Building rural public cultural spaces for enhanced well-being: Evidence from China

Abstract

Rural public cultural spaces as important living environments can improve resident well-being. According to space theory, this research explored the core dimensions of rural public cultural spaces, and analyzed the relationship between rural public cultural spaces and resident well-being through a case study. In addition, the moderation effect of place attachment and mediation effect of space openness between rural public cultural space on resident well-being were tested based on a survey of 1,755 residents in Foshan, Guangdong, China. The results showed that physical, power and meaningful spaces were the three core dimensions of rural public cultural spaces. There are positive impacts of rural public cultural spaces on resident well-being. Furthermore, the effects of public cultural spaces on resident well-being were mediated by place attachment and strengthened by space openness. These research findings not only provide new insights on enhancing resident well-being during the transformation period of China, but also enrich the theoretical perspectives on rural public space production.

Keywords: Rural public cultural space; Space openness; Place attachment; Resident well-being; China

1 Introduction

Well-being emphasizes people's emotional and cognitive evaluations of their lives (Diener, Oishi and Lucas, 2003; Sarracino and Piekakiewicz, 2020). Generally speaking, well-being is composed of subjective (Hoogerbrugge, Burger and Van Oort, 2021; Karagöz and Ramkissoon, 2023) and psychological well-being (Fabian, 2021; Joshanloo, 2019). People are born with the pursuit of happiness, and enhancing well-being has become a critical policy goal for China. Crucially, the most challenging areas for well-being improvement tend to be rural communities.

Previous research finds that macro-level factors, including the economy, income levels, policy initiatives, and culture could impact well-being (Luo and Gilmour, 2004; Pleeging Burger, and van Exel, 2021; Sarracino and Piekakiewicz, 2020; Wirtz et al., 2010; Wu, 2021). Additionally, micro-level factors such as personality, motivations and positive psychology influence individual well-being (Diener et al., 2003; Marrero, Carballeira and Hernández-Cabrera, 2020; Moreira et al., 2021). However, the effects of living environments on well-being have been largely neglected, especially where living cultural environments may be a significant antecedent of resident well-being (Ayala-Azcárraga, Diaz and Zambrano, 2019; Grossi et al., 2012; Gao, Dupre and Bosman, 2019; Smith et al., 2021; Xu, He and Yang, 2021).

Evidence shows that public space could impact human-place bonds and social interaction, thereby promote resident well-being (Cattell et al., 2008; Cole, Coleman and Scannell, 2021; Douglas, Lennon and Scott, 2017; Holy-Hasted and Burchell, 2022). Public space could provide relief from daily routines, foster individual's feeling of community, offer opportunities

for build relationships and contribute to satisfying diverse needs (Cattell et al., 2008). Compare to common public spaces, rural public cultural spaces are not only physical buildings and infrastructure, but also present complex social and cultural implications (Lefebvre, 1991). Rural public cultural spaces are public cultural places formed by interaction and communication, which also present the rural traditional culture (Ye et al., 2020). It is well acknowledged that spaces usually reflect powers and emotions (Seo and Skelton, 2017; O'Brien, 2017; Overton, 2010). In rural public cultural spaces, diversified functions develop, powers of multiple stakeholders are intertwined, and complex meanings are embodied (Leary, 2013; Lepawsky, 2005). Surprisingly, there is a lack of a comprehensive understanding of the core dimensions of rural public cultural spaces that hinders our understanding about the effects of those public spaces in daily life (Ding, Salinas-Jiménez and Salinas-Jiménez, 2021).

Furthermore, existing research has shown that public spaces can influence individuals significantly (Holy-Hasted and Burchell, 2022; Smith et al., 2012; Wiles et al., 2009); however, little is known about whether rural public cultural spaces facilitate resident well-being and how those public spaces impact rural resident well-being. Generally speaking, rural public cultural spaces can invigorate and protect traditional cultural in villages and improve resident life quality (Nordberg, 2021). In addition, public cultural spaces satisfy the spiritual and cultural needs of rural residents, and social connectivity and cultural participation figure increasingly in defining well-being (O'Brien, 2017).

To date, the psychological process between public cultural spaces and resident well-being is underestimated. Evidence shows that public cultural spaces translating into resident well-being may depend on individual psychological processes (Ujang, Kozlowski and Maulan,

2018). Specifically, the role of place attachment was investigated and explained how public cultural spaces affect rural resident well-being (Chen, Sun and Seo, 2022; Davis, 2016). Place attachment reflects the emotional connections between people and places, including emotional identity and functional dependence (Ramkissoon, Smith, and Weiler, 2013a; Qian and Zhu, 2014; Williams and Vaske, 2003). Emotional identity is the consistency between individuals and places, and people's consistency in local culture, values, thinking modes and behavior norms, which form the psychological sense of belonging to a place. Place dependence emphasizes the dependence of individuals on local functions (Marieke and Cody, 2022; Morgan, 2010). The value and significance of space to individual is achieved through emotional bond (Qian and Zhu, 2014). Thus, it is reasonable to define place attachment as the psychological process that mediates between public cultural spaces and resident well-being.

Therefore, this research aims to explore the core dimensions of rural public cultural spaces and how they foster resident well-being. The main contributions are that this research extends the literature on public space, and provides a comprehensive understanding of rural public cultural spaces. Second, this study offers valuable insights on health theory from social cultural perspective. It investigates the relationship between rural public cultural spaces and resident well-being, and reveals the black-box how rural public cultural spaces influence resident well-being through examining the mediating effect of place attachment and moderating effect of space openness between public cultural space and resident well-being.

2 Literature review

2.1 Public cultural space and place attachment

Public cultural spaces are places for rural resident daily activities and exchanges, including traditional public spaces and public spaces formed by villagers themselves, such as ancestral halls, temples, meeting rooms, and public guest halls. Traditionally, rural public cultural spaces were used for holding clan ceremonies and discussion by communities of geographical, blood and rural origins. Nowadays, public cultural spaces were reconstructed, and optimized and integrated to serve multiple stakeholders.

Space has some attributes of emotion and is composed of social forces, which are the basis of power generation (Lefebvre, 1991). The production of space reflects the interweaving and changes in material, power and emotion (Koskela, 2000). Therefore, space is closely related to place attachment (Brown and Raymond, 2007). When space is endowed with emotion, it will become a place and establish emotional and psychological connections with people.

Place attachment is defined as the connections between individual and specific place (Ramkissoon, 2023). It is reflected in place symbols, spaces and collective memory (Qian and Zhu, 2014). Generally speaking, the perception of place results from personal interactions with surroundings as well as the representations of those surroundings (Holloway and Hubbard, 2001). Public space usually improves individual place emotion though social interaction, which leads to emotional attachment and functional dependence (Ujang et al., 2018). Rural cultural space could support diverse forms of activities and interactions in daily life. The social interactions are associated with sense of community and place attachment (Francis et al., 2012).

Additionally, rural cultural space is symbol of places, and are venues for cultural activities, communication and exchange. The social and cultural aspects of spaces demonstrate local belonging and emotional dependence (Lin and Lockwood, 2014). The rural cultural spaces maintain traditional cultural symbols of rural communities, and strengthens collective memory, so it has a positive impact on resident place attachment. However, existing studies are lacking in-depth analysis of this relationship. It is necessary to analyze the impact of public cultural space on resident place attachment.

2.2 Place attachment and resident well-being

Subjective well-being is based on hedonism, which emphasizes the perception and evaluation of an individual's quality of life, manifested as satisfaction with life, experience of positive and avoidance of negative emotions (Diener et al., 1999). Psychological well-being is based on the theory of eudaimonia, which focuses on the development of individual potential capability (Ryff, 1989; Ryan and Deci, 2001), and reflects the psychological state of pleasure including the perception of autonomy, goal realization, individual growth and positive relationships (Wright and Cropanzano, 2004). Subjective and psychological well-being are gradually moving from separation to integration (Diener and Biswas-Diener, 2002; Dagenais-Desmarais and Savoie, 2012； Zheng et al., 2015). Rural resident well-being includes the pleasure they experience from the satisfaction of life and psychological needs (Linley, Maltby and Wood, 2009).

Well-being is an experience influenced by subjective perceptions which are aroused by objective factors. Evidences shows that objective living environments have a significant effect

(Dolan, Peasgood and White, 2008), including public space (Cattel et al., 2008; Chen et al., 2022), parks (Ujang, Moulay, and Zakariya, 2015) and green space (Holy-Hasted and Burchell, 2022). Those spaces could promote well-being because spaces foster their perceptions of life quality and provide social connections (Francis, 2012; Chen et al., 2022). As a result, space is filled with emotion and endowed with meaningfulness (Ramkissoon, 2023; Ujang et al., 2018). Space becomes place through emotional bonds, which presents the deeper relationship between human and place (Cole et al., 2021; Davis, 2016).

Place attachment is an essential mechanism for explaining how public cultural spaces impact rural resident well-being. Spaces become meaningful because of emotions (Ujang et al., 2018). The belonging and dependence on places reflect people's most basic psychological belongingness and sense of meaning (Qian and Zhu, 2014). Place attachment reflects a person's cognition and emotion of space, which satisfies subjective and psychological needs and improves well-being (Ramkissoon, 2023). Place attachment enhances the individual's sense of well-being by promoting dependence on the living environment (Bogdan, Rioux and Negovan, 2012; Ujang et al., 2015). Rural residents with strong place attachment are willing to stay in the place to which they are attached, which increase their happiness (Ramkissoon et al., 2013b; Wu et al., 2019). In addition, place attachment could improve well-being through psychological need satisfaction (Ryan and Deci, 2000; Booker, Dunsmore and Fivush, 2021) and make individuals find meaning and security from places, so it is conducive to improving well-being (Kale, 2019; Wiles et al., 2009).

In short, the accumulated literature provides a strong foundation to study what are the dimensions of rural public cultural spaces and how public cultural space affects rural resident

well-being. However, the mediating effect between public cultural space and resident well-being is underestimate. This research applied mixed-methods design to address explanatory and confirmatory research questions. A case study (study 1) was used to explore what are the dimensions of rural public cultural spaces and how public cultural space affected rural resident well-being. Thereafter, a quantitative study (study 2) used the survey method to examine the relationship between rural public cultural spaces and resident well-being. Based on the case study, study 2 focused on testing the mediating and moderating effects between rural public cultural spaces and resident well-being.

3 Case study

The core dimensions of rural public cultural space were analyzed through an exploratory case study. It also explored how rural public cultural space affected rural resident well-being through place attachment.

3.1 Study site

On December 3, 2020, a pre-investigation of four villages among the 30 "ancestral hall + culture"[1] sites in Foshan were conducted. Members of government, village cadres and villagers were interviewed to preliminarily explore the basic situations and development status of "ancestral hall + culture" demonstration sites. There were four reasons for choosing "ancestral hall + culture" sites in Foshan as the case study on rural public cultural spaces. First, as an important place for rural sacrifices, discussions on village affairs, public welfare and

[1] "Ancestral hall + culture" refers rural public cultural space in Foshan based on ancestral hall, which is the typical traditional cultural space in Foshan.

cultural activities, ancestral halls are important carriers of rural cultural revitalization and rural governance in China. They are extremely important spaces and representative of rural public cultural spaces. Second, ancestral halls have experienced a transition process from prosperity to decline. Ancestral hall reactivation demonstrates rural public space in China, as a result of the national Rural Revitalization policy. Third, the "ancestral hall + culture" public cultural space in Sanshui District of Foshan City is a model of rural cultural governance, and has become a well-known brand. Fourth, Foshan is located in the Greater Bay Area, close to Guangzhou and Shenzhen. It is an active city with frequent population inflows. The rural areas in greater Foshan are closed and open, and are experiencing the integration of local people with immigrants. Therefore, the rural public cultural space in Foshan is typical and representative. The study site is shown in Figure 1.

[Insert Figure 1 here]

3.2 Data collection

Semi-structured in-depth interviews gathered basic information on respondents, their thoughts about village ancestral halls, perceptions of and attitudes toward the current "ancestral halls + culture" sites, and impacts of "ancestral halls + culture" sites. From December 14 to 16, 2020, respondents were interviewed in Chen's, Zhong She and Deng's ancestral halls in Baini, the ancient ancestral hall group of Da Qi Tou and Hu's in Leping, as well as Cai's and Lu's ancestral hall in Lubao. There are three towns and seven typical demonstration sites and 63 interviewees were randomly interviewed, including 10 government officials, 44 villagers and 9 immigrants. The time range for interviews were 30-90 minutes. Through content analysis, there were found

to be saturation after certain number of interviews with government officials, villagers, and immigrants. It was found that interviews were lacking for local villagers working in other places and from tourists. From January 1 to 3, 2021, the Sui Song ancestral hall in Jianggen village, Deng's ancestral hall in Dengguan village, and Cheng's ancestral hall in Dongxi village were used for more interviewing. Ten local villagers working in other places and 18 tourists were interviewed. The rural public cultural spaces and respondents are presented in Table 1.

[Insert Table 1 here]

3.3 Data analysis

All interview data were encoded using NVivo11 and there were three levels of coding.

Open coding: 91 interviewees including ten government officials, 54 villagers and 27 immigrants were coded as G1-m to G10-n，T1-m to T54-n, M1-m to M27-n, respectively. Then all interview text was labeled, and 649 original sentences were extracted, and labels were repeatedly compared and sorted. Finally, concepts were selected and merged, and the elements with similar quality and content were recombined to produce the original category (AI). In the process of original categorization, the initial concepts of repetition frequency ≤ four times and inconsistencies were eliminated. Finally, 41 original categories, such as unique architecture, ancestral hall restoration, additional facilities, surrounding resources and environment, were formed.

Axial coding: Based on the 41 original categories, associations were established between concepts. Through repeated analysis and comparison, ten subcategories (AI) and four overarching categories (AAI) were formed. The subcategories were physical space, power space, meaning space, emotional identity, place dependence, opening of physical space,

opening of power space, opening of meaning space, subjective well-being, and psychological well-being. The main categories were rural public cultural space, place attachment, space openness, and well-being (Table 2).

[Insert Table 1 here]

Selective coding: Selective coding aims to build the relationships. After open and axial coding, it was found that the four main categories were rural public cultural space, place attachment, space openness, and resident well-being. The relationships among these four core categories are shown in the conceptual model in Figure 1. In addition, the mediating role of place attachment and the moderating role of space openness were established between public cultural space and resident well-being.

According to Boyatzis (1998), the coding was conducted by four researchers who compared, discussed, and modified the coding results to guarantee the reliability. The mutual agreement degree among the four researchers was 0.791, and the reliability was 0.842. The reliability exceeded 0.70, indicating that the coding results were acceptable.

3.4 results

In sum, rural public cultural space included three core dimensions: physical, power, and meaning space. Place attachment was comprised of emotional identification and place dependence. The openness of space covered the openness of physical, power, and meaning space. Well-being included subjective and psychological well-being. Public cultural space could affect rural resident subjective and psychological well-being through place attachment, and space openness could strengthen the relationship between public cultural space and rural resident well-being. Therefore, enhancing rural resident well-being is not only dependent its

core dimensions and openness of public cultural space, but also associated with place attachment.

[Insert Figure 2 here]

4 Quantitative study

Based on the case study, a quantitative study was used to examine the effects of rural public cultural spaces on resident well-being, the mediating effects of place attachment, and the moderating effects of space openness between rural public cultural space and resident well-being.

4.1 Hypotheses

4.1.1 Public cultural space and rural resident well-being

Public cultural space can improve the daily living environments of rural residents and have a positive impact on their well-being. Leisure is life (Cai and Zhu, 2019) and living environments providing leisure space are positively related to well-being (Ala-Mantila et al., 2018). Public spaces, places for daily activities, and cultural services contribute to a greater diversity in leisure for rural residents.

The physical space protects original unique and treasured buildings, reunites the fragments of Chinese traditional culture and spirit, and integrating the high-quality public cultural supply services. This also can satisfy the psychological needs and growing cultural demands of rural residents. In addition, under the guidance and support of the government, the power space strengthens the social relationships and networks based on blood ties and geography, facilitating information sharing and resource allocation. The power space promotes

trust and cooperation among residents and improves their well-being (Glatz and Eder, 2020). Meaningful space is usually combined with the daily needs of villagers. Traditional activities including respecting senior relatives and holding wedding parties and cultural activities such as artistic performances, exhibitions, public lectures, mobile library, public movie broadcasts are implemented, and both they enhance the quality of rural resident spiritual and cultural lives (Cinderby and Bagwell, 2017). Interaction and emotional communication in daily life tends to foster resident well-being (Hicks and Lewis, 2019; Williams, 2017).

H1 Public cultural space positively influences rural resident well-being:

H1A1 Physical space is positively related to resident subjective well-being.

H1A2 Physical space is positively related to resident psychological well-being.

H1B1 Power space is positively related to resident subjective well-being.

H1B2 Power space is positively related to resident psychological well-being.

H1C1 Meaningful space is positively related to resident subjective well-being.

H1C2 Meaningful space is positively related to resident psychological well-being.

4.1.2 The moderation effects of space openness

The openness of rural public cultural space reflects the level of public accessibility, including the degree of open physical space, the participation of multiple agents in power space, and the degree of diversified need satisfaction of meaningful space. The effects of public space are dependent on its openness (Villanueva et al., 2015). Openness can be divided into complete opening and semi-opening.

The rural public cultural space aims to promote the revitalization of rural culture. Its functionality depends on the openness of rural public cultural space. A higher degree of rural public cultural space openness means that physical space is not limited to the ancestral and sacrificial clan occasions, but shared equally by local residents. Government, villagers, rural sages and new residents can help in stimulating resident enthusiasm and initiative in participating in the expansion of rural public cultural space thereby enhancing the satisfaction of place. In addition, social involvement with higher level of openness could strength people's life quality, including psychological satisfaction (Ramkissoon et al., 2018). Greater meaningful space satisfies the diverse needs of residents for education, fitness, leisure and interpersonal communication. The better use of leisure settings enhances resident well-being (Chang et al., 2019). Therefore, openness can strengthen the effectiveness of rural public cultural space with respect to resident subjective and psychological well-being.

On the contrary, lesser openness of rural public cultural space means that it is shared by fewer people, resident initiative for co-construction and sharing is diminished. Additionally, the functionality provided by the space is one-dimensional. Thus, it is difficult to satisfy residents' diverse cultural needs and weakens the beneficial impact of rural public cultural space on resident well-being.

H2 The openness of rural public cultural space plays a moderating role in the relationship between rural public cultural space and resident well-being:

H2A1 The greater the openness of rural public cultural space, the stronger the impact of

physical space on resident subjective well-being.

H2A2 The greater the openness of rural public cultural space, the stronger the impact of physical space on resident psychological well-being.

H2B1 The greater the openness of rural public cultural space, the stronger the impact of power space on resident subjective well-being.

H2B2 The greater the openness of rural public cultural space, the stronger the impact of power space on resident psychological well-being.

H2C1 The greater the openness of rural public cultural space, the stronger the impact of meaningful space on resident subjective well-being.

H2C2 The greater the openness of rural public cultural space, the stronger the impact of meaningful space on resident psychological well-being.

4.1.3 The mediation effects of place attachment

Place attachment refers to individual emotions regarding space and is affected by the rural public cultural space. Spaces become integrated with emotions and generate a special significance for people (Paul et al., 2020). It is proposed that place attachment shows the connections between the individual and the place (Ramkissoon et al., 2013a). First, physical space strengthens the symbolic meaning of traditional spaces, so as to enhance resident emotional identity and dependence on those places (Wiles et al., 2009). Second, power space involves the participation of multiple agents, and emphasizes the participation of residents. Power embedding stimulates positive identification emotions of participants (Anton and Lawrence, 2014). Resident participation contributes to symbol and landscape reconstruction in

spaces and promotes the cultural needs of residents. Symbolic meaning and local traditional culture increase resident place attachment (Paul et al., 2020). Third, meaningful space with resident participation will be more integrated into people's daily lives. Social bonding and interaction usually contribute to better mental, physical, emotional, and spiritual wellbeing (Ramkissoon, 2022).

The influence of rural public cultural space on resident well-being is mediated by place attachment. Generally, space is endowed with multiple values and meanings, and becomes a place with collective memory, thus increasing individual emotional identity and place attachment (Berg, 2020). First, rural public cultural space may increase resident attachment including the functions and affect. The physical elements of rural public cultural space such as environment, facilities, color and even smell contribute to leisure, recreation and sacrifice. Users may form unique spatial perceptions and have affective attachment for these special "places". They satisfy the needs of residents for daily activities such as entertainment, leisure, exercise, socializing and learning and improve their well-being.

Second, rural public cultural space fosters resident well-being by satisfying psychological and emotional needs. Public cultural spaces in rural areas where the government and other governance agents participate solves the issues and enhances the enthusiasm of villagers to participate. In this way the public cultural space helps to satisfy the psychological expectations of villagers. Furthermore, participatory governance is conducive to guiding villager self-construction, self-management and self-development, and the development of personal abilities and potential enhances resident well-being. Based on social relationships and networks of blood ties and geography, rural public cultural space promotes people's emotional exchange

and identity, and enhances well-being.

In sum, place attachment, including emotional identity and functional dependence, plays a mediating role in the relationship between rural public cultural space and resident well-being.

H3 Place attachment plays a mediating role in the relationship between rural public cultural space and resident well-being:

H3A1 Physical space affects resident subjective well-being through place identity.

H3A2 Physical space affects resident psychological well-being through place identity.

H3A3 Physical space affects resident subjective well-being through place dependence.

H3A4 Physical space affects resident psychological well-being through place dependence.

H3B1 Power space affects resident subjective well-being through place identity.

H3B2 Power space affects resident psychological well-being through place identity.

H3B3 Power space affects resident subjective well-being through place dependence.

H3B4 Power space affects resident psychological well-being through place dependence.

H3C1 Meaningful space affects resident subjective well-being through place identity.

H3C2 Meaningful space affects resident psychological well-being through place identity.

H3C3 Meaningful space affects resident subjective well-being through place dependence.

H3C4 Meaningful space affects resident psychological well-being through place dependence.

4.2 Survey

4.2.1 Sample selection

The survey was conducted at 30 demonstration "ancestral temple + culture" sites in Sanshui District, Foshan, Guangdong. During the survey process, the research purpose and process were explained to the Guangdong Provincial Department of Culture and Tourism, Sanshui District Party Committee Publicity Department, Town (Street) cultural station and Village committee. Convenience sampling was applied, and questionnaires were distributed through the WeChat online platform. A total of 1,755 valid questionnaires were received.

Among the respondents, 873 (49.7%) were male and 882 (50.3%) were female. The number of married people was 1,240, or 70.7%. Some 388 were CCP party members or 22.1%. There were 1,530 local residents, accounting for 87.2%. The number of people aged 18-35 was 1,069 (60.9%). There were 529 people (30.1%) with high school or technical secondary school education, and 425 (24.2%) had Bachelor's degree or higher. Per person monthly incomes 3,500-7,000 CNY accounted for 51%, and another 451 people (25.7%) had monthly incomes lower than 3,500 CNY. Those who thought they were in good health were 700, accounting for 39.9%. Those living in the village for more than 20 years were 757 or 43.1%. There were 1,462 respondents (83.3%) with parents or relatives living in the village. Some 624 (35.6%) lived within 15 minutes of the cultural center, and 451 (25.7%) lived between 15 and 30 minutes away.*4.2.2 Questionnaire and scale development*

The maturity scale was used in the questionnaire design, and adjusted according to the actual situation "ancestral hall + culture". The measurement of rural public cultural space included

three dimensions: physical space, power space and meaningful space based on the research of Lefebvre (1991). The reliability coefficient (Cronbach's α for physical space was 0.92, power space s α was 0.95, and meaningful space was 0.94.

Place attachment was measured according to the research of Williams and Vaske (2003). The two dimensions of place identification and place dependence both had reliability coefficients of 0.94. The scale of resident well-being followed Zheng et al. (2015) and Cronbach's α of subjective and psychological well-being were 0.95.

The openness of rural public cultural space was measured according to government policies and field investigation. A complete opening was assigned the value of 1 and an incomplete opening the value of 0.

The control variables of resident personal and family characteristics included gender, marital status, political status, religious beliefs, regional identity, age, educational background, per person monthly family income, subjective perceived income level, subjective perceived health status, social relationships in the village and the average commute time to the cultural center.

4.2.3 Data analysis

1. Validity analysis

Confirmatory factor analysis (CFA) was used to analyze the variables by LISREL 8.8. The results showed that the factor loadings for each variable were over 0.5, average extractions variance (AVEs) were greater than 0.5, and combined validity (CR) exceeded 0.7, indicating that the variables showed acceptable aggregate validity (Table 3). Furthermore, the

discriminant validity of the variables was tested, and results showed that the seven-factor model (physical space, power space, meaningful space; emotional identity, place dependence, subjective well-being and psychological well-being) presented the best fit (NFI = 0.98; NNFI = 0.98; CFI = 0.98; IFI = 0.98; RMSEA = 0.075 < 0.080).

[Insert Table 3 here]

2.Regression analyses

SPSS22.0 was used to test the relationships between rural public cultural space and place attachment, place attachment and resident well-being, respectively.

After controlling for gender, marital status, political status, religious beliefs, regional identity, age, educational background, family income level, subjective perceived income level, subjective perceived health status, social relationships in the village, and the average commute time to the cultural center, physical space was positively related to subjective (M1: $\beta = 0.22$, $p < 0.001$) and psychological well-being (M2: $\beta = 0.19$, $p < 0.001$). Power space was positively related to subjective (M1: $\beta = 0.26$, $p < 0.001$) and psychological well-being (M2: $\beta = 0.10$, $p < 0.01$). Meaningful space was positively related to subjective (M1: $\beta = 0.24$, $p < 0.001$) and psychological well-being (M2: $\beta = 0.49$, $p < 0.001$). Physical space and power space had more significant impacts on subjective well-being, while meaningful space had a stronger impact on psychological well-being.

The results showed that physical space was positively associated with emotional identity (M3: $\beta = 0.15$, $P < 0.001$) and place dependence (M4: $\beta = 0.22$, $P < 0.001$). Power space was positively related with emotional identity (M3: $\beta = 0.06$, $P < 0.05$) and place dependence (M4: $\beta = 0.18$, $P < 0.001$). Meaningful space was positively related with emotional identity (M3: $\beta = 0.63$, $P < 0.001$) and place dependence (M4: $\beta = 0.43$, $P < 0.001$). The influences of physical

space and power space on place dependence were more significant, while the effect of meaningful space on emotional identity was stronger.

Emotional identity was positively associated with subjective (M5: $\beta = 0.08$, $P < 0.05$) and psychological well-being (M6: $\beta = 0.34$, $P < 0.001$). Place dependence was positively related with subjective (M5: $\beta = 0.67$, $P < 0.001$) and psychological well-being (M6: $\beta = 0.45$, $P < 0.001$). Hypothesis 1A1, 1A2, 1B1, 1b2, 1C1, 1C2 were supported. These results show in Table 4.

[Insert Table 4 here]

Furthermore, process 3.3 of SPSS22.0 was used to test the moderating effect of space openness and the mediating effect of place attachment including emotional identity and place dependence. The moderating effect and mediating effect are shown in Table 5.

[Insert Table 5 here]

After controlling for physical space, power space and meaningful space, the relationship between emotional identity and subjective well-being was not significant. Place dependence was positively related with subjective well-being, after controlling for physical space (M7: $b = 0.60$, $p < 0.001$), controlling for power space (M8: $b = 0.58$, $p < 0.001$), and controlling for meaningful space (M9: $b = 0.66$, $p < 0.001$).

Emotional identity and psychological well-being were positively related after controlling for physical space (M10: $b = 0.28$, $p < 0.001$), controlling for power space (M11: $b = 0.26$, $p < 0.001$) and controlling for meaningful space (M12: $b = 0.14$, $p < 0.001$). Similarly, place dependence and psychological well-being were positively related after controlling for physical space (M10: $b = 0.33$, $p < 0.001$), controlling for power space (M11: $b = 0.33$, $p < 0.001$) and controlling for meaningful space (M12: $b = 0.36$, $p < 0.001$).

Furthermore, the mediating effects of emotional identity and place dependence were tested by a bootstrap test with spss22 process3.3. The random repeated sampling was 5,000, and the confidence interval (CI) was 95%. The results were as follows:

(1) The total indirect effect of physical space on resident subjective well-being was 0.41, 95% CI was [0.37, 0.46], and the indirect effect of emotional identity was 0.01, 95% CI = [- 0.04, 0.06], which was not significant. The indirect effect of place dependence was 0.40, 95% CI = [0.34, 0.47], and the mediating effect was significant. The total indirect effect of physical space on psychological well-being was 0.39, 95% CI was [0.35, 0.44], the indirect effect of emotional identity was 0.17, 95% CI= [0.12, 0.21], and the mediating effect was significant; The indirect effect of place dependence was 0.22, 95% CI = [0.17, 0.28], and the mediating effect were significant.

(2) The total indirect effect of power space on subjective well-being was 0.38, 95% CI was [0.34, 0.43], and the indirect effect of emotional identity was 0.00, 95% CI = [- 0.05, 0.05], which was not significant. The indirect effect of place dependence was 0.38, 95% CI = [0.33, 0.44], and the mediating effect was significant. The total indirect effect of power space on psychological well-being was 0.37, 95% CI was [0.33, 0.42], the indirect effect of emotional identity was 0.16, 95%CI = [0.11, 0.20], and the mediating effect was significant. The indirect effect of place dependence was 0.22, 95%CI = [0.17, 0.26], and the mediating effect were significant.

(3) The total indirect effect of meaningful space on subjective well-being was 0.52, 95% CI was [0.45, 0.59], and the indirect effect of emotional identity was - 0.02, 95% CI = [- 0.11, 0.07], which was not significant. The indirect effect of place dependence was 0.54, 95 CI% =

[0.47, 0.62], and the mediating effect was significant. The total indirect effect of meaningful space on psychological well-being was 0.40, 95% CI was [0.35, 0.46], the indirect effect of emotional identity was 0.11, 95% CI was [0.04, 0.18], and the mediating effect was significant. The indirect effect of place dependence was 0.29, 95% CI was [0.23, 0.35], and the mediating effect was significant. In the test of mediating effect, the hypothesis 3a1, 3b1, 3c1 were not supported. Hypotheses 3a2, 3a3, 3A4; 3b2，3b3，3b4；3c2, 3C3, 3C4 were supported.

Similarly, the moderating effect of spatial openness was tested by bootstrap test with an SPSS 22 process 3.3. The random repeated sampling was 5,000, and the confidence interval was 95%.

(1) The interaction between space openness and physical space was positively related with resident subjective well-being (M7: $b = 0.11$, $P < 0.01$) (Figure 3). In the fully open space, the effect of physical space on subjective well-being was 0.28 ($P < 0.001$), and the 95% confidence interval was [0.23, 0.34]. In the incomplete open space, the effect of physical space on subjective well-being was 0.17 ($P < 0.001$), the 95% confidence interval was [0.12, 0.22], and the moderating effect of space openness was significant. However, the interaction between space openness and physical space had no significant relationship with resident psychological well-being (M1: $b = 0.03$, ns).

[Insert Figure 3 here]

(2) The interaction between space openness and power space was positively related with resident subjective well-being (M8: $b = 0.11$, $P < 0.01$) (Figure 4). In the fully open space, the effect of power space on subjective well-being was 0.30 ($P < 0.001$), and the 95% confidence interval was [0.25, 0.35]. In the incomplete open space, the effect of power space on subjective

well-being was 0.19 (P < 0.001), the 95% confidence interval was [0.14, 0.23], and the moderating effect of space openness was significant. However, the moderating effect of space openness on power space and psychological well-being was not significant (M11: $b = 0.01$, ns).

[Insert Figure 4 here]

(3) The interaction between space openness and meaningful space was positively related with resident subjective well-being (M9: $b = 0.14$, P < 0.01) (Figure 5). In the fully open space, the effect of physical space on resident subjective well-being was 0.27 (P < 0.001), and the 95% confidence interval was [0.20, 0.35]. In the incomplete open space, the effect of physical space on subjective well-being was 0.14 (P < 0.001), the 95% CI was [0.07, 0.20], and the moderating effect of space openness was significant. The interaction between space openness and meaningful space was positively related with resident psychological well-being (M12: $b = 0.07$, P < 0.05) (Figure 6). In the fully open space, the effect of physical space on subjective well-being was 0.36 (P < 0.001), and the 95% confidence interval was [0.30, 0.42]. In the incomplete open space, the effect of physical space on subjective well-being was 0.30 (P < 0.001), the 95% confidence interval was [0.24, 0.35], and the moderating effect of space openness was significant. In the test of the moderating effect of space openness, H2a2 and H2b2 were not supported. H2a1, H2b1, H2c1 and H2c2 were supported.

[Insert Figure 5 here]

[Insert Figure 6 here]

The results showed that effects of physical space, power space and meaningful space on subjective well-being through emotional identity were not supported. According to

interviewing, the reason is that most of the respondents were “urban and rural amphibians” who frequently commute between urban and rural areas. They work in the city during the day (weekday) and return to the village at night (weekend). These “urban-rural amphibians” are dependent on the function of the city in life, and show more psychological attachment to villages. Therefore, rural public cultural space affects their psychological well-being through emotional identity. As interviewee T20 said: *“I will come back with my wife and children every weekend. Although I am used to the life in the city, I will feel happy when I come back here and see my hometown getting better. I will come back here when I have time.”*

In addition, the research found that space openness did not strengthen the relationship between physical space and psychological well-being. The possible reason is that villagers of the “urban-rural amphibians” use less physical space in daily life. For example, interviewee T33 said: *“Currently, Chen’s ancestral hall is open to the public every day. It is equipped with various functional facilities inside. As for me, I used the table tennis table a lot, and this enriches my daily life.”*

Finally, the influence of space openness on the relationship between power space and psychological well-being was not significant. The possible reason is that the development level of rural public cultural space in villages are varied, and the hollowing phenomenon is more serious in some villages. Usually, senior residents have a conservative attitude towards the opening of ancestral halls. In addition, a large number of young people work in other cities, and they are inclined to emphasize psychological need satisfaction from meaningful space but show less initiative in participating in physical space. As interviewee T39 said:

“*In the past, this place (Cai’s ancestral hall) was my alma mater, but now it is open to all,*

and everyone can go in. I hope the government can return to what it used to be... At least keep a classroom."

5. Conclusions and discussion

5.1 Conclusions

First, rural public cultural space including physical, power and meaningful space. According to Lefebvre's theory of space production, rural public cultural space is not just a simple container of culture, but a social space with value (Lefebvre, 1991). Rural public cultural space includes three core dimensions: physical, power, and meaningful space. Physical space tends to infuse greater traditional rural culture. Power space shows the transformation of the governance from single to multiple agents, including government, village sages, villagers and the participation of new residents and tourists. Meaningful space reflects the satisfaction with functional meanings. This research revealed the implications of rural public cultural space and complements the understanding of rural public cultural space from the perspective of cultural scenes.

Second, the effectiveness of rural public cultural space is affected by space openness. A higher degree of space openness reflects a higher governance level and positively impacts resident well-being. Fully open rural public cultural space enables residents to enjoy public cultural spaces in their daily lives and an appropriate supply of public cultural services through public cultural spaces is conducive to improving well-being. These conclusions are consistent with Wang and Wong (2011) and Wang et al. (2019). The leader of Bai Ni town G2 said: "*Our town is the most mature place for "ancestral hall + culture", being open every day, and all*

people can enter freely. All people especially the new residents can enjoy the cultural services provided by these spaces. It can be said that the old and the new Baini town people are very satisfied!"

On the contrary, the lack of openness of spaces hinders the effects of public cultural spaces. "*Our ancestral temple will only open when there are good things, and we will go there. Usually, we do not go to ancestral temple. New residents generally do not go to the ancestral temple. Although two-thirds of the residents are new, their understanding of our village is very limited. Our village history museum was funded and built by the government, and there are not many villagers participated; So, the new residents do not know much about it... In the future, I hope more people can participate and will enjoy it when they are involved"* (Interviewee T29).

Third, rural public cultural space improves resident well-being through functionality and emotions. Rural public cultural space makes residents more dependent on the rural living environment and lifestyle by satisfying resident subjective well-being. In addition, rural public cultural space improves the psychological well-being by satisfying resident emotional needs (Ryan and Deci, 2000). Especially with the improvement in material living standards, this suggests that psychological well-being is more prominent in rural resident life. As interviewee T32 said: "*In the afternoon, many residents come here to play (table tennis) every day. Without this ancestral hall, my life would not be so colorful and happy. There are people dancing at night. There are also karaoke and chess matches.*"

In addition, the influence of rural public cultural space on resident well-being is mediated by place attachment. Though interviews, it was found that rural public space not only satisfies local villagers functional and emotional demands, but also plays a very important role in the

cohesion of rural sages who leave the village. As T26, the guardian of Chen' s ancestral hall, said: "*This ancestral hall reconstruction not only makes villagers more identify with their own village, but also increases overseas Chen's national identity and local cultural identity*."

"*I grew up in this village as a child, and I have a strong feeling for it. But for a long time, the village was dirty and messy, and the roads were muddy. With the rural public cultural space reconstruction, villagers have become more enthusiastic about local public affairs than in the past. Many villagers who have not returned in the past have also begun to plan to do something for the village, and some have even introduced friends to invest in the village. The Zhongshe ancestral hall is the key to the village construction and development, and the reason I give up the outside world, return to the village as the village head and build an orchard. Back in the village, I feel more valuable, meaningful and happier than fighting outside*" (T28, village head of Zhongshe village, Baini town).

5.2 Discussion

Theoretical implications

First, this research enriches the concept of rural public cultural space based on the space production theory. Responding to the classic place theory (Lefebvre, 1991), this study provides a theoretical framework and empirical evidence for the multi dimensions of rural public cultural space. The existing research regards public space as a container of resources and activities (Cattell et al., 2008; Chen et al., 2022; Francis et al., 2012; Holy-Hasted and Burchell, 2022; Wu, 2014), and ignores the variability, social aspects, and subjectivity of public space. Rural public cultural space is not only a place for gathering rural cultural resources and activities, but

also has multiple functions, power, and meanings, and this finding is congruent with previous research findings (Seo and Skelton, 2017; O'Brien, 2017; Overton, 2010). Accordingly, this study explores the core dimensions of rural public cultural space, which includes physical, power, and meaning space through a case study. The results extend the social attribute of public space, and highlight the power and meaningfulness hidden in social activities. In addition, physical, power, and meaning space enrich the single connotation of rural public cultural space and deepen the understanding of public space. Aa a result, rural public cultural space contributes to the implementation of the concept of spatial justice in rural areas called for by Nordberg (2021).

Second, this research examines the effects of rural public cultural spaces on individual well-being and explored the boundary conditions of rural public cultural space. In line with previous theoretical and empirical work, this study found that public space has a positive impact on resident well-being (Ayala-Azcárraga et al., 2019; Mouratidis, 2020; O'Brien, 2017; Smith et al., 2021). In addition, this study investigates the moderating effects of space openness and enriches previous finding on the effects of public space. The effects of rural public cultural space on resident well-being are affected by space openness. Space openness influences resident access to physical spaces, participation in power spaces, and satisfaction with meaningful spaces, therefore strengthening positive impacts on resident well-being. This study shed light on the boundary condition of rural public cultural space.

Third, this research indicates how rural public cultural space affects resident well-being, and helps to open the "black box" between public space and well-being. The current research focuses on the effects of urban spaces (Ayala-Azcárraga et al., 2019; Chen et al., 2022;

Mouratidis, 2020; O'Brien, 2017; Smith et al., 2021), neglecting the effects of rural public spaces on resident well-being. This investigation expands the understanding on the influence of public cultural space on well-being (Wang and Wong, 2011). In addition, this research investigates the mediating role of place attachment between public cultural space on well-being and explain how could rural public cultural space influence resident well-being. Public spaces are the fundamental feature of local environment, which could improve face-to-face interactions and social inclusion. As a result, public space turns to meaningful place because of the social interactions and emotional bond. Place attachment as the perception of human and place relationship transmit the effects of rural cultural public spaces on resident well-being. This study responds to Cai and Zhu's (2019) appeal that "leisure is life", and it is valuable to pay attention to rural areas providing inspiration for the further analysis of rural culture development.

Practical implications

First, it is desirable to build a variety of rural public cultural spaces. Rural public cultural space can improve resident well-being. It is necessary to build and rebuild public cultural space in rural areas. Due to differences in rural area types, development histories, and development stages, physical, power, and meaningful space should be in the form of "thousands of villages and thousands of views" rather than "thousands of villages and one view."

Second, providing varied rural public cultural spaces requires co-reconstruction and sharing. Rural public cultural space needs participation from multiple agents. In addition, measures need to be adjusted to local conditions to improve resident accessibility to physical

spaces, participation in power spaces, and functional satisfaction with meaningful spaces.

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