



# Community-based structural social capital and depressive symptoms of older urban Chinese adults: The mediating role of cognitive social capital

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## ARTICLE INFO

### Keywords:

Cognitive social capital  
Structural social capital  
Depressive symptoms

## ABSTRACT

**Objectives:** The present study aimed to investigate the mediating role of cognitive social capital in the association between community-based structural social capital and depressive symptoms among older adults living in urban China.

**Methods:** Data were derived from a community survey conducted in Suzhou City, China, in late 2015 with 456 respondents aged 60 or older. Structural equation modeling was used to test the proposed hypothesis.

**Results:** The latent variables of cognitive and structural social capital were established. Cognitive social capital was found to have a mediation effect on the association between structural social capital and depressive symptoms, even after controlling for the respondents' sociodemographic characteristics, health status, and family variables.

**Conclusions:** The findings support the utility of social capital theory in urban Chinese contexts. A more comprehensive assessment tool to measure structural social capital should be built nationwide. Fostering cognitive social capital should play an important role in interventions aiming to enhance structural social capital among older adults. Policy and intervention implications are discussed.

## 1. Introduction

Older populations living in urban China have grown dramatically in the past few decades. The number of Chinese adults aged 65 or older reached 143.86 million in 2015, around half of whom were living in urban cities (National Bureau of Statistics of China, 2016). Meanwhile, Chinese society and traditional culture have undergone dramatic changes, such as rapid urbanization and modernization, the transition from multigenerational family structure to nuclear family structure, and changes in filial piety culture (Lin & Yi, 2011; National Bureau of Statistics of China, 2016). These rapid social changes contribute to a range of social issues that could be particularly stressful for older adults, such as changes in living environment, decline in social engagement, and the lack of instrumental support from adult children. Furthermore, compared to younger groups, older adults are more likely to encounter a range of risk factors related to mental health in later life, including loss of social roles and important relationships, living alone, decline in physical health, chronic diseases, and pains (Lu, Liu, & Lou, 2015; Norstrand & Xu, 2011; Nyqvist, Forsman, Giuntoli, & Cattani, 2012). Therefore, to achieve healthy and active aging, mental health

among older adults deserves great attention from policy makers and scholars.

Depressive symptoms are considered one of the major mental health problems in later life (Bassett & Moore, 2013; De Silva, McKenzie, Harpham, & Huttly, 2005; Macinko & Starfield, 2001). The prevalence of depressive symptoms and depression in China varies by age groups, sampling regions, and screening criteria. However, empirical evidence suggests that depressive symptoms are particularly severe among older populations and the prevalence rates have increased in the past few decades (Li, Zhang, Shao, Qi, & Tian, 2014; Qin, Wang, & Hsieh, 2016; Yu, Li, Cuijpers, Wu, & Wu, 2012). Depressive symptoms not only are an important dimension of well-being among older adults, but also play an important role in influencing older adults' social engagement in their families and communities (Kvelde et al., 2015; World Health Organization, 2004). Community-based social capital is considered an important and modifiable social determinant of depressive symptoms among older adults that increases the frequency of social participation, sustains social relationships in local communities, enhances reciprocal exchanges among neighbors, and develops positive thoughts regarding individuals' social lives (De Silva et al., 2005; Norstrand & Xu, 2011;

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<https://doi.org/10.1016/j.archger.2019.01.014>

Received 27 August 2018; Received in revised form 12 October 2018; Accepted 26 January 2019

Available online 28 January 2019

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Peng & Lin, 2018).

### 1.1. Defining and measuring social capital

Community and family are recognized as two important sources of social capital among older adults (hereafter community social capital and family social capital; Coleman, 1990; Furstenberg, 2005). We focused on community-based social capital in this study. A community social capital framework can be conceptualized from both collective and individual perspectives (Agampodi, Agampodi, Glozier, & Siribaddana, 2015; Nyqvist et al., 2012). Specifically, social capital can be defined as “features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions” (Putnam, Leonardi, & Nanetti, 1993, p. 167). Social capital can also be defined as social resources inherent in social structures and connections in which individuals have memberships and share consensus on social norms and cultural values (1990, Coleman, 1988). Social capital might influence depressive symptoms among older residents through their personal actions in developing trust, engaging in reciprocal exchanges with others, joining social organizations, and participating in social activities (De Silva et al., 2005; Nyqvist et al., 2012). Given individual variations in social capital levels, we examined social capital through individuals’ attitude and behaviors regarding their social involvements in local communities.

Furthermore, community social capital has two important dimensions: cognitive social capital and structural social capital (De Silva, Huttly, Harpham, & Kenward, 2007). Cognitive social capital refers to individuals’ subjective evaluations of their social connections in local communities. The most frequently adopted measures in Chinese studies include social trust in local communities and reciprocity among neighbors (Cao, Li, Zhou, & Zhou, 2015; Grootaert, Narayan, Jones, & Woolcock, 2004; Wang, Schlesinger, Wang, & Hsiao, 2009; Yip et al., 2007). Structural social capital, on the other hand, refers to objective indicators of individuals’ social connections. The common indicators include number of organization memberships, volunteering, social participation, and citizenship activities (Agampodi et al., 2015; De Silva et al., 2007; Nyqvist et al., 2012).

### 1.2. Structural social capital and depressive symptoms

The literature contains inconsistent findings on the association between structural social capital and depressive symptoms among older adults. For example, Chiao, Weng, and Botticello (2011) showed that social participation had a protective effect on depressive symptoms among older adults in Taiwan. In contrast, some empirical studies found that individuals’ social participation in community activities was not associated with depressive symptoms or depression (Bassett & Moore, 2013; Fujiwara & Kawachi, 2008). A more recent study conducted in urban China also found that the association between social participation and geriatric depression was statistically nonsignificant (Cao et al., 2015). Furthermore, findings of studies on the relationship between other structural social capital indicators (e.g., organization memberships, attendance at social centers, volunteering, and citizenship activities) and depressive symptoms or depression were also mixed (De Silva et al., 2005; Schwarzbach, Lupp, Forstmeier, König, & Riedelheller, 2014). These inconsistent findings might result from the following issues: (a) There is no consensus in terms of the conceptualization and measurement of structural social capital, making it difficult to compare the findings of relevant studies and reach conclusive judgments; (b) some studies did not simultaneously examine both structural and cognitive social capital (Chiao et al., 2011; De Silva et al., 2005; Schwarzbach et al., 2014); and (c) most studies focused on the effects of structural and social capital without examining how the two dimensions interact.

### 1.3. The role of cognitive social capital in the association between structural social capital and depressive symptoms

Structural social capital and cognitive social capital are closely related (Brehm & Rahn, 1997; Lindstrom, 2004). Structural social capital is a contextual factor that reflects the objective nature of social behavior. Cognitive social capital, on the other hand, reflects individuals’ subjective appraisals of their social relationships, which influence their social involvements in local communities (De Silva et al., 2005; Nyqvist et al., 2012). We argue that the relationships between these two factors are more likely to be reciprocal (Brehm & Rahn, 1997; Lindstrom, 2004). Social participation, for example, provides important opportunities for older residents to form trust and engage in reciprocal exchanges in local communities. Individuals who trust their neighbors are also more likely to participate in social and citizenship activities in local communities. This virtuous circle could lead to the development of social capital. In contrast, low social participation might lead to a low level of social trust and reciprocity, and vice versa. This vicious circle could lead to the decline of social capital in local communities, which can eventually have negative impacts on the mental health of older residents. Structural social capital (e.g., civic engagement) might be a more efficient method of enriching social trust in others than the reverse (Brehm & Rahn, 1997; Putnam, 2000). It is also more practical to form social capital by generating higher levels of social participation among older residents in local communities. Therefore, we focused on the effect of structural social capital on cognitive social capital in this study.

Literature has shown that cognitive social capital is a stronger protective factor of depressive symptoms than structural social capital at the individual level (Bassett & Moore, 2013; Cao et al., 2015; De Silva et al., 2005). Individuals who trust their friends and neighbors and perceive their neighborhood with high reciprocity levels were less likely to be depressed in Western contexts (Bassett & Moore, 2013). Trust and reciprocity were also significantly associated with depression among older adults in an urban Chinese context (Cao et al., 2015). Furthermore, trust and reciprocity were important predictors of other mental health indicators (e.g., life satisfaction, subjective well-being) among older adults in Chinese contexts (Lu, Jiang, Lou, Zeng, & Liu, 2018; Norstrand & Xu, 2011; Yip et al., 2007).

In summary, the interplay between cognitive and structural dimensions of social capital and their influences on depressive symptoms have been largely understudied. Many relevant studies tended to adopt a single indicator to represent a subdimension of social capital. Such methods cannot capture the multidimensional nature of social capital. Both cognitive and structural social capital, as an example, can be tested by latent constructs through observed variables of individuals’ involvements in community activities (De Silva et al., 2007). Therefore, the present study aimed to establish latent constructs of cognitive and structural social capital and examine the mediating role of cognitive social capital on the association between structural social capital and depressive symptoms of older adults living in urban China. This would give us a more nuanced understanding of the mechanisms linking social capital to depressive symptoms in later life. The findings could have important implications for social capital interventions designs focused on promoting mental health in older age.

Based on the literature and social capital theory, we hypothesized that cognitive social capital plays a mediating role in the relationship between structural social capital and depressive symptoms among older Chinese adults. To examine the hypothesis, we controlled variables recognized to be significantly associated with depressive symptoms, including sociodemographic characteristics, socioeconomic status, and physical health (Cao et al., 2015; Kim & Lee, 2015; Lu, Xu, Lou, & Chi, 2018; Qin et al., 2016).

## 2. Methods

### 2.1. Sampling

The data were derived from a community sample of older adults from the Gusu District of Suzhou. The survey was conducted by the Department of Social Work at Renmin University of China from October to December 2015. A quota sampling method was used to recruit respondents. The sampling procedures were as follows: first, one or two communities from each of the 16 streets of the district were selected based on referrals from committees on aging and community centers; second, based on community center referrals, 25 respondents from each community were interviewed by trained interviewers. To be recruited to the survey, the respondents needed to (a) be local residents and live in local communities for more than 6 months in the past year; (b) be aged 60 or older; and (c) have adequate listening and cognitive capacities to complete the survey. Informed consent forms were signed and collected before conducting the survey. A total of 456 respondents successfully completed the survey. The age and gender ratios of recruited respondents were consistent with those of the local representative sample from the sixth national census. The response rate was higher than 90% in each selected community.

### 2.2. Measurement

#### 2.2.1. Dependent variable

Depressive symptoms were measured by the 15-item Geriatric Depression Scale (Chan, 1996). This scale's reliability and validity among Chinese populations have been well established (Chuang, Kao, Lee, & Chang, 2018; Fung et al., 2018). The scale includes 10 positive questions and five negative questions. Respondents were asked about their positive affect, depressive mood, social engagement, and somatic syndromes. Their answers to each item were measured by binary variables (0 = no; 1 = yes). All scores were summed, with a range from 0 to 15. Higher scores indicated higher depressive symptom levels. In this study, Cronbach's alpha for this scale was .670. This indicates that this scale's internal consistency is satisfactory.

#### 2.2.2. Independent variable

The latent construct of structural social capital was examined by four indicators: organization memberships, volunteering, social participation, and citizenship activities (De Silva et al., 2007; Grootaert et al., 2004). Respondents were asked whether they were members of the following organizations: political parties, neighborhood committees, women's groups, labor unions, community associations, sports clubs, charitable organizations, religious groups, or credit groups. Responses to each question were recoded as a binary variable (0 = no, 1 = yes). We summed the scores to represent the number of organization memberships, with a range from 0 to 10. Social participation was measured by a single question: "How frequently did you participate in activities organized by the above organizations in the past year?" Responses to this question were measured using a 6-point scale (1 = never, 4 = 1–3 times per month, 6 = more than twice per week). In addition, respondents were asked how many hours of volunteer work they had conducted in the referenced organizations in the past month. The responses were further recoded as a binary variable (0 = no; 1 = yes). Finally, citizenship activities were measured using a simple question: "Did you collaborate with other local residents to cope with a common issue or problem in the past year?" Responses to this question were assessed dichotomously (0 = no, 1 = yes). Higher scores on these indicators indicated higher levels of structural social capital.

#### 2.2.3. Mediator

The latent construct of cognitive social capital was assessed by four trust and reciprocity indicators: trust in the local community, willingness to cooperate with others, perceived helpfulness of others, and

feelings of belongingness (De Silva et al., 2007; Lu, Lum, & Lou, 2016). Regarding trust, the respondents were asked to offer their opinions on the following statement: "The majority of local residents living in this community can be trusted." Regarding reciprocity, they were asked whether local residents helped one another and cared about both their benefits and others' interests. Finally, the respondents were asked whether they considered the local community to be a big family and themselves to be members of that family. Responses were measured on a 5-point scale (1 = strongly disagree or never helpful, 3 = neutral or sometimes helpful, 5 = strongly agree or always helpful). Higher scores on these indicators indicated higher levels of cognitive social capital.

#### 2.2.4. Control variables

In this study, control variables included the respondents' socio-demographic characteristics (age, gender, marital status, living alone and number of children), socioeconomic status (education and income), and health status (an objective indicator measuring activities of daily living [ADLs]). Age was reported by the respondents. Gender, marital status, living alone and education were recoded as binary variables (0 = male, 1 = female; 0 = other marital status, 1 = married; 0 = no, 1 = yes; 0 = primary school or lower, 1 = secondary school or higher, respectively). The respondents were asked how many living children they had at the time of survey. The respondents were also asked to report their monthly household income. ADLs were measured by the Barthel Index (Mahoney & Barthel, 1965). This scale has 10 categories assessing walking, going up and down stairs, eating food, washing face and brushing teeth, dressing, getting out of a chair and bed, bathing, continence of bowels, going to the toilet, and bladder control. Responses were assessed using a 3-point scale. Scores of the 10 items were summed to represent respondents' ADL abilities (range = 0–100). Higher scores indicated higher levels of independence in ADLs. The internal consistency of the scale was satisfactory (Cronbach's alpha = .814).

### 2.3. Data analysis

Structural equation modeling (SEM) was used to examine the proposed hypotheses in Mplus 7.0 (Muthén & Muthén, 2012). Specifically, SEM was conducted in two steps: a measurement model and a structural model (Kline, 2011). A classic estimator of SEM, maximum likelihood, is based on the assumption that observed variables are continuous and normally distributed (Kline, 2011; Li, 2016; Rhemtulla, Brosseau-Liard, & Savalei, 2012). This is not appropriate for ordinal and categorical observed variables. Therefore, diagonally weighted least squares (WLSMV in Mplus) was the estimator in this study (Muthén & Muthén, 2012). This approach is specifically designed for ordinal and categorical variables.

Using confirmatory factor analysis, we tested the model fit of the measurement model first. A range of fit indexes were used, including the chi-square test, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and weighted root mean square residual (WRMR; Kline, 2011). The following cutoff criteria were used to determine a good model fit: nonsignificant chi square values, RMSEA values lower than .05, CFI and TLI values higher than .90, and WRMR values lower than 1 (Bentler, 1990; Browne & Cudeck, 1993; Kline, 2011; Steiger, 1990; Yu, 2002). At the second stage, an initial structural model was built to examine the direct effect of structural social capital on depressive symptoms. A final structural model was built to examine the mediating effect of cognitive social capital on the relationship between structural social capital and depressive symptoms.

Furthermore, data entry was conducted using EpiData 3.1. Data cleaning was also conducted to ensure the accuracy of the entries (less than 5% errors were identified and corrected). Because social participation was involved in both the latent variable of structural social capital and depressive symptoms (i.e., several items assessed social

**Table 1**  
Sample Characteristics (N = 456).

	n (%)	M (SD)
<b>Age</b>		70.67 (7.35)
60–64	107 (23.5)	
65–74	219 (48.0)	
75 or above	130 (35.9)	
<b>Gender</b>		
Men	206 (45.2)	
Women	250 (54.8)	
<b>Marital status</b>		
Married	342 (75.0)	
Other marital status	114 (25.0)	
<b>Education</b>		
Primary school or lower	159 (34.9)	
Secondary school or above	295 (64.7)	
<b>Monthly household income</b>		
Equal or less than RMB 3000	143 (31.4)	
RMB 3001 or above	309 (67.8)	
<b>Living alone</b>		
Yes	79 (17.3)	
No	377 (82.7)	
<b>Self-rated health</b>		
Very poor, poor, or fair	222 (48.7)	
Good or very good	233 (51.1)	
<b>ADLs</b>		98.88 (4.64)
<b>Depressive symptoms</b>		2.37 (2.20)
<b>Number of children</b>		1.89 (1.07)

engagement and social withdrawal), we conducted a sensitivity analysis. We recalculated the scores of depressive symptoms without the items relating to social participation and reran the model. The results were similar and the conclusion remained the same. Therefore, we chose to report the previous full model. The results of the sensitive analysis are presented in Appendix 1.

### 3. Results

#### 3.1. Sociodemographic characteristics of the respondents

Table 1 presents the sociodemographic characteristics of the respondents. The respondents' mean age was 70.67 years. More than half of the respondents were women. Three quarters were married and 17.3% lived alone. Around two thirds had completed secondary school or higher levels of education. On average, each respondent had 1.89 children. Furthermore, 67.8% of the respondents reported that their household income was higher than 3000 RMB per month (1 USD = 6.3 RMB). Additionally, 82.5% considered their family relationship to be good or very good; 51.1% considered their health status to be good or very good; and 8.4% reported that they had limitations in ADLs.

**Table 2**  
Measurement Model of Social Capital.

	Estimate	SD	Standardized Estimate	Standardized SD
<b>Cognitive Social Capital</b>				
Trust in local community	1.000	0.000	.445***	.041
Willingness to cooperate with others	2.141***	0.236	.829***	.039
Perceived helpfulness of others	1.547***	0.202	.676***	.041
Feelings of belonging	1.259***	0.153	.662***	.038
<b>Structural Social Capital</b>				
Organization memberships	1.000	0.000	.612***	.049
Volunteering	0.821***	0.112	.687***	.058
Social participation	1.406***	0.197	.658***	.049
Citizenship activities	0.867***	0.110	.726***	.053

\*\*\*  $p < .001$  (two-tailed).

Regarding social capital indicators, 84.6% of the respondents reported that most of the local residents in their communities can be trusted (agree or strongly agree). More than half (56.8%) considered local residents to be helpful at most times or always; 77.9% believed that local residents cared about both their own and others' interests (agree or strongly agree); and 89.9% agreed or strongly agreed that their local community is similar to a big family. The average number of organizational memberships among respondents was 1.73. Regarding community involvement, 29.6% reported that they had participated in community social activities held by local organizations more than once per week on average in the past year; 24.1% never participated in any such activity in the past year; and 64.9% reported that they did not participate in any voluntary activity in the past month. Nearly two thirds (65.1%) reported that they did not collaborate with other residents to solve a common problem in the past 12 months. Finally, 13.6% of the respondents were at risk of depression (Scores on GDS equal to or greater than 5).

#### 3.2. Measurement model: cognitive social capital and structural social capital

Before examining the hypothetical model, we tested the measurement model of cognitive and structural social capital using the whole sample. Both latent constructs had four factor indicators. Estimates of fit statistics indicated that the model adequately fit the data,  $\chi^2(18) = 22.117, p = .2268, RMSEA = 0.0023, CFI = 0.993, TLI = 0.989, WRMR = 0.542$ . The standardized estimates of the factor loadings ranged from .445 to .829 for cognitive social capital and .612 to .726 for structural social capital (see Table 2).

#### 3.3. Direct effect of structural social capital on depressive symptoms

We examined the direct effect of structural social capital on depressive symptoms in the first structural model. The fit statistic estimates indicated that the first structural model adequately fit the data,  $\chi^2(28) = 37.756, p = .1031, RMSEA = 0.028, CFI = 0.973, TLI = 0.952, WRMR = 0.692$ . The standardized estimates of the factor loadings ranged from .625 to .712 for structural social capital. The results showed that structural social capital was significantly associated with depressive symptoms ( $\beta = -0.596, SD = 0.153, p < .001$ ; see Fig. 1).

Age, income, education, and ADLs were significantly associated with structural social capital (age:  $\beta = -0.017, SD = 0.008, p < .05$ ; income:  $\beta = 0.057, SD = 0.026, p < .05$ ; education:  $\beta = 0.506, SD = 0.113, p < .001$ ; ADLs:  $\beta = 0.052, SD = 0.015, p < .01$ ). Income and ADLs were significantly associated with depressive symptoms (income:  $\beta = -0.131, SD = 0.054, p < .05$ ; ADLs:  $\beta = -0.0128, SD = 0.018, p < .001$ ).

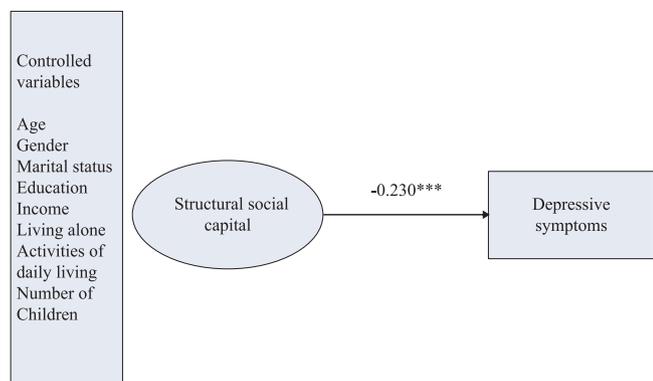


Fig. 1. The first structural model of the relationship between structural social capital and depressive symptoms.

Note. Standardized coefficients reported. \*\*\* $p < .001$  (two-tailed).

### 3.4. Structural model: mediation effects of cognitive social capital on structural social capital and depressive symptoms

In the final stage, we added cognitive social capital to the final structural model as a mediator. The fit statistic estimates indicated good model fit,  $\chi^2(71) = 77.039, p = .2916, RMSEA = 0.014; CFI = 0.992, TLI = 0.988; WRMR = 0.630$ . The standardized estimates of the factor loadings ranged from .445 to .750 for cognitive social capital and .604 to .752 for structural social capital.

The results show that cognitive social capital was significantly associated with depressive symptoms among respondents ( $\beta = -2.405, SD = 0.426, p < .001$ ). After entering the latent variable of cognitive social capital in the model, the association between structural social capital and depressive symptoms became nonsignificant ( $\beta = -0.253, SD = 0.161, p = .115$ ). Furthermore, structural social capital was significantly associated with cognitive social capital ( $\beta = 0.167, SD = 0.040, p < .001$ ). Therefore, cognitive social capital had a mediating effect on the relationship between structural social capital and depressive symptoms ( $\beta = -.401, SD = .099, p < .001$ ; see Fig. 2). Age, income, education, and ADLs were significantly associated with structural social capital (age:  $\beta = -0.016, SD = 0.008, p < .05$ ; income:  $\beta = 0.052, SD = .0025, p < .05$ ; education:  $\beta = 0.485, SD = 0.110, p < .001$ ; ADLs:  $\beta = 0.052, SD = 0.015, p < .01$ ). ADLs were significantly associated with depressive symptoms ( $\beta = -0.109, SD = 0.015, p < .001$ ).

## 4. Discussion

Older adults are particularly vulnerable to decreasing social

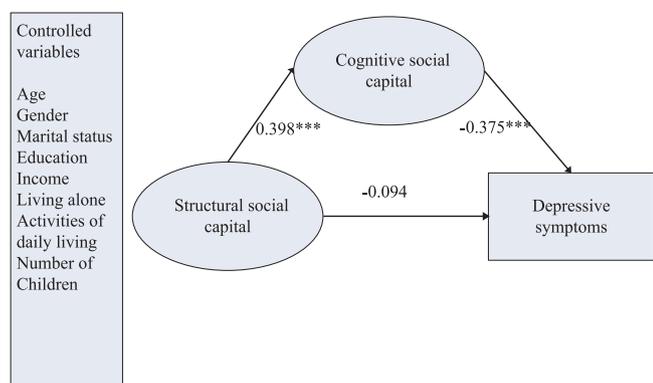


Fig. 2. The final structural model of the mediating effect of cognitive social capital on the relationship between structural social capital and depressive symptoms.

Note. Standardized coefficients reported. \*\*\* $p < .001$  (two-tailed).

networks and at greater risk of depressive symptoms and depression. Thus, social capital embedded in local communities might become more important for older adults to sustain or improve their mental health. There is a lack of empirical evidence and in-depth understanding of the mechanisms linking multidimensional social capital to depressive symptoms among older adults in China, where local populations are aging rapidly and traditional family support systems have encountered great challenges. The findings of this study support a more comprehensive latent structure of structural and cognitive social capital and indicate their interplay and their relationship with depressive symptoms in later life. The findings provide new empirical evidence to support the application of social capital theory in urban Chinese contexts. Furthermore, the findings have important implications for the promotion of social engagement and mental health among older adults living in urban China and other Confucian-oriented countries and communities.

The results of the measurement model confirmed two unobservable latent variables, labeled as structural social capital and cognitive social capital from the perspective of social capital theory. Specifically, individuals with higher levels of structural social capital are more likely to have more organizational memberships, conduct more volunteer hours, and participate in social and citizenship activities more frequently. Individuals who have higher levels of cognitive social capital tend to be more involved in reciprocal exchanges among neighbors, develop social trust with others, and have feelings of belongingness in local communities. The latent constructs of structural social capital and cognitive social capital are useful instruments to assess the quantity and quality of social capital in urban Chinese communities. These findings should be replicated in future studies to produce comparable empirical evidence.

The findings suggest that structural social capital plays an important role in reducing older adults' depressive symptoms. Previous studies often used a single indicator (e.g., social participation) to represent structural social capital, generating mixed findings (Bassett & Moore, 2013; Cao et al., 2015; De Silva et al., 2005). This study provided a more comprehensive measurement model and found that this association was statistically significant. In other words, we should not just focus on the frequency of social participation and its influence on depressive symptoms. Volunteering, social network size, and citizenship activities also influence the promotion of mental health in older age.

The findings of this study support the hypothesis, which posited that cognitive social capital plays a mediating role in the relationship between structural social capital and depressive symptoms. In other words, structural social capital affects depressive symptoms through promoting cognitive social capital. One potential explanation is that older adults foster social trust and enhance reciprocity with others by participating in community activities. Trust and reciprocity help them to not only sustain their social network and improve the quality of their social relationships, but also develop more positive thoughts and improve their satisfaction with their social lives.

The findings have several important implications for policies and interventions in urban Chinese communities. First, community-dwelling older adults with low levels of structural social capital should receive particular attention. As mentioned previously, the latent construct of structural social capital can be used to screen for at-risk older populations in local communities. Second, structural social capital could be used to buffer a range of negative effects of depressive symptoms, such as social withdrawal. Fostering structural social capital could lead to an increase in cognitive social capital, which in turn might not only reduce depressive symptoms among older adults but also lead to virtuous circles that form community-level social capital. A wide range of social organizations should be developed in local communities to provide adequate opportunities for older adults to sustain their social involvements. Local organizations should also focus on assessing older adults' social needs and provide support when necessary. Furthermore, community social workers should help older adults participate in

citizenship activities in the collective interests of the community. This might enhance meaning in life, a sense of belonging, and feelings of worthiness among older adults, which could help older adults reduce their depressive symptoms.

Third, fostering cognitive social capital should be an important indicator of evaluation outcomes in interventions aiming to enhance structural social capital among older adults. In other words, participation in community activities should help older adults foster trust with others, engage in reciprocal exchanges with neighbors, and enhance feelings of belongingness in local communities. Otherwise, participation in social and citizenship activities themselves might not matter for the mental health of older adults. For example, financial incentives (e.g., reduction in taxes and benefits related to long-term care insurance; Uesugi, 2010) could be used to encourage young-old populations to provide support for old-old populations, especially those who are frail and have disabilities. Moreover, engagement in team building and motivational prompts can be used to encourage social participation in community activities and foster trust in neighbors (Warburton, Terry, Rosenman, & Shapiro, 2001; Warner, Wolff, Ziegelmann, & Wurm, 2014).

This study had several limitations. First, the data were cross-sectional. Therefore, we could not examine the causal relationship between structural social capital and cognitive social capital. As previously discussed, the relationship could be reciprocal. The causal relationships between social capital and depressive symptoms were also not examined in this study. Individuals with higher levels of social capital might be less depressed; individuals with lower levels of depressive symptoms could be more socially active and have higher levels of social trust in others. The findings only showed statistically significant associations among the three focal variables. However, the theoretical and empirical rationales for the proposed mediation model were discussed.

Second, the relationship between cognitive social capital and structural social capital might be reciprocal. We tested a model to determine whether structural social capital played a mediator role in the association between cognitive social capital and depressive symptoms. The model fit was equally good. However, the mediation effect was nonsignificant. Therefore, we chose to report findings regarding the original model. Longitudinal studies are needed to examine the potential reciprocal relationships among structural social capital, cognitive social capital, and depressive symptoms.

Third, the latent construct of structural social capital was examined in a large city in China. The latent constructs of structural and cognitive social capital should be replicated and tested in other contexts (e.g., small cities and rural areas). Furthermore, the sample was not randomly selected. This limits the empirical generalization of the findings. These findings could be useful for older adults who have similar socio-demographic characteristics and live in similar social, economic, and cultural contexts. Finally, the roles of specific types of formal organizations (e.g., professional associations, civic organizations, sports clubs) in influencing mental health among older adults were not examined in this study. It is recommended that future studies examine structural social capital indicators in specific formal organizations and test their effects on depressive symptoms among older populations.

### Conflict of Interest

Both authors have contributed significantly to the work and approved the submission of the manuscript to the journal. Specifically speaking, Nan Lu planned the study, supervised the data collection, performed statistical analysis, wrote and revised the paper, Changmin Peng contributed to statistical analysis, paper writing and paper revision. We have no potential conflicts of interest.

### Acknowledgements

This study was supported by the Fundamental Research Funds for the Central Universities, and the Research Funds of Renmin University of China (15XNQ031).

### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.archger.2019.01.014>.

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