual's social capital and enabling the individual to obtain a broader range of social resources and support (Aydoğmuş and Koyuncuoğlu, 2021). It is characterized by humility, obedience, and trust, which helps them perceive more social support and can effectively improve the individual's subjective well-being (Aydoğmuş and Koyuncuoğlu, 2021). In action, it often displays strong empathy, which helps them to care for others more proactively, enhances the individual's willingness to participate in volunteer services, strengthens service motivation, and improves functional effectiveness (Bekkers, 2005).

For pre-service teachers who are in the process of career preparation, personality traits are related to their learning styles. Individuals with agreeable personalities are more inclined to adopt effective learning methods and effectively improve their academic performance (Komarraju et al., 2011). In community participation, pre-service teachers with highly agreeable personalities are usually

friendlier, which enables them to better understand and respect the differences between different cultures in cross-cultural interactions, thus showing higher cross-cultural sensitivity (Aksin, 2023). In interpersonal interactions, they are more open and accepting, and more inclined to cooperate rather than conflict, which enables them to better solve problems and reach consensus with people from different cultural backgrounds, making them more adaptable to the environment. Specifically, in the process of interpersonal interaction, stronger empathy enables them to better understand students' learning and emotional needs, have stronger motivation to help students, and be willing to invest more time and energy to create a more inclusive and supportive educational environment for students, thereby enhancing pre-service teachers' beliefs about diversity (Unruh and McCord, 2010). At the same time, agreeableness has a significant effect on intrinsic career motivation and career satisfaction, especially in collectivist cultures that place more emphasis on the role of agreeableness in choosing careers with high social utility value (Jugović et al., 2012). Their friendly and cooperative qualities help them to build positive interpersonal relationships through community involvement, and they are more likely to receive positive feedback and career satisfaction from students, peers, mentors, and community members. Further, this motivates them to be more concerned about the well-being of others and willing to provide service to others. Therefore, in career exploration, they are more inclined to choose careers with high social utility value and form pro-social values. In addition, they are more likely to form proactive behaviors and inspire the use of social capital to explore their career ideals (Yang et al., 2024).

In summary, the social capital developed by pre-service teachers through community interactions might enhance their exploration of careers. The association between these factors might be influenced by agreeableness, where higher levels of agreeableness might strengthen the positive influence of social capital on career exploration. Therefore, the fifth hypothesis of this study is proposed:

> *Hypothesis 5 (H5):* Agreeableness will positively moderate the relationship between community social capital and career exploration.

Hypotheses 1–5 are exploratory and reflect the process of Chinese pre-service teachers' exploration of career calling in community engagement. We used the WCT framework to empirically investigate the mechanisms by which social support influences the development of career calling. More specifically, this study aims to explore how community social capital affects career calling through the mediating effect of career exploration, and whether the influence of community social capital on career exploration varies according to individual personality. The purpose of the study was to provide a theoretical basis for enhancing students' participation in community service and developing individualized education for pre-service teachers. Figure 1 depicts the research model.

3 Methods and measures

3.1 Participants and procedure

The data for this study were collected during the spring semester of 2024 over a span of 3 weeks, using an online questionnaire platform

(Wenjuanxing). The research team designed a questionnaire containing basic information about the participants and research variables, then conducted a pre-test to ensure that the questionnaire had good reliability and validity. Meanwhile, a detailed informed consent form was provided to all participants, clearly explaining the purpose and process of the survey to ensure that they understood and agreed to participate. Participants completed the questionnaire anonymously and were informed that all questions and answers would be viewed solely by the research team and used for research purposes, thus protecting their privacy. Participants filled out the questionnaire online based on their own experiences and perceptions, and the entire process took approximately 10 min.

Participants were students from a local undergraduate institution in Guangdong Province, China. This institution has a long history and serves as a major provider of primary and secondary school teachers in the western region of Guangdong, making significant contributions to local educational services. Through random sampling, a total of 500 students were recruited to participate in the survey, of which 455 questionnaires were confirmed to be valid. The descriptive statistical analysis results (Table 1) provide basic demographic information of the sample, including grade, gender, and family residence. Among the participants, 39.1% were male and 60.9% were female. In terms of grade distribution, the majority were in their second, third, or fourth year, which is related to the institution's practical teaching schedule. The distribution of living expenses reflects the material conditions of the students' academic lives. Their family residences are distributed across various economic development areas: 39.1% are from rural areas, 21.1% are from townships, 14.9% are from county seats, and 24.8% are from urban areas. This study conducted a demographic analysis of the sample using SPSS 25.00. The specific results are shown in Table 1.

3.2 Measurement methods

3.2.1 Community social capital

The Community Social Capital Scale is used to assess individuals' perceived community support and resources, based on the Social Capital Assessment and Learning for Equity Measures Technical Manual (Search Institute, 2021). The scale consists of four items, such as "I have more people I can go to for help in pursuing my education

or career goals," among others. Responses are measured using a 5-point Likert scale, ranging from 1 ("*Strongly Disagree*") to 5 ("*Strongly Agree*"). Higher scores indicate a greater amount of social capital gained from community service learning. In this study, internal consistency was confirmed with a high alpha value (=0.916).

3.2.2 Career calling

The Career Calling Scale is used to assess individuals' sense of guidance, meaningfulness, and prosocial motivation related to engaging in a specific profession. Developed by Zhang et al. (2015), the scale comprises 11 items, such as "I want to be engaged in an occupation that is beneficial to others." Participants respond based on their actual feelings, with scores ranging from 1 ("*Strongly Disagree*") to 5 ("*Strongly Agree*"). The scale was designed based on the interpretation of career calling within the Chinese cultural context, with the original data sourced from Chinese college students. Higher scores indicate a stronger sense of vocation. In this study, the scale demonstrated very high internal consistency, with a Cronbach's Alpha of 0.936.

3.2.3 Career exploration

The Career Exploration Scale (Kracke, 1997) is a 6-item measure of individuals' exploratory behaviors and cognitions in career development (e.g., "I talk to as many people as possible about occupations I am interested in"). The reliability and validity of the scale were further validated in Kracke (2002) subsequent research. Items are rated on a scale from 1 ("*Strongly Disagree*") to 5 ("*Strongly Agree*"), higher scores indicate a greater degree of career exploration. In this study, the scale demonstrated a Cronbach's alpha coefficient of 0.907.

3.2.4 Agreeableness

The Agreeableness dimension is measured using the Chinese Big Five Personality Inventory-15 (Zhang et al., 2019). This scale comprises 3 items (e.g., "I think most people are well-intentioned"). Yang et al. (2024) utilized this scale to assess agreeableness characteristics among Chinese college students and reported a high internal consistency ($\alpha = 0.905$). Participants rated their responses on a 5-point Likert scale, with 1 indicating "*Strongly Disagree*" and 5 indicating "*Strongly Agree*." Higher scores reflect greater agreeableness. In this study, the scale demonstrated a Cronbach's alpha coefficient of 0.873, indicating good reliability within the current sample.
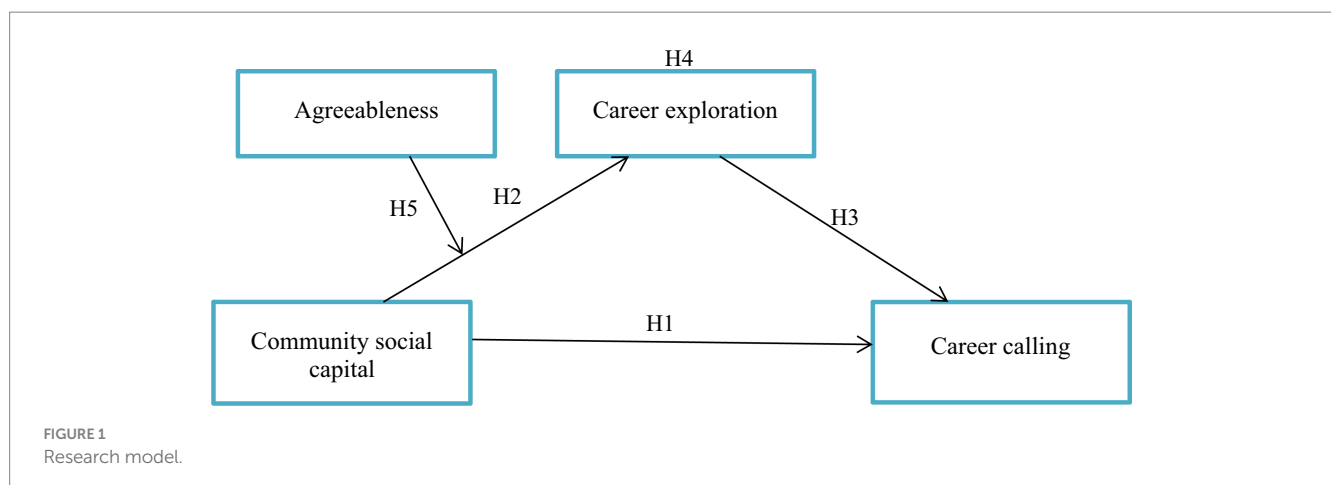

FIGURE 1
Research model.

Variable	Type	Frequency	%
Gender	Male	178	39.1
	Female	277	60.9
Grade	1	1	0.2
	2	103	22.6
	3	264	58.0
	4	87	19.1
Living cost	Below 1,000 CNY	38	8.4
	1,000–1,499 CNY	246	54.1
	1,500–1999 CNY	115	25.3
	2000–2,499 CNY	41	9.0
	2,500 CNY and above	15	3.3
Residence	Rural	178	39.1
	Township	96	21.1
	County Seat	68	14.9
	Urban	113	24.8
Total		455	100

4 Results

4.1 Mean, standard deviation, and correlation analysis

To facilitate further reporting of the research results, mean, standard deviation, and correlation analyses were conducted for four variables: community social capital, career exploration, career calling, and agreeableness. The specific results are shown in Table 2.

Table 2 shows that the correlations among the four variables studied are significant, which provides data support for the next step of analysis.

4.2 Confirmatory factor analysis

This study conducted confirmatory factor analysis of all latent variables using AMOS 24.00 and reliability analysis of all samples using SPSS 25.00. Specific results are shown in Table 3.

Based on Table 3, the Average Variance Extracted (AVE) for each variable ranges from 0.622 to 0.811, all exceeding 0.5. The Composite Reliability (CR) ranges from 0.874 to 0.928, all exceeding 0.7, and Cronbach's Alpha (α) ranges from 0.873 to 0.936, all exceeding 0.7. To mitigate collinearity, this study conducted a CFA single-factor test on the sample, with results presented in Table 4.

Based on Table 4, the single-factor results are as follows: $\chi^2 = 3132.346$, $\chi^2/\text{DF} = 12.691$, CFI = 0.628, NFI = 0.611, IFI = 0.629, RMSEA = 0.167, SRMR = 0.112. Therefore, the data obtained in this study do not exhibit collinearity. To proceed with reporting the structural equation modeling results, Table 4 indicates that the data for the four factors support further data reporting.

TABLE 2 Mean, standard deviation, and correlation analysis of variables.

Variable	Mean	SD	CSC	CE	AN	CC
CSC	3.720	0.702	1			
CE	3.886	0.621	0.552**	1		
AN	3.826	0.719	0.515**	0.461**	1	
CC	3.811	0.690	0.566**	0.549**	0.440**	1

* <0.05, ** <0.01; CSC, community social capital; CE, career exploration; CC, career calling; AN, Agreeableness.

4.3 Direct and mediated effects analysis

Based on the confirmatory factor analysis of each variable, this study can proceed to test hypotheses H1, H2, H3, and H4 through path analysis using AMOS 24.00. The results are presented in Tables 5, 6.

Based on Table 5, H1: Community social capital (B = 0.392, $p < 0.001$) positively influences career calling among pre-service teachers. H2: Community social capital (B = 0.390, $p < 0.001$) positively affects career exploration. H3: Career exploration (B = 0.350, $p < 0.001$) positively impacts career calling. Hypotheses H1, H2, and H3 are supported. To test the mediating effect of career exploration, a bootstrap test with 5,000 samples was conducted, and the results are shown in Table 6.

Table 6 shows that community social capital has a positive impact on career mission through career exploration, which is supported by the data (H4). The mediating effect of career exploration is 0.153, and the mediating effect accounts for 30.4%.

4.4 Moderating effect test

This study used SPSS25.00 to conduct multilevel regression analysis to verify the moderating effect of agreeableness (H5). In order to ensure the authenticity and reliability of the results, all variables were de-neutralized before conducting the multilevel regression analysis. The specific results are shown in Table 7.

Table 7 indicates that the interaction term of community social capital and agreeableness can positively and significantly affect career exploration. Hypothesis 5 is supported by the data. In order to further show the moderating effect of agreeableness, this study conducted a graphical analysis, and the results are shown in Figure 2.

4.5 Data analysis

First, Table 2 shows the means and standard deviations of the main variables. Among them, the mean of community social capital (CSC) is 3.720 and the standard deviation is 0.702; the mean of career exploration (CE) is 3.886 and the standard deviation is 0.621; the mean of agreeableness (AN) is 3.826 and the standard deviation is 0.719; the mean of career calling (CC) is 3.811 and the standard deviation is 0.690. Meanwhile, the correlation analysis (Table 2) shows a significant positive relationship between CSC and CE, AN, and CC ($r = 0.552$, $r = 0.515$, $r = 0.566$, $p < 0.01$). CE is significantly correlated with AN and CC ($r = 0.461$, $r = 0.549$, $p < 0.01$). AN and CC are also significantly correlated ($r = 0.440$, $p < 0.01$). Second, the structural equation modeling (SEM) analysis (Figure 3) showed that the direct

TABLE 3 Factor loading, AVE, CR, and α analysis ($N = 455$).

Variable	Item	Estimate	AVE	CR	α
Community social capital	CSC 1	0.861	0.733	0.916	0.916
	CSC 2	0.856			
	CSC 3	0.847			
	CSC 4	0.860			
Career exploration	CE1	0.754	0.622	0.908	0.907
	CE 2	0.822			
	CE 3	0.835			
	CE 4	0.804			
	CE 5	0.708			
	CE 6	0.800			
Agreeableness	AN1	0.797	0.698	0.874	0.873
	AN 2	0.859			
	AN 3	0.849			
Career calling	CC1	0.905	0.811	0.928	0.936
	CC 2	0.914			
	CC 3	0.882			

path coefficient from CSC to CC (H1) was 0.350 ($p < 0.001$), the path coefficient from CSC to CE (H2) was 0.392 ($p < 0.001$), and the path coefficient from CE to CC (H3) was 0.390 ($p < 0.001$). The mediating effect of CE between CSC and CC (H4) has a path coefficient of 0.153 ($p < 0.001$). Finally, the results of the moderation regression analysis indicate that AN significantly moderates the effect of CSC on CE (H5), the coefficient for the moderation effect is 0.113 ($p < 0.01$). Additionally, this moderating effect is further confirmed by the moderation plot. The specific results of the research model are shown in Figure 3.

5 Discussion, limitations and future research

5.1 Discussion

Career calling is associated with a deeper purpose and meaning, not only for personal satisfaction but also for moral responsibility and social contribution (Dik and Duffy, 2009). Teachers are burdened with the important responsibility of disseminating knowledge, spreading ideas, and nurturing talents, and career calling is a core part of teachers' professional ethics. Therefore, educational institutions and policymakers should emphasize the cultivation of a sense of career calling as a critical component of teacher education (Shang et al., 2022a). This study aims to examine the mechanism by which social capital established through interaction between students and the community affects the development of career calling in the community service-learning course of pre-service teacher education in China, and to explore the individual differences in the impact of community social capital on career exploration. This is of great value in promoting the professional development of pre-service teachers and cultivating their professional spirit and social sentiment. The structural modeling analysis revealed that community social capital can directly predict

career calling, and this relationship is mediated by career exploration. At the same time, agreeableness plays a moderating role in community social capital and career exploration.

Firstly, the results of the study showed that community social capital is significantly correlated with career calling, which supports hypothesis 1 and empirically verifies the work as a calling theory (Duffy et al., 2023), indicating that resources and support in social contexts are essential factors in the development of career calling. Thus, the resources and support gained through the social network established in community service learning for pre-service teachers can lead individuals to a clearer understanding of their career goals and sense of purpose (Tinkler and Tinkler, 2020), help them address career development challenges (Akin, 2021), enhance their psychological resources (Asenjo et al., 2021), and strengthen the stability and longevity of their career calling. This provides important insights for educational and career development practices, suggesting that social network resources should be fully utilized to assist students in transitioning from school to society and bridging the gap between theoretical learning and practical experience (Resch and Schrittesser, 2023).

Secondly, we further explore how schools in organizational settings create conditions that provide a platform for pre-service teachers' explorations to shape the impact of career calling by altering individuals' perceptions of person-environment (P-E) fit (Duffy et al., 2018). This not only fills a gap in the research on the antecedents of career calling (Chen et al., 2023), but also provides educators with a student-centered mechanism for achieving career growth through career exploration. By verifying Hypothesis 2, 3, we found that career exploration plays an important mediating role in community social capital and career calling, which supports Duffy et al.'s explanation of the source of career calling, that is, when individuals clarify the fit between their interests, abilities, values and career requirements during career exploration, they can form a stronger sense of career calling (Duffy et al., 2014). It also enriches the empirical research and practical application of creating an organizational climate of career calling (Duffy et al., 2018, 2023). The discovery of mediating roles provides a mechanism for teachers to grow in community service-learning. Namely, through service-learning, pre-service teachers reap the benefits of reflection on their internal personal philosophy of education and pedagogical skills, but also include awareness of social needs and vocational environments to better shape their personal professional roles, deepen their professional identity and commitment to the profession (Resch and Schrittesser, 2023; Tinkler and Tinkler, 2020).

Furthermore, we tested Hypothesis 5 and confirmed that agreeableness significantly moderates the effect of community social capital on career exploration. This finding not only deepens the understanding of individual differences in the career development process but also offers new insights for educational practice. Specifically, individual personality traits influence how one acquires and utilizes social support, thereby affecting career development outcomes. Individuals with high agreeableness are more likely to actively seek and accept support from the community, thereby receiving substantial assistance and enhancing their motivation and confidence in career exploration (Aksin, 2023). In other words, agreeableness moderates the impact of community social capital, making the career exploration process more effective. Therefore, educational institutions can design more targeted teacher education

TABLE 4 Confirmatory factor analysis.

Factor	x^2	x^2/DF	CFI	NFI	IFI	RMSEA	SRMR
Four factors	552.654	2.501	0.958	0.931	0.958	0.057	0.040
Single factor	3132.346	13.691	0.628	0.611	0.629	0.167	0.112

TABLE 5 Direct path data.

Path	Estimate	S.E.	C.R.	*p*
Community social capital →Career exploration	0.392	0.049	8.017	***
Career exploration → Career calling	0.390	0.067	5.798	***
Community social capital → Career calling	0.350	0.059	5.894	***

TABLE 6 Mediated effects analysis.

Path	Parameter	Estimate	*Se*	Bias-corrected		Percentile	
				Lower	Upper	Lower	Upper
Community social capital → Career exploration → Career calling	Total	0.503	0.082	0.350	0.674	0.342	0.664
	Direct	0.350	0.077	0.212	0.516	0.207	0.506
	Indirect	0.153	0.044	0.083	0.259	0.740	0.246

TABLE 7 Moderated regression analysis.

Variable	Career exploration					
	M1			M2		
	B	SE	VIF	B	SE	VIF
Gender	−0.054	0.050	1.005	−0.054	0.048	1.008
Grade	0.060	0.037	1.005	0.048	0.036	1.008
Living cost	0.021	0.027	1.007	0.009	0.026	1.013
CSC	0.488***	0.035	1.008	0.355***	0.040	1.439
AN				0.225***	0.039	1.412
CSC×AN				0.113**	0.039	1.062
ΔR^2	0.305			0.356		
F	50.886			42.829		

*< 0.05, **< 0.01, ***< 0.001; CSC, community social capital; AN, Agreeableness.

programs based on the personality traits of pre-service teachers, particularly the level of agreeableness. For instance, providing individuals with high agreeableness with additional emotional support and social interaction opportunities can further enhance their career exploration outcomes and sense of career calling.

In summary, community service-learning is a positive and effective learning experience, which is an important way for pre-service teachers to acquire social capital in the community and can contribute to the development of career calling for pre-service teachers. School administrators should actively build supportive communities to create meaningful learning experiences for prospective teachers and encourage them to search for and realize their career calling through learning and service.

5.2 Limitations and future research

First, in terms of the sample and setting of the study, this study focuses only on pre-service teachers at a local teacher training college in China. However, both community social capital and career calling are multi-level concepts and are culturally diverse. Namely, community social capital and career calling are the result of the interaction of multiple factors, including social structures, values, and educational policies under different cultural contexts. Therefore, future research could examine pre-service teachers in different countries and cultures to test the generalizability and cultural sensitivity of the model. At the same time, personality differences cover a wide range of personality traits, in addition to agreeableness, other personality traits on
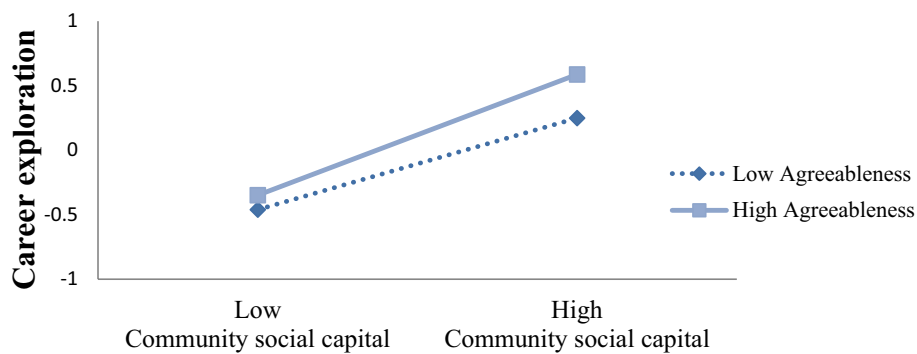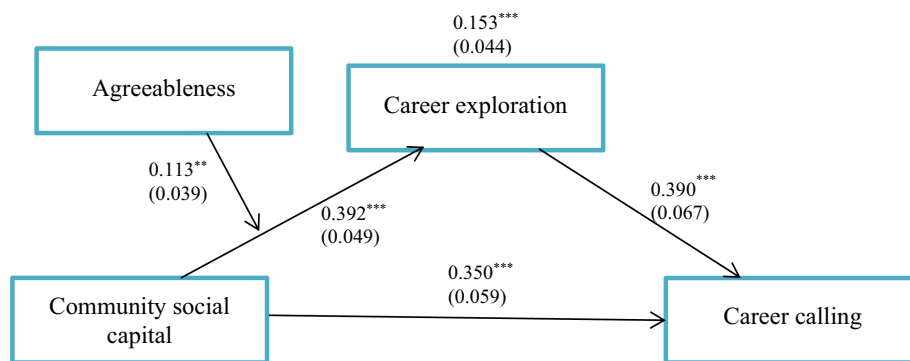
FIGURE 2
Moderating effect of agreeableness.

FIGURE 3
Path coefficient results.

neuroticism, extroversion, responsibility and openness may also have an impact on influencing the development of career calling, and future research could consider the influence of other personality traits. Second, in terms of research design, this study adopted a cross-sectional design, which limited the understanding of the interaction between education and changes in student growth. Therefore, future research could conduct a longitudinal study to follow the changes of pre-service teachers from their training to the beginning of their careers in order to observe the trajectory and stability of career calling. Third, in terms of measurement tools, the measurement tool utilized in this study relied on self-report questionnaires, which may have led to a bias in social expectations. Future research could consider using a variety of methods for collecting data, such as combining observation and qualitative interviews.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

XS: Writing – original draft, Project administration, Methodology, Investigation. AA: Writing – review & editing, Resources, Methodology, Formal analysis, Conceptualization. JA: Writing – review & editing, Validation, Supervision, Formal analysis.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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