

Social Capital and Self-Rated Health among Older Adults in China: A Multilevel Analysis

Abstract

This study examined the association between social capital, at both the individual- and community-level, and self-rated health among older adults in China. Using data from the 2008 Pilot Survey of *China Health and Retirement Longitudinal Study*, a series of multilevel logistic models were estimated in SAS 9.2. The association between social capital and self-rated health was examined among 996 adults aged 45 or older from two provinces in China, while controlling for demographic characteristics and socioeconomic variables. Our results suggest the significant association between social capital, at both the individual- and community-level, and self-rated health. The individual-level social capital in the form of perceived help in the future and the social capital of community in the form of the availability of amenities and association within the community were significantly related to self-rated health. A significant cross-level interaction effect between individual- and community-level social capital was also observed.

Key Words: Individual social capital; community social capital; multilevel logistic modeling;

2008 Pilot Survey of China Health and Retirement Longitudinal Study.

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The whole world is graying rapidly. Health and well-being of older adults has become a worldwide public health concern and has been attracting increasing attention from scholars across the globe. As the home of more than one fifth of the world's population, China is also the leading force in this graying trend. It is projected that the proportion of the persons aged 60 years or older will be about 30% of the Chinese population by 2050 (United Nations, 2010). But, the health of the Chinese elderly is still understudied. Recent years has witnessed a growing interest in examining the association between social capital and health among older adults (Berry & Welsh, 2010; Ichida, Kondo, & Hirai, 2009; Snelgore, Pikhart, & Stafford, 2009; Ziersch, Baum, Darmawan, Anne, & Bentlet, 2009). Only limited studies has focused on studying social capital and health in the Chinese cultural context (e.g., Norstrand & Xu, 2011; Wang, Schlesinger, Wang, & William, 2008; Yip et al., 2007). And there existed variations in these findings in terms of the relationship between social capital and health status. To better understand the link between social capital and health in China, this study used a more recent data from a more representative sample and employed a multilevel perspective to explore new evidence pertaining to whether social capital, both at the individual- and community-level, was associated with self-rated health among older adults in China.

Social Capital and Health

Social capital has become an increasingly popular concept in a number of sociological studies, though much has also been written on the ambiguities both in its conceptualization and measurement (Kawachi, Kim, Coutts, & Subramanian, 2004; Portes, 1998). Even with the variations in its conceptualization, most studies in current literature draw upon the four streams

of “social capital” represented by the definition of Bourdieu (1986), Coleman (1988), Putnam (1993), and Lin (2001) respectively.

Bourdieu (1986:248) defined social capital as “the aggregate of the actual or potential resources that are linked to a durable network of more or less institutionalized relationships”. For Bourdieu, social capital is the sum of the actual and potential resources that can be activated through membership in organizations and social networks. Coleman (1988:s118) defined social capital by its function as “a variety of different entities having two characteristics in common: they all consist of some aspects of social structure, and they facilitate certain actions of individuals who are within the structure”. According to Coleman, social capital includes obligations and expectations, information, and norms embedded in relations among persons. Putnam’s social capital emphasizes the vibrancy of associational life and an informed public at the community level. And Putnam’s social capital is “features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions” (Putnam, 1993: 167). Another popular definition of social capital provided by Nan Lin (2001) has defined social capital as “valued resources embedded in a social structure that are accessed and/or mobilized in purposive actions” (Lin, 2001:29). For Lin, social capital is resources derived from one’s direct or indirect social ties.

The variations in these widely cited definitions are evident, yet they share a similar assumption that social capital is a kind of social resource and may bring “benefits accruing to individuals or families by virtue of their ties with others” (Portes, 1998: 6).

A considerable body of research has documented the proactive function of social capital in promoting better health (Fujisawa, Hamano, & Takegawa, 2009; Ichida et al., 2009; Kawachi, Kennedy, & Glass, 1999; Kim & Kawachi, 2006; Subramanian, Kim, & Kawachi, 2002).

Considering the increasing decline of physical health status and the increasing need for support among older adults, social capital theory has become a promising perspective that shed light on the health of older adults (Berry et al., 2010; Ichida et al., 2009; Snelgrove et al., 2010). For example, Berry et al. (2010) found that social capital, measured as community participation, personal social cohesion, trust, and reciprocity, positively affected the general health and mental health of elderly Australians. Another empirical study by Snelgrove et al. (2009) evidenced the positive effects of social capital on self-rated health in Britain, with social capital being measured as social trust and civic participation. Different impact of social capital on health was also evidenced. For example, Veenstra (2005) reported that community social capital, measured by the availability of public spaces, was negatively associated with depressive symptoms but was irrelevant to long-term illness and self-rated health in Canada. Unfortunately, most of these empirical evidences were from Western industrialized countries. These countries have social settings quite different from China, particularly when considering the availability of old age support and caring systems.

Only limited research has focused on the effect of social capital on health/well-being of Chinese older adults. Whether social capital has any impact on health among Chinese elderly is still unclear. For example, both empirical research by Wang et al. (2008) and Yip et al. (2007) confirmed the positive influence of social capital, measured by trust at both individual- and community-level, among rural residents in China. Another study by Norstrand and her coauthor (2011) indicated that social capital, measured by the close ties among family members, friends, and neighbors, mutual help between people, and number of years of being a Communist Party member, was significantly associated with health among urban Chinese older adults, but not for older adults in rural areas. Moreover, most studies (Wang et al., 2008; Yip et al., 2007) were

conducted in limited townships and are limited in representing the more general characteristics of the social and economic life of older Chinese adults.

Meanwhile, the term “social capital” is still encapsulated by some ambiguities both in its conceptualization and measurement (Harpham, Grant, & Thomas, 2002; Portes, 1998; Szreter & Woolcock, 2004). And the literature has not yet reached a consensus on how to measure social capital in the Chinese cultural context. For example, three studies on social capital and health in the Chinese context (Norstrand & Xu, 2011; Wang et al., 2008; Yip et al., 2007) varied from each other in measuring social capital. From the existing literature on social capital and health, it appears that the social variables most often being used as reflection of social capital are trust, participation in voluntary organizations, social support, perceived help, network, and so on (Fujisawa et al., 2009; Kawachi et al., 1999; Putnam, 1993; Berry et al., 2000). But some empirical studies have doubted the full applicability of using indicators and questionnaires developed in western cultural context to measure social capital in Chinese society (Norstrand & Xu, 2011; Xu, Perkins, & Chow, 2010). Further, social capital at the community level in some studies was aggregated by individual level perceptions (Fujisawa et al., 2009; Wang et al., 2008; Yip et al., 2007). Such measurement may be subject to potential errors (Mohnen, Groenewegen, Volker, & Flap, 2011; Wang et al., 2008).

Study Objectives

Current Chinese cultural context is an interesting and unique setting to study the dynamics between social capital and health among older adults. The conceptualization of social capital emphasizes social capital as social resources and reciprocity embedded in social networks with others (Bourdieu, 1986; Coleman, 1986, Putnam, 1993; Lin 2001). Network resources and reciprocity with others have always been valued in the traditional Chinese cultural norm of

collectivism. However, China has undergone enormous social, economic, and political changes over recent decades, which have presented mounting challenges to the maintaining of such traditional Chinese cultural values. The changing scenarios of demographic structure together with the social forces of urbanization and globalization have been transforming the family patterns and family life of ordinary Chinese people. Traditionally upheld virtue of filial piety seems dismantling and family support of old age in current China is mainly practiced by the sharing of family expenses and spiritual solicitude at the time (Tang, 2007). The changing patterns of family life and transformation of cultural norms seem to be disintegrating the traditional social networks related to family kinship and the traditional reciprocity and mutuality patterns in Chinese culture.

Meanwhile, organized social services for the elderly in China are not yet well developed. And, facilities for subsidized institutional care for the elderly are still limited in China. China's elderly care facilities have beds for just 1.6 percent of its 176 million citizens over 60, and most of these facilities are concentrated in the largest cities (Balfour & Khan, 2012). Policy makers are still looking to help from family members and communities to care and to maintain a healthy life for the elderly (Balfour & Khan, 2012; Ding, 2003). Since 1990, the Chinese government has promulgated a series of "community construction" programs to mobilize mutual help and support at community level to provide needed support for the elderly population (Pei & Tang, 2011). The many social and health changes in China are raising many questions related to the health of the Chinese elderly and the impact of their networks as well as the mutuality and reciprocity embedded in their networks in the transformation era of China.

The present study fills gaps in current literature of social capital and health in China by (1) using a more representative sample from a recently collected dataset; (2) measuring social

capital at both the individual- and community levels. The individual-level social capital was measured by individual's perception while the community-level social capital was tapped from community survey data; (3) measuring more facets of social capital by closely following the seminal definitions of "social capital" and the specific cultural context of China; (4) examining the interaction effects between individual-level social capital and community-level social capital.

Conceptualization of social capital

Following the major four streams of defining "social capital", this study conceptualizes social capital as a feature of associational life at both the individual- and community-levels. And social capital in this study was examined by both structural and cognitive dimensions proposed by Harpham et al. (2002). According to Harpham et al. (2002), structural social capital includes the connectedness with others both in formal and informal organizations, while cognitive social capital refers to the attitudinal manifestations such as reciprocity, trust, support, and sense of belonging.

Methods

Data

Data for this study were from the 2008 Pilot Study of *China Health and Retirement Longitudinal Study (CHARLS)*, an ongoing collaborative project of the University of Southern California, Oxford University, and Peking University in China. Designed to be comparable with related aging surveys such as Health and Retirement Study (HRS) and the Survey of Health, Aging and Retirement in Europe (SHARE), CHARLS is a survey of older adults aged 45 or above in China (Zhao, Strauss, Park, & Sun, 2009). The 2008 pilot survey was conducted in Gansu and Zhejiang provinces in China. Altogether 2,685 individuals aged 45 years or older

were randomly sampled from 96 communities in 16 counties from these two provinces. Communities were defined as per official administrative places, including administrative villages (*cun* in Chinese) in rural areas and neighborhoods (*shequ* in Chinese) in urban areas. The 96 communities in CHARLS 2008 pilot study included 74 villages and 22 neighborhoods. The present study used data from the household survey and community survey. The average retirement age in China (51.2) is 10 years lower than the world's average (French, 2007). And many blue-collar workers have been allowed to retire in their 40s. So in this study, we did not further select the study sample based on age criteria but just included all respondents in this dataset.

Variables and Measures

The dependent variable was self-rated health, in response to the question that asked the respondent to rate his/her general health on a five-point scale of “very good”, “good”, “fair”, “poor”, and “very poor”. The majority (72.2%) of the respondents in this sample self-assessed their health as “good” or “very good”. And the response were collapsed into two categories that contrast “at least good health” (1= “good”, “very good”) against “fair or poor health” (0= “very poor”, “poor”, and “fair”).

Our main independent measures of interest reflect social capital, which was measured at both the individual- and community-level and will be examined from two broad dimensions of structural and cognitive social capital.

At the individual level, structural social capital was measured by the older adult's network size and whether the older adult was born in the current community. Older adult's network size is a composite measure summed by respondent's responses to “the number of children” “the number of siblings still alive” and “the number of married siblings”. With China's

clan culture legacy, being born in the same community the respondent was living during the interview would imply more network ties and connections with others. Cognitive social capital at the individual level was measured with three dichotomous measures that capture support and mutuality between respondents and others: whether respondents have received any help (monetary or non-monetary) from others (1 = yes, 0 = no); whether respondents have provided any help (monetary or non-monetary) to others (1 = yes, 0 = no); and whether respondents believed that they could receive help in the future (1 = yes, 0 = no).

Structural social capital at the community level was measured by the number of amenities and associations available for the elderly within the community. Previous study (Veenstra, 2005) has used the availability of public spaces within community to measure community social capital. In addition, the Chinese government initiated setting amenities and associations for the elderly people with the aim of mobilizing mutual support within community (Pei & Tang, 2011). And more amenities and associations for the elderly would imply greater access to seek help and mutual support and rapid diffusion of information and behavioral norms within the community. This variable was a summed number of recreation facilities (e.g., exercise facilities, room for card games and chess games, etc), organizations and associations (e.g., elderly association, activity center for the elderly, etc) available for older adults to use. The cognitive social capital at the community level was measured by the number of years the central community committee office has been in existence. In China, the community central committee office is the lowest level of official administration which is responsible for routine functions of civil affairs within the community. The community committee office in China has a very close link with its residents and most of the time it represents its residents (Tian, 2000). According to Poortinga

(2006), community committee indicates the sense of neighborhood connection and the history of community committee can be used to measure the social capital at the community level.

Respondent's socioeconomic status (education and household expenditure) and demographic characteristics (gender, age, and marital status) were included as control variables. Respondent's *Hukou* status was also included as control variable. *Hukou* status is a primary and salient social identity in China. *Hukou* system categorizes Chinese people into two groups of rural and urban, with urban residents being privileged in economic resources, education, employment, and social welfare benefits (Liu, 2005). Respondents were from two provinces, with Gansu being one of the poorest province while Zhejiang one of the most economically vibrant province in China. So a dummy variable for province with 1 = *Gansu* and 0 = *Zhejiang* was also included to compare differences across these two provinces.

Statistical Analytical Strategies

A series of multilevel logistic regression models were estimated with GLIMMIX procedure in SAS 9.2. Impacts of the individual-level factors and the community-level social capital variables were assessed as the fixed effects, whereas the variations across communities were assessed as random parameters. All models utilized the logit link function, with the logarithm of the odds of good health as the outcome.

Firstly, a two-level null (empty) model of 996 individuals (level 1) nested within these 96 communities/villages (level 2) with no predictor variables in the fixed or the random parts of the model was tested. In this model, the probability of good health was only the function of the community where the respondent lived. The model notation goes as:

$$\text{Logit}(p_{ij}) = \beta_{0j} + \varepsilon_{ij} \quad (\text{Model 1})$$

In this model, the subscripts i and j reflects respondent and the communities the respondent was living in, respectively; p_{ij} measures the probability of respondent to report good health status; β_{0j} is the sum of an intercept that vary over the communities; and ε_{ij} refers to the random component of the error term.

The individual-level variables were then included in the model (Model 2) to examine the impact of individual-level predictors ($\beta_{1j}X_{ij}$), including the individual's basic demographic information, socioeconomic status, and individual level social capital among respondents in different communities:

$$\text{Logit}(p_{ij}) = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij} \quad (\text{Model 2})$$

The next model (Model 3) included all the individual-level predictors ($\beta_{10}X_{ij}$), but further considered the fixed effect of the community-level social capital variables ($\beta_{01}W_j$):

$$\text{Logit}(p_{ij}) = \beta_{00} + \beta_{10}X_{ij} + \beta_{01}W_j + \mu_{0j} + \mu_{1j}X_{ij} + \varepsilon_{ij} \quad (\text{Model 3})$$

Finally, an interaction term was added (Model 4) to test whether there were any intersections ($\beta_{11}W_iX_{ij}$) between the individual-level social capital and the community-level social capital:

$$\text{Logit}(P_{ij}) = \beta_{00} + \beta_{10}X_{ij} + \beta_{01}W_j + \beta_{11}W_iX_{ij} + \mu_{0j} + \mu_{1j}X_{ij} + \varepsilon_{ij} \quad (\text{Model 4})$$

Specifically, an interaction term formed by the respondent's perceived help in the future with the years of community committee has been in existence was tested.

Results

Listwise deletion of missing data produced a sample size of 996 at the individual level and a sample size of 96 at the community level. A T-test indicated that there were no significant differences between the respondents included in the final sample and those deleted in terms of key variables in this study. Table 1 presents a summary of the variables used in the final analyses. The respondents on average had a poor educational background. The majority of them was married and were living with their spouses in rural areas. More than half respondents self-assessed their health as at least good.

[INSERT TABLE 1 HERE]

Table 2 presents the results from multilevel logistic models. Logits were converted into odds ratios (OR) and were reported in Table 2. Also reported were the 95% confidence intervals (95% CI), established by $\exp \times (\text{coefficient} \pm \text{standard error})$.

The null model with no predictors (Table 2, Model 1) indicated a significant variation in self-rated health of respondents in 96 communities ($\sigma^2_{\mu 0}=0.95$, ICC = 0.224). A reduction of 0.22 in the random parameter from Model 1 to Model 3 indicates that some of the variations found by Model 1 were explained by differences of socio-demographic characteristics in the population.

As expected, gender, age, and *Hukou* status were significantly associated with respondents' self-rated health (Table 2, Model 2). The predicted odds of reporting good health for males was about 48% higher than it was for females (OR = 1.48). Similarly, respondents with urban *Hukou* status (OR = 1.87) were 87% more likely to report good health than respondents with rural *Hukou* status. Respondents aged 60 years or older on average had reported worse

health compared to respondents younger than 60. Further, the respondents in Gansu province (poorer area) reported significantly worse health (OR = 0.35) compared to respondents in Zhejiang province (wealthier area).

After adjusting for individual-level socioeconomic variables (Table 2, Model 3), the effects of age (OR = 0.65), urban *Hukou* status (OR = 1.77), and province of residence (OR = 0.34) were still significant. But the effect of gender lost its significance. Both education and annual household expenditure were significantly related to self-rated health. Respondents who had received some formal education were 50% more likely to report good health (OR = 1.50) compared to those illiterate. But the effect of household expenditure was significantly negative (OR = .96). Each additional thousand Chinese *Yuan* increase in the annual household expenditure was associated with a 4% decrease in the predicted odds of reporting good health.

After adding five individual-level social capital variables (Table 2, Model 4), still significant were the effects of age (OR = 0.66), province of residence (OR = 0.33), education (OR = 1.87), and annual household expenditure (OR = 0.92). The effect of *Hukou* status no longer showed any statistical significance. This implies that the effect of rural-urban *Hukou* status on self-rated health was somewhat confounded by the individual-level social capital. Among the significant social capital variables, were the respondent's perceived help in the future and whether the respondent had received any help from others. Respondents who were sure that they could get the needed help and support in the future were more likely to report good health compared to those who were not (OR = 1.43). However, respondents who reported that they had received help from others were more likely to report poorer health compared to those who had never received any help from others.

Community-level social capital variables were added in Model 5. Statistical results indicate that the number of amenities or associations available for the elderly within the community was significantly associated with self-rated health (OR = 1.13, $p < .05$) among the respondents. Also, introducing social capital variables at the community level did not change the significant impacts of age, education, annual household expenditure, receiving help from others, and the individual-level social capital measured by the perceived help in the future.

The effect of interaction term formed by “perceived help in the future” and “years the community committee has been in existence” was found to be significant (Table 2, Model 6, OR = 1.14, $p < .05$). It indicated that the longer the history of a central committee office within the community, the more likely the self-rated health of respondents would be significantly influenced by their perception of getting the needed help or support in the future.

Comparing the values of model fit statistics in these six models indicate that the model that included social capital at both the individual- and community-levels were comparatively better (Table 2, Model 5, AIC = 2534.88, BIC = 2619.85) than the model that included only demographic characteristics (Table 2, Model 2, AIC = 5418.89, BIC = 5418.97) or the model that just included socio-demographic characteristics and social capital at the individual level (Table 2, Model 3, AIC = 5422.58, BIC = 5436.28).

[INSERT TABLE 2 HERE]

Discussion and Implications

First of all, our study finds support that certain dimensions of social capital at both the individual- and community-level were significantly associated with health among the Chinese elderly. Consistent with other studies on social capital and health status among Chinese population (Wang et al., 2008; Yip et al., 2007), our study indicate that the cognitive dimension

of individual social capital, measured by the perceived help in the future, was significantly related to self-rated health among the respondents even after accounting for individual demographic and socioeconomic status variables. Also in line with previous study on the relationship between social capital and health in the Chinese context (Yip et al., 2007), our results did not confirm the significant association between structural social capital at the individual level and health status. This suggests that the individual-level cognitive dimension rather than the structural dimension of social capital is important to the perceived health of older Chinese adults. This result also supports the conclusion drawn by Fujisawa et al. (2009:503) that “cognitive social capital has an impact not only in Western societies but also in Asian societies”. Further, the importance of perceived help in the future testifies to the legacy of traditional cultural values in the Transformation Era of China. As stated in a popular saying in China – “We need to raise children in order to get needed help in old age (in Chinese *yangerfanglao*)”, traditional Chinese culture emphasizes the expected obligations of the adult children to care for their aged parents. With its rapid economic development and globalization, there has been a fading emphasis of adult children’s obligations to their parents (Tang, 2007). However, it appears that legacy of traditional culture is still affecting people’s life, such as through their perception of their health. It also implies that whether one can get the needed help and support when in need is a looming concern among older Chinese adults. And, Chinese government is confronted with the challenge to create safety nets to its elderly population to help them to live a healthier life.

Another individual-level social capital variable, whether the respondent had received any help from others, was found to be significantly but negatively related to good self-rated health. Our analysis results did not support the positive impact of receiving help on health reported in

the previous studies (Kawachi et al., 1999; Fujisawa et al., 2007). One possible explanation for the negative direction is that we did not make a distinction between monetary and non-monetary help. Based on their study of social capital and health among older Chinese adults, Norstrand and her coauthor (Norstrand et al., 2011) have argued that in the Chinese context, material support impacted health in a different way from that of the emotional support. Another possible explanation is that some respondents received help just because they were in need of help owing to their poor health. Since 1990s, the Chinese government has practiced such programs as minimum standard of living program, old-age endowment insurance, and the Five Guarantees (*Wubaohu* in Chinese) support program to provide benefits to the elderly population, especially those with long-term illness and poverty (Ding, 2003). However, this unique effect has yet to be examined with further research.

In line with previous studies in Western context (Kawachi et al., 1999; Lindstrom et al., 2004; Mohnen et al., 2011; Subramanian et al., 2002) and studies in the Chinese context (Yip et al., 2007; Norstrand & Xu, 2011), our statistical results confirmed the significant association between community-level social capital and better health independent of individual-level demographic characteristics, socioeconomic status, and individual-level social capital. Structural dimension of community-level social capital, in the form of the number of the amenities and association within the community available for the elderly, was found to be positively associated with good self-rated health among the respondents. The more amenities and associations available for the elderly within the community implies that there were more available public spaces and more accesses to mutual support, and rapid diffusion of health information and healthy norms of behavior (Kawachi et al., 1999; Putnam, 2004; Veenstra, 2005). Also, such amenities and organizations may induce more collective actions, which hold promise for

improving the health and well-being of the Chinese population by promoting healthy behaviors (Norstrand & Xu, 2011) and by producing an environment that enhances social networks and facilitate the exchange of support (Yip et al., 2007).

The community-level cognitive social capital indicator, number of years the community committee office has been in existence, was not associated with the respondent's self-rated health. However, the cross-level interaction term formed by the respondent's "perceived help in the future" and "years the community committee office have been in existence" was found to be significant. Self-rated health of respondents living in communities that had established their community committee earlier was more likely to be influenced by their perception of getting the needed help in the future. This implies that the effect of individual cognitive social capital on self-rated health is conditional on the history of the community committee office. This result also supports the finding by Wang et al (2008) that individual-level cognitive social capital interacts positively with community-level cognitive social capital to affect the health in China. The committee office within the community in China is responsible for assisting in implementing policies and programs from the central and regional governments, protecting resident's legal rights, and providing services to its residents. It is generally believed that such committees and the persons serving on these committees are always trusted and regarded as the sources for consultation, help, and protection whenever community residents are in need of (Tian, 2000). The puzzling impact of community committee office also reflects the ordinary people's mixed feelings of governance in the transformation era of China. On the one hand, market economy has gradually reduced the role of local government in satisfying ordinary people's basic living needs. On the other hand, the effects of a planned economy and the cultural tradition of collectivism were still lingering around. The significant interaction between the individual cognitive social

capital and the community social capital also suggests that the Chinese government needs to practice effective policies and programs to enhance social capital at the community level to improve health status of its elderly population.

In addition, the random parameters across communities ($\sigma^2_{\mu 0}$) and intra-class correlations (ICCs) from our statistical analysis indicated that self-reported health among older Chinese adults had some variability that could be reasonably attributed to the community. We observed significant random parameters across communities in all multilevel models. This implies the important influence of community contexts in shaping health patterns among the respondents. The consistent significant random parameters across communities indicate that smaller spatial units such as the village (*cun* in Chinese) in rural areas and the neighborhood (*shequ* in Chinese) in urban areas may not be regarded merely as the boundaries of administration in China. They are also substantial units of society that exert a meaningful influence on elderly residents' health. This result further implies that there are still great differentiations in economic and social life between different communities in China, even with its rapid developing economy in recent years. The Chinese policy makers are challenged to narrow the differences across different groups in different regions.

Although this study has a number of strengths, it also has several limitations. First, the data is from a cross sectional study so it is difficult to test the possible reverse causality between social capital and health, suggested by other scholars (Norstrand et al., 2011; Subramanian et al., 2002; Wang et al., 2008). The possible reverse causality cannot be ruled out in this study. Second, this study is limited in its large number of missing cases. CHARLS pilot study requires that the questionnaire items about older adult's health status and the transfer and mutuality with others should only be answered by the older adults themselves and no proxy respondent can

answer these questions. The T-test revealed no significant differences in terms of health and social capital variables between the older adults included in the final sample and the deleted ones. But the large number of missing cases undoubtedly hampered the final statistical results. Third, the assessment of social capital in this study is limited. CHARLS was not specifically designed for tapping the social capital among older adults in China. So several other indicators of social capital examined in previous studies, such as the civic participation and voluntarism (Putnam 1993; Subramanian et al., 2002) in western context, and Communist Party affiliations in Chinese context (Norstrand et al., 2011; Yip et al., 2007) were not tested in this study. Accordingly, the evidence of relationship between social capital and health presented in this study may not be taken to mean that similar effects exist for other dimensions of social capital.

References

- Balfour, F., & Khan, N. (2012). China's "Demographic Tsunami". Bloomberg Businessweek. January 9-January 15.
- Berry, H. L., & Welsh, J. A. (2010). Social capital and health in Australia: An overview from the household, income and labor dynamics in Australia survey. *Social Science & Medicine*, 70(4), 588-96.
- Bourdieu, P. (1986). The forms of capital. In Richardson J.G. (Eds.), *Handbook of theory and research for the sociology of education* (pp. 241-258). New York, NY: Greenwood.
- Coleman, J.S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.
- Ding, K. (2003). The crucial role of local governments in setting up a social safety net. *China Perspectives*, 48, 2-16.
- French, H. (2007). "Pension Crisis Looms for China". The New York Times. Published March 20.
- Fujisawa, Y., Hamano, T., & Takegawa, S. (2009). Social capital and perceived health in Japan: An ecological and multilevel analysis. *Social Science and Medicine*, 69, 500-505.
- Harpam, T, Grant, E, & Thomas, E. (2002). Measuring social capital within health surveys: key issues. *Health Policy Plan*, 17, 106-111.
- Ichida, Y., Kondo, K., & Hiroshi, H. (2009). Social capital, income inequality and self-rated health in Chita peninsula, Japan: A multilevel analysis of older people in 25 communities. *Social Science & Medicine*, 69(4), 489-99.
- Kawachi, I, Kennedy, B.P, & Glass, R. (1999). Social capital and self-rated health: A contextual analysis. *American Journal of Public Health*, 89(8), 1187-1193.
- Kawachi, I., Kim, D., Coutts, A., & Subramanian, S. V. (2004). Commentary: Reconciling the three accounts of social capital. *International Journal of Epidemiology*, 33(4), 682-690 [discussion 700-684].

- Kim, D., & Kawachi, I. (2006). A multilevel analysis of key forms of community- and individual-level social capital as predictors of self-rated health in the United States. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 83(5), 813-826.
- Lin, N. (2001). *Social capital: a theory of social structure and action*. Cambridge, U.K.: Cambridge University Press.
- Lindstrom, M., Moghaddassi, M., & Merlo, J. (2004). Individual self-reported health, social participation and neighborhood: a multilevel analysis in Malmo, Sweden. *Preventive Medicine*, 39:135-141.
- Liu, Z. Q. (2005). Institution and inequality: the *Hukou* system in China. *Journal of Comparative Economics*, 33, 133-157.
- Mohnen, S. M, Groenewegen, P., Volker, B., & Flap, H. (2011). Neighborhood social capital and individual health. *Social Science & Medicine*, 72, 660-667.
- Norstrand, J., & Xu, Q. (2011). Social capital and health outcomes among older adults in China: The urban-rural dimension. *The Gerontologist*, 7, 1-10.
- Pei, X., & Tang, C. (2011). *The role of community support for the rural aged during the transition*. CSP Research Report (2). Retrived from:
<http://www.socialprotectionasia.org/Conf-prgram-pdf/2-SPA-Final-Paper-No-02.pdf>.
- Poortinga, W. (2006). Social relations or social capital? Individual and community health effect of bonding social capital. *Social Science & Medicine*, 63 (1): 255-270.
- Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24, 1-24.
- Putnam, R.D. (1993). *Bowling alone: the collapse and revival of American community*. New York: Simon & Schuster.
- Snelgore, J. W., Pikhart, H., Stafford, M. (2009). A multilevel analysis of social capital and self-rated health: Evidence from the British Household Panel Survey. *Social Science & Medicine*, 68(11), 1993-2001.

- Subramanian, S.V., Kim, D.J., & Kawachi, I. (2002). Social trust and self-rated health in US communities: A multilevel analysis. *Journal of Urban Health*, 79(4), s21-s34.
- Szreter, S., & Woolcock, M. 2004. Health by association? Social capital, social theory, And the political economy of public health. *Journal of Epidemiology*, 33, 650-667.
- Tang, C. (2007). New issues in the system of support of old age in China. Retrieved on Nov. 20, 2011 from www.sociology.cass.cn/english/papers/p020070306304512651059.pdf/.
- Tian, X. (2000). "We choose them; they help us." China Daily, May 20.
- United Nations. (2010). *World Population Prospects. Volume II: Sex and Age*. New York.
- Wang, H.M., Schlesinger, M., Wang, H., & Williams, C. (2008). The flip-side of social capital: The distinctive influences of trust and mistrust on health in rural China. *Social Science & Medicine*, 68(1), 133-142.
- Veenstra, G. (2005). Location, location, location: contextual and compositional health effects of social capital in British Columbia, Canada. *Social Science & Medicine*, 60(9):2059-2071.
- Xu, Q., Perkins, D., & Chow, J. (2010). Sense of community, neighboring, and social capital as predictors of local political participation in China. *American Journal of Community Psychology*, 45, 259-271.
- Yip, W., Subramanian, S.V., Mitchell, A. D. Lee, D. T.S., Wang, J., & Kawachi, I. (2007). Does social capital enhance health and well-being? Evidence from rural China. *Social Science & Medicine*, 64(1), 35-49.
- Zhao, Y.H., Strauss, J., Park, A., & Sun, Y. (2009). *China Health and Retirement Longitudinal Study, Pilot, User's Guide*. National School of Development, Peking University.
- Ziersch, A. M., Baum, F., Darmawan, K., Anne M., & Bentley, R. J. (2009). Social capital and health in rural and urban communities in South Australia. *Australian & New Zealand Journal of Public Health*, 33(1), 7-16.

Tables

Table 1. Descriptive statistic for individual- and community-level variables of the final sample

	Mean	SD	Range/Categories
Individual Level Variables (N=996)			
Health Outcomes			
Self-rated health	.72	.45	0 = not good; 1 = at least good
Demographic Characteristics			
Sex	.48	.49	0 = female; 1 = male
Age	.44	.49	0 = less than 60; 1 = 60 or older
<i>Hukou</i> Status	.20	.39	0 = rural; 1 = urban
Marital Status	.82	.38	0 = otherwise; 1 = married & living with spouse
Province	.53	.49	0 = Zhejiang; 1 = Gansu
SES variables			
Education Attainment	.57	.49	0 = illiterate; 1 = at least some formal education
Household Expenditure	6985.80	7078.33	0 (Chinese <i>Yuan</i>) --30,000 (Chinese <i>Yuan</i>)
Individual level social capital variables			
Birthplace	.49	.50	0 = others; 1 = born in current community/village
Network size	9.6	3.8	2--25
Receiving help	.51	.49	0 = no; 1 = yes
Providing help	.49	.50	0 = no; 1 = yes
Having Perceived support	.77	.42	0 = no; 1 = yes
Community level social capital variables (N=96)			
Number of amenities/associations	4.75	3.26	0-14
Yrs. committee office established	28.34	18.81	2--59

Source: China Health & Retirement Longitudinal Study (CHARLS) -- 2008 Pilot Survey

Table 2. Odds ratio from the multilevel logistic models for good health (N=996. 95% confidence interval in parentheses)

Fixed Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Individual Predictors						
Demographic Background						
Male	1.48**	1.26	0.82	0.92	0.96	
	(1.23/1.78)	(1.08/1.47)	(.62/1.07)	(.69/1.11)	(.72/1.27)	
60 yrs or older	0.63 **	0.65 **	0.66*	0.62*	0.62*	
	(.52/.76)	(.56/.75)	(.53/.82)	(.49/.78)	(.49/.78)	
Urban <i>Hukou</i>	1.87**	1.77**	1.29	1.16	1.06	
	(1.43/2.44)	(1.44/2.17)	(.94/1.77)	(.82/1.66)	(.74/1.51)	
Married & living with Spouse)	1.10	1.09	1.38	1.35	1.38	
	(.84/1.58)	(.91/1.31)	(1.05/1.79)	(1.03/1.78)	(1.05/1.81)	
<i>Gansu</i> Province	0.35***	0.34***	0.33***	0.57*	0.60*	
	(.29/.40)	(.29/.40)	(.25/.43)	(.37/.88)	(.38/.93)	
Socioeconomic Status						
at least some formal education		1.50*	1.87*	1.75*	1.74*	
		(1.28/1.75)	(1.46/2.40)	(1.36/2.27)	(1.34/2.25)	
Household Expenditure		0.96*	0.92*	0.91*	0.94*	
		(.93/.98)	(.88/.96)	(.88/.95)	(.91/.97)	
Social Capital at Individual-Level						
Network size			1.04	1.04	1.05	
			(1.01/1.07)	(1.01/1.07)	(1.01/1.08)	
Birthplace, current community			1.29	1.47	1.39	
			(1.00/1.85)	(1.12/1.92)	(1.06/1.83)	
Receiving help			0.68*	0.64*	0.64 *	
			(.54/.84)	(.49/.84)	(.51/.80)	
Providing help			1.01	1.03	1.02	
			(.81/1.25)	(.78/1.36)	(.81/1.29)	
Perceived future help			1.43*	1.46*	1.22*	
			(1.11/1.83)	(1.13/1.89)	(1.01/1.46)	
Social Capital at Community-Level						

Number of Amenities					1.13*	1.08*
Years					(1.07/1.20)	(.98/1.18)
Committee existed					1.01	0.99
					(1.00/1.02)	(.89/1.03)
Cross-Level Interactions						
Perceived help × Community Committee						1.14*
						(1.06/1.23)
Random Parameters						
across Communities ($\sigma^2_{\mu 0}$)	0.95***	0.92***	0.73**	0.56**	0.53*	0.53*
	(.082)	(.076)	(.073)	(.227)	(.238)	(.240)
Intra-class Correlation (ICC)	0.224	0.218	0.182	0.147	0.139	0.139
Model Fit Statistics						
AIC	5401.32	5418.89	5422.58	2714.29	2534.88	2546.85
AICC	5401.22	5418.96	5422.67	2724.68	2534.68	2546.96
BIC	5403.42	5418.97	5436.28	2780.56	2619.85	2552.95

Note: *p<0.05, **p<0.01, ***p<0.001