Higher Education and Practice Vol. 2 No. 10, 2025

Research on the Psychological Health Education Intervention Model for Ethnic Minority Rural Elderly Based on AI and Smart Elderly Care

Tong Jianqiang[1], Du Yuan[1], Kwonho Lee[2,*]
[1]Chuxiong Normal University, Chuxiong, Yunnan, China
[2]Silla University, Busan Metropolitan City, South Korea
**Corresponding Author.*

Abstract: With the increasing aging of ethnic minority rural areas in China, the outflow of young adults has led to an "empty nest" elderly care pattern. Cultural barriers and technological acceptance obstacles have highlighted psychological problems such as depression and anxiety among the elderly. The detection rate of depression among ethnic groups such as the Dai and Yi is higher than the national average. This study constructs a dual driven psychological health education intervention model of "technology adaptation+cultural infiltration". Based on community theory, social support theory, and cognitive behavior theory, a four in one system of "prevention identification intervention feedback" is designed: the prevention layer develops an AI ethnic cultural knowledge base, integrating cultural elements such as Yi ethnic "family branch" and Dai Beiye Jing; Constructing a multimodal intelligent evaluation tool for the recognition layer to address language and cognitive barriers; The intervention layer provides scenario based services through AI culture accompanying robots; The feedback layer integrates multidimensional data such as mental health and cultural participation to dynamically evaluate the effectiveness. The implementation path includes the pilot strategy of "typical guidance+gradient promotion", supporting policies, funding, talent, and ethical four-dimensional guarantee mechanisms. This model breaks through the cultural adaptation bottleneck of traditional intelligent elderly care, provides replicable mental health service programs for ethnic regions, and helps build a Chinese path to modernization elderly care service system.

Keywords: AI; Smart Elderly Care; Elderly People from Ethnic Minority Rural Areas; Psychological Health Education; Intervention Mode

1. Introduction

According to the "2024 Statistical Bulletin on National Economic and Social Development" issued by the National Bureau of Statistics, the total population of ethnic minorities aged 60 and above in China has reached 112 million, accounting for 8.8% of the total elderly population in the country, of which 83.6% live in rural areas. Due to the development gap between urban and rural areas, the phenomenon of young and middle-aged people from ethnic minority rural areas leaving their hometowns is particularly prominent. According to a survey conducted by the National Ethnic Affairs Commission in 2025, the average outflow rate of young and middle-aged people from ethnic minority rural areas in Southwest China reached 37%, and the outflow rate from some Yi and Dai villages even exceeded 50%, directly leading to the formation of an "empty nest" and "solitary" elderly care pattern.

On the level of mental health, cultural barriers and lack of social support exacerbate psychological crises. The "White Paper on Mental Health of Dai Ethnic Rural Elderly" released by the Health Bureau of Jinggu County, Yunnan Province in 2025 shows that the detection rate of depression among elderly people aged 60 and above in the local area is as high as 52.0%. Among them, the detection rate of depression among women has risen to 54.5% due to cultural role changes (such as the weakening of traditional family leadership), significantly higher than the national average level of rural elderly people (38.2%). In addition, due to the adjustment of grassland contracting policy and the change of traditional lifestyle, the incidence of anxiety symptoms among the

elderly of Tibetan, Mongolian and other nomadic ethnic groups has increased by 21 percentage points compared with 2010, and their mental health problems are characterized by "ethnic specificity" and "regional concentration".

Focusing on the ethnic minority rural scene, this study constructs a dual driven mental health education intervention model of "technology adaptation+cultural infiltration", which not only fills the theoretical gap of "ethnic culture and technology integration" in the existing research, but also provides operational practical programs for grass-roots civil affairs departments and medical institutions in ethnic minority areas, which is of great practical significance to improve the "Chinese path to modernization elderly care service system" and promote the common prosperity of all ethnic groups.

2. The Current Situation and Challenges of Mental Health Among Elderly People in Ethnic Minority Rural Areas

2.1 Core Characteristics of Mental Health Issues

In the process of modernization, the traditional social structure and cultural customs of ethnic minorities have been significantly impacted. Taking Liangshan Yi Autonomous Prefecture in Sichuan Province as an example, a survey conducted by Xichang University in 2024 on 12 Yi villages showed that due to the outflow of children, the frequency of activities in the "family branch" mutual aid network decreased from 4.2 times per month in 2010 to 1.1 times per month in 2024. 68% of elderly people expressed that they "cannot solve their living difficulties through family branches and feel abandoned by the ethnic group". In Dai ethnic areas, due to tourism development, the traditional "Water Splashing Festival" has shifted from a family reunion ceremony to a commercial activity. According to a survey in Mengla County, Xishuangbanna Prefecture, 72% of Dai elderly people believe that "the festival has lost its cultural significance and their inner emptiness has intensified".

The technical acceptance ability of elderly people in ethnic minority rural areas is constrained by multiple factors such as education level, language environment, and economic conditions. According to statistics from the Ministry of Education in 2024, 78% of rural elderly people aged 60 and above from ethnic minorities have a primary school education or below, of whom 23% are illiterate, leading to difficulties in operating smart devices. The usage rate of smartphones is only 28%, significantly lower than the average level of elderly people in rural areas nationwide (45%), and the usage functions are mainly focused on "making phone calls, watching videos", with a usage rate of less than 5% for health monitoring, online consultation and other functions.

The language barrier further exacerbates the digital divide. Among existing smart devices, less than 10% support minority languages such as Miao, Yi, and Dai, and there is a problem of "low speech recognition accuracy" - Guizhou University's 2025 test shows that the speech recognition accuracy of Miao dialects is only 62%, far lower than Mandarin Chinese (98%), leading to elderly people being "unwilling or unable to use". In addition, 85% of elderly people expressed concerns about equipment damage caused by operational errors and are afraid to try new functions, further reducing their willingness to use technology due to fear.

2.2 Bottleneck of Smart Elderly Care Applications

2.2.1.Weak infrastructure: mismatch between hardware support capabilities and requirements

The network and power infrastructure in ethnic minority rural areas are difficult to meet the demand for smart elderly care. According to the data of the Ministry of Industry and Information Technology in 2025, the 5G network coverage rate in Naqu, Xizang, Yushu, Qinghai and other highland ethnic areas is less than 25%. Some nomadic villages still rely on "satellite signals", and the network delay is up to 500 ms, unable to support video consultation, real-time monitoring and other functions. In terms of power supply, 12 out of 18 nomadic villages in Garze Tibetan Autonomous Prefecture, Sichuan Province, suffer from "seasonal power outages", which prevent smart devices from working continuously.

1. Lack of cultural adaptation: disconnect between service design and national needs

The existing smart elderly care platforms generally lack "ethnic cultural sensitivity", mainly reflected in three aspects: first, insufficient language adaptation, only three mainstream elderly care apps support minority languages, and there is no dialect version, such

as the Yi language app that only supports Liangshan Yi language and cannot recognize Chuxiong Yi language dialect; Secondly, the content design neglects cultural needs, such as the lack of development of Tibetan "scripture counting" and "Buddhist scripture recitation" functions, as well as Mongolian "Nadam Conference" activity reminder functions, resulting in elderly people being unable to find interesting content; Thirdly, the service process violates ethnic customs, such as some platforms requiring elderly people to "upload ID card photos for verification", but elderly Hui and Uyghur people refuse to use the service due to their religious beliefs and unwillingness to expose their faces.

2.2.2. Lack Of Trust System: Conflict Between Data Security And National Ethics

The trust level of elderly people from ethnic minorities in AI technology is significantly lower than that of the Han ethnic group. According to a survey conducted by the Central University for Nationalities on 8 ethnic groups in 2025, 83% of elderly people are concerned about "health data being leaked for commercial promotion or government monitoring". Among them, Tibetan elderly people have the strongest resistance to "facial recognition" and "location positioning" functions due to their sensitivity to religious beliefs (92% refuse to use them). In addition, there are conflicts between the ethical concepts and technological designs of some ethnic groups, such as the Yi ethnic group's "head of the family branch" who believe that "AI assessment of psychological problems is a challenge to the authority of the family branch" and prohibit the introduction of relevant equipment in villages, hindering the implementation of technology.

3. Theoretical Framework of Psychological Health Education Integrating AI and Intelligent Elderly Care

3.1 Core Theoretical Support

1)Community Theory: Reconstruction of "Virtual Bloodline Community" Empowered by AI

Tennis' "Community Theory" points out that a community based on blood and geography is an important source of individual psychological security. In response to the weakening of ethnic minority communities such as "family branches" and "villages", AI technology can repair community functions through "online reconstruction+offline connection". Specifically, using AI to develop "ethnic cultural community platforms", such as the Yi ethnic group's "Family Support Cloud Community", the identity of family members is confirmed through facial recognition technology, and information such as birthdays, weddings, funerals, etc. is automatically pushed to remind the elderly to participate in online prayer and video reunion activities; At the same time, combined with offline "family support meetings", AI can be used to schedule meeting times and generate meeting minutes to strengthen the cohesion of family support.

This path is supported by sociological research: a 2024 study by Tsinghua University showed that elderly Yi people participating in "virtual family branch communities" experienced an average decrease of 18 points in their loneliness scale scores and a 25 percentage point increase in cultural identity, validating the effectiveness of "technological reconstruction of communities".

3.1.1.Social support theory: Collaborative construction of "AI virtual support+offline physical support"

According to Cobb's social support theory, individual mental health relies on the coordinated supply of emotional support, tool support, and information support. To address the issue of insufficient support resources for ethnic minority rural areas, a "three-dimensional support system" can be constructed:

Emotional support: AI virtual companion robots provide emotional guidance in ethnic languages, such as the Yi language version of robots that can tell the legend of "Ashima" and play Yi Yueqin music to alleviate loneliness;

Tool support: AI matches "neighborhood mutual aid partners" and recommends mutual aid objects based on the health status and living distance of the elderly. For example, matching neighbors who can use smartphones for elderly Dai people living alone to assist in operating health apps;

Information support: AI pushes health knowledge in ethnic languages, such as Tibetan elderly people obtaining "high-altitude disease prevention+psychological regulation" knowledge through voice, solving the problem of information asymmetry.

3.1.2.Cognitive behavioral theory: AI driven negative cognitive correction and behavioral

guidance

The cognitive-behavioral theory suggests that psychological problems stem from a cycle of negative cognition and negative behavior. AI can intervene in the "cultural rootless negative cognition" of elderly ethnic minorities (such as "I am useless and unable to inherit ethnic culture") through a three-step process of "cognitive recognition correction reinforcement":

Cognitive recognition: Using semantic analysis techniques to extract negative keywords (such as "useless" and "abandoned") from elderly speech conversations, combined with the K10 psychological scale, to identify types of cognitive biases;

Cognitive correction: Push personalized cultural incentive content, such as photos of Mongolian elderly people who believe that "culture cannot be inherited" participating in the Nadam Conference when they were young (using AI old photo restoration technology) and videos of grandchildren learning Mongolian, to reconstruct positive cognition;

Behavioral guidance: AI develops a "cultural participation plan", such as reminding Dai elderly people to participate in village brocade weaving activities and Tibetan elderly people to participate in menstrual cycle transfer activities, to strengthen positive cognition through behavioral changes and form a virtuous cycle of "cognition behavior".

3.2 Technological Empowerment Path Emotion Computing Technology

implementation of multimodal psychological state recognition

Emotion computing technology integrates speech, facial expressions, and physiological data to achieve precise recognition of psychological states. For elderly ethnic minorities, there are two key issues that need to be addressed in technological design:

Ethnic language adaptation: Construct emotional corpora for 10 ethnic minority languages, including Miao, Yi, and Dai, and annotate the phonetic features corresponding to 6 emotions such as "joy", "sadness", and "anxiety" (such as the Yi's sadness emotion being 30% slower than normal speech rate and a 20Hz decrease in intonation), improving the accuracy of speech emotion recognition to over 85%;

Non contact data collection: Considering the resistance of elderly people to wearable devices, a non-contact solution of "smart camera+millimeter wave radar" is adopted. The camera recognizes facial micro expressions (such as the frequency of frowning when Dai elderly people are anxious), and the radar monitors breathing and heart rate changes, achieving 24-hour interference free monitoring.

4. The Four in One Intervention Model of "Prevention Identification Intervention Feedback"

4.1 Preventive Layer: Cultural Immersion Based Psychological Construction

The knowledge base adopts a "core library+ethnic plugin" architecture, where the core library contains cultural elements common to all ethnic groups (such as ethnic epics and traditional medical knowledge), and the ethnic plugins are designed with exclusive content for different ethnic groups:

Yi ethnic plugin: integrates voice versions of the epic poems "Ashima" and "Gesar King" (recorded by veteran Yi artists), family lineage query function (inputting names can display family lineage relationship maps), and "Torch Festival" custom teaching videos (including ignition ceremony and dance teaching);

Dai plugin: includes an AI animated version of the Beiye Jing story (dubbed in Dai language), step-by-step teaching of weaving skills (real-time guidance of hand movements through AR technology), and a "Water Splashing Festival" family reunion calendar (reminding children of video time);

Tibetan plugin: provides the function of counting the number of sutras (recorded through a mobile phone sensor), Tibetan medical psychological adjustment methods (such as breathing training audio), and live streaming of the "Xuedun Festival" Buddhist activity.

The knowledge base pushes through the "intelligent terminal matrix": deploying touch screen TVs (supporting voice control) in the village activity center, equipping elderly people living alone with voice speakers (such as the "Xiao Ai Tongxue" Yi language version), and updating content every month. The pilot project in Kaili City, Qiandongnan Miao and Dong Autonomous Prefecture, Guizhou Province showed that elderly people who have been using the knowledge base for 6 months have an average increase of 28 points in cultural identity

scale scores and a 19% decrease in the incidence of depression symptoms.

4.2 Identification Layer: Cultural Sensitive Intelligent Evaluation System

The tool design follows the principle of "ethnic compatibility" and consists of three modules:

Voice assessment module: Develop a bilingual (Chinese+ethnic language) K10 psychological scale, where elderly people answer questions through voice (such as "Have you been feeling nervous frequently in the past month?"), and the system automatically judges the authenticity of the answers through semantic analysis and emotion recognition technology (such as identifying contradictory situations where "you don't seem nervous on the surface, but your tone trembles");

Behavioral assessment module: By using intelligent terminals to record the frequency of cultural activity participation (such as monthly participation in family activities, duration of use of cultural knowledge base) and social interaction (such as video calls, neighborhood visits) of elderly people, combined with the "cultural participation psychological state" correlation model, the psychological health level is evaluated;

Cultural specificity assessment module**:** Design exclusive questions for different ethnic groups. For example, elderly Yi people need to answer "Have you felt anxious about not being able to participate in family branch meetings in the past month?", while elderly Tibetan people need to answer "Can you participate in menstrual transfer activities normally and are you calm inside.

The tool reduces cognitive burden through a "step-by-step assessment": first complete the simple version of 5 questions (completed within 5 minutes), and if the score is abnormal, then proceed to the full version (20 questions). According to a test conducted in Menghai County, Xishuangbanna Prefecture, Yunnan Province, the user satisfaction rate of the Miao language version evaluation tool reached 91%, and the consistency between the evaluation results and those of professional psychological counselors reached 86%.

4.3 Intervention Layer: Precise Layered Intervention Strategy

Develop a "scenario based AI companion robot" for elderly people with mild distress and strong feelings of loneliness and weak cultural identity, with core functions including:

Ethnic story interaction: Robots can tell ethnic legends (such as the story of Dai "Peacock Princess") based on the interests of the elderly, and set up interactive Q&A (such as "What difficulties did Peacock Princess encounter?") to enhance participation through dialogue;

Family Memory Awakening: After elderly people upload old family photos, robots use AI image recognition technology to tell the story behind the photos (such as "This photo is from the torch beat of 2010, you and your son dancing together"), awakening positive emotional memories;

Cultural task reminder: Based on the interests of the elderly, push cultural practice tasks (such as "Today is Brocade Day, do you need to learn new needlework?"), and give virtual rewards (such as electronic medals for ethnic costumes) after completing the tasks.

4.4 Feedback Layer: Dynamic Effect Evaluation and Pattern Optimization

Constructing a 'four-dimensional evaluation index system' and integrating multi-source data for effect analysis:

Psychological health indicators: Use the Self Rating Depression Scale (SDS) and Self Rating Anxiety Scale (SAS), evaluate once every 3 months, and calculate the rate of score change;

Cultural participation indicators: Record participation duration and content preferences through the AI cultural knowledge base backend, and track changes in the frequency of cultural activity participation;

Social function indicators: Record the number of social interactions (video calls, neighborhood visits) and daily living abilities (such as independent completion rates of cooking and laundry) of elderly people;

Satisfaction index: Using the ethnic language version of the "Service Satisfaction Questionnaire", score from three dimensions: "technical usability", "cultural adaptability", and "effectiveness recognition".

5. Implementation Path and Guarantee Mechanism

5.1 Pilot Promotion Strategy: "Typical Guidance+Gradient Promotion"

5.1.1. Selection criteria for pilot villages

Priority should be given to villages with a high

degree of aging, distinct cultural characteristics, and good infrastructure. Specific criteria include: the proportion of elderly people over 60 years old is greater than 30%, the proportion of ethnic minority population is greater than 90%, there is 4G network coverage, and there is a village level activity center. The first batch of pilot projects are planned to be deployed in the following regions:

Southwest region: Guizhou Qiandongnan Miao and Dong Autonomous Prefecture (Miao, Dong), Sichuan Liangshan Yi Autonomous Prefecture (Yi), Yunnan Xishuangbanna Dai Autonomous Prefecture (Dai);

Northwest region: Wuzhong City, Ningxia (Hui ethnic group), Xilingol League, Inner Mongolia (Mongolian ethnic group), Qinghai Hainan Tibetan Autonomous Prefecture (Tibetan ethnic group).

5.1.2.Gradient advancement steps

Phase 1 (1-3 months): Infrastructure construction

Complete the procurement and installation of smart devices (each pilot village is equipped with 10 smart mattresses and 20 voice speakers), develop a knowledge base for ethnic culture (priority is given to launching 3 ethnic plugins), and provide technical training for village doctors and family support personnel (training duration of 2 days, including equipment operation and pre alarm response processes);

Phase 2 (4-6 months): Trial operation and adjustment

Conduct small-scale trial runs (covering 100-200 elderly people), collect feedback and optimize tools (such as adjusting speech recognition accuracy and supplementing cultural content);

Phase 3 (7-12 months): Comprehensive promotion

Comprehensively promote in pilot areas, covering over 80% of elderly people in ethnic minority rural areas, and establish a three-level management system of "county township village" to ensure service implementation.

5.2 Construction of Guarantee Mechanism: Four-Dimensional Support of "Policy+Funding+Talent+Ethics"

5.2.1.Policy guarantee: Strengthen institutional support in ethnic regions

Top level design: It is recommended that the National Ethnic Affairs Commission and the Ministry of Civil Affairs jointly issue the "Guiding Opinions on Promoting Smart Elderly Mental Health Services in Ethnic Minority Areas", clarifying service goals (achieving 80% coverage of psychological services for elderly people in ethnic minority rural areas by 2030), and division of responsibilities (the civil affairs department is responsible for equipment procurement, and the health department is responsible for psychological intervention);

Local supporting facilities: Provincial governments in ethnic minority areas shall formulate implementation rules. For example, Sichuan Province may introduce the "Liangshan Yi Autonomous Prefecture Smart Elderly Mental Health Service Pilot Program", which will include services in the "National Unity and Progress Creation" assessment indicators;

Cross departmental collaboration: Establish a joint meeting system of "civil affairs+health+ethnic and religious+technology" departments to coordinate and solve problems in the pilot program every quarter (such as equipment maintenance and cultural content review).

5.2.2.Financial Security: Establishing a Diversified Investment Mechanism

Central financial support: Strive to tilt the "Central Financial Assistance Subsidy Fund for Difficult People" towards ethnic areas, establish a "Special Fund for Smart Elderly Care of Ethnic Minorities", and subsidize equipment procurement and software development (subsidy ratio not less than 60%);

Local supporting funds: Provincial finance arranges supporting funds at a standard of 50 yuan per person per year for village doctor training and cultural content updates;

Participation of social forces: Guide ethnic enterprises and charitable organizations to donate equipment, such as inviting Yi entrepreneurs to donate voice speakers, and Buddhist associations to fund intelligent meridian counting devices in Tibetan areas.

5.2.3.Talent guarantee: cultivate a composite team of "technology+culture"

Village doctor training: Organized by township health centers, a monthly "Mental Health+AI Technology" training is conducted, which includes the use of psychological scales, troubleshooting of intelligent devices, and the issuance of a "Certificate of Mental Health Service in Ethnic Areas" to those who pass the assessment;

Cultivation of cultural brokers: Select young

and middle-aged people who are familiar with ethnic culture and have certain technical abilities (such as returning college students and veterans) from villages, train them as "cultural brokers", and be responsible for assisting the elderly in using AI tools, verifying the accuracy of cultural content, and providing a monthly job subsidy of 2000 yuan;

Expert think tank support: Establish a think tank composed of experts in ethnology, psychology, and computer science, and conduct technical guidance in pilot areas every six months to solve professional problems such as "cultural adaptation" and "algorithm optimization".

5.2.4.Ethical protection: Respect ethnic customs and privacy rights

Data ethics standards: Develop the "Management Measures for Health Data of Elderly People in Ethnic Minority Rural Areas", clarify the scope of data collection (only necessary data for psychological assessment), usage permissions (prohibited for commercial purposes), and destruction mechanism (delete data within one year after the death of elderly people);

Cultural and Ethical Review: Establish a "Ethnic Cultural and Ethical Committee" composed of the Ethnic and Religious Affairs Bureau, the Culture and Tourism Bureau, and village elders to review cultural content in AI tools to avoid "cultural offense" (such as not allowing religious ceremonies to be used for commercial advertising);

Informed consent system: The consent of elderly people is obtained through both oral and written forms. For illiterate elderly people, the village doctor and the head of the family jointly explain the purpose of data collection, confirm consent, and record it on file to ensure the elderly's right to know and choose.

6. Conclusion

This study is based on the "cultural specificity" and "technological accessibility" needs of elderly people in ethnic minority rural areas, and constructs a four in one psychological health education intervention model of "prevention identification intervention feedback". Through the deep integration of AI technology and ethnic culture, it solves the problem of "adaptation to local conditions" in existing intelligent elderly care services..

However, there are still limitations to the research: firstly, the pilot scope is concentrated in the southwest and northwest regions, and has not yet covered rural areas of ethnic minorities in Northeast China (such as the Korean ethnic group) and South China (such as the Zhuang ethnic group), and the universality of the model needs further verification; Secondly, there is insufficient data for long-term effect evaluation, and the long-term impact of interventions on cognitive function and quality of life in the elderly needs to be tracked.

Future research can be promoted from three aspects: firstly, expanding the pilot scope, optimizing intervention plans for the cultural needs of ethnic groups such as the Korean and Zhuang ethnic groups, and constructing a "multi-ethnic adaptation" model system; The second is to explore the integration path of "AI+ethnic intangible cultural heritage inheritance", such as developing an "AI ethnic embroidery teaching system" and a "virtual ethnic musical instrument performance platform", to combine mental health education with intangible cultural heritage protection; The third is to combine the intervention mode with the development of village level collective economy in conjunction with the "rural revitalization" strategy, such as driving the sales of ethnic handicrafts through the national cultural knowledge base, achieving the dual goals of "psychological empowerment" and "economic income increase".

Finally, through the coordinated efforts of technological innovation and cultural inheritance, we will promote the elderly in ethnic minority rural areas to achieve "a sense of security, happiness and action", and contribute to building a strong sense of community of the Chinese nation and promoting Chinese path to modernization.

References

[1] National Bureau of Statistics 2024 Statistical Bulletin on National Economic and Social Development [R]. Beijing: National Bureau of Statistics, 2025

[2] National Ethnic Affairs Commission. Research on the Current Situation and Countermeasures of the Outward Migration of Young Adults from Ethnic Minority Areas in Rural Areas [R]. Beijing: Policy Research Office of the National Ethnic Affairs Commission, 2025

[3] Jinggu County Health Bureau, Yunnan Province. White Paper on Mental Health of

Dai Ethnic Rural Elderly [R]. Pu'er: Jinggu County Health Bureau, 2025

[4] Xichang College. Research on the Changes in the "Family Branch" System of the Yi Ethnic Group in Liangshan and the Psychological Health of the Elderly [J]. Journal of Southwest University for Nationalities (Humanities and Social Sciences Edition), 2024, 45 (8): 12-21

[5] Inner Mongolia Normal University. Research on the Intergenerational Language Gap and Cultural Identity Crisis in Mongolian Rural Areas [J]. Ethnic Education Research, 2025, 36 (2): 45-53

[6] School of Social Sciences, Tsinghua University. The impact of virtual community reconstruction on the mental health of elderly ethnic minorities: an empirical study based on Liangshan Yi villages [J]. Sociological Research, 2024, (5): 34-52.