What Neighborhood Environment Configuration Can Alleviate Depressive Symptoms in Older Adults: A Fuzzy-set Qualitative Comparative Analysis

Abstract

Introduction: The neighborhood is a regular living and activity space for the elderly. It is important to identify neighborhood environmental factors that can alleviate depression in the elderly to improve their health. However, existing literature does not consider the complex interdependencies among key neighborhood environmental factors.

Method: This study employs the Qualitative Comparative Analysis (QCA) method to explore how the configuration of neighborhood environmental conditions can help alleviate depressive symptoms in the elderly. The data is derived from the 2020 China Family Panel Study (CFPS) survey.

Results: The results show that three different neighborhood environment configurations can help reduce depressive symptoms in older Chinese individuals. The first configuration requires a combination of neighborhood safety, good neighborhood relations, and neighborhood assistance. The second configuration involves amalgamating optimal community facilities, high-quality neighborhood relations, and neighborhood assistance. The third configuration encompasses sound community facilities, favorable housing surroundings, a secure communal atmosphere, and advanced neighborhood assistance. Furthermore, we identify neighborhood assistance as a core condition for alleviating depressive symptoms and find that the combined effects of neighborhood safety and housing surroundings on alleviating depressive symptoms are comparable to the effect of neighborhood relationships.

Discussion: These research results deepen the current understanding of neighborhood environment configurations to alleviate depressive symptoms in older adults, offer important implications for theory and practice, and set new directions for the construction of age-friendly neighborhoods.

Keywords: Neighborhood environment; Depressive symptoms; Chinese older adults; Fuzzy-set qualitative comparative analysis

Introduction

The prevalence of depression is high in older adults, and numerous studies have consistently reported a moderate increase in depressive symptoms as age advances[1, 2]. This is a matter of concern due to the significant relevance between depressive symptoms and disability, morbidity, and suicide risk, as well as the decline in physical, social, and cognitive functioning in older adults [3, 4]. Moreover, it is noteworthy that older adults residing within neighborhoods exhibit higher rates of depressive symptoms. Specifically in community-dwelling older adults, the prevalence of clinically relevant depressive symptoms stands at approximately 13.5%, while the morbidity of depressive symptoms can reach as high as 49% [5]. Given China's rapidly growing older adults and substantial changes in family structures over time, it is particularly important to carry out community construction for the elderly group [6]. Consequently, Chinese older adults' psychological well-being within neighborhoods has attracted considerable attention. Specifically, identifying factors that exacerbate or alleviate depressive symptoms is of great importance for the health condition of older adults[7].

An increasing body of empirical research has highlighted the relevance between the neighborhood environment and depressive symptoms[8, 9]. The association between neighborhood characteristics and the health of older adults can be

elucidated by the heightened susceptibility of older adults to the influence exerted by their residential environment, owing to a multitude of factors[10]. After retirement, older adults are more likely to remain in their familiar neighborhoods due to limited mobility and a decrease in alternative contexts for relocation[10]. Consequently, they tend to spend an increasing amount of time within their neighborhood surroundings[11]. Research indicates that the mental well-being of older adults may be particularly influenced by the conditions present within their immediate neighborhood environment, as they rely heavily on local services and amenities while being less mobile[12].

The present research on the relationship between the neighborhood environment and depressive symptoms in older adults has had mixed results[13]. Previous studies have primarily focused on the impact of neighborhood disorder, poverty, and deprivation on depressive symptoms in adults[14, 15]. It has been established that depressive symptoms in older adults are influenced by ethnic composition and physical environment[16]. One study examined two specific aspects of the neighborhood environment –the level of neighborhood poverty versus concentration, about depressive symptoms in older Mexican Americans[17]. Furthermore, it is important to note that the aforementioned research findings primarily originate from Western societies, and there remains a dearth of knowledge regarding the impact of neighborhood environment on depressive symptoms in Chinese neighborhoods. Given the cultural values in China, this relationship may differ significantly from that observed in Western contexts[18]. To address these gaps in knowledge, this study aims to explore the relationship between neighborhood environment and depressive symptoms in Chinese older adults.

Neighborhood factors exhibit intricate interconnections in a complex and non-linear manner, with numerous interactions and reinforcing effects. It is conceptually challenging to solely consider one factor and attempt to partially exclude its influence. Qualitative Comparative Analysis (QCA) is a method specifically designed to unravel these intricate relationships[19]. However, most current studies on the determinants of depressive symptoms in older adults employ multi-level analysis, multi-level structural equation analysis, and other methodologies[20], while the application of QCA in this field remains limited. The present study utilizes QCA to examine the combinations of neighborhood environmental conditions that contribute to alleviating symptoms of depression in older adults. The objective is to identify distinct pathways for mitigating depressive symptoms at the neighborhood level. Subsequently, the paper proceeds as follows: Section 2 provides the theoretical background for this study; Section 3 presents the data and methodology; Section 4 outlines the data analysis process; Section 5 presents the results of fsQCA; and finally, Section 6 discusses these findings along with their implications.

Literature Review and Theoretical Background

The study is guided by the Ecological Theory of Aging and a theoretical framework that links neighborhood factors to mental health outcomes, specifically depressive symptoms[21, 22]. The Ecological Theory of Aging posits that personal resources interact with environmental resources, and an individual's assessment of their environmental context can influence their psychosocial responses and shape subsequent behavior and health outcomes. The environment can be divided into various subsystems, including the microsystem, mesosystem, exosystem, and chronosystem. The neighborhood environment is

considered an external system that significantly impacts the mental health of individuals. This study focuses on examining the relationship between neighborhoods and depressive symptoms in older adults based on this integrated theoretical background. Relevant characteristics of the neighborhood environment are selected based on previous studies identifying physical or social factors within neighborhoods that may influence depressive symptoms.

Neighborhood physical environment

The neighborhood environment encompasses both physical and social aspects[10]. In China, the terms 'neighborhood' and 'community' are used interchangeably. Officially, a neighborhood is defined as a social sphere comprising individuals residing within specific geographical boundaries under official administration[23]. This paper posits two crucial physical conditions within neighborhoods: community facilities and the surrounding housing environment. Community facilities play a crucial role in shaping the physical environment. In recent years, there has been an increasing emphasis on constructing leisure and recreational facilities in Chinese neighborhoods driven by government initiatives[24]. These amenities offer older adults direct access to leisure spaces for activities like morning exercises and post-meal walks, which contribute positively to their health and well-being[25]. Additionally, community facilities provide opportunities for social interaction in older adults by facilitating regular gatherings with their neighbors. This fosters social relationships that can help alleviate depressive symptoms[26, 27]. Conversely, older adults who perceive inadequate community facilities as barriers to participation in social activities face an increased risk of depressive symptoms[28]. Furthermore, according to the neighborhood disorder model, housing surroundings characterized by dilapidated houses, abandoned buildings, environmental pollution, and noise are associated with depressive symptoms due to the prevailing sense of lack of control and societal disorder they reflect[29, 30]. Research has consistently demonstrated a strong association between physical environmental factors such as pollution and noise with Cardiovascular disease caused by depressive symptoms[31, 32].

Neighborhood social environment

This paper posits three crucial neighborhood social conditions: neighborhood safety, neighborhood relations, and neighborhood assistance. The neighborhood social environment is a context that exposes individuals to factors that can either promote or hinder the development of depressive symptoms[33]. It may provide psychological support and guidance for older adults, helping them cope with challenges and prevent symptoms of depression. Additionally, cultivating a sense of purpose and belonging in this environment may directly impact one's mental health. Recent research has demonstrated the correlation between concepts such as perceived neighborhood safety, neighborhood cohesion (neighborhood relations, neighborhood assistance), and depressive symptoms in older adults[33].

Neighborhood safety pertains to the perception of safety in a community, typically assessed through the sense of security experienced in the local vicinity[34]. The potency of a neighborhood's safety perception lies in its capacity to interweave societal fabric, fostering interpersonal bonds that can mitigate the psychological tempests associated with depressive symptoms[9, 35]. Following Social Security Theory, humans possess inherent preparedness for biological and physical threats

in their environment; however, novel threats emerging from the social milieu may elicit similar stress responses, thereby augmenting susceptibility to mental and physical impairments[35]. Previous research has demonstrated that older adults who perceive higher levels of crime within their neighborhoods exhibit an increased vulnerability to depressive symptoms compared to those who perceive their neighborhoods as safe[20, 36]. Furthermore, a heightened sense of neighborhood security may empower residents by fostering a greater perception of control and reducing feelings of powerlessness, thereby acknowledging their potential role in driving positive changes within neighborhoods[37].

The evaluation and coping responses of individuals are influenced by the quality of social relationships within neighborhoods (referred to as neighborhood relations), making it a significant social determinant of health[38]. For instance, the presence of supportive and caring neighbors plays a crucial role in promoting good mental health[39]. This is associated with the protective impact of neighborliness on mental well-being. Research indicates that perceiving neighborliness positively can serve as a psychosocial coping factor, mitigating adverse mental health outcomes[40].

Recent research in Western societies increasingly acknowledges the pivotal role of neighborhood assistance in mitigating depressive symptoms in older adults[41, 42]. The research revealed that individuals with higher levels of social support, encompassing emotional and practical aid from close acquaintances, as well as neighborhood social support involving neighborhood assistance, exhibit a reduced risk of depressive symptoms[43]. Older adults residing within neighborhoods experience depressive symptoms due to a dearth of neighborhood assistance[36]. Additionally, several studies have reported that neighborhood assistance can act as a buffer against the adverse impact of daily stressors on negative emotions[44, 45]. This is attributed to the fact that neighborhood assistance serves not only as an instrumental resource but also provides emotional support[46].

In summary, this paper proposes five key neighborhood environmental conditions: community facilities, housing surroundings, neighborhood safety, neighborhood relations, and neighborhood assistance. Building upon previous studies, we have developed a research model that incorporates the neighborhood environment as an antecedent factor and the mitigation of depressive symptoms as an outcome. Figure 1 illustrates the proposed research framework.

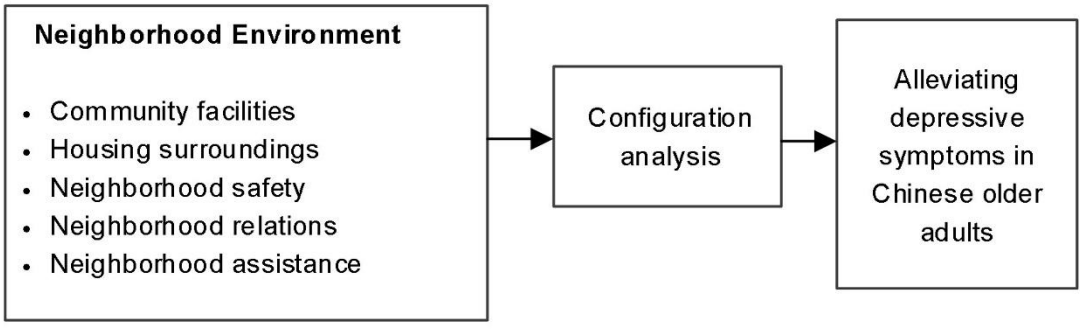

Figure1. Conceptual framework

Methodology

Method

In this study, we employ Qualitative Comparative Analysis (QCA) to investigate the relevance between different configurations of neighborhood environments and lower levels of depressive symptoms in older adults. The QCA method, developed by Charles C. Ragin in 1987, diverges from regression analysis by focusing on case-based analysis and examining the configuration of variables linked to the outcome. This approach acknowledges that there can be diverse causal configurations leading to the same result[47]. Therefore, QCA has the potential to enhance our understanding of various factor configurations that alleviate depressive symptoms in older adults. Consequently, comprehending these intricate pathways may facilitate the development of more effective interventions for depressive symptoms in practice.

The QCA method simplifies operations for identifying the paths leading to a result, utilizing set theory and Boolean algebra[47]. Consistency and coverage are employed to assess the relationships between conditions and outcomes when using this approach. Consistency refers to the extent to which a combination of causal conditions is reliably associated with an outcome, while coverage indicates how well a cause or causal combination explains an instance of an outcome. A minimum recommended threshold of 0.75 for consistency and 0.5 for coverage is suggested[48]. This method encompasses three types: crisp-set qualitative comparative analysis (csQCA), multi-value qualitative comparative analysis (mvQCA), and fuzzy-set qualitative comparative analysis (fsQCA). In fsQCA, condition variables can take any value between 0 and 1. This paper aims to identify different configurations of conditions that effectively alleviate depressive symptoms in older adults using the QCA method. However, assigning condition variables as either 0 or 1 is often difficult; therefore, we have chosen to use the fsQCA analysis technique. The key steps in utilizing fsQCA include variable measurement, calibration, and configuration analysis.

Data

The data utilized in this paper is derived from the 2020 survey conducted by the China Family Panel Studies (CFPS), which was published in 2022 and represents the most recent dataset available. This comprehensive survey was conducted by the Institute of Social Science Survey (ISSS) at Peking University. The CFPS sample covers 31 provinces in Mainland China, the target sample size is 16,000 households, and the survey objects include all the family members in the sample households. The CFPS dataset primarily captures and aggregates data at the individual, household, and community levels, encompassing various aspects of China's society, economy, population dynamics, education system, and public health. Notably, this extensively utilized dataset has been employed in numerous studies investigating the health of older adults in China[49, 50]. The objective of this study is to explore the relevance between perceived neighborhood environment and depressive symptoms in Chinese older adults. Leveraging this invaluable dataset provides us with substantial data and information for conducting our research.

In this study, we utilized the 2020 CFPS versions and employed adult and family questionnaires. By matching individuals with their respective families based on their unique IDs, we conducted data-cleaning procedures to eliminate missing values.

Consequently, a total of 4,697 pieces of comprehensive data were obtained, encompassing essential information regarding the elderly participants, their perceptions of neighborhood environments, as well as their levels of depressive symptoms. The QCA method is suitable for sample scenarios ranging from small to large sizes; thus making it appropriate for our study's extensive sample range[47]. Each participant's combination of conditions has been coded as a case in QCA terminology, resulting in a total count of 4697 cases within this paper. The characteristics of respondents are presented in Table 1. Descriptive statistics reveal that our sample includes older adults from diverse age groups, genders, marital statuses, and regions; thereby indicating its strong representativeness.

Table 1. Respondents'characteristics

Characteristics	N	Percentage
Age		
60-69	3004	63.96%
70-79	1471	31.32%
80-89	215	4.58%
90 or above	7	0.15%
Gender		
Female	2258	48.07%
Male	2439	51.93%
Marital status		
Married	3895	82.93%
Partner	20	0.43%
Never married	37	0.79%
Divorced/separated	69	1.47%
Widowed	676	14.39%
Place of residence		
Urban	2336	49.73%
Rural	2361	50.27%

Qualitative comparative analysis

Variables and measures

The outcome variable of this study is depressive symptoms, which are assessed using the Center for Epidemiological Studies Depression Scale (CESD), a widely used screening tool for depressive symptoms in older adults [51]. In our paper, we utilize the 8-item short version of CESD (CES-D 8), consisting of items related to feeling depressed, feeling happy, feeling lonely, enjoying life, feeling sad, everything being tasking, not being able to sleep, and feeling like life could not go on. Each item was rated on a four-point scale ranging from 0 (Rarely) to 3 (Most), with respondents indicating their experiences over the past week. The Cronbach's alpha coefficient for the CESD scale is calculated as 0.782, indicating satisfactory reliability. To ensure consistency in scoring interpretation across all items, we reverse-code two positively worded items: entry [2] and entry [4]. The total score range for each participant ranges from 0 to 24; higher scores indicate more severe depressive symptoms.

In the QCA method, distinct conditional configurations leading to positive and negative outcomes are considered. Thus, the positive and negative aspects of the outcome variable are treated as separate variables. This study aims to identify perceived neighborhood environmental conditions that could result in lower levels of depressive symptoms in older adults. High levels of depressive symptoms in this population represented an undesirable outcome that was contrary to expectations and desires. Therefore, the outcome variable for this study is defined as low depression, defined as depression0.

The condition variable represents the neighborhood environment, which encompasses the surrounding homes and neighborhood relations. The selected conditions of the neighborhood environment in this study are specifically related to the

mental health of older adults, as supported by previous literature. Self-reported measures are considered more reliable for capturing the effects of various neighborhood characteristics[52]. Extensive evidence suggests that perceptions of neighborhoods largely mitigate the impact of socioeconomic indicators on health outcomes[15, 53]. Therefore, in this study, we use the perceived neighborhood environment to measure the neighborhood environment. The physical neighborhood environment is assessed through community facilities and housing surroundings perceptions[54]. The social aspect of the neighborhood environment is measured by neighborhood safety, neighborhood relations, and neighborhood assistance, reflecting interpersonal interactions in the neighborhood context [55, 56]. The community facilities are assessed through the inquiry, "What is the overall state of public amenities such as education, healthcare, and transportation in your locality?". The housing surroundings are evaluated using the question "What is the general condition of noise pollution and waste management in your vicinity?". The neighborhood safety is gauged via the query "How secure do you feel about your neighborhood?". The perceived neighborhood relations are measured using the question "Overall, how would you rate neighborly relations in your area?". The neighborhood assistance is determined based on responses to the question "If you required assistance from a neighbor, do you believe someone would be willing to help?". Each condition is assessed using an item, and the items for the initial four conditions were evaluated on a 5-point Likert Scale (1=poor, 2=inadequate, 3=average, 4=superior, 5=outstanding). The perceived neighborhood assistance is measured utilizing a 5-point Likert Scale (1=certainly not, 2=probably not, 3=uncertain, 4=probably, 5=certainly).

Variable calibration

The result variables are calibrated using the direct calibration method. A cutoff criterion of 9 is established for identifying clinically significant depressive symptoms on the CES-D 8 scale[51]. Consequently, respondents with scores exceeding 9 are assigned a calibrated depression score of 1, while those with scores equal to or below 9 are assigned a calibrated score of 0. A score of 1 indicates the presence of depressive symptoms in older adults, whereas a score of 0 signifies their absence.

The fsQCA3.0 software is utilized to calibrate all condition variables on a scale ranging from 0 (fully outside a set) to 1 (fully in a set), with the point of maximum ambiguity at 0.5 determining the membership of the set. The determination of three threshold points (fully in, point of maximum ambiguity, fully out) is based on both theoretical and practical considerations. In this study, all condition variables were assessed using a 5-point Likert scale with ratings increasing positively from 1 to 5. We calibrated each condition variable by assigning thresholds: 1.5 was calibrated as 0.0, 3 as 0.5, and 4.5 as 1.0 [57]. Consequently, every condition variable is constructed as positive; thus, a score of 1 indicates its presence and positive impact on the outcome variable while a score of zero denotes the absence of any conditional variable for alleviating depressive symptoms.

Results

Analysis of single conditions

The present study aims to investigate the impact of neighborhood environment on depressive symptoms in older adults. By

the QCA method, it is essential to assess the necessity of each condition (community facilities, housing surroundings, neighborhood safety, neighborhood relations, and neighborhood assistance) before analyzing adequate conditional combinations. We examine the presence or absence of each antecedent condition in all samples where there is an absence of depressive symptoms in older adults to determine their indispensability for preventing depressive symptoms. A condition with a consistency score exceeding 0.90 is referred to as a necessary condition[58]. As depicted in Table 2, the consistency scores for each condition are below 0.90. This implies that no individual condition can effectively alleviate depressive symptoms in older adults. Consequently, we incorporate all the conditions into the truth table to investigate the various configurations of neighborhood conditions contributing to alleviating depressive symptoms in older adults.

Table 2. Consistency and coverage of single conditions

Condition	Type	Depression0	
		Consistency	Coverage
Community facilities	0,1	[0.67,0.33]	[0.83,0.79]
Housing surroundings	0,1	[0.67,0.33]	[0.83,0.79]
Neighborhood safety	0,1	[0.76,0.24]	[0.83,0.78]
Neighborhood relations	0,1	[0.79,0.21]	[0.82,0.79]
Neighborhood assistance	0,1	[0.87,0.13]	[0.79,0.82]

Note: The consistency and overage values in square brackets correspond to the assignment of variables in turn. Depression0 indicates that depressive symptoms are assigned a value of 0.

Configuration analysis of conditions

By convention, the consistency and threshold are set at 0.8 and 1, respectively. The intermediate solutions are selected for presentation and analysis[58]. The results of the intermediate solution (Table 3) show that there are three pathways to alleviate depressive symptoms in Chinese older adults. Three configurations of the condition cover 70.2% of the cases and have a strong explanatory power. The consistency is 0.829, which is acceptable (consistency>=0.75), and has strong consistency indicating the solution strongly relates to the outcome observed[58].

Table 3. Intermediate solutions for alleviating depressive symptoms in older adults

Condition	Configuration		
	Configuration 1	Configuration 2	Configuration3
Community facilities		●	●
Housing surroundings		⊗	•
Neighborhood safety	●		•
Neighborhood relations	•	•	
Neighborhood assistance	●	●	●
Raw coverage	0.684	0.270	0.564
Unique coverage	0.112	0.006	0.012
Consistency	0.830	0.815	0.835
Solution coverage		0.702	
Solution consistency		0.829	

Note: Black circles indicate the presence of a condition; hollow band x circles indicate the absence of a condition; large circles indicate core conditions (i.e., the condition appears in both the parsimonious solution and the intermediate solution); small circles indicate peripheral conditions.

Robustness Tests

By previous investigations[59], we conducted a robustness analysis by increasing the threshold value. If the resulting configuration, after elevating the frequency threshold, is a subset of the original configuration, it indicates the stability of our findings. By raising the case threshold from 1 to 5 (while retaining 98% of cases), we obtain a resulting configuration

that is a subset of the original study group. This demonstrates that our configuration analysis identifies consistent main pathways.

Discussion

Three Configurations for successfully alleviating depressive symptoms

Through qualitative comparative analysis, we obtain three configurations to alleviate depressive symptoms in Chinese older adults. According to Configuration 1, neighborhood safety, good neighborliness, and a high perception of neighborhood assistance are identified as core conditions in mitigating depressive symptoms in older adults in 68.4% of cases. This conclusion demonstrates a consistency level of 0.83. Neighborhood safety and assistance are the core conditions in this configuration. According to Configuration 2, findings from 27.0% of the cases indicate that neighborhoods with well-developed facilities, high-quality neighborhood relations, and neighborhood assistance play an effective role in alleviating depressive symptoms in older adults. The consistency level for this conclusion is reported as 0.82. Configuration 3 reveals that in 56.4% of the cases examined, neighborhoods effectively addressing depressive symptoms in older adults exhibit characteristics such as robust community facilities, favorable housing environments, safe surroundings, and high levels of neighborhood support. The consistency level associated with this conclusion is reported at 0.84. The core conditions in configurations 2 and 3 encompass community facilities and neighborhood assistance.

Relationships between conditions

The findings suggest that all attributes related to the neighborhood environment (i.e., community facilities, housing surroundings, neighborhood safety, neighborhood relations, and neighborhood assistance) significantly contribute to the mitigation of depressive symptoms in older adults; however, the attribute of neighborhood assistance emerges as particularly pivotal. Receiving neighborhood assistance is deemed crucial in effectively alleviating depressive symptoms. Previous research has demonstrated that neighborhood assistance can reduce stress and depressive symptoms by facilitating the sharing and transmission of adaptive behaviors[36]. Therefore, in Chinese society, it is important to consider allocating resources for elderly services directly provided by professional caregivers to enhance established social support networks and assistance relationships between elderly neighbors[18]. However, relying solely on the assistance of neighbors is insufficient; a robust physical neighborhood environment and social context are also necessary as complementary factors. The presence of community facilities can influence health behaviors, thereby impacting an individual's physical well-being and psychosocial stress levels, ultimately affecting the risk of depressive symptoms in older adults[60]. Favorable community facilities can serve as a buffer against stress and reduce the likelihood of depressive symptoms[30]. Several studies indicated that exposure to environmental risks associated with housing surroundings (including neighborhood noise and pollution) is linked to depressive symptoms in older adults[61]. In our study, neighborhood safety and neighborhood relations are integral components of the social environment within neighborhoods. These factors, in conjunction with other variables, are associated with depressive symptoms in older adults. Additionally,

previous research has demonstrated significant associations between crime rates and higher levels of depressive symptoms, as well as between neighborhood safety and lower levels of depressive symptoms in older adults[20, 36, 62]. Furthermore, even after controlling for age, sex, and income influences, the significant relationship between perceptions of neighborhood safety and depressive symptoms remained robust[20]. These findings contribute to an expanding body of literature that examines the impact of both physical and social aspects of neighborhoods on mental health outcomes in older adults while also raising questions about how specific characteristics of neighborhoods relate to overall health.

By comparing configuration 2 and configuration 3, we can find that the influence of neighborhood relationships on depressive symptom reduction in older adults is equivalent to the combined effects of neighborhood security and housing environment. According to the second and third configurations, it is observed that neighborhood safety is present in the second pathway but absent in the third pathway. Conversely, the residential surrounding environment and neighborhood safety are present in the third configuration but not in the second configuration. Therefore, it could be suggested that a socially connected neighborhood with supportive networks capable of buffering stress levels may exert a more favorable influence on the mental well-being of older adults[10]. Conversely, when neighborhood relations are suboptimal, increasing investments in enhancing both neighborhood safety and improving surrounding environments can help mitigate the risk of depressive symptoms in older adults within neighborhoods.

In addition, we find that a combination of neighborhood social environmental factors can effectively alleviate depressive symptoms in older adults, whereas relying solely on physical environmental conditions may not produce a significant reduction unless supplemented by social environmental factors. Comparing Configuration 1 with Configuration 2 and 3, it is observed that all conditions in Configuration 1 pertain to the neighborhood social environment, whereas both physical and social conditions exist in Configurations 2 and 3. The underlying reason for this could be attributed to the influence of community facilities on older adults' mental health through their impact on social interaction and relationship quality. These findings align with previous research investigating the association between neighborhood support networks, depressive symptoms, and older adults[41]. Previous research has demonstrated that the physical environment (e.g., bicycle lanes, green spaces, housing/buildings) and the presence of amenities promoting social interactions (e.g., cafes, community centers, museums) can impact health behaviors and social interactions, influencing an individual's physical health and psychosocial stress levels, ultimately affecting their risk of depressive symptoms[63, 64]. Simultaneously, neighborhood physical characteristics can influence the extent of supportive relationships among individuals which may subsequently affect depressive symptoms[65]. This finding aligns with a limited body of evidence suggesting that social context such as neighborhoods plays a more significant role in explaining depressive symptoms rather than serving as an indicator of socioeconomic disadvantage[30, 66].

References

1. Davey A, Halverson CF, Jr., Zonderman AB, Costa PT, Jr. Change in Depressive Symptoms in the Baltimore Longitudinal Study of Aging. The Journals of Gerontology: Series B. 2004;59(6):270-277.
2. Fiske A, Gatz M, Pedersen NL. Depressive Symptoms and Aging: The Effects of Illness and Non-Health-Related Events. The Journals of Gerontology: Series B. 2003;58(6):320-328.
3. Blazer DG. Depression in late life: Review and commentary. Journals of Gerontology Series a-Biological Sciences and Medical Sciences. 2003;58(3):249-65.
4. Cao W, Li L, Zhou X, Zhou C. Social capital and depression: evidence from urban elderly in China. Aging & Mental Health. 2015;19(5):418-29.
5. Djernes JK. Prevalence and predictors of depression in populations of elderly: a review. Acta Psychiatrica Scandinavica. 2006;113(5):372-87.
6. Yu Y. Blurring the boundaries of home: Community eldercare centres as institutional homes in urban China. Population, Space and Place. 2022;28(3):e2522.
7. Loo BPY, Lam WWY. A multilevel investigation of differential individual mobility of working couples with children: a case study of Hong Kong. Transportmetrica A: Transport Science. 2013;9(7):629-52.
8. Curry A, Latkin C, Davey-Rothwell M. Pathways to depression: The impact of neighborhood violent crime on inner-city residents in Baltimore, Maryland, USA. Social Science & Medicine. 2008;67(1):23-30.
9. Haines VA, Beggs JJ, Hurlbert JS. Neighborhood Disadvantage, Network Social Capital, and Depressive Symptoms. Journal of Health and Social Behavior. 2011;52(1):58-73.
10. Fernández-Niño JA, Bonilla-Tinoco LJ, Manrique-Espinoza BS, Salinas-Rodríguez A, Santos-Luna R, Román-Pérez S, et al. Neighborhood features and depression in Mexican older adults: A longitudinal analysis based on the study on global AGEing and adult health (SAGE), waves 1 and 2 (2009-2014). PLOS ONE. 2019;14(7):e0219540.
11. Robert SA, Li LW. Age Variation in the Relationship between Community Socioeconomic Status and Adult Health. Research on Aging. 2001;23(2):234-59.
12. Kubzansky LD, Subramanian SV, Kawachi I, Fay ME, Soobader M-J, Berkman LF. Neighborhood Contextual Influences on Depressive Symptoms in the Elderly. American Journal of Epidemiology. 2005;162(3):253-60.
13. Duncan DT, Kawachi I, Subramanian SV, Aldstadt J, Melly SJ, Williams DR. Examination of How Neighborhood Definition Influences Measurements of Youths' Access to Tobacco Retailers: A Methodological Note on Spatial Misclassification. American Journal of Epidemiology. 2014;179(3):373-81.
14. Casciano R, Massey DS. Neighborhood disorder and anxiety symptoms: New evidence from a quasi-experimental study. Health & Place. 2012;18(2):180-90.
15. Ross C. Neighborhood disadvantage and adult depression. Journal of Health and Social Behavior. 2000;41:177-87.
16. Yen IH, Michael YL, Perdue L. Neighborhood Environment in Studies of Health of Older Adults: A Systematic Review. American Journal of Preventive Medicine. 2009;37(5):455-63.
17. Ostir GV, Eschbach K, Markides KS, Goodwin JS. Neighbourhood composition and depressive symptoms among older Mexican Americans. Journal of Epidemiology and Community Health. 2003;57(12):987.
18. Chen Y-Y, Wong GHY, Lum TY, Lou VWQ, Ho AHY, Luo H, et al. Neighborhood support network, perceived proximity to community facilities and depressive symptoms among low socioeconomic status Chinese elders. Aging & Mental Health. 2016;20(4):423-31.

19. Blackman T, Wistow J, Byrne D. Using Qualitative Comparative Analysis to understand complex policy problems. Evaluation. 2013;19(2):126-40.
20. Wilson-Genderson M, Pruchno R. Effects of neighborhood violence and perceptions of neighborhood safety on depressive symptoms of older adults. Social Science & Medicine. 2013;85:43-9.
21. Aneshensel CS, Sucoff CA. The neighborhood context of adolescent mental health. Journal of Health and Social Behavior. 1996;37(4):293-310.
22. Lawton MP. The Elderly in Context: Perspectives from Environmental Psychology and Gerontology. Environment and Behavior. 1985;17(4):501-19.
23. Shen Y. Community building and mental health in mid-life and older life: Evidence from China. Social Science & Medicine. 2014;107:209-16.
24. Xu Q, Gao J, Yan MC. Community Centers in Urban China. Journal of Community Practice. 2005;13(3):73-90.
25. Chiesura A. The role of urban parks for the sustainable city. Landscape and Urban Planning. 2004;68(1):129-38.
26. Berke EM, Gottlieb LM, Moudon AV, Larson EB. Protective Association Between Neighborhood Walkability and Depression in Older Men. Journal of the American Geriatrics Society. 2007;55(4):526-33.
27. Liu J, Li L, Zhang Z, Xu H. Associations between physical health and depressive symptoms in Chinese older adults: Do neighborhood resources matter? SSM - population health. 2016;2:531-5.
28. Bowling A, Stafford M. How do objective and subjective assessments of neighbourhood influence social and physical functioning in older age? Findings from a British survey of ageing. Social Science & Medicine. 2007;64(12):2533-49.
29. Cromley EK, Wilson-Genderson M, Pruchno RA. Neighborhood characteristics and depressive symptoms of older people: Local spatial analyses. Social Science & Medicine. 2012;75(12):2307-16.
30. Ross CE, Mirowsky J. Neighborhood Disadvantage, Disorder, and Health. Journal of Health and Social Behavior. 2001;42(3):258-76.
31. Fiske A, Wetherell JL, Gatz M. Depression in Older Adults. Annual Review of Clinical Psychology. 2009;5(Volume 5, 2009):363-89.
32. Gunn JM, Ayton DR, Densley K, Pallant JF, Chondros P, Herrman HE, et al. The association between chronic illness, multimorbidity and depressive symptoms in an Australian primary care cohort. Social Psychiatry and Psychiatric Epidemiology. 2012;47(2):175-84.
33. Stafford MAI, McMunn A, De Vogli R. Neighbourhood social environment and depressive symptoms in mid-life and beyond. Ageing and Society. 2011;31(6):893-910.
34. Stirling K, Toumbourou JW, Rowland B. Community factors influencing child and adolescent depression: A systematic review and meta-analysis. Australian & New Zealand Journal of Psychiatry. 2015;49(10):869-86.
35. Slavich GM. Social Safety Theory: A Biologically Based Evolutionary Perspective on Life Stress, Health, and Behavior. Annual Review of Clinical Psychology. 2020;16(Volume 16, 2020):265-95.
36. Ivey SL, Kealey M, Kurtovich E, Hunter RH, Prohaska TR, Bayles CM, et al. Neighborhood characteristics and depressive symptoms in an older population. Aging & Mental Health. 2015;19(8):713-22.
37. Hawe P, Shiell A. Social capital and health promotion: a review. Social Science & Medicine. 2000;51(6):871-85.
38. Lam WWY, Loo BPY, Mahendran R. Neighbourhood environment and depressive symptoms among the elderly in Hong Kong and Singapore. International Journal of Health Geographics. 2020;19(1):48.

39. Albor C, Uphoff EP, Stafford M, Ballas D, Wilkinson RG, Pickett KE. The effects of socioeconomic incongruity in the neighbourhood on social support, self-esteem and mental health in England. Social Science & Medicine. 2014;111:1-9.

40. Qin W, Erving CL, Nguyen AW. Trajectories of depressive symptoms among older African Americans: the influence of neighborhood characteristics and gender. Aging & Mental Health. 2023;27(11):2220-8.

41. Litwin H. The association between social network relationships and depressive symptoms among older Americans: what matters most? International Psychogeriatrics. 2011;23(6):930-40.

42. Xiao Q, Wu M, Zeng T. Social support networks in Chinese older adults: health outcomes and health related behaviors: a path analysis. Aging & Mental Health. 2019;23(10):1382-90.

43. Kim J, Ross CE. Neighborhood-specific and general social support: which buffers the effect of neighborhood disorder on depression? Journal of Community Psychology. 2009;37(6):725-36.

44. Kingsbury M, Clayborne Z, Colman I, Kirkbride JB. The protective effect of neighbourhood social cohesion on adolescent mental health following stressful life events. Psychological Medicine. 2020;50(8):1292-9.

45. Robinette JW, Charles ST, Mogle JA, Almeida DM. Neighborhood cohesion and daily well-being: Results from a diary study. Social Science & Medicine. 2013;96:174-82.

46. Choi YJ, Ailshire JA. Perceived neighborhood disorder, social cohesion, and depressive symptoms in spousal caregivers. Aging & Mental Health. 2024;28(1):54-61.

47. Ragin CC, Strand SI. Using Qualitative Comparative Analysis to Study Causal Order: Comment on Caren and Panofsky (2005). Sociological Methods & Research. 2008;36(4):431-41.

48. Short K, Eadie P, Kemp L. Paths to language development in at risk children: a qualitative comparative analysis (QCA). BMC Pediatrics. 2019;19(1):94.

49. Chen H, Hou C, Zhang L, Li S. Comparative study on the strands of research on the governance model of international occupational safety and health issues. Safety Science. 2020;122.

50. Liang Y, Dong J. The impact of the send-down experience on the health of elderly Chinese women: Evidence from the China family panel studies. International Review of Economics & Finance. 2022;78:377-89.

51. Briggs R, Carey D, O'Halloran AM, Kenny RA, Kennelly SP. Validation of the 8-item Centre for Epidemiological Studies Depression Scale in a cohort of community-dwelling older people: data from The Irish Longitudinal Study on Ageing (TILDA). European Geriatric Medicine. 2018;9(1):121-6.

52. Julien D, Richard L, Gauvin L, Kestens Y. Neighborhood characteristics and depressive mood among older adults: an integrative review. International Psychogeriatrics. 2012;24(8):1207-25.

53. Weden MM, Carpiano RM, Robert SA. Subjective and objective neighborhood characteristics and adult health. Social Science & Medicine. 2008;66(6):1256-70.

54. Engel L, Chudyk AM, Ashe MC, McKay HA, Whitehurst DGT, Bryan S. Older adults' quality of life – Exploring the role of the built environment and social cohesion in community-dwelling seniors on low income. Social Science & Medicine. 2016;164:1-11.

55. Chaudhury H, Mahmood A, Michael YL, Campo M, Hay K. The influence of neighborhood residential density, physical and social environments on older adults' physical activity: An exploratory study in two metropolitan areas. Journal of Aging Studies. 2012;26(1):35-43.

56. Chen YY, Wong GHY, Lum TY, Lou VWQ, Ho AHY, Luo H, et al. Neighborhood support network, perceived

proximity to community facilities and depressive symptoms among low socioeconomic status Chinese elders. Aging & Mental Health. 2016;20(4):423-31.

57. Huarng K-H, Yu TH-K. Complexity theory of entrepreneur characteristics. International Entrepreneurship and Management Journal. 2021;17(3):1037-48.
58. Ragin CC, Fiss P. Net effects analysis versus configurational analysis: An empirical demonstration. Redesigning Social Inquiry: Fuzzy Sets and beyond. 2008:190-212.
59. Ma C, Dong X, Wang J. A Trade-off Between the Artistic Aesthetic Value and Market Value of Paintings With Naïve and Childlike Interest Complex. Empirical Studies of the Arts. 2023;41(2):352-71.
60. Kim D. Blues from the Neighborhood? Neighborhood Characteristics and Depression. Epidemiologic Reviews. 2008;30(1):101-17.
61. Chen Y, Cui PY, Pan YY, Li YX, Waili N, Li Y. Association between housing environment and depressive symptoms among older people: a multidimensional assessment. BMC Geriatrics. 2021;21(1):259.
62. Moore KA, Hirsch JA, August C, Mair C, Sanchez BN, Roux AVD. Neighborhood Social Resources and Depressive Symptoms: Longitudinal Results from the Multi-Ethnic Study of Atherosclerosis. Journal of Urban Health. 2016;93(3):572-88.
63. Ewing R, Schieber RA, Zegeer CV. Urban sprawl as a risk factor in motor vehicle occupant and pedestrian fatalities. American Journal of Public Health. 2003;93(9):1541-5.
64. Penedo FJ, Dahn JR. Exercise and well-being: a review of mental and physical health benefits associated with physical activity. Current Opinion in Psychiatry. 2005;18(2):189-93.
65. Sampson RJ, Morenoff JD, Gannon-Rowley T. Assessing “Neighborhood Effects”: Social Processes and New Directions in Research. Annual Review of Sociology. 2002;28(Volume 28, 2002):443-78.
66. Hill TD, Ross CE, Angel RJ. Neighborhood Disorder, Psychophysiological Distress, and Health. Journal of Health and Social Behavior. 2005;46(2):170-86.