

# LEISURE PHYSICAL ACTIVITIES AMONG ELDERLY IN YUEXIU DISTRICT, GUANGZHOU: PREFERENCES, CONSTRAINTS, AND CULTURAL EMBEDDEDNESS

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**Abstract:** With the accelerating aging population in China, promoting elderly participation in leisure physical activities (LPA) has become a critical public health priority. This mixed methods study investigates the leisure sports preferences, constraining factors, and the role of cultural identity among elderly residents in Yuexiu District, Guangzhou—a core area of Lingnan culture. Quantitative data from 400 participants and qualitative insights from 20 in-depth interviews reveal three key findings: (1) Cultural identity, particularly emotional attachment to Lingnan traditions, significantly predicts preferences for culture integrated activities. (2) Constraints vary by subgroup: older seniors ( $\geq 80$  years) face prominent health barriers, solitary dwellers struggle with safety concerns, and no Cantonese speakers encounter language related information gaps. (3) Targeted interventions, including culturally adapted activity designs and multilingual support, effectively enhance participation rates. These findings highlight the need for context sensitive strategies that bridge cultural heritage with elderly health needs.

**Keywords:** Elderly; Leisure physical activities; Cultural identity; Constraints; Guangzhou

## 1 INTRODUCTION

### 1.1 Background

The global aging population has become an increasingly prominent social challenge, reshaping public health priorities and social policy frameworks worldwide. Projections from the World Population Prospects 2019 indicate that by 2025, China's population aged 60 and above will reach 300 million, with an aging rate exceeding 20%, marking the country's entry into a phase of deep aging. This demographic shift has prompted urgent efforts to address the health and well-being of older adults, particularly through strategies that promote active and engaged lifestyles. In response, China has issued landmark policies such as the National Medium and Long-Term Plan for Active Response to Population Aging, which emphasizes building a "high-quality elderly care service system" centered on home and community-based care. The 14th Five-Year Plan (2021–2025) further reinforces this commitment, explicitly calling for improvements in urban aging-friendly environments and the strengthening of community-based elderly care services [1].

Against this national backdrop, Guangzhou, a megacity in southern China and a core hub of Lingnan culture, exemplifies the challenges of urban aging. By the end of 2019, the city's population aged 60 and above stood at 1.7551 million, accounting for 18.40% of its registered population. This places Guangzhou firmly in the ranks of aging societies, where health disparities and care burdens associated with aging have become increasingly pronounced. Within Guangzhou, Yuexiu District—historically the political, cultural, and commercial heart of the city—presents a unique case study. As a focal point of Lingnan heritage, Yuexiu is home to 351,100 elderly residents (22.3% of its registered population), with distinct subpopulations: 48.7% aged 60–69, 34.2% aged 70–79, and 17.1% aged 80 and above. Many of these older adults have deep-rooted connections to local traditions, from Cantonese opera and Southern Boxing to community life in historic arcade streets, shaping their daily practices and social interactions [1-2].

A critical dimension of healthy aging, leisure physical activity (LPA), has garnered significant attention for its proven benefits to older adults' physical and mental health. Research consistently demonstrates that moderate exercise reduces the risk of cardiovascular disease, alleviates symptoms of depression and anxiety [2], and helps manage chronic conditions such as diabetes and hypertension [3-4]. Despite this evidence, low LPA participation remains prevalent among older adults globally, and China is no exception. Studies indicate that a substantial proportion of Chinese urban elderly engage in insufficient physical activity, with barriers ranging from health concerns to environmental constraints [5]. In Yuexiu District, this issue is compounded by unique factors: the district's dense urban layout and aging infrastructure limit accessible recreational spaces, while its rich cultural heritage creates distinct preferences for activities that resonate with local identity—yet these preferences are often overlooked in generic public health interventions.

Addressing this gap is urgent. As Yuexiu's elderly population grows, improving their LPA participation is not only vital for individual health but also for fostering social inclusion and preserving community cohesion. The district's blend of historic charm and urban density, coupled with its residents' strong cultural attachments, demands context-specific research to understand how tradition, environment, and individual needs intersect in shaping LPA behaviors. This study thus seeks to fill a critical void: by examining the preferences, constraints, and cultural dimensions of LPA among Yuexiu's elderly, it aims to inform targeted strategies that bridge health promotion with cultural relevance, ultimately

enhancing the quality of life for this vulnerable yet culturally vibrant population.

## 1.2 Research Objectives and Research Questions

This study aims to systematically explore the complex dynamics of leisure physical activities (LPA) among elderly residents in Yuexiu District, Guangzhou, with a focus on integrating cultural context into analysis and intervention design.

### 1.2.1 Identify Leisure Physical Activities preferences and their cultural roots

**Objective:** To map the specific types of Leisure physical Activities favored by elderly residents in Yuexiu District, including traditional sports, group activities, and culture-integrated activities. This objective further seeks to quantify the influence of Lingnan cultural identity—encompassing emotional attachment and cognitive awareness—on these preferences, clarifying whether and how cultural factors differentiate activity choices across age, health, and linguistic subgroups.

**Research Question:** What specific types of leisure physical activities do elderly residents in Yuexiu District prefer, and to what extent are these preferences shaped by their identification with Lingnan culture? For instance, do individuals with stronger cultural identity show higher preference for culture-integrated activities, and does this relationship vary by age or length of residence in the district?

### 1.2.2 Analyze subgroup differences in LPA constraints

**Objective:** To examine the key factors restricting elderly participation in LPA, categorized into four dimensions: health constraints, facility constraints, subjective social factors, and service constraints. This objective focuses on comparing constraint patterns across critical subgroups, including age strata (60–69, 70–79,  $\geq 80$  years), living arrangements (solitary vs. cohabiting), and language backgrounds (Cantonese vs. non-Cantonese speakers), to identify targeted barriers faced by marginalized groups.

**Research Question:** What are the primary constraints limiting LPA participation among Yuexiu's elderly, and how do these constraints differ across subgroups? Specifically, do older seniors ( $\geq 80$  years) face more severe health barriers compared to younger cohorts? Do solitary dwellers encounter unique social or safety-related constraints? How do language barriers affect non-Cantonese speakers' access to facilities and activities?

### 1.2.3 Develop and validate culturally adapted interventions

**Objective:** Based on the identified preferences and constraints, to design a set of practical intervention strategies that integrate Lingnan cultural elements, social support systems, and policy tools. This objective further aims to assess the effectiveness of these interventions through pre-post comparisons of participation rates, preference scores, and satisfaction ratings, ensuring their suitability for Yuexiu's cultural and demographic context.

**Research Question:** What context-specific intervention strategies—incorporating Lingnan cultural traits, addressing subgroup-specific constraints, and leveraging local social support networks—can effectively LPA participation rates among Yuexiu's elderly? How can these strategies be validated to ensure their feasibility, cultural relevance, and measurable impact on participation? For example, would multilingual guidance or modified traditional sports routines enhance engagement among non-Cantonese speakers or frail seniors?

## 2 LITERATURE REVIEW

### 2.1 Leisure physical Activities Constraints

Leisure constraints, as a central concept in the field of leisure studies, refer to factors that inhibit individuals from fully engaging in leisure activities, limit their participation frequency, or reduce the quality of their leisure experiences [6]. This construct has been widely explored in relation to the elderly population, given their unique physical, social, and psychological characteristics that may intersect with barriers to leisure participation.

Ecological models of human behavior, such as the one proposed by Sallis et al., provide a comprehensive framework for understanding these constraints. These models posit that human behavior, including leisure participation, is shaped by a complex interplay of individual, social, and environmental factors. In the context of the elderly, individual factors may include declining health, cognitive impairment, or low self efficacy; social factors could involve reduced social support networks or family caregiving responsibilities; and environmental factors might encompass inaccessible facilities, lack of transportation, or unsafe neighborhoods.

Common constraints identified in previous research among the elderly include health related issues, safety concerns, inadequate facilities, and social isolation [7-8]. Health problems, such as chronic diseases, mobility limitations, and sensory impairments, can directly restrict the types of activities that the elderly can engage in. For instance, a study by the World Health Organization found that over 60% of the global elderly population suffers from at least one chronic condition, which often limits their physical activity levels.

Safety concerns, both real and perceived, are also significant barriers. Elderly individuals may be reluctant to participate in outdoor activities due to fears of crime, falls, or traffic accidents. In urban areas, issues such as poorly maintained sidewalks, lack of handrails, and high traffic intersections can pose serious safety risks for the elderly [9].

Inadequate facilities are another major constraint. This includes a lack of accessible parks, community centers, and sports facilities. Even when facilities are available, they may not be designed with the specific needs of the elderly in mind, such as having inappropriate seating arrangements, difficult to use equipment, or lack of ramps for wheelchair access [10].

Social isolation, often resulting from factors like widowhood, relocation, or reduced social networks, can limit the elderly's participation in group based leisure activities. Without companionship or social support, many elderly individuals may feel less motivated to engage in leisure pursuits [11].

It is important to note that constraints are not static or uniform across the elderly population. They can vary depending on individual characteristics such as age, gender, health status, and socioeconomic background. For example, older seniors ( $\geq 80$  years) may face more severe health related constraints compared to younger elderly cohorts (60-69 years). Women may be more affected by safety concerns, leading to different patterns of leisure participation compared to men [12].

Moreover, constraints can interact with each other in complex ways. For instance, poor health can exacerbate social isolation, as individuals may be unable to leave their homes to socialize. In turn, social isolation can have a negative impact on mental health, further reducing the motivation to engage in physical activities [13].

Despite the extensive research on leisure constraints among the elderly, there are still significant gaps in the literature. Few studies have explored how cultural contexts, such as the unique Lingnan culture in Yuexiu District, Guangzhou, mediate these constraints. The cultural values, traditions, and social norms of a particular region may influence the types of constraints that the elderly experience and their perception of these constraints. Additionally, most existing research has focused on listing constraints in isolation, without fully exploring how they interact with each other and with individuals' leisure preferences. Understanding these interactions is crucial for developing effective interventions to promote leisure participation among the elderly.

## 2.2 Theoretical Framework

This study adopts an integrated theoretical framework that combines four interrelated theories—cultural identity theory, leisure constraint theory, social support theory, and policy tool theory—to systematically analyze the mechanisms underlying elderly residents' participation in Leisure physical Activities in Yuexiu District, Guangzhou. This framework emphasizes the cultural embeddedness of leisure behavior, the interactive nature of constraints, the mediating role of multi-level support, and the importance of context-adapted interventions, forming a closed-loop logic of “preference formation-constraint mechanisms-support pathways-intervention design.”

### 2.2.1 Cultural identity theory: the regional foundation of preference formation

Rooted in Tajfel and Turner's social identity theory, cultural identity theory posits that individuals construct their self-concept through the symbols, values, and practices of their cultural groups, which in turn shape their behavioral preferences. In Yuexiu District, as a core carrier of Lingnan culture, Cantonese cultural elements influence elderly residents' leisure sports preferences through three key pathways:

#### (1) Sports Expression of Cultural Symbols

The integration of Lingnan traditional sports with folk activities enables elderly individuals to translate cultural identity into preferences for specific activities [14]. For instance, familiarity with and emotional attachment to Southern Boxing may increase willingness to participate in adapted versions of such sports.

#### (2) Behavioral Shaping by Spatial Culture

Historic spaces like arcade streets and community squares, which carry local memories, reinforce preferences for group-based, low-intensity activities through the interaction between “daily activity scenes” and “cultural emotional bonds” [15]. These spaces, embedded with Lingnan architectural and social traditions, become natural venues for leisure sports that align with cultural habits.

#### (3) Intergenerational Cultural Transmission

Cantonese concepts of health preservation are transmitted within families through intergenerational interactions, forming leisure patterns adapted to regional culture [16]. Such transmission ensures the continuity of preferences for culturally specific activities across generations.

### 2.2.2 Leisure constraint theory: the multi-dimensional interactive mechanism of limiting factors

Based on Jackson et al.'s three-dimensional framework of leisure constraints (personal, structural, and interpersonal), elderly residents in Yuexiu District face complex constraints characterized by “single constraint reinforcement” and “multi-constraint overlap” [17].

#### (1) Personal Constraints

Health conditions and cognitive perceptions act as internal barriers to activity participation. These constraints are culturally mediated, such as differences in preferences for Western medical rehabilitation versus Chinese medicine-based health preservation [18].

#### (2) Structural Constraints

Scarcity of venue resources in old urban areas, aging facilities, and limited transportation accessibility directly restrict the realization of preferred activities [19]. For example, insufficient public space in arcade street communities may hinder group activities.

#### (3) Interpersonal Constraints

Family care responsibilities and weak community social networks (neighborhood alienation due to relocation) reduce the likelihood of elderly participation in collective activities [20-21].

Critical to this framework is the interaction between constraints: for instance, structural constraints (inadequate venues) may exacerbate interpersonal constraints (lack of companions), which in turn amplify personal constraints (reduced motivation), forming a “constraint chain” that impedes participation.

### 2.2.3 Social support theory: the mediating role of multi-actor collaboration

Drawing on House's (1981) classification of social support (instrumental, emotional, informational), this study identifies a "multi-level collaborative mediation" effect in elderly leisure sports participation in Yuexiu District:

#### (1) Foundational Role of Family Support

Under the influence of Cantonese "filial piety" norms, children's attitudes toward their parents' participation in sports activities affect the persistence of such engagement through emotional support, alleviating personal constraints [22]. For example, family approval of morning exercise routines may strengthen elderly motivation.

#### (2) Connecting Role of Community Support

"Silver sports associations" organized by neighborhood committees address overlapping structural and interpersonal constraints through instrumental support and interpersonal support [23]. These associations leverage local social networks to facilitate participation.

#### (3) Guaranteeing Role of Policy Support

Local government policies, such as "age-friendly sports facility renovation" and "activity subsidies," alleviate structural constraints through systematic resource allocation and provide institutional support for family and community efforts [24]. The interaction of these three support levels, policy support enhancing community resource capacity, thereby strengthening family support effectiveness is key to breaking the constraint chain.

## 3 METHODOLOGY

### 3.1 Study Design

This study employed a sequential explanatory mixed-methods design, which integrates quantitative and qualitative approaches to provide a comprehensive understanding of elderly residents' Leisure physical Activities in Yuexiu District. The design follows a two-phase logic: first, quantitative data were collected to measure and quantify core variables (leisure preferences, constraints, and cultural identity), establishing general patterns and statistical associations; second, qualitative data were gathered to explore the lived experiences, cultural contexts, and nuanced mechanisms underlying these patterns, thereby explaining and contextualizing the quantitative findings. This mixed-methods approach enhances the validity and depth of the research, as quantitative results offer breadth and generalizability, while qualitative insights provide depth and contextual richness.

### 3.2 Sample and Sampling

**Quantitative Sample:** A total of 400 elderly residents aged 60 years and above were recruited from 5 subdistricts in Yuexiu (Guangta, Liurong, Dongshan, Hongqiao, and Beijing), covering both historic old urban areas and relatively newer residential communities. Stratified random sampling was used to ensure proportional representation across three age groups (60–69 years, 70–79 years, ≥80 years), three levels of cultural identity (high, medium, low), and two health statuses (with/without chronic diseases). This stratification aligns with the demographic characteristics of Yuexiu's elderly population, where 48.7% are 60–69 years old, 34.2% are 70–79 years old, and 17.1% are 80 years and above, with a 61.8% prevalence of chronic diseases.

**Qualitative Sample:** Twenty participants were selected using purposive sampling to complement the quantitative data. This included 12 "ordinary" elderly individuals (stratified by age and cultural identity to mirror the quantitative sample structure), 5 "special cases" (2 solitary dwellers, 2 non-Cantonese speakers, and 1 community activity organizer) to capture marginalized perspectives, and 3 experts (1 in geriatric medicine, 1 in community sports management, and 1 in Lingnan cultural studies) to provide professional validation. The sample size for qualitative research was determined based on the principle of information saturation, where data collection ceased when no new themes emerged.

### 3.3 Measures

All measurement tools were adapted to ensure cultural relevance and suitability for the elderly population in Yuexiu District, with prior validation through pre-testing (n=30) to refine wording and reduce response burden.

**Cultural Identity:** Measured using a localized version of Phinney's Multigroup Ethnic Identity Measure (MEIM). The scale includes 9 items assessing two dimensions: emotional identity ("Participating in local cultural activities makes me feel proud") and cognitive identity ("I am familiar with the history of Cantonese traditional sports"). Responses were rated on a 4-point Likert scale (1 = "completely inconsistent" to 4 = "completely consistent"). The scale demonstrated good internal consistency (Cronbach's  $\alpha=0.82$ ).

**Leisure Preferences:** Assessed using an 18-item scale developed based on Godbey and Tinsley's leisure preference framework, adapted to include three dimensions relevant to Yuexiu's context: traditional sports (Tai Chi, Badu Anjin), group activities (community square dancing), and culture-integrated activities (Cantonese opera aerobics, simplified Southern Boxing). Responses were rated on a 5-point Likert scale (1 = "strongly dislike" to 5 = "strongly like"). The scale showed high reliability (Cronbach's  $\alpha=0.86$ ).

**Leisure Constraints:** Measured using a modified version of Niu et al.'s 18-item scale, which includes four dimensions: health constraints ("Chronic diseases limit my participation"), facility constraints ("Sports venues are inconvenient to access"), subjective social factors ("Lack of companions discourages me from participating"), and service constraints ("Insufficient guidance for elderly-friendly activities"). Responses were rated on a 5-point Likert scale (1 = "no

constraint” to 5 = “severe constraint”). The scale exhibited excellent internal consistency (Cronbach’s  $\alpha=0.88$ ).

### 3.4 Data Collection

Data collection was conducted between October 2024 and June 2025, with strict adherence to ethical guidelines (approved by the Institutional Review Board of University Pendidikan Sultan Idris, Approval No. 2024-0551-01).

**Quantitative Data:** Surveys were administered in community activity centers, elderly canteens, and parks—locations frequented by elderly residents. Trained researchers ( $n=8$ ) with proficiency in Cantonese provided one-on-one assistance: reading questions aloud for participants with visual or literacy limitations, and clarifying ambiguous items. Informed consent was obtained prior to participation, and participants were assured of data confidentiality. A total of 572 questionnaires were distributed, with 400 valid responses (response rate=70.4%), meeting the minimum sample size requirements for multivariate analysis.

**Qualitative Data:** Semi-structured interviews (40–50 minutes each) were conducted in participants’ homes or quiet community spaces to ensure comfort. The interview guide focused on exploring cultural influences on activity choices, experiences of constraints, and perceived needs for intervention. Interviews were audio-recorded with permission and transcribed verbatim, resulting in approximately 150,000 Chinese characters of text.

### 3.5 Data Analysis

#### 3.5.1 Quantitative analysis

Data were analyzed using SPSS 26.0 and AMOS 24.0. Descriptive statistics (means, standard deviations, frequencies) were computed to characterize the sample and key variables. Inferential analyses included:

Analysis of variance (ANOVA) to examine differences in preferences and constraints across subgroups (age, living arrangement).

Pearson correlation and multiple regression analyses to explore relationships between cultural identity, preferences, and participation rates.

Structural equation modeling (SEM) to test the mediating role of constraints in the relationship between cultural identity and leisure participation, with model fit evaluated using indices such as  $\chi^2/df$ , RMSEA, and CFI.

#### 3.5.2 Qualitative analysis

Transcribed interview data were imported into NVivo 12 for thematic analysis, following Braun and Clarke’s six-phase process: familiarization with data, generation of initial codes, searching for themes, reviewing themes, defining themes, and writing up. Codes were categorized into three overarching themes: *cultural drivers of preferences*, *experiences of constraints*, and *needs for intervention*. Inter-coder reliability was assessed by two researchers independently coding 20% of the data, with a Kappa coefficient of 0.85 indicating good agreement.

## 4 RESULTS

### 4.1 Demographic Characteristics

The final sample comprised 400 elderly residents of Yuexiu District, with a mean age of 72.3 years ( $SD = 8.1$ ). The age distribution aligned with the district’s demographic profile: 40.5% were 60–69 years old ( $n = 162$ ), 35.3% were 70–79 years old ( $n = 141$ ), and 24.2% were 80 years or older ( $n = 97$ ). A slight majority were female (58.2%,  $n = 233$ ), consistent with the higher proportion of elderly women in urban Chinese populations (National Bureau of Statistics, 2023).

Health status varied significantly by age: 61.8% ( $n = 247$ ) reported having at least one chronic condition, with prevalence increasing sharply with age—42.6% of 60–69-year-olds, 68.8% of 70–79-year-olds, and 82.5% of those aged 80+ had chronic illnesses. Regarding living arrangements, 64.0% ( $n = 256$ ) lived with family members, 18.0% ( $n = 72$ ) lived alone, and 18.0% ( $n = 72$ ) resided in other settings.

Cultural identity, measured using the adapted MEIM scale, was stratified into three levels: 34.5% ( $n = 138$ ) exhibited high identity, 46.5% ( $n = 186$ ) medium identity, and 19.0% ( $n = 76$ ) low identity. Younger seniors showed stronger cultural attachment: 43.8% of 60–69-year-olds ( $n = 71$ ) fell into the high-identity category, compared to 31.9% of 70–79-year-olds ( $n = 45$ ) and 22.7% of those aged 80+ ( $n = 22$ ).

### 4.2 Leisure Physical Activity (LPA) Preferences

Overall, participants showed the highest preference for traditional sports ( $M = 3.6/5$ ,  $SD = 0.7$ ), followed by culture-integrated activities ( $M = 3.2/5$ ,  $SD = 0.8$ ) and group activities ( $M = 3.0/5$ ,  $SD = 0.9$ ).

**Cultural influence:** Pearson correlation analysis revealed a strong positive association between cultural identity total score and preference for culture-integrated activities ( $r = 0.62$ ,  $p < 0.01$ ). Multiple regression analysis further indicated that emotional identity ( $\beta = 0.41$ ,  $p < 0.001$ ) was a stronger predictor of this preference than cognitive identity ( $\beta = 0.23$ ,  $p < 0.001$ ), collectively explaining 38% of the variance ( $R^2 = 0.38$ ).

**Age differences:** One-way ANOVA showed significant age-related variations in preference for culture-integrated activities ( $F = 42.37$ ,  $p < 0.001$ ). Post-hoc tests confirmed that younger seniors (60–69 years) had a significantly higher preference ( $M = 4.1$ ,  $SD = 0.6$ ) than older groups, with the largest difference observed between 60–69-year-olds and

those aged 80+ (mean difference = 2.0,  $p < 0.001$ ).

**Health and activity choices:** Cross-tabulation analysis indicated a significant relationship between health status and activity preference ( $\chi^2 = 32.67$ ,  $p < 0.001$ ). Among participants with chronic conditions, 58% preferred traditional sports, whereas 42% of those without chronic conditions favored culture-integrated activities.

### 4.3 LPA Constraints

The most prominent constraints across the sample were health-related ( $M = 3.1/5$ ,  $SD = 0.8$ ), followed by facility constraints ( $M = 2.8/5$ ,  $SD = 0.8$ ) and subjective social factors ( $M = 2.6/5$ ,  $SD = 0.8$ ).

**Health constraints:** Scores increased significantly with age ( $F = 39.21$ ,  $p < 0.001$ ), with the 80+ group reporting the highest levels ( $M = 3.8$ ,  $SD = 0.6$ ) compared to 60–69-year-olds ( $M = 2.1$ ,  $SD = 0.8$ ). Qualitative data confirmed that mobility limitations and fear of injury were key concerns, particularly among those with arthritis or hypertension.

**Facility constraints:** Non-Cantonese speakers reported significantly higher facility constraint scores ( $M = 3.5$ ,  $SD = 0.7$ ) than Cantonese speakers ( $M = 2.6$ ,  $SD = 0.8$ ;  $t = 7.24$ ,  $p < 0.001$ ). This gap was primarily attributed to language barriers in accessing activity information (Cantonese-only notices) and limited multilingual support.

**Social constraints:** Solitary dwellers exhibited higher scores for subjective social factors ( $M = 3.2$ ,  $SD = 0.9$ ) than those living with family ( $M = 2.3$ ,  $SD = 0.7$ ;  $t = 6.18$ ,  $p < 0.001$ ). Independent samples t-tests also showed that solitary dwellers had lower preference for group activities ( $M = 2.4$ ,  $SD = 0.7$ ) compared to non-solitary participants ( $M = 3.3$ ,  $SD = 0.6$ ;  $t = 5.21$ ,  $p < 0.001$ ), with safety concerns and lack of companions identified as key barriers.

### 4.4 Qualitative Insights

Thematic analysis of interviews with 20 participants (12 ordinary elderly, 5 special cases, and 3 experts) further elaborated on the quantitative findings, identifying three core themes that reflect the cultural and contextual nuances of leisure sports participation in Yuexiu District:

#### 4.4.1 Cultural motivations: identity and nostalgia in activity engagement

Participants with high cultural identity consistently framed their preference for culture-integrated activities as a connection to personal history and community identity. For instance, a 65-year-old resident from Guangta Street, who self-identified as having strong cultural attachment, described his participation in Cantonese opera aerobics: “The movements remind me of watching my grandfather perform in the old teahouse—every step feels like carrying on something important. It’s not just about moving my body; it’s about remembering where we come from.” This linkage between physical activity and cultural continuity was echoed by other high-identity participants, who often referenced local landmarks as integral to their activity experiences.

Qualitative data also revealed that “cultural symbols” served as emotional triggers: 8 out of 12 ordinary elderly participants mentioned specific elements like melodies or Southern Boxing postures as reasons for preferring certain activities, aligning with the quantitative finding that emotional identity ( $\beta = 0.41$ ) more strongly predicted preference than cognitive knowledge of culture.

#### 4.4.2 Subgroup-specific challenges: barriers beyond the quantitative lens

**Solitary dwellers:** Safety concerns emerged as a dominant barrier, extending beyond the quantitative “social constraints” score. A 81-year-old resident from Liurong Street explained, “I used to join the morning walk group, but after seeing an old man fall and wait 20 minutes for help, I stopped. When you live alone, one mistake can be fatal.” This fear of unassisted emergencies was reinforced by 72% of solitary participants, who noted that even minor inconveniences deterred participation—details not fully captured by standardized constraint scales.

**Non-Cantonese speakers:** Language barriers created layered exclusion, beyond mere “facility constraints.” A 76-year-old migrant from Hunan, living in Beijing Street, described missing a community dance class: “The notice was in Cantonese characters—I thought it said Saturday, but it was Sunday. By the time my neighbor told me, it was too late.” Another non-Cantonese participant added that verbal interactions during activities compounded isolation: “Everyone laughs and talks, but I can’t join in. It’s not just the words; it’s the jokes and references I don’t get.” These narratives explained why non-Cantonese speakers scored 0.9 points higher on facility constraints ( $M = 3.5$  vs.  $M = 2.6$  for Cantonese speakers) in quantitative analyses.

#### 4.4.3 Expert recommendations: culturally grounded solutions

**Geriatric medicine expert:** Emphasized modifying culture-integrated activities to accommodate age-related health limitations, suggesting, “Preserve the essence of Cantonese opera movements but reduce joint strain—for example, limit arm raises to shoulder height and replace deep squats with gentle knee bends.” This directly responded to quantitative data showing 82.5% of adults aged 80+ face chronic health constraints.

**Community sports management expert:** Advocated for “inclusive infrastructure” that merges cultural preservation with accessibility, noting, “Yuexiu’s arcade streets are ideal for group activities, but we need ramps for wheelchairs and bilingual signs. A 70-year-old non-Cantonese speaker can’t enjoy a historic space if they can’t read the schedule.” This addressed both facility constraints and language barriers.

**Lingnan culture expert:** Stressed balancing authenticity and adaptability, recommending, “Southern Boxing’s ‘horse stance’ is non-negotiable—it’s a cultural signature—but we can shorten hold times from 60 seconds to 30 for older participants.” This ensured cultural integrity while addressing the lower participation rates of older seniors in culture-integrated activities (5% weekly participation for 80+ vs. 32% for 60–69-year-olds).

## 5 LPA DISCUSSION

### 5.1 Cultural Identity and Preferences

This study's findings underscore the pivotal role of cultural identity—particularly emotional attachment to Lingnan culture—in shaping elderly residents' preferences for Leisure physical Activities in Yuexiu District. Quantitative analysis revealed a strong positive correlation between cultural identity (total score) and preference for culture-integrated activities ( $r=0.62$ ,  $p<0.01$ ), with the emotional identity dimension ( $\beta=0.41$ ) exerting a more pronounced influence than cognitive identity ( $\beta=0.23$ ). This aligns with Smith's (2020) "emotional primacy model," which posits that emotional connections to cultural symbols drive behavioral preferences more strongly than cognitive knowledge[25].

The qualitative data further illuminate this mechanism: elderly participants with high cultural identity frequently linked culture-integrated activities to nostalgic memories of youth, such as "dancing to Cantonese opera melodies reminds me of watching performances at the old theater in my neighborhood [26]." This confirms that cultural symbols function as emotional triggers, reinforcing engagement with specific activities.

Notably, age stratified the influence of cultural identity: younger seniors (60–69 years) showed significantly higher preference for culture-integrated activities ( $M=4.1$ ) compared to older cohorts ( $\geq 80$  years:  $M=2.1$ ;  $F=42.37$ ,  $p<0.001$ ). This aligns with Barker's observation that health constraints increasingly overshadow cultural motivations in advanced age. In Yuexiu, 82.5% of adults aged 80+ reported chronic conditions, which directly limited their ability to participate in physically demanding cultural activities, even when preferences remained strong [27,28].

These findings extend existing research by demonstrating the "cultural specificity" of identity-driven preferences in Lingnan contexts. Unlike broader national studies, which note general cultural influences, this study identifies region-specific symbols (arcade street spaces, Cantonese dialect) that uniquely mediate the relationship between identity and leisure choices.

### 5.2 Subgroup-Specific Constraints

The analysis of constraints revealed distinct barriers across subgroups, emphasizing the need for targeted interventions rather than one-size-fits-all approaches.

(1) **Older seniors ( $\geq 80$  years):** Health constraints emerged as the primary barrier, with this group scoring highest on health-related limitations ( $M=3.8\pm 0.6$ ) compared to younger seniors (60–69 years:  $M=2.1\pm 0.8$ ). This aligns with document findings that 82.5% of adults aged 80+ live with chronic diseases, which restrict participation in even low-intensity activities. Qualitative interviews highlighted fears of falls and fatigue, with one 82-year-old participant noting, "I want to join the Southern Boxing class, but my knees can't handle the squats anymore."

(2) **Non-Cantonese speakers:** Facility constraints were most pronounced ( $M=3.5\pm 0.7$  vs. Cantonese speakers:  $M=2.6\pm 0.8$ ), driven primarily by language barriers. NVivo analysis revealed a 90% association between "non-Cantonese use" and "information access difficulties," as participants struggled with Cantonese-only activity notices and verbal instructions. One migrant participant from Sichuan explained, "I saw a poster for a folk-dance event, but I couldn't read the time or location, so I didn't go."

(3) **Solitary dwellers:** Safety concerns (85% association strength) and lack of companions (72%) were key barriers, contributing to lower preference for group activities ( $M=2.4\pm 0.7$  vs. cohabiting seniors:  $M=3.3\pm 0.6$ ;  $t=5.21$ ,  $p<0.001$ ). Interviews revealed fears of medical emergencies without assistance, with one elderly stating, "I avoid group walks because if I fall, no one in the group knows my family's contact."

These findings echo Li et al.'s research on social isolation and LPA but add nuance by identifying *cultural context* as a mediator: for example, non-Cantonese speakers' facility constraints are not merely physical but reflect linguistic exclusion in a region where Cantonese dominates community life[29].

### 5.3 Intervention Implications

#### 5.3.1 Culturally adapted activity design

To balance cultural relevance with health constraints, activities for older/less healthy seniors should prioritize low-intensity, modified versions of traditional practices. As recommended by the geriatric medicine expert, this includes reducing movement amplitude by 30% and limiting duration to 30 minutes. For example, Southern Boxing routines can be adapted to "wall-supported stances" to reduce knee strain, preserving cultural symbolism while enhancing safety. This aligns with quantitative data showing that 58% of chronically ill seniors prefer traditional sports—suggesting modified cultural activities could bridge health limitations and cultural preferences.

#### 5.3.2 Inclusive communication systems

Addressing non-Cantonese speakers' barriers requires multilingual support, as advocated by the community sports management expert. This includes bilingual (Cantonese-Mandarin) activity notices, audio guides in multiple dialects, and recruiting bilingual volunteers to assist with on-site instruction. In pilot tests, such measures increased non-Cantonese speakers' facility constraint satisfaction from 2.6 to 3.8 (5-point scale), demonstrating improved access.

#### 5.3.3 Age-friendly space renovation

Historic sites should be retrofitted with accessibility features to accommodate older seniors and solitary dwellers. As observed in qualitative data, these spaces hold cultural significance for residents, making them ideal venues for LPA if

safety is enhanced. For solitary dwellers, pairing renovations with “buddy systems” (matching low-risk seniors to assist high-risk peers) addressed safety concerns, increasing group activity participation by 22% in pilot communities.

#### 5.4 Limitations

This study has limitations: its cross-sectional design precludes causal inference, and non-registered migrant seniors were underrepresented, potentially limiting generalizability. Future research should adopt longitudinal designs to track changes in preferences and constraints over time, and expand sampling to include migrant populations to explore cultural adaptation processes. Additionally, testing the proposed interventions in randomized controlled trials would strengthen evidence for their effectiveness[30,31].

Despite these limitations, this study advances understanding of how culture, age, and context intersect to shape elderly leisure behavior, offering actionable insights for promoting healthy aging in culturally rich urban settings like Yuexiu.

## 6 CONCLUSION

This study underscores the role of cultural identity in shaping elderly LPA preferences in Yuexiu. By addressing subgroup specific constraints and leveraging Lingnan traditions, interventions can enhance participation and wellbeing. Future research should explore longitudinal effects and expand to include migrant populations.

## COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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