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Community support as a driver for social integration in ex-situ poverty alleviation relocation communities: a case study in China

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After the implementation of Poverty Alleviation Relocation (PAR), the social integration of migrants has gradually received attention. While studies recognize the factors affecting migrants' social integration such as human capital, social capital, and policies are multiple and co-influential, the role of community support in simultaneously influencing migrants' social integration has been largely overlooked. This paper addresses this gap by introducing community support into the social integration framework, taking China's PAR that cause complex spatial, economic, and social changes as the object of study. We evaluated the social integration of Poverty Alleviation Migrants (PAMs) in five Ex-situ Poverty Alleviation Relocation (ESPAR) communities in the southwestern province of China across four dimensions: psychological identity, economic integration, communicative integration, and cultural acceptance. Utilizing a multiple linear regression model, we analyzed influencing factors on social integration. Results indicate that overall social integration of PAMs is at a medium-high level, with psychological identity scoring the highest. Notably, community support significantly influences the social integration of PAMs, particularly in terms of psychological identity. In conclusion, we highlight the imperative of enhancing the spatial environment of ESPAR communities to facilitate the better integration of PAMs into society.

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Introduction

The social integration of migrants has always been a very important issue, which is related to local and regional development (Wise and Ramírez 2001; Mai and Wang 2022), urban security (Shihadeh and Flynn 1996; Rüegger 2019), public health (Baumgartner and Susser 2013; Liang et al. 2020), economic and social equity (Bell et al. 2010; Ofori et al. 2022), educational equality (Lan 2014; Koehler and Schneider 2019; Carlana et al. 2022), gender relations (Hagan 1994; Curran et al. 2006; Cheung and Phillimore, 2017), and so on. All of these topics influence the achievement of the Sustainable Development Goals (SDGs) (Giljević and Lalić Novak 2020). Social integration is a process that individuals or groups become accepted as a member in mainstream society or various social areas equally (Scheff 2007), and it is a classical topic in urban research that how the group of newcomers to integrate after migrating into a new city. A lot of researches about the theory of migrants' social integration have been conducted. Based on the discussion of ethnic immigration in the United States and the study of social integration in Europe (Alba and Foner 2014), the dominant view of migrants and social integration in western academic circles can be divided into "Assimilation" and "Multiculturalism", however, whether it is assimilation or multiculturalism, social integration involves the aspects of society, polity, economy, culture and psychology (Harder et al. 2018; Tang et al. 2022). A poor level of integration may not only affect individual physical and mental health, but also lead to some serious social problems such as social polarization (Rye 2018), racist harassment and violence (Erel 2011; Araújo 2016). Therefore, how the migrants can achieve a higher level of social integration in the new community is a question that governments, Non-Governmental Organization (NGOs), and scholars are all very concerned about.

The restrictions on the social integration of migrants are multiple and co-influential. It has mainly formed three attribution theories including human capital (Becker 2009; Abdulla, 2020), social capital (Portes 1998; Lu et al. 2013; Gericke et al. 2018; Gërxhani and Kosyakova 2022) and policy (Lukes 1975). There are also studies that discuss the simultaneous effects of human capital and social capital on the social integration of migrants (Chou and Chow 2009). But few of them paid enough attention to the influence of community environmental resources, which are closely related to poverty's occurrence (Jalan and Ravallion 1997; Schulz et al. 2013; Mouratidis, 2020) and social integration (Stokes, 2020). Neighborhood communities, as the physical and social environments of residents' daily lives, not only provide residents with resources such as public services, but also shape the extent to which residents benefit from these resources (Cassiers and Kesteloot 2012; Jia et al. 2021). Although community support dimensions such as geographic location and infrastructure have been shown to play an important role in the degree of social integration of residents (Kısar Koramaz 2014), there is also a theory of social-spatial integration proposed by Ruiz-Tagle (2013) in the context of the U.S. in four dimensions: physics, function, relation, and symbol, emphasizing the importance of space for the process of social-spatial integration. However, it is not clear whether community support joins human capital, social capital, and policy in influencing the social integration of migrants simultaneously. Therefore, it is necessary to incorporate community support into the existing analytical framework of social integration and explore its relationship with migrants' social integration.

There are also differences in the level of social integration of residents in communities with different levels of quality and structure (Kısar Koramaz 2014). Poverty alleviation relocation (PAR) in China has caused profound changes in the natural and human environment, resulting in challenges such as spatial reconstruction within a short period of time and a huge urban-rural gap, as well as complex and drastic changes in modes of production, lifestyles, and interpersonal relationships among the migrants (Lo et al. 2016; Yang et al. 2020a). Two spatial forms have appeared during the relocation——long-distance resettlement and short-distance resettlement, with long-distance resettlement referring to relocation in cities or towns and short-distance resettlement referring to relocation in the nearby township or rebuilt on the original site (Lo et al. 2016), of which long-distance resettlement has the largest number of people, and is the most representative resettlement mode of PAR in China. Currently, most studies have analyzed the impact of single community support factors such as resettlement distance (Zhang et al. 2023) and neighborhood environment accessibility (Wang and Liu 2022) on the social integration of migrants. However, in the context of complex spatial, economic and social changes induced by PAR, there is a paucity of research on how community support affects the social integration of migrants.

This article introduces community support based on the existing explanatory framework of social integration to analyze the factors influencing the social integration of poverty alleviation migrants (PAMs). Taking Guizhou province, one of the most typical provinces in China, where PAR has been implemented, as the study object, we first examined the level of social integration of PAMs after relocation and investigated how different factors affect the social integration of PAMs, especially community support. In order to gain a more comprehensive understanding of the situation under different relocation modes, we further analyzed the impact of different factors on social integration of PAM under the resettlement in cities/towns (i.e., long-distance resettlement) mode. We hope that the findings of this article can provide some scientific guidance for policy makers and scholars to help PAMs in China better integrate into the society by improving the community environment, which may also have some reference value for the choice of PAR spatial modes in other countries.

Background and literature review

Background. China has the largest population in the world, as well as the most populous of poverty people. China has spared no effort to reduce poverty by implementing a series of poverty alleviation policies since it carried out the Reform and Open-up policy in 1970s. The ex-situ poverty alleviation relocation (ESPAR), as the most important and high-profile poverty alleviation policy in recent years, aims to relocate the poor who used to live in harsh and impoverished natural and living environment, where development conditions to achieve the goal of eradicating poverty are poor (NDRC 2018). This policy emphasizes on voluntarism of the masses, leaded and funded by the government and protected by a series of institutionalized mechanisms. Under such policy, the poor households need to leave within a prescribed time and the original house will be pulled down, and then ecological compensation policies will be implemented immediately for promoting sustainable development. Meanwhile, migrants will be relocated free of charge to a unified new residential area built by the government. During the 13th Five-Year Plan period, China has successfully implemented the ESPAR which completed the relocation of 9.6 million people in order to solve the poverty problem caused by spatial factor (The State Council Leading Group Office of Poverty Alleviation and Development,2020).

Currently, PAR in China is in the post-settlement stage, migrants have all moved into their new community, and the level of social integration concerns the result of poverty elimination

(Dugarova 2015), subjective well-being (Herrero et al. 2011) and health (Marcus et al. 2016) of migrants. Although it is a voluntary relocation led by the government, to some degree, this kind of relocation puts the improvement of economy at the first place, but pays less attention to its social and cultural adaptation or integration (Yang et al. 2020b). Meanwhile, as the largest scale of spatial restructuring in rural China recently (Lo et al. 2016), the sudden emergence of such large number of migrant communities will affect the spatial pattern of urban and rural areas. And a poor level of integration could result in social segregation, even some social phenomenon like spatial movement along with poverty concentration. So, it is necessary to pay more attention to the social integration at the post-resettlement stage of PAR in China.

Guizhou province is one of the most typical provinces in China, where PAR has been implemented. It is a multiracial province located in the southwest of China, and geographic feature such as mountainous and few of plains, and fragile ecology have brought about its traffic inconvenience and lagging economy. Therefore, Guizhou is one of most impoverished provinces in China and also the province with a largest scale of the PAR. In recent years, poverty incidence in Guizhou declined from 14% in 2005 to 0.85% in 2019 (The Poverty Alleviation and Development Office of Guizhou Province 2017, 2020). Such a giant leap could not separate from the work of China's PAR. By the end of 2019, Guizhou reduced the number of poverty population in rural area by 1.24 million, and completed the PAR project which involved 1.88 million migrants who are now at the stage of post-resettlement (The Poverty Alleviation and Development Office of Guizhou Province, 2020). So, as the most powerful explanatory object, study in Guizhou, to a certain extent, can objectively reflect the current situation in China.

Literature review

Socio integration of PAM. There are already many cases of PAR of various types in the world, however, the social, economic, and psychological problems after the PAR are extremely complicated. Zimbabwe's government aimed to eliminate unequal distributions of land of Africans by the land reform program. Despite its partial effectiveness, the economic income level continually declined due to insufficient follow-up policies and the shortage of financial support, and the migrants' inability to master new technique and experience (Kinsey 1999). Ethiopia has started PAR since 1980. By 2003, the problem such as competition for interests and religious conflicts occurred between migrants and the local because of the improper planning of resettlement sites and lack of social support and cultural integration after resettlement (Hammond 2008). In Laos, in order to eradicate opium cultivation and for security concerns, the government and international aid agencies help relocate voluntary or involuntary highland indigenous minorities into lowland areas along public roads. Ignoring and underestimating the place attachment to the original area, the primal social systems, livelihoods and culture of many indigenous ethnic communities and people were totally destroyed after movement, also many migrants were unable to adapt to the new life, and some severe physical and psychological health problems emerged (Baird and Shoemaker 2007). In China, the representative migrant groups that have received much attention are mainly concentrated in the Three Gorges migrants (Heming et al. 2001; Zhen et al.2023), ecological migrants (Xue and Huang 2019; Guo et al. 2023) and new-generation migrant workers (Chen and Wang 2015; Zhao et al. 2018), most of which have developed certain economic, social, cultural, psychological and other aspects of inadaptation after migration, as well as social barriers with the original residents.

China's PAR, as one of the main ways to eradicate poverty in rural areas, has such special characteristics. First, it is an externally driven migration, with a clear emphasis on the voluntariness of the migrants, but the time for relocation and adaptation is necessarily limited and short (Lo and Wang 2018). Second, the government uniformly relocates migrants to areas with better economic environments and provides them with security for their lives after relocation, but because their own economic conditions were generally hard and highly dependent on the external economic support (Lo et al. 2016). Again, PAR involves a multinational integration, but without changes in nationality (Tang et al. 2022). Finally, due to various standards of the TPA strategy (Guo et al. 2022), the restructuring environment of different migrants were various, which led to different and complexed socio-economic problems faced by them (Yang et al. 2020a). Combined with the series of social, economic, and psychological integration problems faced by migrants in other countries after relocation mentioned above, the social integration of PAMs in China also needs attention. Although some studies have already assessed the degree of social integration of PAMs and some of the influencing factors (Tang et al. 2022), a comprehensive analysis of the social integration of PAMs is urgently needed, given the special nature of China's ESPAR and the serious consequences of reducing the poor social integration of migrants after relocation. This can also provide a reference for other countries, especially developing countries, to formulate and evaluate poverty reduction strategies.

Evaluation system of migrants' social integration. Social integration is a multi-dimensional concept, a large number of studies have proposed different evaluation methods for the social integration of different migrant groups, but scholars primarily focused on four domains: economy, society, culture, and psychology. For example, Landecker (1951) divided social integration into four types: cultural integration, normative integration, communicative integration, and functional integration, and considered them to be continuously changing. Heckmann and Schnapper (2003) have differentiated between social, cultural and other integration. Census Bureau in the USA has considered economic, cultural, and civic mainstream aspects to compare the integration of native- and foreign-born adults in a long term (Vigdor 2008). Migrant Integration Policy Index (MIPEX) was released in 2004, and the fifth edition is now widely used in 56 countries, with a system of indicators covering eight policy areas, providing tools and opportunities for a rich, multilevel understanding of the level of integration of migrants (MIPEX 2020). In China, various scholars have referred to the measurements from western scholars while combining with national conditions and specific research focus, and established their own evaluation system. Yang et al. (2020a) examined the differences in social integration among different types of migrants in Shenzhen in terms of five dimensions: community integration, economic integration, social relations integration, cultural integration, and psychological integration. Tang et al. (2022) measured the social integration of Chinese migrants in five dimensions: social, psychological, cultural, economic, and political integration. Shen and Xia (2023) analyzed the floating population's social integration structure and path from five dimensions: physiological adaptation, economic integration, social adaptation, identity, and psychological integration.

Theoretical framework and hypothesis. There are three main types of attribution theory about social integration, including human capital, social capital, and policy. Human capital theory mentioned by Becker extends economic theory to the study of

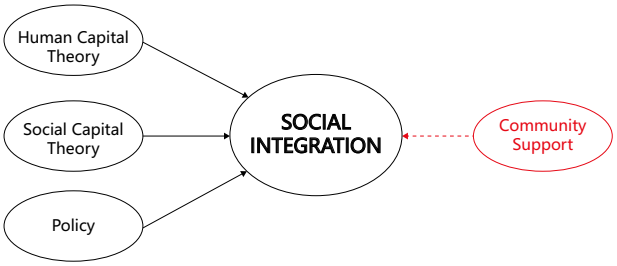

Fig. 1 Analytical framework and hypothesis. Community support is combined with existing theories of human capital, social capital, and policy to form a more systematic analytical framework for PAM community integration.

human behavior (Becker 2009). And human capital of migrants refers to the human capital characteristics possessed by individuals, including educational attainment (Chen and Wang 2015; Kearns and Whitley 2015), language skills, work experience and other demographic indicators, which are closely related to the economic income of migrants (Garibaldi 2006; Tan 2014). At the same time, the original notions and ideologies of migrants, such as differences in ethnicity are also part of human capital (Becker 2009). Social capital theory is about the secure benefits accessing from migrants' social network or other social structures (Portes 1998). And the degree of social intimacy of migrants is affected by social support networks, family relations, and marital status. Moreover, the move-in time and the distance between relocation and the move-out place are both related to the formation of social support and social bonds (Keene et al. 2013). Due to insufficient social capital, migrants cannot obtain enough social support and will affect their integration (Portes 1998; Feng and Zhu 2022). The difference is that scholars emphasizing the role of policy exposit the restrictive effects of policies on social integration of migrants (Lukes 1975). The goal orientation of policies at relocating place, including employment policies, social welfare and other restrictions on migrants' social integration (Penninx 2005), could be reflected in the situation of social integration. So, there are also some government policy supports having a positive impact on the social integration, such as the right to get migrant's household registration and residence permit in the inflow place, and the guarantee on signing a legal labor contract (Cao and Wang 2016).

Meanwhile, many studies also suggested that, community support such as environmental resources have deep influence on PAMs. From an objective social and economic point of view, limited by time and economic costs, the public space of the community is an important place for migrant leisure time activities compared to other places in the city (Tan, 2021). And the characteristics of outdoor public spaces affect the formation and maintenance of social relationship (Kweon et al. 1998). Also, the quality of public transportation system affects the socio-spatial integration of the migrant and the local (Özkazanç and Özdemir Sönmez 2017). For migrant subjective psychology, environmental comfort affects whether the migrant is willing to continue living here (Huang and Chen 2022). Housing security is related to neighborhoods, happiness, and social integration (Zheng et al. 2020). A safe environment is more conducive to people's interactions (Mikulincer et al. 2005). And benefiting from the convenience, safety, and services of the neighborhood with the superior conditions characteristic of the city will make migrants feel more sense of belonging for the city they live in (Liu et al. 2022). So, community support has the most direct impact on people, but at present, the summary and utilization of it are lacking.

To sum up, it is vulnerable for previous studies to discuss the influencing factors of migrants' social integration only from human capital, social capital, and policy. Existing studies have revealed that the consequence of community support, while it lacks a theoretical integration. Therefore, in addition to the three existing theories, this paper integrates the impact of community support on social integration of PAM to form a more systematic analytic framework (Fig. 1). Taking into account the post-resettlement stage of PAR in China and the characteristics of PAMs, we focus on the following issues:

1. How to evaluate the level of social integration of the PAMs in China? What is the difference between the integration situations in the three modes of resettlement, i.e. resettlement in original village, resettlement in a nearby township, resettlement in cities/towns?
2. What factors affect the level of social integration of the PAMs, especially in the term of community support?
3. How to promote the social integration of PAMs, especially from the community support?

Methods

Case and data. Anshun, a city located in the midwestern part of Guizhou Province, is a typical area of karst topography with multi-ethnic communities, and is chosen as our research region. From 2017 to 2020, Anshun has built 84 centralized resettlement sites, which accommodated 82,104 migrants all over the city (The People's Government of Anshun 2020), and 5 of the 6 poverty-stricken counties in Anshun have all achieved their poverty relief goals (The People's Government of Guizhou Province 2018, 2019). The research sample of this paper is collected from five different types of PAR sites (A, B, C, D, E) in five different counties in Anshun City (Fig. 2).

According to the distance between the resettlement sites and the original villages, we classify the distance of relocation as within 3 km, 3–15 km, 15–40 km and 40 km or more. The resettlement sites with relocation distance within 3 km are convenient for migrants to walk back to the village in daily life. The resettlement sites with relocation distance of 3–15 km are concentrated along the highway adjacent to the original villages, and the resettlement sites with relocation distance of 15–40 km or 40 km are usually located at the edges of cities and towns, and migrants need to return to their original villages by car. Considering the different types of relocation, resettlement in cities/towns has the largest number of people, and is the most representative mode for PAR in China. At the same time, it has been shown that compared to resettlement in original village or in a nearby township, migrants relocated cities/towns face more social integration problems, such as shifts in livelihood patterns and reconfiguration of social networks (Lo et al. 2016; Yang et al. 2020a). Therefore, we also focused on the specific factors influencing the social integration of migrants under the mode of resettlement in cities/towns.

The research data comes from the on-site questionnaire survey conducted at each PAR site during January 2020. All the respondents have been the participants of the PAR in Guizhou since 2016. Stratified random sampling was used to determine the sample size of the two types of resettlement according to the ratio of long-distance resettlement (resettlement in cities/towns): short-distance resettlement (resettlement in original village and resettlement in a nearby township) of about 3.6:1 in Guizhou Province, and secondly, in combination with the specifics of the total population size of the five PAR sites, the survey samples were taken according to the principle of random sampling, and it was ensured that the sample sizes of each PAR sites were

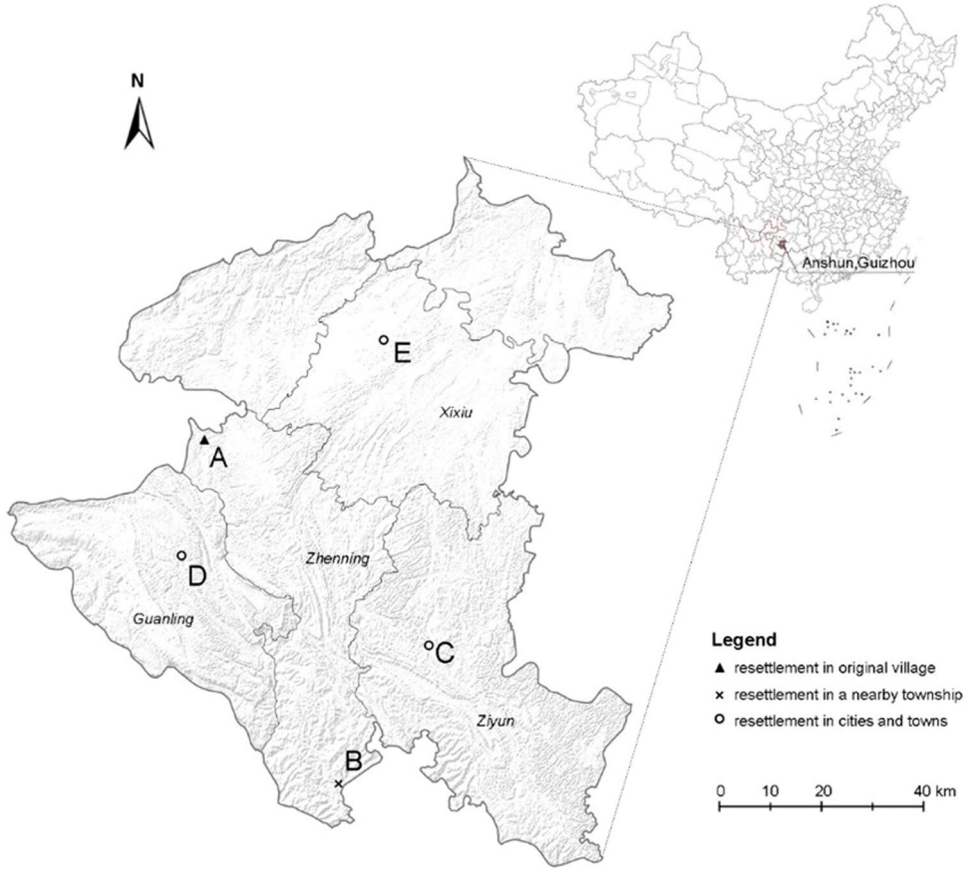

Fig. 2 Location of 5 sampled PARs in Anshun, Guizhou, China. The three legends indicate the geospatial location of the different types of sample PAM communities. Of these, ▲ represents resettlement in original village. × represents resettlement in a nearby township. ○ represents resettlement in cities and towns.

Table 1 Sample distribution.

Sampled PAR	City and County	Type of Sampled PAR	Number of PAR households	Number of valid questionnaires (sampling proportion)
A	Zhenning	resettlement in original village	148	42(28.38%)
B		resettlement in a nearby township	80	24(30.00%)
C	Ziyun	resettlement in cities/towns	710	53(7.46%)
D	Guanling		1788	72(4.03%)
E	Xixiu		1259	132(2.17%)
Total			3985	323(8.11%)

guaranteed to be more than 20. Finally, a total of 340 questionnaires were randomly distributed in five PAR sites, including 323 valid questionnaires, with an effective rate of 95%. The backgrounds and data collection status of each resettlement site are shown in Table 1.

Social integration evaluation system of PAMs. We refer to the existing evaluation system of measuring the social integration and comprehensively take the actual situation of PAR in China into account, and finally select a total of 11 indices from the four dimensions of economy, society, psychology and culture to build an exclusive society integration evaluation system for the PAMs in China. In terms of economy, we mainly consider income changes, income satisfaction, and acceptance of the living cost in the new community after relocation. The difference in resettlement sites directly affects the changes in livelihoods and living costs of the relocated people, that is, income and expenditure. In terms of society, we mainly consider the interaction among neighbors, the participation in social activities, and the size of local social circles after relocation, in order to evaluate the construction of social networks and the strength of social support after migration. In terms of psychology, we mainly consider whether residents will become more positive, and have confidence in the new community, and feel a sense of belonging to the new community, in other words, whether they accept the changes in the living environment and would like to integrate into the new life actively. In terms of culture, we mainly consider whether residents of different nationalities have language barriers after relocation, and whether there are differences in customs and habits which may have an impact on culture integration (Gońda et al. 2021). Measurements are made through the five-point Likert scale, ranging from 1(strongly disagree/totally dissatisfied) to 5(strongly agree/totally satisfied). The higher the score, the better

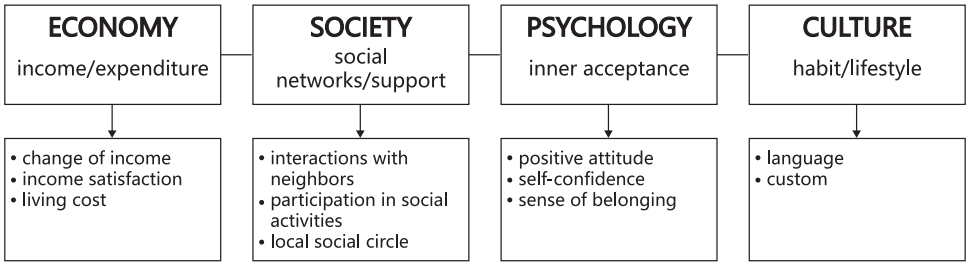

Fig. 3 Social integration evaluation system of PAMs. Drawing on existing social integration evaluation systems and the actual situation of China's PAR, a total of 11 indicators were selected from four dimensions: economy, society, psychology, and culture, to construct an exclusive social integration evaluation system for China's PAR.

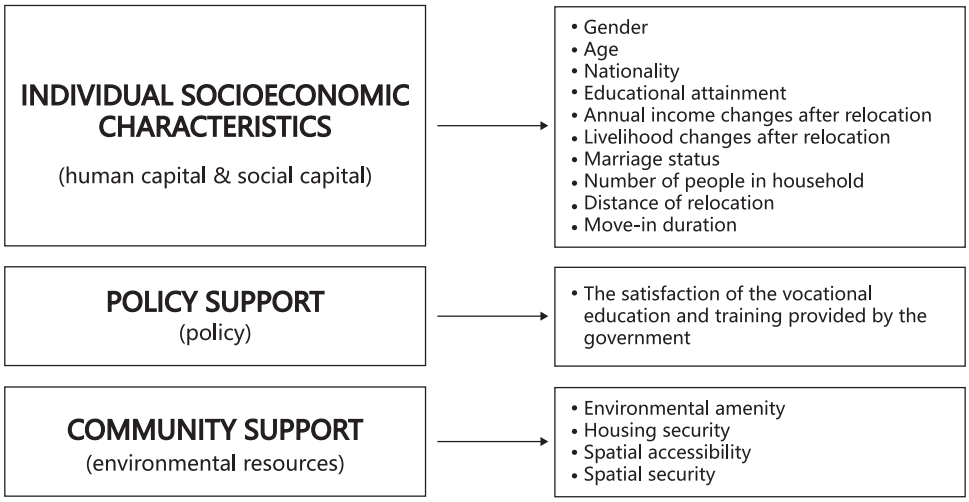

Fig. 4 Influencing factors of social integration of PAMs. Based on the analytical framework and theoretical assumptions constructed in this paper as well as the actual situation of PAMs in China, the influencing factors of social integration of PAMs are explored in terms of individual socioeconomic characteristics, policy support and community support.

the level of social integration (Fig. 3). Cronbach Alpha based on normalized terms was estimated at $\alpha = 0.743 > 0.7$.

Influencing factors of social integration of PAMs. Based on current theories, our hypothesis, and the actual situation of the PAMs in China, we study three aspects of influencing factors of social integration: individual socioeconomic characteristics, policy support and community support. Individual socioeconomic characteristics combines the knowledge of human capital and social capital, including gender, age, nationality, educational attainment, annual income changes after relocation, livelihood changes after relocation, marriage status, number of people in household, distance of relocation, move-in duration. Policy support refers to the macro-institutional factor that affects the structural integration of migrants, which includes one item of the satisfaction of the vocational education and training provided by the government. And community support reflects the concern about the environmental resources of the community, which include four items of environmental amenity, housing security, spatial accessibility, and spatial security (Fig. 4). Regarding community support, Cronbach Alpha based on normalized terms was estimated at $\alpha = 0.750 > 0.7$.

Statistical analysis. Factor analysis and ordinary least square (OLS) multiple linear regressions are used to study the level and influencing factors of social integration of the PAMs. Firstly, for the 11 indices in the PAMs social integration evaluation system, we apply factor analysis to eliminate the effects of collinearity and extract main factors that represent most of the original factors of social integration. The social integration score is calculated based on the variance contribution rate of each main factor as the weight and is normalized to a percentage system according to the standard score. Subsequently, we calculate the score of social integration of three resettlement modes. Further, in exploring the influencing factors of social integration, we apply OLS multiple linear regressions for comparative studies of the association between multiple influencing factors (i.e. individual socioeconomic characteristics, policy support, and community support) and the score of social integration in both the full sample and the samples of resettlement in cities/towns. All the above statistical analyses were performed with IBM SPSS Statistics 25.

Result

Descriptive statistics. Table 2 demonstrates that all the average score of the social integration indices is above 3.200, with the highest average score for the dimension of psychology. Regarding the influencing factors of policy support and community support, all factors show high scores, with the highest satisfaction with transportation accessibility and the lowest satisfaction with vocational education and training provided by the government. In terms of individual socioeconomic characteristics, 61.7% of the respondents are male and the education level of the all samples is generally low. Also, the household with more than 5 members account for 67.1%, 69.3% of the respondents moved more than 15 km away, and respondents who have moved in for more than one year account for 55.1%.

Table 2 Descriptive statistics ($N = 323$).

Evaluation of Social Integration	Mean	Std. Deviation
Economy	3.384	
Compared with before, are you satisfied with your financial income after relocation?	3.346	0.966
Can you accept the cost of living in your new community?	3.514	1.023
Do you think your financial income has had any change since you relocated?	3.293	0.968
Society	3.411	
How many local friends and acquaintances (in the city or in the town) do you have after relocation?	3.264	1.190
Do you often participate in social activities (i.e. community activities, square dancing, chatting, eating at the feast, etc.) after relocation?	3.285	1.218
Do you often socialize with the neighbors in your new community after relocation?	3.684	1.077
Psychology	4.162	
Do you enjoy living in your new community and would like to continue to do so?	4.177	0.847
Are you confident about integrating into the new community?	4.227	0.853
Do you feel happier and more positive about your life than you did before the relocation?	4.081	0.852
Culture	3.898	
Can you understand the local dialect and communicate smoothly with others after relocation?	4.498	2.962
Is there a big difference in the customs of the resettlement from those of the original village?	3.298	1.255

Influencing factors of social integration

Individual socioeconomic characteristics		N	Valid Percent
Sex	Male	190	61.7
	Female	118	38.3
Age	≤18	24	7.5
	18–45	160	50.0
	46–69	117	36.6
	>69	19	5.9
Nationality	Han Chinese	146	45.6
	Ethnic minority	174	54.4
Educational attainment	No education	50	15.5
	Elementary school	92	28.6
	Middle school	127	39.4
	High school or secondary vocational school education	31	9.6
	Three-year college education or bachelor degree	22	6.8
Annual income changes after relocation	Decreased	35	11.0
	The same	189	59.2
	Increased	95	29.8
Livelihood changes after relocation	Unchanged	162	50.8
	Changed	157	49.2
Marriage	Married	232	72.7
	Not married	87	27.3
Number of people in household	≤3	46	14.4
	4	59	18.5
	≥5	214	67.1
Distance of relocation	<3 km	49	16.0
	3 ~ 15 km	45	14.7
	15 ~ 40 km	130	42.5
	>40 km	82	26.8
Move-in duration	<0.5 year	35	10.9
	0.5 ~ 1 year	109	34.0
	>1 year	177	55.1
Policy support			
Are you satisfied with the vocational education and training provided by the government after relocation?		3.92	0.970
Community support			
Environmental amenity——Do you think the living environment of the new community is beautiful and comfortable?		4.17	0.782
Housing security —— Are you satisfied with the quality of your housing?		3.96	0.985
Spatial accessibility——Do you think it more convenient to go to towns and cities than before?		4.39	0.787
Spatial security——do you feel safer living in your new community than before?		4.24	0.845

Score of social integration. Four main factors are extracted by Factor Analysis (KMO = 0.812 > 0.7, the value of Bartlett test of sphericity is 978.992, Sig. P = 0.000) which is basically consistent with the four dimensions of social integration initially set in this study. Four main factors are named as psychological identity, economic integration, communicative integration, and cultural acceptance, with explained variance of 19.433%, 18.026%, 17.889% and 10.581% (Table 3).

Table 4 reports the social integration score of migrants under the three kinds of PAR model, which have a comparable level of social integration, and the scores are at a medium-high level in general (57.61). The social integration score of the resettlement in

Table 3 Factor loading matrix after rotation.

Variables in the Equation	Component				Communality
	1 psychological identity	2 economic integration	3 communicative integration	4 cultural acceptance	
Do you enjoy living in your new community and would like to continue to do so?	**0.830**	0.191	0.173	0.097	0.764
Are you confident about integrating into the new community?	**0.798**	0.161	0.113	0.042	0.676
Do you feel happier and more positive about your life than you did before the relocation?	**0.763**	0.251	0.231	0.094	0.707
Do you think your financial income has had any change since you relocated?	0.093	**0.852**	0.044	−0.010	0.737
Compared with before, are you satisfied with your financial income after relocation?	0.291	**0.770**	0.093	0.039	0.687
Can you accept the cost of living in your new community?	0.219	**0.630**	0.225	0.065	0.500
Do you often socialize with the neighbors in your new community after relocation?	0.155	0.026	**0.858**	0.053	0.764
Do you often participate in social activities (i.e. community activities, square dancing, chatting, eating at the feast, etc.) after relocation?	0.199	0.089	**0.776**	0.007	0.650
How many local friends and acquaintances (in the city or in the town) do you have after relocation?	0.121	0.351	**0.666**	0.172	0.611
Is there a big difference in the customs of the resettlement from those of the original village?	0.095	0.094	−0.037	**0.788**	0.640
Can you understand the local dialect and communicate smoothly with others after relocation?	0.051	−0.028	0.164	**0.696**	0.515
explained variance (%)	19.433	18.026	17.889	10.581	

Extraction method: principle component analysis; rotation method: varimax rotation with Kaiser standardization.
Rotation converges after five iterations.

Table 4 Score of social integration.

Type of PAR	Data (N)	Psychological identity	Economic integration	Communicative integration	Cultural acceptance	Social integration
Resettlement in original village	42	66.50	53.57	68.41	16.41	60.08
Resettlement in township	24	66.13	52.6	58.44	13.58	54.24
Resettlement in cities/towns	257	72.77	53.78	54.26	13.81	57.59
Full sample	323	71.37	53.61	56.50	14.12	57.61

original village is the highest (60.08), followed by resettlement in cities/towns (57.59) and resettlement in a nearby township (54.24). Compared with the others, resettlement in original village performs best in the dimension of communicative integration and cultural acceptance, and resettlement in cities/towns has the highest score in dimension of psychological identity and economic integration but the lowest score in communicative integration. Moreover, resettlement in a nearby township scores lowest in terms of psychological identity, economic integration, and cultural acceptance.

Regressions results of the influencing factors of social integration. The regression results of the social integration, psychological identity, economic integration, communicative integration, cultural acceptance, and three aspects of influencing factors are shown in models 1–5 (Table 5). The analysis finds the scores of social integration, psychological identity, economic integration, and communicative integration are significantly correlated with the factors of individual socioeconomic characteristics, policy support, and community support. In term of social integration score, policy support that the satisfaction of the vocational education and training provided by the government has the most positive impact, followed by the two community support factors i.e. environmental amenity and spatial security in the new community. Meanwhile, individual socioeconomic characteristics such as age, educational attainment, move-in duration, and annual income changes also have different positive correlations with it. From the perspective of different dimensions, psychological identity is mainly affected by age and various indicators of community support. Compared with minor respondents under 18 years old, the psychological integration of seniors is significantly higher. And environmental amenity, housing security, spatial accessibility, and spatial security all have a positive correlation with better psychological integration. In terms of economic integration, policy support and environmental amenity have a significant positive effect. Those with education level above elementary school have higher economic integration than those who have not been educated, the same for those whose annual income remains unchanged or increases than those decreases after relocation. However, differing from environmental amenity and the satisfaction of the vocational education and training, changes in livelihoods play a negative role in economic integration. In terms of communicative integration, environmental amenity has a significant positive effect. Respondents who are over 69 years old or have moved in for more than half a year integrate better and environmental amenity has positive effects. However, social integration has a negative correlation with longer relocating distances. Finally, there is no significant relationship between cultural acceptance and those factors.

To sum up, the policy support of vocational education and training satisfaction has a significantly large impact on the social integration of PAMs, especially economic integration. In terms of community support, environmental amenity and spatial security had the greatest impact on social integration, with environmental amenity also having a significant effect on all three sub-dimensions of psychological identity, economic integration, and communication integration. In terms of individual socioeconomic characteristics, the middle-aged and elderly (46 years old and above) integrate better, especially the elderly in terms of psychological, economic, and social integration. And those with medium-to-high education levels (elementary school and above) have higher economic integration level. Longer move-in duration (more than half a year) also associated with better integration performance. However populous households (with more than 4 people) and those with reduced annual income after relocation have greater pressure on economic integration.

Regressions results of the influencing factors of social integration of resettlement in cities/towns. Resettlement in cities/towns is the largest and most representative mode of relocation in PAMs. Therefore, we analyzed the influencing factors of the mode of resettlement in cities/towns separately. The regression results are shown in models 6–10 (Table 6). Compared with the full sample regression results, the differences are as follows: in terms of individual socioeconomic characteristics, male's communicative integration is higher than the female. Changes in livelihood also have positive significance for communicative integration of PAMs in cities/towns in addition to economy integration. Besides economic integration, the positive impact of policy support on social integration also being embodied in both psychological identity and communicative integration. The results of other factors are basically similar to the full sample regression results. Moreover, in terms of community support, housing security is associated with a higher score for social integration, and spatial security is associated with higher economic integration.

Discussion

This paper first establishes an evaluation system of social integration specially for China's PAMs from four dimensions: psychological identity, economic integration, communicative integration, and cultural acceptance. Subsequently, on the basis of the existing attribution theory of social integration, we incorporate community support and analyze the influencing factors of social integration of PAMs from the perspectives of individual socioeconomic characteristics, policy support, and community support. At the same time, we also analyzed the influencing factors under the mode of resettlement in cities/towns.

With regard to the social integration of PAMs, we found that psychological identity scores were the highest and economic integration scores were the lowest. This result is basically consistent with previous studies and our predictions (Tang et al. 2022). We believe that this can be explained from the voluntarism nature of the relocation program and the huge improvement of the living

Table 5 Multiple regression results of social integration and influencing factors.

Individual Information	Model 1 Social integration B	Model 2 Psychological identity	Model 3 Economic integration	Model 4 Communicative integration	Model 5 Cultural acceptance
Individual socioeconomic characteristics					
Sex (Male: reference group)					
Female	−0.048	0.069	−0.020	−0.141	−0.015
Age (0–18: reference group)					
19–45	0.068	0.282**	−0.127	−0.057	0.006
46–69	0.170*	0.329**	−0.116	0.064	−0.101
>69	0.145**	0.233***	−0.157**	0.163**	−0.119
Nationality (Han Chinese: reference group)					
National minority	0.033	0.002	0.012	0.044	−0.004
Marriage (Married: reference group)					
Not married	−0.053	−0.069	−0.022	0.003	−0.074
Number of people in household (<4: reference group)					
4	−0.024	−0.095	−0.038	0.099	0.015
>4	−0.033	−0.020	−0.117*	0.080	−0.036
Educational attainment (with no education: reference group)					
elementary school	−0.001	−0.028	0.090	−0.062	0.056
middle school	0.155**	0.039	0.212**	0.021	0.073
high school, secondary vocational school education	0.149**	0.025	0.210**	0.028	0.049
Three-year college education, bachelor degree	0.076	−0.053	0.208**	−0.015	0.078
Annual income changes after relocation (Decreased: reference group)					
The same	−0.011	−0.050	0.261***	−0.230**	0.014
Increased	0.116*	−0.090	0.378***	−0.076	−0.164
Livelihood changes after relocation (Unchanged: reference group)					
changed	−0.043	−0.005	−0.144*	0.074	0.070
Move-in duration (<0.5 year: reference group)					
0.5 ~ 1 year	0.143**	0.104	−0.002	0.145*	0.079
>1 year	0.131*	−0.021	−0.002	0.259**	0.084
Distance of relocation (<3 km: reference group)					
3 ~ 15	0.031	0.011	0.071	−0.027	−0.066
15 ~ 40	−0.032	0.035	0.021	−0.116	−0.155
>40	−0.065	0.052	0.003	−0.176**	−0.154
Policy support					
the satisfaction with the vocational education and training provided by the government	0.300***	0.053	0.125**	0.096	0.023
Community support					
Environmental amenity	0.178**	0.165**	0.211***	0.144**	0.002
Housing security	0.080	0.207**	−0.017	0.110	0.145
Spatial accessibility	0.066	0.101*	0.099	−0.066	−0.075
Spatial security	0.157**	0.113**	0.043	−0.048	0.100
F	12.390***	7.082***	6.908***	3.726***	1.023
Adjusted R^2:	0.469	0.321	0.314	0.175	0.002
Data (N)	323	323	323	323	323

*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

environment. However, it also reflects problems such as economic incompatibility and marginalization, which are extremely common after the drastic changes in economic and social conditions (Yang et al. 2020a). Comparing the social integration under three different resettlement modes, we found that: (1) The social integration score of resettlement in original village is the highest, especially in the dimensions of society and culture. Because under this mode the entire village is basically relocated on the same place, whose primary social network is well preserved. And there are few changes of the social and cultural environment, so it is relatively easy for their society and culture to integrate. (2) Resettlement in cities/towns has the highest score in terms of psychological identity and economic integration but has the lowest in communicative integration. Taking advantage of urban location and economy, this relocation mode creates good environment for migrants' employment. Although the living cost has risen, the trend of migrants' economy is generally improving. Meanwhile, complete community supporting facilities, livable environment, and government employment support policies all have promoted the process of migrants actively integrating into the new environment. However, the large scale of resettlement sites, the complex population composition, and the public housing building model break the original social network and hinder neighborhood association (Kweon et al. 1998), resulting in a low level of communication and integration. (3) The social integration score of resettlement in township is the lowest, especially in economic integration. In this paper, resettlement B is far away from the economy and job market in cities/towns, and it is not as convenient as resettlement in original village for farming or

Table 6 Multiple regression results of social integration in cities/towns and influencing factors.

Individual Information	Model 6 Social integration B	Model 7 Psychological identity	Model 8 Economic integration	Model 9 Communicative integration	Model 10 Cultural acceptance
Individual socioeconomic characteristics					
Sex (Male: reference group)					
Female	−0.047	0.065	0.013	−0.167**	−0.047
Age (0–18: reference group)					
19–45	0.067	0.333**	−0.159	−0.047	−0.075
46–69	0.153	0.384**	−0.151	0.051	−0.112
>69	0.121*	0.274***	−0.166**	0.120	−0.145
Nationality (Han Chinese: reference group)					
National minority	0.051	0.012	0.039	0.039	−0.047
Marriage (Married: reference group)					
Not married	−0.015	0.004	−0.066	0.040	−0.068
Number of people in household (<4: reference group)					
4	−0.045	−0.086	−0.041	0.049	−0.059
>4	−0.052	0.018	−0.113	0.009	0.021
Educational attainment (with no education: reference group)					
elementary school	−0.055	−0.134*	0.091	−0.062	−0.032
middle school	0.132*	0.001	0.227**	−0.003	0.050
high school, secondary vocational school education	0.14**	−0.001	0.226**	0.016	0.040
Three-year college education, bachelor degree	0.054	−0.090	0.184**	−0.007	0.084
Annual income changes after relocation (Decreased: reference group)					
The same	0.005	−0.051	0.292***	−0.251**	−0.054
Increased	0.14**	−0.045	0.371***	−0.094	−0.205
Livelihood changes after relocation (Unchanged: reference group)					
changed	−0.008	−0.002	−0.158**	0.157**	−0.025
Move-in duration (<0.5 year: reference group)					
0.5 ~ 1 year	0.133*	0.132	−0.011	0.121	0.092
>1 year	0.115	−0.019	0.018	0.21**	0.068
Distance of relocation (<3 km: reference group)					
3 ~ 15	0.016	−0.085	0.039	0.074	0.014
15 ~ 40	0.001	−0.020	−0.086	0.113	−0.034
>40	−0.039	0.004	−0.085	0.015	−0.055
Policy support					

Table 6 (continued)

Individual Information	Model 6 Social integration B	Model 7 Psychological identity	Model 8 Economic integration	Model 9 Communicative integration	Model 10 Cultural acceptance
the satisfaction with the vocational education and training provided by the government	0.291***	0.153**	0.226***	0.135**	−0.027
Community support					
Environmental amenity	0.106*	0.17**	−0.045	0.069	0.162
Housing security	0.102*	0.110	0.089	−0.019	−0.049
Spatial accessibility	0.076	0.122**	0.008	0.007	0.029
Spatial security	0.196**	0.106	0.136**	0.106	−0.007
F	10.127***	5.553***	6.104***	3.176***	
Adjusted R^2	0.471	0.308	0.333	0.175	0
Data (N)	257	257	257	257	257

*p < 0.10, **p < 0.05, ***p < 0.01.

animal husbandry to generate income (Zhou et al. 2018), therefore causing poor economic integration. To sum up, the social network that relying on a relatively stable geographical relationship and affinity is conducive to social integration (Li, 1996), which has been verified by the highest score of resettlement in original village in our study. However, comprehensively considering that future economic development will lead to the integration of society and culture, migrants tend to integrate more easily into cities when they live in more mainstream, formalized neighborhoods with higher-quality public services (Zhu et al. 2021; Liu et al. 2022). Therefore, we think that resettlement in cities/towns has the greatest potential for sustainable poverty reduction.

Regarding the factors influencing the social integration of PAMs, we highlight the important impact of community support. In general, a comfortable and safe environment greatly determines the social integration of migrants, which is consistent with the conclusions of previous researches (Kweon et al. 1998). We further clarified that the change of the spatial environment is most directly reflected in the psychological identity of migrants. A comfortable, safe, and accessible residential community is more likely to be recognized by migrants and contributes to their subjective well-being (Pan et al. 2021). Existing studies have shown that the improvement of the level of community support will also lead to the improvement of the level of human capital and social capital (Wang et al. 2020), and this paper also confirms that the comfort of the environment is related to the economic integration and communicative integration of migrants. A pleasant community environment will create a good communication space for residents to develop social activities for promoting integration (Liu et al. 2022). For the migrants in cities/towns whose spatial environment has the biggest change, we found that besides comfort, both the safeties of house and community environment are very important for them. The reason is that compared with others, although the social capital of them, that is, the original social network and support, is the minimum, community support they received is the largest. Therefore, in addition to comfort, superior and stable natural environment, high quality and complete security management system, modern residential buildings, and other safeguard conditions affect their integration. Further, a convenient traffic environment highlights the advantages of community support, and then influences the psychological identity of migration. So, community support is related to multiaspect of integration, especially for the migrant in cities/towns, and the result strongly supports the hypothesis proposed above. As a result, this paper puts community support in the same position as human capital, social capital, and policy, and summarizes the influence of environmental resources, and discusses the influencing factors of PAMs in China from three aspects: individual socioeconomic characteristics, policy support, and community support.

We find that policy support has a similarly significant impact on the social integration of migrants, and is even more significant in resettlement in cities/towns where has more employment opportunities, which proves the theory about policy again. Existing research shows that in the early stage of migration, the economic income of immigrants has a disadvantageous effect compared with local people (Hum and Simpson 2004). So, the vocational education and training provided by the government is a valid mean to help the migrants' economy integrates effectively after relocation. On this basis, we believe that economic support not only affects the economic integration, but also promotes social and psychological integration. As Penninx (2005) thought, policies largely determine the opportunities and scope of actions of migrants. In resettlement in cities/towns, it is a necessary policy that the government provides vocational education and training during which opportunities for communication and interaction are also created among migrants, and a new social network could be established, so that

migrants can adapt to the new life faster and gain a sense of belonging (Chou and Chow 2009).

As for individual socioeconomic characteristics, a longer move-in period, rising income, and higher education level have a broad impact on social integration. Obviously, migrants who moved in earlier have more time to build new social networks (Keene et al. 2013). And it is a key step in social integration that migrants could improve their economic life with better salary after relocation (Bauer et al. 2013). Also, migrants with higher levels of education often have more and better job opportunities, and thus have more advantages in communicative integration and economic integration (Bauer et al. 2013; Kearns and Whitley 2015). In resettlement in cities/towns, males have better communicative integration than females, which is related to male advantages in job hunting. Occupational gender segregation is well established in China, and the greater the degree of local labor marketization, the greater the impact on occupational gender segregation (He and Wu, 2017).

We also have some new discoveries basing on the special policy background and characteristics of the target group. Firstly, the older, the better the social integration. This is different from the conclusions of previous studies that elderly need more sense of belonging and the support of social network (Tang et al. 2022). This is because many activities carried out by the local government for migrants are aimed at the elderly, and the elderly also have more leisure time and opportunities to participate in community activities. On the contrary, the problem of the social integration of the youth needs more attention. A large proportion of them are left-behind children who have not fully possessed the mature mentality and are separated with their parents all year around. The stress they are facing after relocation is both from the emotion absence of being separated from their parents, and the dramatic changes in living environment. Secondly, families with more than four people have more financial pressures. Research shows that for poor families, familial networks contribute to economic development (Danzer and Ulku 2011), but the populous households in this region often have a large proportion of incapacitated elderly and minors. Therefore, their economic pressure is increasing. However, there is no obvious difference in social integration between ethnic minorities and Han migrants in Anshun, and the ethnic boundaries of migrants of different nationalities (Bolt et al. 2010) in different regions barely exists. So, restrictions on social integration from the original notions and ideologies of migrants in human capital theory become pleasingly small. This is mainly because all ethnic groups in Anshun have lived together for many years and have been developed cultural integration in language and customs. At the same time, the local governments often hold different activities according to different ethnic traditions, so there is little difference in the cultural integration of various ethnic groups.

Also, we have some suggestions that (1) It is necessary to build and maintain high-quality community public space, attach importance to community safety, take responsibility for the follow-up housing repairing work, and perfect the public transportation system in order to create a better spatial environment, especially in resettlement in cities/towns. (2) In the future, resettlement in cities/towns should be the main mode, and forceful policy support and more job priority opportunities should be given to economic disadvantaged groups, including service jobs inside community, community-based manual manufacturing jobs, etc. In order to prevent these migrants from being affected by economic conditions. (3) Governments should provide more useful vocational education and training for migrants with high potential labor capacity to enhance the future competitiveness of migrants' workforce in the city and to allow for better economic, psychological, and communicative integration with their next generations. (4) Appropriate financial assistance should be provided for targeted people with low incomes or educational attainment, and families with large population to help them overcome the most difficult adaptive period. Also, more opportunities should be created for women and children, and more attention should be addressed to their psychological changes. The suggestions are intended to promote faster and better integration of migrants into communities and urbanization in China. In addition, we also call for a long-term follow-up study on the social integration of PAMs and constantly adjust relevant policies to finally achieve the goal of poverty alleviation.

Conclusions

This paper focuses on evaluating the level of social integration of PAMs and examines the degree of social integration of PAMs and the factors influencing it, with particular emphasis on the role of community support. We found that PAMs had the highest psychological identity scores and the lowest economic integration scores. Among the three types of relocation, the level of integration was highest for resettlement in original village, followed by resettlement in cities/towns, and resettlement in township. This paper incorporates community support into the existing theoretical system of social integration to form a more systematic analytical framework, and verifies the significant correlation between community support and the social integration of PAMs, and finds that the impact of community support on the social integration of PAMs is most directly reflected in the psychological identity of migrants. Secondly, policy recommendations to promote the social integration of PAMs, including improving the community spatial environment and promoting the cities/towns resettlement model, are proposed in conjunction with the main results. It is hoped that this paper will provide scientific guidance to promote the social integration of PAMs and help the sustainable development of disadvantaged groups in China and the world.

However, this study also has some limitations. First, only five PARs in Guizhou province were selected to verify the impact of community support on the social integration of PAMs, but considering the differences in community spatial planning measures taken in different provinces, this may lead to differences in the impact of different community support elements on the social integration of PAMs. Therefore, more extensive research on PARs and PAMs in different regions is needed in the future. Second, regarding the measurement of community support elements, this paper has mainly used subjective evaluation, and future research can obtain more integrated and comprehensive data to measure community support elements by using a combination of subjective evaluation and objective data.

Data availability

All data analysed during this study are included in this published article [and its supplementary information files].

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Author contributions

ZP: investigation, formal analysis, writing-original draft. YL: writing-review, and editing. ZJ: conceptualization, methodology, editing, and supervision. ZZ: conceptualization, methodology, investigation, writing-review, editing, supervision and funding acquisition.

Competing interests

The authors declare no competing interests.

Ethical approval

This project was approved by Tsinghua University Science and Technology Ethics Committee (Humanities, Social Sciences and Engineering) (Project No. THU-04-2024-28).

Informed consent

The wishes of the respondent were sought before the questionnaires and interviews, and informed consent was obtained from all individual participants included in the study.

Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1057/s41599-024-03650-w.

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