

Does social capital enhance health and well-being? Evidence from rural China

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Abstract

Despite increasing acknowledgement that social capital is an important determinant of health and overall well-being, empirical evidence regarding the direction and strength of these linkages in the developing world is limited and inconclusive. This paper empirically examines relationships between social capital and health and well-being—as well as the suitability of commonly used social capital measures—in rural China, where rapid economic growth coexists with gradual and fundamental social changes. To measure social capital, we adopt a *structural/cognitive* distinction, whereby structural social capital is measured by organizational membership and cognitive social capital is measured by a composite index of trust, reciprocity, and mutual help. Our outcome measures included self-reported general health, psychological health, and subjective well-being. We adopt multi-level estimation methods to account for our conceptualization of social capital as both an individual- and contextual-level resource. Results indicate that cognitive social capital (i.e., trust) is positively associated with all three outcome measures at the individual level and psychological health/subjective well-being at the village level as well. We further find that trust affects health and well-being through pathways of social network and support. In contrast, there is little statistical association or consistent pattern between structural social capital (organizational membership) and the outcome variables. Furthermore, although organizational membership is highly correlated with collective action, neither is associated with health or well-being. Our results suggest that policies aimed at producing an environment that enhances social networks and facilitates the exchange of social support hold promise for improving the health and well-being of the rural Chinese population. In addition, China may not have fully taken advantage of the potential contribution of *structural* social capital in advancing health and well-being. A redirection of collective action from economic to social activities may be worth considering.

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Introduction

The literature linking social capital to health, and more recently to overall well-being, has been growing. Although the findings vary in strength and ambiguities regarding conceptualizations and

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measurement of social capital remain, there is general acceptance that social capital is an important determinant of health and well-being. Empirical evidence on the relationship between social capital and health/well-being in the developing world, despite its share of global population and burden of diseases, has been limited and inconclusive. Does social capital—a concept and the measurement of which have been developed mainly within the context of rich and Western societies—bear a similar empirical relationship with health and well-being in the developing countries?

The primary objective of this paper is to fill gaps in our knowledge of social capital and health/well-being in the context of developing and non-Western societies. Specifically, we examine empirical relationships between social capital and health and well-being, as well as the suitability of commonly-used social capital measures, in the context of China. Despite being home to a fifth of the world's population, there has been relatively little research in China on the relationships between social capital and health, and much less with overall well-being. In addition to benefiting the Chinese population, findings from China can also offer insights to other populations with similar socioeconomic conditions and cultural backgrounds. China also offers an attractive setting within which to study social capital. Unlike many other developing countries and transition economies, China has experienced unprecedented income growth in the last two decades, accompanied by fundamental but gradual social changes without large-scale social or political upheavals, as had been experienced by Russia, for example. To what extent does this pattern of socioeconomic transformation create or destroy social capital and thus influence the population's health and well-being? Can social capital be used as a policy instrument to enhance the benefits and/or buffer against the negative side-effects of such socioeconomic changes? If so, at what aspects and level of social capital should policies be targeted? Providing answers to these questions, however, is beyond the scope of this paper, which focuses on establishing the empirical relationships between social capital and health/well-being in the context of rural China. Based on the findings, we draw implications regarding the extent to which the concept of social capital can be transferred to non-Western, rural, and developing economies and suggest policy recommendations. We focus on rural China because major differences in socioeconomic

conditions between the urban and rural areas warrant separate analyses, and the rural population's major share of the disease burden deserves urgent attention.

Social capital and health and well-being

A burgeoning literature has linked social capital to a variety of health outcomes and measures of well-being (see, for example, [Kawachi, Kim, Coutts, & Subramanian, 2004](#)). Yet the strength of the evidence varies depending on the conceptualization and measurement of social capital, demographics of the study population, level of analysis and countries' income levels. At the cross-country level, the relatively few studies that exist have mostly focused on high-income countries, and findings have been mixed. For example, a study of middle-aged adults in Germany and the United States found relationships between individual-level reports of reciprocity, trust, and participation and self-reported health, depression, and functional status ([Pollack & von dem Knesebeck, 2004](#)). Using data from a panel of 19 OECD countries, however, [Kennelly, O'Shea, and Garvey \(2003\)](#) found no relationship between social capital (measured by trust in others and membership in voluntary organizations) and life expectancy at the country level. Applying a multi-level framework to 22 European countries, [Poortinga \(2006\)](#) found that while individual-level social trust and civic participation are positively associated with self-rated health, the same measures exhibit no relationship on the national level. In addition, there is evidence of interaction effects between the two levels.

The evidence from within-country studies among developed economies is more extensive. In these contexts, social capital indicators such as membership in organizations, social trust, and civic engagement have been associated with lower all-cause mortality, lower rates of self-reported poor health, better mental health status, and decreased violence ([Kawachi, et al., 2004](#)) provide an overview of several such studies).

Much less is known about social capital and health within developing and middle-income countries. Within transition economies, there is some indication that social capital is linked to improved health. In Hungary, a cross-sectional, individual-level study found membership in both political and non-political organizations to be positively associated with self-reported health ([Skrabski, Kopp, & Kawachi, 2004](#)). In Russia, an aggregate-level study

found social trust, perceptions of reciprocity, and membership in civic organizations to be associated with lower middle-aged mortality among men and women (Rojas & Carlson, 2006), while an individual-level study found that certain types of networks (equated with social capital) were predictive of better self-reported physical and emotional health (Rose, 2000). Fewer studies have been carried out in developing countries. In Indonesia, a longitudinal study finds that the number of community-level organizations (their measure of social capital) is positively associated with self-reported physical and mental health (Miller, Scheffler, Lam, & Rupp, undated). On the other hand, not all studies have found such associations. A cross-sectional study from Colombia found that neither trust nor membership in organizations was related to self-reported mental health when socio-demographic and contextual factors are controlled (Harpham, Grant, & Rodriguez, 2004).

Research on social capital and overall well-being is only just emerging. In a recent study conceptualizing health as a pathway through which social capital affects well-being and using cross-national data from the World Values Survey from the United States and Canada, Helliwell and Putnam (2004) found that civic engagement, trust, and social ties were both independently associated with, and act through health on, subjective well-being. In a study of European countries, a high correlation was found between both community- and individual-level membership in organizations and self-reported happiness even when taking into account other social explanatory factors (Gundelach & Kreiner, 2004). And a national-level study including countries from Europe, the Americas, and Asia found an index of social capital to be positively associated with satisfaction with life (Bjornskov, 2003). No previous research within a single country could be found.

Our study fills gaps in the literature by (1) conceptualizing and measuring social capital in a theory-driven manner; (2) adopting multi-level estimation methods that allow us to ascertain the relative contribution of social capital at the individual- and contextual-level; (3) applying to the general population of all ages in rural China; and (4) examining both health and well-being as outcome variables.

Conceptualizations of social capital

Much has been written about the conceptual ambiguities surrounding research on social capital

(Kawachi et al., 2004). We conceptualize social capital to operate on both individual and collective levels in affecting health and well-being. At one level, it is a resource available to, and chosen by, individuals. As such, “investments” in social capital may provide individuals with access to resources such as social support, which may in turn promote individual health and overall well-being. This conceptualization is consistent with a “network view” of social capital (e.g., Bourdieu, 1986; Coleman, 1988) as well as previous research on social determinants of health (Berkman & Glass, 2000). Social capital may be also conceptualized as a resource at the community level that individuals can tap in order to achieve collective goals that cannot be accomplished by individuals alone. At this contextual level, for instance, higher levels of trust in the community may facilitate quicker and wider diffusion of ideas which may, in turn, promote healthier behaviors. This view is consistent with a “communitarian view” of social capital, emphasizing social cohesion (e.g., Putnam, 1993))

To measure social capital, we follow the “structural/cognitive” distinction that has gained currency in the literature (Harpham, Grant, & Thomas, 2002). The structural dimension encompasses *behavioral* manifestations of social capital, namely participation in formal associations. The “cognitive” dimension subsumes *attitudinal* manifestations, such as trust in others and reciprocity between individuals. We use this framework to inform our choice of measures of social capital. In short, we conceptualize social capital to consist of two broad dimensions—structural and cognitive—each of which are potentially associated with health and well-being at both the individual and community levels.

Data and analysis

Study population and household survey

Our data come from the baseline survey of a longitudinal study conducted in three rural counties of Shandong province during March/April 2004. We chose Shandong in Northeastern China as the study site because geographic variations in economic level and growth within the province mirror those of China as a whole. The per capita GDP of Shandong ranks around the 65th percentile of the national GDP per capita. Counties east of the provincial capital (Jinan) are adjacent to the coastal

regions of China and are relatively wealthier. The western, more mountainous, part of Shandong is relatively poorer.

Rural areas in China are divided into a three-tier administrative system: county, town, and village. We first selected three counties reflecting different levels of economic development and growth in Shandong province. For each county, towns were ranked by level of economic growth with one randomly selected from each quartile. Within each town, the same procedure was repeated to select four villages, and within villages, we randomly selected 10–20 households (depending on the size of the village).

The survey collected data on household composition, housing conditions, ownership of durable goods, household income and expenditures, and basic demographics, and a variety of social and health-related indicators for each household member aged 16–80. For household members not present at the time of the interview, the head of the household provided data on their age, gender, education, occupation, and reasons for absence from home.

Our final sample consists of 839 households and 2401 household members aged 16–80, with a response rate of 98%. Our study sample consists of the 1218 individuals aged 16–80 who were present at the time of the interview. Those not present were primarily at work or at school. Compared to the full sample, those interviewed were older (45 vs. 41 years old), more likely to be female (57% vs. 50%), farmers (79% vs. 61%), less likely to be students (7% vs. 14%) or migrant workers (2% vs. 8%), had lower levels of education (46% had junior high and above vs. 55%) and had a lower household income (11,636 vs. 12,128 Chinese Yuan).

Measures

Variables of primary interest are described here. Dependent variables are self-reported general health, psychological health, and subjective well-being. Independent variables include items related to social capital and socioeconomic and demographic characteristics.

Health

Self-reported general health (SRH) was assessed on a 4-point Likert scale on which respondents

rated their health as Excellent (1), Good (2), Fair (3), or Poor (4). SRH has proved to be a robust predictor of mortality above and beyond “objective” measures of health status, behaviors, or SES (Idler & Benyamini, 1997; Idler & Kasl, 1991). For the analysis, we categorized excellent and good as “good” health (SRH = 0), and fair and poor together as “poor” health (SRH = 1).

Psychological health was assessed through the General Health Questionnaire 12-item (GHQ-12), which is an abbreviated version of the original 30-item scale that has been used to screen for psychological morbidities (McDowell & Newell, 1996). The 12 items were originally scored on a 4-point scale corresponding to presence of symptoms (“not at all,” “once in a while,” “often,” and “most of the time”). Each of the 12 items was then recoded by the usual method for this scale (0–0–1–1) and a summary score created ranging from 0 to 12 where 12 represents the greatest number of symptoms present. Respondents are then classified into “cases” and “non-cases,” where those scoring 2 or higher are considered cases and those with scores of 0 or 1 are considered non-cases. Psychometric properties of the GHQ-12 have been previously examined and validated among the Chinese population (Pan & Goldberg, 1990). More specifically, Lee, Yip, Chen, Meng and Kleinman (2006) documented good internal consistency and criterion validity of the GHQ-12 administered to the same population as our sample. Their study also indicated that our chosen threshold exhibited good sensitivity and specificity diagnostic in identifying psychiatric disorders.

Subjective well-being

Subjective well-being (SWB) is measured using an adapted version of the Satisfaction with Life Scale (Pavot & Diener, 1993). The scale is composed of five items designed to measure overall self-judgments of respondents’ lives. In our version, the scale’s 5 items are translated into Chinese and the original 7-point Likert scale is reduced to 5 points. An aggregate measure is derived from the 5 items, with scores ranging from 5 (lowest satisfaction with life) to 25 (highest satisfaction with life). This scale has been subject to extensive reliability and validity testing internationally, and has previously been shown to exhibit acceptable psychometric properties among the Chinese population (Lee et al., 2006; Pavot & Diener, 1993).

Social capital

Organizational membership, the dimension of structural social capital, was measured by the number of organizations to which the respondent belongs. The list of organizations was compiled based on local conditions, for example, farmers associations, trade associations, women's associations, groups formed for various cultural activities, and political parties including communist-party-affiliated groups. Given that membership in *voluntary* organizations is most often used to assess social capital, we constructed two membership indicators to reflect this distinction. A party membership dummy variable is created where respondents score 1 if they belong to either the communist party or the party's "Youth League", 0 otherwise. A voluntary membership dummy variable is created where respondents score 1 if they belong to an organization save party-affiliated organizations, 0 otherwise. The party and voluntary membership variables are not mutually exclusive. Further, some villages had a 0% rate of membership in voluntary organizations. It was assumed that voluntary organizations are not available to those respondents, and an indicator variable is created to reflect that assumption.

Trust, the dimension of cognitive social capital, is measured by a composite index constructed from a factor score of 12 questionnaire items broadly related to trust, reciprocity, mutual help, etc. Each of the 12 items makes a statement about trust, reciprocity, mutual help, etc., and respondents use a Likert scale to indicate the degree to which they agree with the statement (higher values are coded to represent higher levels of trust). Some statements are expressed in local idioms based on our ethnographic findings from the villages in the sample. Factor analysis of these items resulted in a one-factor solution (eigenvalue = 2.42; all items loaded above 0.30 and no other factors exceed unity), which we scored and labeled as "trust", for simplicity. While we did not assess the validity of the trust measure in our sample, trust items from our survey have been previously applied to other parts of rural China. There, it exhibited a positive and expected association with joining a voluntary/community-based health insurance scheme which suggests a degree of criterion validity (Zhang, Wang, Wang, & Hsiao, 2006).

To consider village-level social capital effects, mean levels of membership and trust are aggregated to the village level.

SES

Household income is measured based on household expenditures which include consumption of food, non-durable non-food items, durable goods, and housing (Deaton & Zaidi, 2002). For consumption items with a lifetime longer than one year (e.g., housing), we calculated the value of the services received by the household from the item over the past year (annual linear depreciation is used to adjust for depreciation over the life of the item; Inland Revenue Department, 2004).

Household assets is an index constructed from factor analysis of 35 items related to household dwelling characteristics and ownership of consumer durables. Examples of data collected include water source, fuel types for cooking/heating, type/location of toilet, kitchen and living space separation, age of dwelling, type of floor/wall material, and size of dwelling. This methodology is recommended for developing a household assets index in contexts similar to this study (Filmer & Pritchett, 2001).

Occupational status of respondents was classified into five categories: farmer; laborer or peddler; cadre, village doctor, or teacher; migrant worker; and non-working (including students).

Education was measured as the highest grade completed, including: (1) no formal education; (2) primary education; (3) junior-high-level education; and (4) senior-high and above education.

Statistical analyses

Multi-level logistic and linear regressions are used to allow us to distinguish relationships between individual- versus contextual-level social capital and well-being/health (Blakely & Subramanian, 2006; Goldstein, 2003). Our dataset contains a sample of 1218 individuals nested within 48 villages. We specify the following basic model:

$$H_{ij} = \beta_0 + \beta_1(S_{ij} - S_j) + \beta_2 S_j + \beta_3 X_{ij} + \mu_j + \varepsilon_{ij}, \quad (1)$$

where H is the relevant dependent variable for individual i (level 1) in village j (level 2), S is the set of social capital variables measured at the individual and village levels, X is a vector of standard socioeconomic-demographic variables (log of household income, assets, education level, occupation, age, gender, marital status, and household size). The β 's are the "fixed" parameters to be

estimated, whereas μ_j is the village-specific random effect, and ε_{ij} is the random component of the error term. Specifying the individual analogue of social capital as a ‘group-centered’ measure (i.e. $S_{ij} - S_j$) addresses collinearity (Raudenbush & Bryk, 2002) inherent in individual- and village-level social capital terms since our village-level social capital variables are calculated as the mean value of the individual responses in the village. β_1 is interpreted as the association between individual-level social capital above and beyond any village-level association and is hypothesized to be positive.

Eq. (1) can be re-expressed as

$$H_{ij} = \beta_0 + \beta_1 S_{ij} + (\beta_2 - \beta_1) S_j + \beta_3 X_{ij} + \mu_j + \varepsilon_{ij}, \quad (2)$$

where $\beta_2 - \beta_1$ is interpreted as the effect of village-level social capital. Testing whether β_2 is statistically different from β_1 is therefore tantamount to testing whether village-level social capital is independently associated with health/well-being above and beyond associations at the individual level.

For each of the three dependent variables, we specify three models: a baseline model that includes only socioeconomic and demographic variables, a second model adds village-level social capital to the baseline, and a third model includes both village- and individual-level social capital. For each model, we calculated the intra-class correlation (ICC), which estimates the model’s residual variance that is attributable to the village-level (Level 2). Comparing the ICC of the second to the baseline model allows us to ascertain the relative contribution of village-level social capital to explaining the variations in health and well-being. In the case of SWB, we analyze one set of models which excludes the two health-related variables (i.e. SRH and GHQ) and one set which includes those terms as right-hand side variables in order to examine the degree to which social capital may associate with SWB by operating through health as opposed to exhibiting associations with SWB independent of health.

Results

Descriptive statistics

Table 1 presents descriptive statistics of the study sample. Average annual household income is 11,182 Yuan (2971 Yuan per capita), ranging from 13,955 to 8642 Yuan in the highest- to the lowest-income

Table 1
Descriptive statistics

	Mean (Std dev)/%
<i>Income/wealth</i>	
Annual income/capita (Yuan)	2971 (2276)
Annual income/HH (Yuan)	11,182 (8291)
HH Assets index	−0.01 (0.99)
<i>Education</i>	
Illiterate (omitted) ^a	22%
Primary	23%
Junior high	40%
Senior high +	15%
<i>Occupation</i>	
Farmer (omitted) ^a	62%
Laborer/peddler	12%
Cadre/village-doctor/teacher	2%
Migrant worker	8%
Non-working	14%
<i>Age (in years)</i>	
16–35 (omitted) ^a	37%
35–44	22%
45–54	20%
55–64	10%
65+	9%
<i>Gender</i>	
Female (omitted) ^a	50%
<i>SRH</i>	
Excellent	5%
Good	60%
Fair	23%
Poor	12%
<i>GHQ</i>	
Cases	23%
SWB	16.90 (2.57)

^aReference group for all regressions.

county, as a result of our sampling strategy to reflect the variation in economic conditions in Shandong. By construction, the asset index is centered on 0 with a standard deviation of 1. Close to one-half of the sample has only a primary education or no formal education at all, and only 15% have more than a senior-high-level of education. In terms of occupation, the majority are farmers (62%). Well more than one-half of the sample is between 16 and 45 years, and about 20% are 55 years of age or older. The sample is evenly split between men and women. In terms of dependent variables, the majority rate their health as good (60%), followed by fair (23%), poor (12%), and excellent (5%). About 23% of the sample is classified as GHQ-12 ‘‘cases,’’ and the average SWB is 16.9.

Table 2 presents summary statistics of the social capital indicators. Just over one-fifth report belonging to any organization, with more than twice as

Table 2
Summary statistics + social capital

	%/Mean (std dev)	Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree	Factor loadings
Membership in Organizations							
All	21%						
Party-affiliated	16%						
Voluntary	7%						
Trust							
<i>Overall factor score</i>	0.01 (0.87)						
Individual Items:							
Change in level of trust among villagers over past few years		32%*		52%**		16%***	0.42
Do you agree with the following statement about most people in this village?							
Trustworthy		1%	5%	8%	79%	7%	0.37
Concerned with their self-interests ^a		1%	33%	12%	48%	7%	0.39
Worried about being taken advantage of ^a		1%	43%	20%	31%	4%	0.44
Will help a fellow villager in need		1%	16%	15%	62%	6%	0.60
Will return a lost item, e.g., clothing to a fellow villager		1%	18%	15%	58%	7%	0.57
Will return lost money to a fellow villager		12%	48%	18%	20%	1%	0.54
Trusts village cadre officials		3%	17%	21%	55%	3%	0.38
Would lend money to sick neighbor in need		0%	2%	8%	71%	19%	0.39
Feels sense of belonging to the village		0%	7%	10%	72%	11%	0.36
Trust the majority of neighbors		0%	2%	6%	78%	13%	0.34
Would participate in project which benefits village but not the individual directly		1%	18%	14%	62%	5%	0.50

* Corresponds to "Worse"; ** Corresponds to "None"; *** Corresponds to "Improved".

^aReverse coded for construction of factor score/Cronbach's alpha.

many respondents (16%) belonging to party-affiliated organizations as voluntary organizations (7%). The mean of the trust factor score is centered around 0 with a standard deviation of 0.87. Individual item factor loadings on the *trust* score range from 0.34 to 0.60, and Cronbach's alpha of trust items is 0.74. There is some degree of variability in response to the individual items. For instance, while the majority of respondents agree that most villagers can be trusted and are willing to help each other, there is also indication that villagers are highly concerned with their self-interest. It is also interesting to note that while 65% of the respondents agree that most villagers will return a lost item, such as clothing, to the owners, only 21% agree that villagers will do so if the lost item is money.

Multi-level regressions

Health—SRH and GHQ

Table 3 presents results on the relationships between the social capital and SRH/GHQ and we

focus our discussion on model 3, the most comprehensive model. Higher trust is associated with a lower likelihood to report poor SRH and a GHQ case. For SRH, higher level of trust is associated with similar magnitude of reduced odds at both the village and individual levels (OR = 0.76 vs. OR = 0.71). However, only individual-level trust is statistically significant ($z = 1.35$ vs. $z = 4.46$). For GHQ, both village- and individual-level trust are statistically significant (OR = 0.58 [$z = 2.28$] and OR = 0.71 [$z = 3.92$], respectively). A likelihood ratio test indicates that village-level trust is significantly different from the individual-level term ($p = 0.02$) in its association with GHQ, showing that there is both an individual and a contextual association of trust with psychological health. Measures of membership density do not exhibit the same consistency or strength of association as trust. Village-level membership, for both party- and voluntary organization affiliations, does not exhibit significant association with either SRH or GHQ. At the individual level, party membership is significantly associated with SRH (OR = 0.62; $z = 2.53$)

Table 3
Social capital and health (odd ratios reported)

Fixed parameters	SRH			GHQ		
	Baseline	Model 2	Model 3	Baseline	Model 2	Model 3
<i>Social capital</i>						
Trust: Village		0.74 (1.45)	0.76 (1.35)		0.57 (2.37)*	0.58 (2.28)*
Trust: Individual—Village			0.71 (4.46)**			0.71 (3.92)**
Party membership: Village		1.17 (0.16)	0.96 (0.04)		0.59 (0.47)	0.52 (0.58)
Party membership: Individual—Village			0.62 (2.53)*			0.88 (0.56)
Voluntary organization membership: Village		1.40 (0.19)	1.15 (0.08)		1.45 (0.17)	1.29 (0.12)
Voluntary organization membership: Individual—Village			0.81 (0.85)			0.51 (2.06)*
No Voluntary organization in village		1.28 (0.89)	1.27 (0.86)		0.72 (0.94)	0.71 (0.96)
<i>Household characteristics</i>						
Log HH income	0.90 (1.23)	0.83 (1.67)	0.86 (1.36)	0.92 (0.67)	0.93 (0.58)	0.94 (0.47)
HH assets	0.80 (3.47)**	0.86 (1.76)	0.86 (1.77)	0.77 (2.63)**	0.77 (2.61)**	0.77 (2.54)*
HH size	0.93 (1.56)	0.94 (1.10)	0.94 (0.99)	0.92 (1.20)	0.92 (1.28)	0.92 (1.18)
<i>Education level</i>						
Primary	0.72 (2.49)*	0.77 (1.51)	0.78 (1.41)	0.89 (0.63)	0.88 (0.65)	0.89 (0.60)

Table 3 (continued)

Fixed parameters	SRH			GHQ		
	Baseline	Model 2	Model 3	Baseline	Model 2	Model 3
Junior high	0.61 (3.66)**	0.69 (2.03)*	0.71 (1.79)	0.80 (1.07)	0.81 (0.99)	0.83 (0.88)
Senior high +	0.47 (3.99)**	0.64 (1.72)	0.73 (1.18)	0.85 (0.56)	0.85 (0.53)	0.89 (0.37)
<i>Age</i>						
35–44	1.83 (3.98)**	1.49 (2.14)*	1.43 (1.90)	1.40 (1.46)	1.33 (1.23)	1.27 (1.05)
45–54	2.53 (5.92)**	2.03 (3.68)**	1.95 (3.43)**	2.04 (3.14)**	1.88 (2.76)**	1.79 (2.52)*
55–64	2.17 (4.07)**	1.86 (2.65)**	1.88 (2.65)**	1.49 (1.44)	1.44 (1.30)	1.44 (1.29)
65+	3.33 (5.88)**	1.73 (1.89)	1.72 (1.84)	1.10 (0.28)	1.00 (0.00)	0.94 (0.19)
<i>Occupation</i>						
Laborer/peddler	1.10 (0.59)	1.48 (1.76)	1.47 (1.70)	0.76 (0.94)	0.81 (0.74)	0.79 (0.82)
Cadre/village-doctor/teacher	0.97 (0.10)	0.96 (0.09)	1.15 (0.32)	1.11 (0.21)	1.05 (0.09)	1.16 (0.30)
Migrant worker	0.81 (0.92)	1.13 (0.25)	0.97 (0.05)	2.10 (1.44)	2.35 (1.63)	2.02 (1.32)
Other	0.93 (0.45)	1.13 (0.43)	1.19 (0.62)	1.33 (0.95)	1.36 (0.99)	1.41 (1.07)
<i>Sex</i>						
Male	1.05 (0.52)	0.94 (0.47)	0.96 (0.28)	0.82 (1.19)	0.81 (1.26)	0.82 (1.19)
<i>Marital status</i>						
Married	1.73 (3.50)**	1.01 (0.06)	1.09 (0.37)	0.89 (0.45)	0.88 (0.49)	0.97 (0.13)
<i>Random parameters</i>						
Level 2: Between-village variation	0.04 (1.42)	0.01 (0.27)	0.01 (0.31)	0.07 (1.08)	0.02 (0.38)	0.02 (0.48)
Intra-class correlation	0.013	0.003	0.004	0.019	0.006	0.007
Observations	1218	1218	1218	1218	1218	1218
Likelihood ratio test ^a : Trust (<i>p</i> -value)			0.17			0.02
Likelihood ratio test ^a : Party membership (<i>p</i> -value)			0.95			0.50
Likelihood ratio test ^a : Voluntary organization membership (<i>p</i> -value)			0.95			0.89

*Significant at 5%; ** significant at 1%

Absolute value of *z* statistics in parentheses.

^aLikelihood ratio tests that restricted model ($\beta(\text{Individual-Village [relevant SC Measure]} = 0)$) is nested in unrestricted model ($\beta(\text{Individual-Village [relevant SC Measure]} \neq 0)$) applied to SRH/GHQ.

while voluntary organization membership is significantly associated with GHQ (OR = 0.51; $z = 2.06$). Comparing Model 2 to the baseline model, including village-level social capital reduced the village-level variance component from 0.043 to 0.010 (or intra-class correlation from 0.013 to 0.003) and from 0.065 to 0.018 (or intra-class correlation from 0.019 to 0.006) for SRH and GHQ, respectively.

Among the set of socioeconomic variables, greater household assets are significantly associated with

better health, while household income is not. This finding may be due to larger measurement error for household income (a common finding in developing-country data) or a substantive difference in the effect of current versus more permanent income on an individual's health. While education has a significant and positive effect on SRH, there is no association with GHQ. It is interesting to note that, once the social capital variables are controlled for in Models 2 and 3, estimates for the education variables are no longer statistically significant,

suggesting a high correlation between education and measures of social capital. There is no statistical significance between occupation and health, perhaps because most of those sampled are farmers and there is not sufficient variation among the other occupation groups to detect statistical significance. Among the demographic control variables, age exhibits the strongest associations with SRH, with the older groups associated with poorer health. Finally, no significant differences are found by gender, marital status, or household size.

Subjective well-being—SWB

Table 4 presents results on the relationships between social capital and SWB, first excluding, then including health as control variable. Similar to

the GHQ results, trust is found to be positively associated with SWB at both levels, irrespective of whether health is controlled for. Inclusion of SRH and GHQ reduces the magnitude of the effect estimates, though not substantially (i.e., 10–20%), suggesting that social capital affects SWB partly through health, but also has significant independent effects. Chi-square tests of Model 3 indicate that the village-level trust is significantly different from individual-level trust in both models. Using results from the model including health, we find that a one standard deviation increase in the trust index is associated with a 0.29- and 0.36-point increase in SWB at the individual and village levels, respectively. These magnitudes are similar to the effects of household income and slightly smaller than the

Table 4
Social capital and SWB (β coefficient reported)

Fixed parameters	Excluding health			Including health		
	Baseline	Model 2	Model 3	Baseline	Model 2	Model 3
<i>Social capital</i>						
Trust: Village		1.23 (5.44)**	1.23 (5.50)**	1.10 (4.88)**	1.11 (4.98)**	
Trust: Individual—Village			0.46 (5.57)**		0.35 (4.34)**	
Party membership: Village		0.51 (0.50)	0.52 (0.51)	0.44 (0.43)	0.41 (0.40)	
Party membership: individual—Village			–0.23 (1.18)		–0.33 (1.74)	
Voluntary organization membership: Village		3.88 (1.94)	3.78 (1.91)	3.93 (1.99)*	3.76 (1.92)	
Voluntary organization membership: Individual—Village			0.25 (0.95)		0.13 (0.52)	
No Voluntary organization in village		0.39 (1.25)	0.38 (1.23)	0.42 (1.37)	0.41 (1.34)	
<i>Health</i>						
SRH (1 = poor/fair health; 0 = good/excellent health)				–0.95 (7.11)**	–0.93 (6.87)**	–0.88 (6.47)**
GHQ (1 = 2+ symptoms; 0 = 0-1 symptoms)				–0.78 (5.05)**	–0.75 (4.82)**	–0.68 (4.36)**
<i>Household Characteristics</i>						
Log HH income	0.40 (3.17)**	0.39 (3.17)**	0.37 (2.98)**	0.34 (2.81)**	0.34 (2.81)**	0.33 (2.72)**
HH assets	0.65 (6.70)**	0.63 (6.81)**	0.62 (6.78)**	0.57 (6.12)**	0.57 (6.23)**	0.57 (6.24)**
HH size	–0.15 (2.30)*	–0.16 (2.54)*	–0.15 (2.43)*	–0.18 (2.80)**	–0.19 (3.00)**	–0.18 (2.83)**
<i>Education level</i>						
Primary	0.54 (2.75)**	0.58 (2.93)**	0.60 (3.08)**	0.43 (2.28)*	0.48 (2.53)*	0.52 (2.73)**
Junior high	0.37 (1.77)	0.37 (1.80)	0.40 (1.94)	0.23 (1.14)	0.25 (1.25)	0.30 (1.49)
Senior high +	0.28 (1.01)	0.26 (0.91)	0.37 (1.29)	0.13 (0.47)	0.12 (0.45)	0.28 (1.00)

Table 4 (continued)

Fixed parameters	Excluding health			Including health		
	Baseline	Model 2	Model 3	Baseline	Model 2	Model 3
<i>Age</i>						
35–44	0.06 (0.32)	0.16 (0.78)	0.22 (1.09)	0.19 (0.97)	0.27 (1.36)	0.31 (1.57)
45–54	0.71 (3.41)**	0.80 (3.81)**	0.91 (4.35)**	0.96 (4.66)**	1.02 (4.95)**	1.10 (5.35)**
55–64	1.57 (6.10)**	1.51 (5.85)**	1.59 (6.19)**	1.76 (7.02)**	1.68 (6.69)**	1.76 (6.98)**
65+	2.42 (7.58)**	2.43 (7.50)**	2.59 (8.04)**	2.57 (8.28)**	2.55 (8.07)**	2.68 (8.53)**
<i>Occupation</i>						
Laborer/peddler	0.10 (0.39)	0.13 (0.50)	0.16 (0.65)	0.15 (0.64)	0.20 (0.81)	0.22 (0.91)
Cadre/village-doctor/teacher	0.59 (1.35)	0.64 (1.47)	0.64 (1.47)	0.60 (1.41)	0.65 (1.52)	0.69 (1.63)
Migrant worker	0.80 (1.56)	0.80 (1.49)	1.05 (1.99)*	0.90 (1.81)	0.93 (1.79)	1.12 (2.18)*
Other	0.00 (0.00)	0.05 (0.18)	0.07 (0.23)	0.07 (0.23)	0.11 (0.37)	0.13 (0.45)
<i>Sex</i>						
Male	0.04 (0.23)	0.10 (0.66)	0.13 (0.86)	0.00 (0.02)	0.06 (0.39)	0.10 (0.66)
<i>Marital Status</i>						
Married	0.70 (2.84)**	0.74 (2.92)**	0.63 (2.49)*	0.67 (2.81)**	0.73 (2.98)**	0.64 (2.62)**
<i>Random Parameters</i>						
Level 1 variation	5.27 (24.35)**	5.29 (24.02)**	5.14 (24.02)**	4.95 (24.35)**	4.96 (24.02)**	4.87 (24.02)**
Level 2: Between-Village variation	0.20 (2.41)*	0.01 (0.32)	0.02 (0.36)	0.17 (2.28)*	0.02 (0.50)	0.02 (0.50)
Intra-class correlation	0.037	0.003	0.003	0.034	0.004	0.004
Observations	1195	1195	1195	1195	1195	1195
Likelihood ratio test ^a : Trust (<i>p</i> -value)			< 0.01			< 0.01
Likelihood ratio test ^a : Party membership (<i>p</i> -value)			0.47			0.47
Likelihood ratio test ^a : Voluntary organization membership (<i>p</i> -value)			0.07			0.06

*Significant at 5%; ** significant at 1%

^a χ^2 test that $\beta(\text{Individual [relevant SC Measure]}) - \beta(\text{Village [relevant SC Measure]}) = 0$ applied to SWB Absolute value of *z* statistics in parentheses

effect of household assets. In terms of membership density, none of the party membership terms is significantly associated with SWB, except for village-level membership in voluntary organizations where the magnitude of effect is quite substantial. The chi-square test of the individual- and village-level terms, while borderline non-significant, further suggests that social capital may be multi-level. Compared to the baseline models, including village-level social capital in Model 2 reduced the variance component of the village-level substantially, probably largely due to village-level trust rather than organizational membership.

Among the other control variables, health, household income/assets, and age exhibit the most statistically positive relationships with SWB. Poor SRH and psychological health are negatively associated with SWB, while income and assets are positively associated (all associations significant). Age is positively associated with SWB. Higher education is also related to higher SWB, though the main benefit appears to operate between no formal education and having primary-level schooling. Occupational groups other than farmers experience, on average, higher levels of SWB (though only the migrant worker terms are

significant), as do those who are married (all terms significant).

Discussion

Our analyses provide evidence that dimensions of social capital are positively associated with general health, psychological health, and overall well-being in rural China. There is also evidence that relationships may operate independently at the individual and contextual (village) levels. Specifically, we find that our measure of cognitive social capital—the trust index—exhibits the most consistently positive associations with all three outcome indicators. In the cases of GHQ and SWB, there is also statistical evidence that trust operates at more than one level, with independent and positive associations found at both the village and individual levels. In contrast, our findings regarding structural social capital—membership in party-affiliated and voluntary organizations—are more puzzling and less consistent with expectations. One form of civic engagement—membership in party-affiliated organizations—is related to better SRH, while a second form of engagement—membership in voluntary organizations—is related to better GHQ and SWB scores. While the relationships between membership and SRH and GHQ operate at the individual-level, the relationship between membership and SWB operates at the village level.

Why does trust exhibit stronger and more consistently positive associations with health and well-being in rural China than organizational membership? To explore mechanisms through which trust and organizational membership might affect health and well-being in our study context, we examined two plausible “downstream” social factors. First, collective action (where respondents score 1 if they joined together with other village residents in the last year to solve common problems, 0 otherwise) may influence health by provision of social services, facilitating information dissemination, or control of deviant behaviors. Second, emotional support (where respondents score 1 if their factor score is at or above the mean, 0 otherwise) has been repeatedly shown to positively affect health along with social networks (Berkman & Glass, 2000). Table 5 presents results of random-effects logistic regressions with collective action and emotional support as outcome variables. Trust exhibits a much stronger association with emotional support than with collective action: whereas neither

individual- nor village-level trust is significantly associated with collective action, both terms are positively associated with odds of being above the mean level of emotional support (OR = 1.65 [$z = 2.00$] and OR = 1.26 [$z = 2.90$], respectively). This finding implies that the cognitive dimension of social capital, including trust, reciprocity, mutual health, and sense of belonging, may facilitate social networks and support mechanisms or rural Chinese which positively affect health and well-being.

In contrast, party membership (at the individual level) and voluntary membership (at both individual and contextual levels) are both positively associated with collective action but not at all with emotional support. Further regression analyses (not reported) indicate very little association between collective action and health/well-being. Thus while organizational membership may indeed facilitate collective action in rural China, neither membership nor collective action has strong relationships to health and SWB. Although the exact reasons underlying these results warrant further in-depth investigation, the patterns of these findings are not inconsistent with recent development efforts in rural China. During China’s recent burst of economic development, collective action has generally been directed at economic activities, such as building roads and repairing irrigation systems, and not social services. For instance, since the collapse of China’s cooperative medical schemes—the pillars for prevention and health care delivery in the pre-market-reform era—there has been no effort to rebuild community-based health schemes. Rural villagers rely on loans from friends and relatives to pay for medical expenses or even resort to informal loan schemes run by individuals charging exorbitant interest. Such an over-emphasis on economic growth and lack of attention to social programs may reflect a change in social norms, ideology, or individual incentives accompanying China’s market-oriented reforms since the 1980s.

Another possible explanation for the lack of a consistent pattern relating organization membership to health and well-being is methodological. First, both membership variables are single items and therefore less reliable/more prone to measurement error than our trust index. However, our measure of membership does not differ substantially from those commonly used in the existing literature, and it is unclear why responses from this sample would exhibit higher measurement error than in other contexts. Second, this commonly used measure of

Table 5
Social capital and downstream social factors (odd ratios reported)

Fixed parameters	Collective action	Emotional support
<i>Social capital</i>		
Trust: Village	1.55 (1.05)	1.65 (2.00)*
Trust: Individual—Village	1.11 (0.89)	1.26 (2.90)**
Party membership: Village	5.33 (0.88)	0.49 (0.62)
Party membership: Individual—Village	2.65 (4.30)**	1.47 (1.89)
Voluntary organization membership: Village	19.90 (0.97)	0.03 (1.56)
Voluntary organization membership: Individual—Village	7.96 (7.53)**	1.38 (1.21)
<i>Household characteristics</i>		
Log HH income	2.01 (3.90)**	1.50 (3.33)**
HH assets	0.68 (2.95)**	1.00 (0.04)
HH size	0.92 (0.97)	0.96 (0.70)
<i>Education level</i>		
Primary	2.49 (2.92)**	1.34 (1.64)
Junior high	2.18 (2.44)*	1.80 (3.01)**
Senior high +	3.17 (2.98)**	2.95 (3.59)**
<i>Age</i>		
35–44	0.94 (0.23)	0.93 (0.34)
45–54	1.06 (0.20)	0.61 (2.37)*
55–64	0.89 (0.32)	0.74 (1.19)
65+	0.42 (1.62)	0.68 (1.25)
<i>Occupation</i>		
Laborer/peddler	0.42 (2.25)*	0.89 (0.49)
Cadre/village-doctor/teacher	3.68 (2.83)**	1.09 (0.17)
Migrant worker	0.50 (0.86)	4.37 (1.89)
Other	0.98 (0.05)	1.02 (0.07)
<i>Sex</i>		
Male	1.77 (2.80)**	1.22 (1.33)
<i>Marital status</i>		
Married	1.57 (1.20)	1.42 (1.43)
<i>Random parameters</i>		
Level 2: Between-village variation	0.34 (2.03)*	0.08 (1.31)
Observations	1213	1218

Absolute value of *z* statistics in parentheses; * significant at 5%; ** significant at 1%

membership may not be entirely appropriate for the context of rural China. Membership was originally developed in the Western literature to capture integration into civil society that may affect health through such factors as dissemination of information (e.g., involvement in a neighborhood Parent-Teacher Association). Such *formal* organizations of these kinds rarely exist in China (partly due to political reasons) even though villagers may still band together in informal groups to perform similar functions leading to collective benefits. Our measures of membership may have under-estimated this latter type of group, explaining the relatively low percentage of individuals reporting any group membership. This possibility highlights the importance of developing measures appropriate to local conditions.

Taken together, our findings suggest that mechanisms through which social capital affects health and well-being in China are more consistently linked to its “network” rather than the social cohesion (or “communitarian”) aspects. Indeed, the stronger association between our trust index with emotional support than collective action, and the fact that trust exhibits a stronger association with psychological health than SRH, support this interpretation. Nevertheless, caution is warranted in over-interpreting this finding, since (a) the index of trust had less measurement error than the single items on organizational involvement; and (b) village-level trust (which could be interpreted as a measure of social cohesion) was associated with better health outcomes. Despite potential weaknesses in measurements, these findings have policy implications, albeit tentative, with respect to the level and the types of social capital at which interventions should be targeted in the rural Chinese context. Our results suggest that policies aimed at producing and enhancing an environment that strengthens existing social networks and facilitates the exchange of social support, at both the individual and village levels, hold promise in improving the health and well-being of the Chinese rural population. In addition, our findings that neither organizational membership nor collective action has any effect on health and well-being (despite a strong association between the two variables) suggest that a redirection of collective action from economic activities towards social and public programs is worth considering.

Limitations

Our analysis contains four main limitations. First, the interpretation of the results of this study is limited to associations and not causation. Just as social capital may affect health and well-being, the converse is likely true as well. While our cross-sectional survey renders it difficult to disentangle associations from causation, follow-up data in future survey waves will provide a longitudinal dataset more conducive to making causal inferences. Second, our measure of trust is also susceptible to omitted variable bias. Since self-reported measures of health and well-being involve subjective assessment by the individual, an estimated relationship between these measures and perceptions of trust may be confounded by other self-/subjectively determined characteristics or dispositions. For example, more optimistic individuals may not only perceive themselves to be in better health and happier, but also perceive their neighbors to be more trustworthy. We are unable to assess the degree of potential bias (e.g., variable instrumentation), but, as above, developing a longitudinal dataset will assist in reducing such bias in future research.

Third, this dataset did not allow for analysis of bonding and bridging social capital. Bonding capital refers to resources available within networks whose members are alike with respect to class, ethnicity, and other sources of social identity, while bridging capital refers to ties enabling individuals and communities to access resources outside their class position (Szreter & Woolcock, 2004). Distinguishing between the two may shed more light on the types of organizational membership and civic engagement that promote (or are deleterious to) health and well-being.

Finally, the results may not be generalizable to all rural Chinese. In particular, the study under-represents working and migrant-worker populations who were not at home during the interview. This group tends to belong to wealthier households, are more highly educated, younger and more likely to be male. However, we replicated our analyses on subsamples representing these factors and found similar associations between social capital and health/well-being to those demonstrated by the full sample.

These limitations notwithstanding, our study provides a base on which future investigations on the effect of social capital on health and well-being in the Chinese context can be built.

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References

- Berkman, L. F., & Glass, T. (2000). Social integration, social networks, social support, and health. In L. F. Berkman, & I. Kawachi (Eds.), *Social epidemiology* (pp. 137–173). Oxford, New York: Oxford University Press.
- Bjornskov, C. (2003). The happy few: Cross-country evidence on social capital and life satisfaction. *KYKLOS*, 56(1), 3–16.
- Blakely, T., & Subramanian, S. V. (2006). Multilevel studies. In M. Oakes, & J. Kaufman (Eds.), *Methods for social epidemiology* (pp. 316–340). San Francisco: Jossey Bass.
- Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education*. Westport, CT: Greenwood Press.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94(Supplement), S95–S120.
- Deaton, A., & Zaidi, S. (2002). *Guidelines for constructing consumption aggregates for welfare analysis*. Washington, DC: World Bank.
- Filmer, D., & Pritchett, L. H. (2001). Estimating wealth effects without expenditure data-or tears: An application to educational enrollments in states of India. *Demography*, 38(1), 115–132.
- Goldstein, H. (2003). *Multilevel statistical models London*. New York: Oxford University Press.
- Gundelach, P., & Kreiner, S. (2004). Happiness and life satisfaction in advanced European countries. *Cross-Cultural Research*, 38(4), 359–386.
- Harpham, T., Grant, E., & Rodriguez, C. (2004). Mental health and social capital in Cali, Colombia. *Social Science & Medicine*, 58(11), 2267–2277.
- Harpham, T., Grant, E., & Thomas, E. (2002). Measuring social capital within health surveys: Key issues. *Health Policy and Planning*, 17(1), 106–111.
- Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society of London B Biological Sciences*, 359(1449), 1435–1446.
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 38(1), 21–37.
- Idler, E. L., & Kasl, S. (1991). Health perceptions and survival: Do global evaluations of health status really predict mortality? *Journal of Gerontology*, 46(2), S55–S65.
- Inland Revenue Department. (2004). Depreciation rate calculator: New Zealand.
- 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].
- Kennelly, B., O'Shea, E., & Garvey, E. (2003). Social capital, life expectancy and mortality: A cross-national examination. *Social Science & Medicine*, 56(12), 2367–2377.
- Lee, D. T., Yip, W. C., Chen, Y., Meng, Q., & Kleinman, A. (2006). Ethno-psychometric evaluation of the General Health Questionnaire in rural China. *Psychological Medicine*, 36(2), 249–255.
- McDowell, I., & Newell, C. (1996). *Measuring health: A guide to rating scales and questionnaires*. New York: Oxford University Press.
- Miller, D. L., Scheffler, R., Lam, S., & Rupp, R. R. (undated). Social capital and health in Indonesia.
- Pan, P. C., & Goldberg, D. P. (1990). A comparison of the validity of GHQ-12 and CHQ-12 in Chinese primary care patients in Manchester. *Psychological Medicine*, 20(4), 931–940.
- Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment*, 5, 164–172.
- Pollack, C. E., & von dem Knesebeck, O. (2004). Social capital and health among the aged: Comparisons between the United States and Germany. *Health Place*, 10(4), 383–391.
- Poortinga, W. (2006). Social capital: An individual or collective resource for health? *Social Science & Medicine*, 62(2), 292–302.
- Putnam, R. D. (1993). *Making democracy work: Civic traditions in modern Italy*. Princeton, NJ: Princeton University Press.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage Publications.
- Rojas, Y., & Carlson, P. (2006). The stratification of social capital and its consequences for self-rated health in Taganrog, Russia. *Social Science & Medicine*, 62(11), 2732–2741.
- Rose, R. (2000). How much does social capital add to individual health? A survey study of Russians. *Social Science & Medicine*, 51(9), 1421–1435.
- Skrabski, A., Kopp, M., & Kawachi, I. (2004). Social capital and collective efficacy in Hungary: Cross sectional associations with middle aged female and male mortality rates. *Journal of Epidemiology and Community Health*, 58(4), 340–345.
- Szreter, S., & Woolcock, M. (2004). Health by association. Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology*, 33(4), 650–667.
- Zhang, L., Wang, H., Wang, L., & Hsiao, W. (2006). Social capital and farmer's willingness-to-join a newly established community-based health insurance in rural China. *Health Policy*, 76(2), 233–242.