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ABSTRACT

While a positive relationship between socioeconomic status (SES) and health has been well established, far less clear is how this relationship changes with aging. Using recent data from China's 2005 Inter-census Survey, we study health differentials by SES and whether they converge, diverge, or remain stable at old ages in China. We found divergence in health differentials with age both by education and by income. Our finding suggests that, due to certain socio-political factors, the influence of SES on health in prime ages is rather limited in China.

INTRODUCTION

While a positive relationship between socioeconomic status (SES) and health has been well established, far less clear is how this relationship changes with aging. Some prior studies based on US data have found health differentials by SES to be largest in prime ages and to then converge at older ages (House et al. 1990; Beckett 2000). This narrowing of health differentials among older adults has been attributed to later-life changes in exposure to and effects of psychosocial risk factors (Lantz et al. 1998; House et al. 1994), to the impact of social programs that become accessible to older adults across social strata (Preston and Elo 1995), and to the increasing role of biological mechanisms in old ages (House, Lantz, and Herd 2005; Mirowsky and Ross 2008). We call this view the "convergence hypothesis." Despite its theoretical appeal and strong empirical support, most of which is based on US data, the convergence hypothesis has not gone unchallenged. A growing body of research now reports evidence of *divergence* in health disparities by SES in later life (Dupre 2008; Willson, Shuey, and Elder 2007; DiPrete and Eirich 2006; Prus 2007, 2004; Ross and Wu 1996). These studies suggest a contrarian view that the health effects of SES may accumulate over the life course, resulting in enhanced, rather than diminished, health disparities in older ages than in middle life (Mirowsky and Ross 2005; Lynch, Kaplan, and Shema 1997; O'Rand 1996).

Using recent data from China's 2005 Inter-census Survey, we study health differentials by SES and whether they converge, diverge, or remain stable at old ages in China. To set the stage for this analysis, we first investigate the strength of associations between self-rated health and SES, separately for urban residents and rural residents in China. Our measures of SES include education, income, occupation, and home ownership. We then assess age patterns of health disparities by SES. To our knowledge, this is the first study to investigate SES-health associations across multiple age groups in China.

We begin by reviewing theories and evidence and laying out a conceptual framework that motivates our own research. We next discuss how particular socio-political-economic contexts in China may set China apart from the US in regards to how associations between socioeconomic status and health vary with age. We then examine empirically the associations between various SES indicators and health in rural and urban China and observed variations in these associations with age.

THEORY AND EVIDENCE

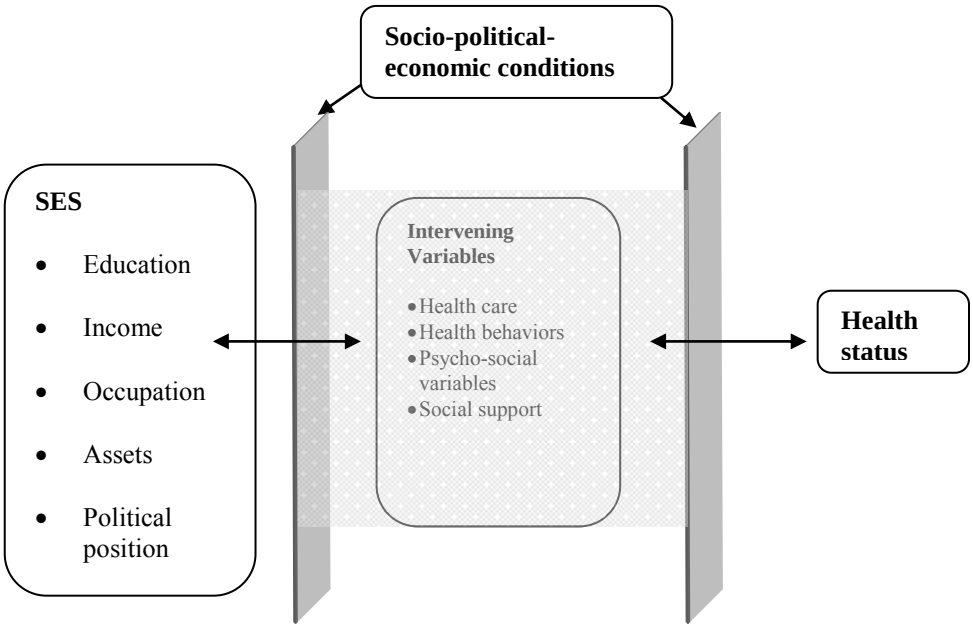
Socioeconomic Status and Health: Key Mechanisms

A vast body of literature exists demonstrating a robust, positive association between socioeconomic status (SES) and health for many populations in a variety of social contexts (i.e., Adler and Ostrove 1999; Feinstein 1993; von dem Knesebeck, Verde, and Dragano 2006; Kitigawa and Hauser 1973; Marmot, et al. 1997). Existing literature also provides good theoretical insights into causal mechanisms accounting for links between various SES dimensions and health. For example, education is believed to promote good health not only by generating economic resources (income and employment) but also by providing social-psychological resources: healthy behaviors (Ross and Wu 1995; Mirowsky and Ross 1999), ability to cope with stress (Lantz et al. 2005; Lin and Ensel 1989), a sense of personal control (Mirowsky and Ross 1998; Taylor and Seeman 1999), and knowledge and skills by which people

are able to better self-manage illness and disease (Goldman and Smith 2002). Income has been shown to promote health by affecting nutrition, housing quality, exposure to environmental hazards, stress, and access to adequate health care (Cohen, Farley, and Mason 2003; Hayward et al. 1988; House et al. 1994; House 2002; Lantz et al. 2005). Low-income persons/families are particularly vulnerable because they may be unable to afford adequate physical and mental health care (Andrulis 1998), limited in terms of access to healthy food (Darmon, Ferguson, and Briend 2002; Caraher et al. 1998), and subject to living in toxic environments (Evans and Katrowitz 2002) and unhealthy housing conditions associated with a higher likelihood of illness and disease (Rosenbaum 2008). Recent research suggests that income associates more strongly with progression (rather than onset) of disease than does education (Herd, Goesling, and House 2007; Zimmer and House 2003), suggesting that economic resources promote health in part by increasing the abilities to pay for medical care and to acquire transportation to care facilities.

Past research has produced valuable knowledge about intervening causal mechanisms by which SES affects health. However, given that this large body of research has mainly been based on data from the US and other western societies, we do not yet know how these causal mechanisms may be influenced by the larger socio-political contexts in which they operate, as illustrated thisin Figure 1, which presents the conceptual framework for our study. Using this framework, we can recognize that causal relationships between health and SES hinge on socio-political-economic conditions insofar as these conditions either facilitate or impede particular mechanisms through which SES affects health. In other words, we borrow from Link and Phelan (1995) in maintaining that social conditions are fundamental causes of health and illness, with varying manifest mechanisms (through which SES affects health).

Figure 1. Conceptual Framework



From this perspective, there are reasons to suspect that associations between SES and health are muted in China, in comparison to the US and other western countries. First, since the founding of the People's Republic of China in 1949, the central state political body has made public health a priority and thus achieved impressive health results for the Chinese population (Banister and Hill 2004; Lieberthal 2003). For a long while, the Chinese government placed a strong emphasis on providing health care and health information to "peasants and workers" (Chen 2001; Liu et al. 1995). During the first decade of the new republic, crude death rates were nearly halved (Banister 1987). By the early 1970s the average life expectancy at birth was at least 60 years of age – much higher than would be expected based on levels of national development (Banister and Hill 2004; Banister and Preston 1981). Infant mortality plummeted from approximately 250 per thousand births in 1949 (Jamison et al. 1984) to an estimated 50 – 60 per thousand births by the late 1970s (Banister and Zhang 2005). The Chinese population was therefore already fairly healthy by the world standard when the country was relatively poor; that is, before the reforms begun in 1978 ushered in the rapid economic growth of the last three decades. China's continued achievement in public health is aided by the presence of a well-developed infrastructure through which health education may be provided to the Chinese population across SES groups. Combined with a focus on disease prevention (Unshuld 1988) -- usually less costly than disease treatment – this wide-spread public access to health knowledge should mitigate information-related disadvantage associated with a low education and income levels. Moreover, subsidized health care and a government-sponsored medical insurance system provide low-income people with affordable access to adequate medical attention and put a check on the SES gradient in health status.

Second, China is a collective society; health behaviors and health care decisions tend to be a family affair rather than a personal matter as in the case of many Western nations (Longino 1998). To the extent that family members and close friends exert a strong influence on personal health behavior and disease/illness management (McLaughlin and Braun 1998), individual education levels may play a smaller role in determining health behaviors and management of disease/illness in China than in the US and other western countries. For example, money and other material resources are supposed to be shared by family members, sometimes even across members in extended families and kinship networks (Baker 1979). Thus, a sort of internal insurance system spreads the risk of major medical problems over a larger social entity, such as a family or an extended family. Underlying these values and practices is Confucian ideology, which sometimes promotes familial unity and family interests at the expense of personal freedoms that may at times lead to unhealthy behaviors (Cheung et al. 2006).

Overall, current socio-political-economic conditions in China lead us to expect relatively low health discrepancies in SES dimensions such as education and income. Our initial task is to establish the extent to which SES and health are associated in the Chinese context. Our next task is to determine whether the strength of SES-health associations diminishes, grows, or simply persists among elderly Chinese.

SES, Health, and Aging: Convergence or Divergence at Old Ages?

Prior studies show that health differentials by SES are smallest for young adults and then widen among people of in late middle age and early old age. Whether health disparities by SES then widen or narrow among elderly people, however, is under debate. A number of influential studies based on US

data have found that SES gradients converge among older adults (House et. al 1990, 1994; Beckett 2000). The main explanation for this narrowing of health differences at older ages is later-life reductions in levels and impact of exposure to psychosocial risk factors contributing to poor health (House et al. 1994), such as:

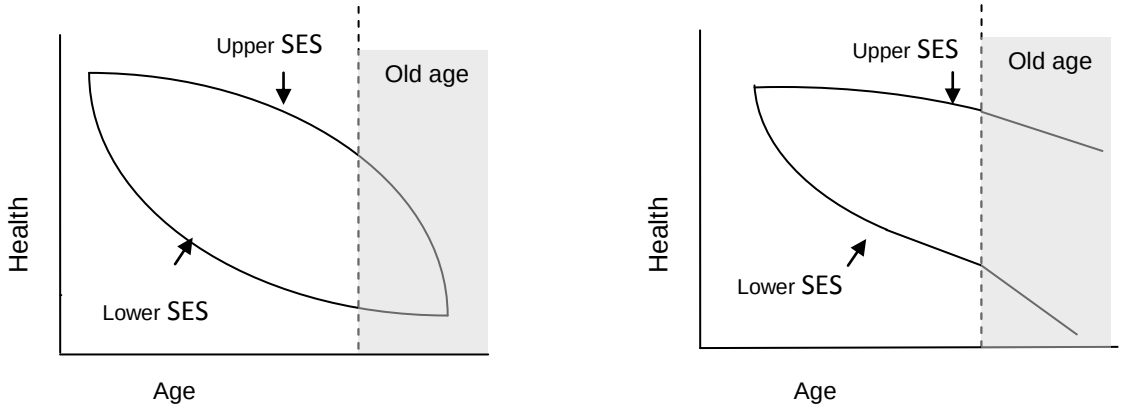
> (1) lack of social relationships and social supports; (2) personality dispositions, such as a lost sense of mastery, optimism, sense of control, and self-esteem or heightened levels of anger and hostility; and (3) chronic and acute stress in life and work, including the stress of racism, classism, and other phenomena related to the social distribution of power and resources (Lantz et al. 1998:1707).

Another explanation is biological, as biological deterioration in later life (Hayflick 1998) becomes more and more important in determining health and thus overrides the significance of social factors in old age (House et al. 2005; Mirowsky and Ross 2008). As a result, aging serves as a leveler, diminishing health disparities by SES. We call this view the "convergence hypothesis."

Recently, a number of studies have challenged the convergence thesis, showing instead that health disparities by SES continue to widen among elderly adults. For example, education is shown to be associated with growing divergence in health status in later life (Dupre 2008; Mirowsky and Ross 2008; Willson et al. 2007; DiPrete and Eirich 2006; O'Rand and Hamil-Luker 2005; Mirowsky and Ross 2005; Prus 2007, 2004; Ross and Wu 1996). Long-term economic hardship also appears to have cumulative effects on health at older ages (McDonough and Berglund 2003; Benzeval and Judge 2001; Lynch et al. 1997). We call this contrarian view the "divergence hypothesis." One important implication of the divergence hypothesis is that health advantages or disadvantages associated with SES are *compounded* over the life course, a phenomenon Merton calls "cumulative advantage," or the "Matthew effect" (Dannefer 2003; Ferraro and Kelley-Moore 2003; Merton 1968). In Figure 2, we graphically illustrate the two competing hypotheses.

Figure 2. Hypotheses about SES-Health Associations at Older Ages (Stylized Depictions)

a. Convergence Hypothesis (Aging-as-Leveler) b. Divergence Hypothesis



What accounts for the contradictory conclusions in the literature about SES-health associations at older ages? One possibility is that in some cases, selective mortality compresses patterns of divergence among elderly people (Mirowsky and Ross 2008; Lynch 2003; Noymer 2001). That is, the early death of disadvantaged individuals may help produce a robust group of surviving low-SES elderly people. Since only the robust low-SES elderly are compared to the ordinary high-SES elderly, with the latter group becoming increasingly frail due to biological forces, SES differentials in health in observed data thus appear small in old ages. Although research by Beckett (2000) suggests that convergence patterns cannot be entirely accounted for by selective mortality, the methods upon which she bases her conclusions have been questioned (George 2005; Noymer 2001). Another possibility is that cohort trends, particularly the rising importance of education for younger cohorts, obscure patterns of old-age divergence in health status by SES in cross-sectional data (Mirowsky and Ross 2008; Lauderdale 2001). It has also been noted that patterns of divergence can be produced by floor and ceiling effects when outcome measures of health are crude (Ross and Wu 1996). In summary, given the ambiguity of the extant literature, we cannot predict with confidence whether SES differentials in health will diminish or grow in old ages. Thus, more empirical evidence on the age patterns of SES differentials in health, especially in a very different social context, can help us evaluate the relative merit and applicability of the convergence hypothesis versus the divergence hypothesis.

THE PRESENT STUDY

In this study, we first establish the empirical association between our measures of socioeconomic status (SES) and self-reported health in our nationally representative data for China. We then need to assess whether or not the age patterns of health differentials by SES converge or diverge in old ages. Based on our conceptual framework, we consider the influence of China's socio-political-economic conditions in our empirical evaluation of the two competing hypotheses. For three reasons, we conjecture that a pattern of old age convergence in SES-health associations may not hold true in China. First, government-subsidized health care is available for Chinese people of all ages – not only for senior citizens. This political-economic context would minimize retirement-age convergence in health gaps by income in that access to health care would not suddenly improve for lower-SES groups upon reaching "senior citizen" status. Secondly, a strong social norm exists in China for family to economically assist one another throughout the life course as well as to provide primary support for all persons (2003). Regardless of a person's socioeconomic status, material and instrumental support can often be mustered from across an extended familial group. This type of family context would thus protect many low-SES persons from risk factors associated with a high likelihood of poor health in the US context. Recall that a primary reason for the convergence trend found in the US (House et al. 1994) is that low-SES persons in late adult ages fare the worst. If health differentials throughout the adult life and late ages are modest, we may not observe a convergence.

Finally, recall that convergence in health status in old age has been explained by changes in exposure to, and impact of, psychosocial risk factors (House et al. 1994). Following this argument, we posit that the extent to which exposure to, and impact of, psychosocial risk factors decreases with age or SES level *can vary by social context*. We postulate that China's socio-political-economic conditions in

several regards discourage age- and SES-based differences in exposure to these risk factors – and therefore dampen any pattern of health status convergence by SES among elderly. First, social relationships and social support at all stages of the life course – including those among elderly and impoverished people – are strongly emphasized in China (Yang 1994). Second, the effect of personality dispositions on health would be minimized by the influence of family and societal pressure to conform to healthy behaviors (McLaughlin and Braun 1998; Yum 1988) and by socio-cultural norms of self-discipline and moderation (Cheung et al. 2006). Finally, China's communist political-economic system has until recently sought to curtail the unequal distribution of power and resources (Lieberthal 2003). Although inequality in China has risen sharply in recent years, contemporary older Chinese adults have lived much of their lives in a context that minimized SES disparities (at least within urban and rural regions). To the extent that social inequality was minimized through political means in earlier eras, we can expect that SES-based differentials in exposure to psychosocial risk factors were also minimized.

Hence, we expect SES gradient differentials to either be stable (reflecting continuation of long-term SES level stemming based on familial resources) or divergent (reflecting the long-term effects of unequal family resources on elder's health). To evaluate our conjecture, we now turn to an empirical analysis of the extent to which SES indicators are related to health in China and whether health differentials by SES converge, diverge, or remain stable. Due to data limitations, previous research on China has been limited to examining SES-health only among elderly people, thereby precluding investigation into changes in SES-health gradients from middle to old ages (Chiu et al. 2005; Liang et al. 2000; Zhu and Xie 2007; Zimmer and Kwong 2004).

METHOD

Data

Data for our study come from the 2005 China Inter-Census Survey (CIS), a nationally representative survey covering 31 provinces of mainland China. We restrict our study to people ages 25 and older who report Han Chinese ethnicity and who do not reside in one of China's autonomous regions. The final size of our analytic sample is 1,366,401. Given the cross-sectional nature of the 2005 CIS, we cannot separate cohort effects (i.e., the effects of membership in a group of individuals born within a particular time frame) from the age effects (i.e., the effects of having attained a certain number of years). Thus, our interpretation of age patterns as the effects of age rather than the effects of cohort hinges on the assumption that there have not been significant changes in the relationship involving SES, age, and health across cohorts. In addition, we are also keenly aware of the difficulty of establishing the causal direction between SES and health with observational, cross-sectional data. For these reasons, we urge the reader to exercise caution and interpret our results as descriptive and associational rather than as necessarily causal.

Measures

Health. Our outcome measure is dichotomized self-rated "good health." Self-reported health has been shown to be a predictor of mortality and functional limitation in both developed and developing countries,

suggesting that such measures are valid indicators of health (Benyamini, Leventhal, and Leventhal 1999; Idler and Benyami 1997; Idler and Kasl 1995; Subramanian et al. 2008). The survey asked respondents to report their health as "good," "basically able to perform regular daily tasks," or "unable to perform regular daily tasks." We constructed a dichotomous variable in which "good health" is coded 1 and other answers are coded 0.[1] We consider selection of either of the latter two categories as indicating at least some level of compromised (poor) health. We deleted cases which were missing on our dependent variable or key independent variables.[2]

Socioeconomic Status. Socioeconomic status is traditionally measured by education, income, occupation, and sometimes additional factors such as home ownership and liquid assets (e.g., Jatrana and Chan 2007; Park 2005; Robert and House 1996). This study employs four indicators of SES: education, income, occupation, and home ownership. Research suggests that education plays an important role in predicting SES in developing countries (Buchmann and Hannum 2001). In China, youth are required to complete nine years of education. Urban youth and rural youth of relatively well-off families usually attend high school or its equivalent, but a university education continues to be out-of-reach for most people, especially for those in earlier cohorts. It is especially common for elderly women in rural areas to have little or no education (Hannum 1999). We divide *education* into four levels: no education or primary school, middle school, senior high school, or any college. To allow for a flexible non-parametric specification of income effects, we categorize *income* from the prior month into quartiles. Using a detailed (three-digit) occupational measure, we categorize respondents into one of five occupational categories: (1) professional/managerial, (2) other non-manual, (3) agricultural, (4) manual laborer, or (5) none/missing. *Home ownership* is coded 0 for people living in owned housing and 1 for people living in rented housing.

Control Variables. Covariates in our multivariate analyses include age, sex, marital status, and province. *Age* is an ordinal variable divided into 12 groups, each representing a five-year age interval (e.g., 24-29, 30-34, 35-39). Dummy variable specification is more conservative than a linear specification and permits the detection of non-linear patterns of health as a function of age. *Gender* is coded 0 for males and 1 for females. *Marital status* is divided into four categories: never *married*, married, divorced, and widowed, but treated as a dichotomous control variable (married or not) in multivariate models. Due to regional disparities in socio-economic status in China (Kanbur and Zhang 1999; Xie and Hannum 1996), we also control for the effects of province with dummy variables.

[1] As noted later, an overwhelming majority of the respondents reported their health as good. Low percentages of the respondents reported their health as "basically able to perform regular daily tasks" (6.77 percent and 6.31 percent for urban and rural residents, respectively) or "unable to perform regular daily tasks" (2.0 percent and 4.17 percent for urban and rural residents, respectively).

[2] Missing values are infrequent in the survey. The percentage of missing values was under one percent for all variables.

***Rural-Urban Status*.** In China, being officially registered as an urban resident provides valuable resources and rights that are difficult to acquire for people born in rural areas (Wang, Zuo, and Ruan 2002; Wu and Treiman 2004, 2007). Because of the stark rural-urban differences in levels of development, government policy, resources, and the general standard of living in China, we perform separate analyses for rural and urban respondents. In this study, rural and urban status is determined by respondents' reported *hukou (*registration) type. Because rural migrants may reside in urban areas for extended periods of time but maintain official status as rural residents, we occasionally use the term "registrant" rather than "resident" when referring to people holding urban or rural *hukou*.

Analytic Strategy

We first present descriptive statistics on the composition and health status of our sample, separately for rural residents and urban residents. Using logistic regression, we then examine bivariate and then multivariate associations between our outcome variable and various indicators of socioeconomic status. By comparing coefficients from bivariate models with corresponding ones from a multivariate model including all the predictors, we are able to detect the extent to which associations between our SES indicators and good health are explained by other socio-demographic factors. In our analysis of how SES-health associations change with age, we choose to focus on age patterns of health differentials by income and education – two of the most important SES measures in the literature. We will estimate multivariate statistical models with interactions of age and income and of age and education. To ease interpretation, we present predicted probabilities of good health for all age groups by education and income levels. This allows us to detect patterns of convergence, divergence, or stability by SES among older adults.

RESULTS

Descriptive Results

We present descriptive results in Table 1, where both the distributions of the predictor variables (in the first two columns) as well as the association between the dependent variable (percent reporting good health) and the main predictors (in the last two columns) are shown, separately by rural and urban status. Let us first focus on the first two columns. As expected, education level, income, and professional employment rates are higher among urban than among rural registrants. Among rural persons, more than half (53.60 percent) report having only a primary school education or less, and only 6.32 percent report education at the high school level or above.[3] In contrast, 59.87 percent of urban people have earned a high school or college degree. The percentages of people owning homes are higher among rural respondents (92.56) than among urban respondents (83.74). This difference probably reflects the high costs of urban housing in China. As expected, a much larger percentage of rural than urban people (56.07 percent and 2.83 percent, respectively) report agriculture work as their main source of income.

[3] This is not to say that rural people do not earn high school or college degrees. But those who do are likely to find employment in the city and change their registration (*hukou*) status to urban (Wu and Treiman 2007).

Table 1. Percentage Distribution and Percent Healthy by Residence and Other Explanatory Factors

Variable	Percentage Distribution		Percent Reporting Good Health		
	Rural	Urban	Rural		Urban
Education Level					
No education/primary	53.60	17.27	82.59	**	74.59
Junior High	40.08	32.87	97.72	**	92.60
High School	5.93	28.85	97.74	**	95.43
Any College	0.39	21.02	97.86	**	97.00
Income Quartile					
First	21.92	45.06	62.15	**	82.19
Second	30.32	1.70	95.13		94.68
Third	32.02	13.17	98.36	**	97.88
Fourth	15.75	40.07	99.45	**	99.08
Occupation					
Professional/Cadre/Managerial	3.94	23.87	97.84	**	99.04
Other non-manual	6.83	14.20	98.72		98.39
Agricultural	56.07	2.83	96.74		97.25
Manual workers	11.56	14.31	99.19		98.43
None/Missing	21.59	44.79	61.61	**	82.09
Home					
Rented	7.44	16.26	98.26	**	89.91
Owned	92.56	83.74	88.92	**	91.49
Age					
25-29	9.92	10.33	98.86	**	99.08
30-34	13.24	13.00	98.58		98.71
35-39	15.34	13.49	98.26	*	98.11
40-44	13.24	13.67	97.74	**	97.17
45-49	10.26	11.55	96.68	**	95.55
50-54	11.10	10.83	94.60	**	93.81
55-59	7.96	7.76	89.83	*	90.29
60-64	5.75	5.78	78.93	**	84.10
65-69	4.68	5.22	65.53	**	75.38
70-74	3.84	4.11	49.71	**	64.19
75-79	2.51	2.47	39.42	**	53.14
80+	2.09	1.78	28.52	**	38.92
Sex					
Women	51.29	49.06	88.61	**	90.88
Men	48.71	50.94	90.68	**	91.58
Marital Status					
Never Married	4.01	5.26	85.81	**	93.95
Married or Re-married	87.91	87.69	92.62	*	92.71
Divorced	0.77	2.13	88.79	**	90.62
Widowed	7.31	4.92	55.60	**	62.31
(n)	(935,217)	(431,184)			

Source: 2005 China Inter-census Population Survey (中国 2005 年全国 1%人口抽样调查) **p<.01; *p<.02 (Significance levels refer to the Pearson chi-square testing for the hypothesis that the health is the same across rural-urban areas within a category)

Now, we turn to the last two columns displaying the association between the predictors and the health measure, focusing first on rural and urban differences. Across most socio-demographic groups, differences in the percentages reporting good health between urban and rural residents are slight. However, substantial rural-urban differences in self-rated health emerge by age 60 and older, with urban elders reporting better health than do rural elders. By age 80, for example, only 28.52 percent of rural elderly report good health, compared to 38.92 percent of their urban counterparts. Rural people with incomes in the first quartile report substantially poorer health compared to their urban counterparts.

Bivariate Results

We have already presented bivariate results on the relationships between the predictors of health and the health measure in Table 1. To facilitate the comparison of the bivariate results with those from a multivariate analysis that includes all the predictors altogether, we now present and interpret the bivariate results in a different form – in the form of logistic regression coefficients, in the first two columns (labeled "Observed Effects") of Tables 2 and 3, respectively for rural and urban residents. These results tell us the "gross effects" of the predictors. As expected, income is positively associated with health in both rural and urban samples. For rural people, relative to those in the second income quartile, the odds of reporting good health are .08 times (exp (-2.475)) as low as those for people reporting first quartile income, 3.07 (exp (1.124)) times as high as the odds for those in the third income quartile, and 9.32 times (exp (2.233)) as high as the odds of reporting good health for people with incomes in the fourth quartile. In the urban sample, relative to those in the second income quartile, the odds of people with first quartile incomes reporting good health are .26 times (exp (-1.349)) as low; for those in the third income quartile, 2.6 times (exp (.955)) as high; and for people reporting incomes in the fourth quartile, 6.05 times (exp(1.800)) as high. Relative to rural agricultural workers, the odds of rural manual laborers reporting good health are 4.13 times ((exp (1.419)) as high. Not controlling for other factors, the odds of urban professional workers reporting good health are 1.97 times ((exp).677) as high as those of agricultural workers who are registered as urban residents.

There are also some interesting rural-urban differences in bivariate associations between health and socio-demographic factors. First, although both rural and urban Chinese with a junior high education (the reference group) demonstrate better health than do people with primary education or below, education above a junior high level is not significantly associated with good health for rural Chinese. However, among urban Chinese, self-reported health increases steadily with education level. This finding suggests that there may be rural-urban differences in health returns to education, or may simply indicate that rural –born people with education above the junior high level tend to have migrated permanently to the city. Secondly, the association between homeownership and health differs for rural and urban registrants. Living in a rented home is associated with better health for rural people whereas living in a rented home is negatively associated with health among urbanites. Because home ownership is the standard in rural China, we suspect that for rural people, living in a rented home is a proxy for temporary migration to urban areas, which would associate with favorable income and health resources.[4] On the contrary, for an urban registrant, renting a home is probably an indication of inability to secure permanent housing and may reflect other disadvantages associated with poor health.

[4] Migrants may also be healthier selectively as compared to non-migrants, due to potential "healthy migrant" selection.

Table 2: Estimated Logistic Regression Coefficients on Self-reported Good Health in RURAL China

Variables	Observed Effects β	SE(β)	Adjusted Effects β	SE(β)
Education level (junior high = excluded)				
No education/primary	-2.201**	.012	-0.579**	.014
High School	.009	.031	0 .019	.034
Any college	.064	.115	0 .482**	.139
Constant	3.758**	.011		
Income (second quartile = excluded)				
First quartile	-2.475**	.010	0.324*	.144
Third quartile	1.124**	.017	0.807**	.018
Fourth quartile	2.233**	.036	1.411**	.040
Constant	2.791**	.009		
Occupation (Agricultural = excluded)				
Professional/Managerial	.423**	.037	-0.267**	.038
Other non-manual	.953**	.036	-0.515**	.04
Manual workers	1.419**	.035	-0.189**	.039
None/Missing	-2.917**	.009	-2.263**	.144
Constant	3.390**	.008		
Home Ownership (owned = excluded)				
Rented	1.949**	.029	.902**	.033
Constant	2.083**	.003		
Age Group (25-29 = excluded)				
30-34	-.220**	.039	-.510**	.041
35-39	-.423**	.037	-.815**	.039
40-44	-.690**	.036	-1.120**	.039
45-49	-1.086**	.036	-1.327**	.038
50-54	-1.595**	.034	-1.547**	.037
55-59	-2.280**	.033	-1.978**	.036
60-64	-3.138**	.033	-2.507**	.036
65-69	-3.816**	.032	-2.851**	.037
70-74	-4.470**	.033	-3.191**	.039
75-79	-4.888**	.034	-3.426**	.038
80+	-5.377**	.035	-3.780**	.039
Constant	4.458**	.031		
Gender (male = excluded)				
Female	-.224**	.007	.299**	.010
Constant	2.275**	.005		
Marital Status (married = excluded)				
Never Married	-.730**	.015	-1.600**	.022
Divorced	-.461**	.038	-.758 **	.048
Widowed	-2.305**	.009	-.180**	.012
Constant	2.530**	.004		
Constant			5.111**	0.056
(N = 935,217)				

Notes: Observed effects on self-reported good health are derived from bivariate models. Adjusted effects are derived from a multivariate model including all variables and controlling for regional (province) effects. **p<.01; *p<.05
Source: 2005 China Inter-census Population Survey (中国 2005 年全国 1%人口抽样调查)

Table 3: Estimated Logistic Regression Coefficients on Self-reported Good Health in URBAN China

Variables	Observed Effects β	SE(β)	Adjusted Effects β	SE(β)
Education level (junior high = excluded)				
No education/primary	-1.450**	.013	-0.370**	.016
High School	0.513**	.017	0.203**	.018
Any college	0.950**	.022	0.400**	.025
Constant	2.527**	.010		
Income (second quartile = excluded)				
First quartile	-1.349**	.052	0.683**	.230
Third quartile	0.955**	.060	0.713**	.067
Fourth quartile	1.800**	.058	1.327**	.069
Constant	2.878**	.052		
Occupation (agricultural = excluded)				
Professional/Managerial	1.074	.064	-0.246**	.076
Other non-manual	.546	.064	-0.315**	.071
Manual workers	.642	.065	-0.287**	.074
None/Missing	-2.04	.056	-1.441**	.227
Constant	3.565	.921	.0553203	
Home Ownership (owned = excluded)				
Renter	-.187**	.014	-0.286**	.046
Constant	2.375**	.006		
Age Group (25-29 = excluded)				
30-34	-.345**	.062	-0.836**	.065
35-39	-.731**	.058	-1.305**	.063
40-44	-1.143**	.056	-1.705**	.061
45-49	-1.615**	.054	-2.004**	.060
50-54	-1.962**	.053	-2.013**	.060
55-59	-2.451**	.053	-2.270**	.060
60-64	-3.015**	.053	-2.656**	.060
65-69	-3.562**	.052	-3.118**	.060
70-74	-4.098**	.052	-3.548**	.061
75-79	-4.555**	.053	-3.852**	.062
80+	-5.132**	.055	-4.454**	.064
Constant	4.681**	.050		
Gender (male = excluded)				
Female	-.087**	.011	0.137**	.013
Constant	2.394**	.008		
Marital Status (married = excluded)				
Never Married	.200**	.029	-1.660**	.038
Divorced	-.274**	.036	-0.683**	.040
Widowed	-2.040**	.015	-0.269**	.019
Constant	2.543**	.006		
Constant			4.891**	.092
(N = 431,184)				

Notes: Observed effects on self-reported good health are derived from bivariate models. Adjusted effects are derived from a multivariate model including all variables and controlling for regional (province) effects. **p<.01; *p<.05
Source: 2005 China Inter-census Population Survey (中国 2005 年全国 1%人口抽样调查)

Multivariate Results

In the last two columns in Tables 2 and 3 under the heading "Adjusted Effects," we show the estimated coefficients and standard errors for a multivariate logistic regression model including all the predictors. We note that in both bivariate and multivariate results, there are no health benefits associated with high school education in rural China. This finding is unexpected since education is often thought to be strongly and positively associated with good health across societies (Wilkinson and Marmot 2003). One possible explanation is selective migration: healthy, independent rural residents with high school educations often seek employment in the cities (Wu and Treiman 2007, 2004), leaving those with health problems or the need for family assistance disproportionately in the rural areas.

The female health disadvantage disappears in our adjusted model. In fact, in multivariate results, we observe better health among women than among men, in both rural and urban samples. Surprisingly, net of other factors, people in the first quartile income group have *better* health than those in the second quartile income group in both rural and urban samples. The health disadvantage of being in the first income quartile found in bivariate results is due to the disproportionately large number of first quartile elderly people who report no income. Net of other SES indicators and socio-demographic factors, we find that agricultural workers report better health than people in other occupations -- an observation that may reflect occupational selection for physical health as well as the health effects of agricultural work. Living in a rented home is still negatively associated with health in urban China, but positively associated with health in rural China, suggesting residential differences in the meaning of this SES dimension.

SES-Health Associations across Age Groups in Rural and Urban China

The key question that motivates our study is how SES-health associations vary with age in contemporary China. In the second step of our analysis, we now address this research question, focusing on education and income as primary SES indictors (Herd et al. 2007; Smith 2004). Toward this end, we add interaction effects between age and the two SES indicator of interest (i.e., education or income) to our baseline multivariate model as shown in Tables 2 and 3. To ease interpretation, we calculated predicted probabilities of good health by the dimension of SES considered and age, while holding constant all other socio-demographic factors and other SES indicators at their sample means.

Rural China. Figure 3(a) shows the predicted probability of reporting good health by educational group and age group for rural respondents. The predicted probability of reporting good health is high until late age 60, when it begins to decline. We find a sharp decline in reported health status with age for respondents with primary or no education, creating a growing divergence between this education group and other groups. Self-rated health declines very little for rural people at the higher educational levels, resulting in only small divergence in health gaps across the other educational groups

Figure 3(b) shows the predicted probability of reporting good health by income quartile and age for rural respondents. Health differentials by income are minimal until age 60, at which point we observe a pattern of divergence. Although probabilities of good health are similar among people earning income in first and second income quartiles, having income in the third, and even more so, in the fourth, quartile are clearly associated with better self-reported health. The pattern becomes more and more pronounced in old ages.

Figure 3(a). Predicted Probability of Reporting Good Health by Education Level, Rural China

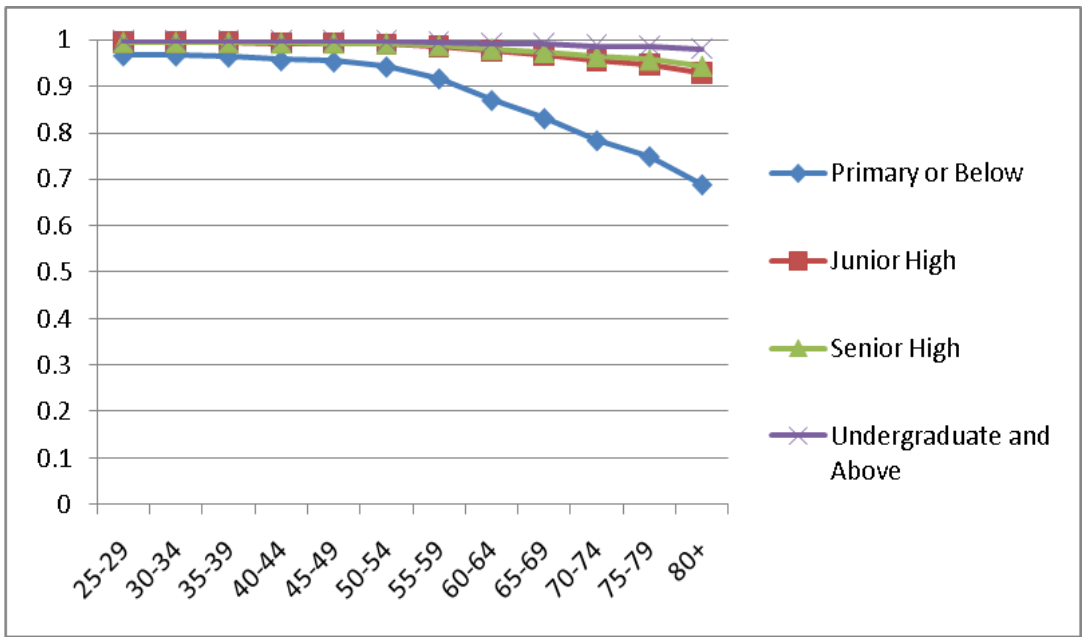
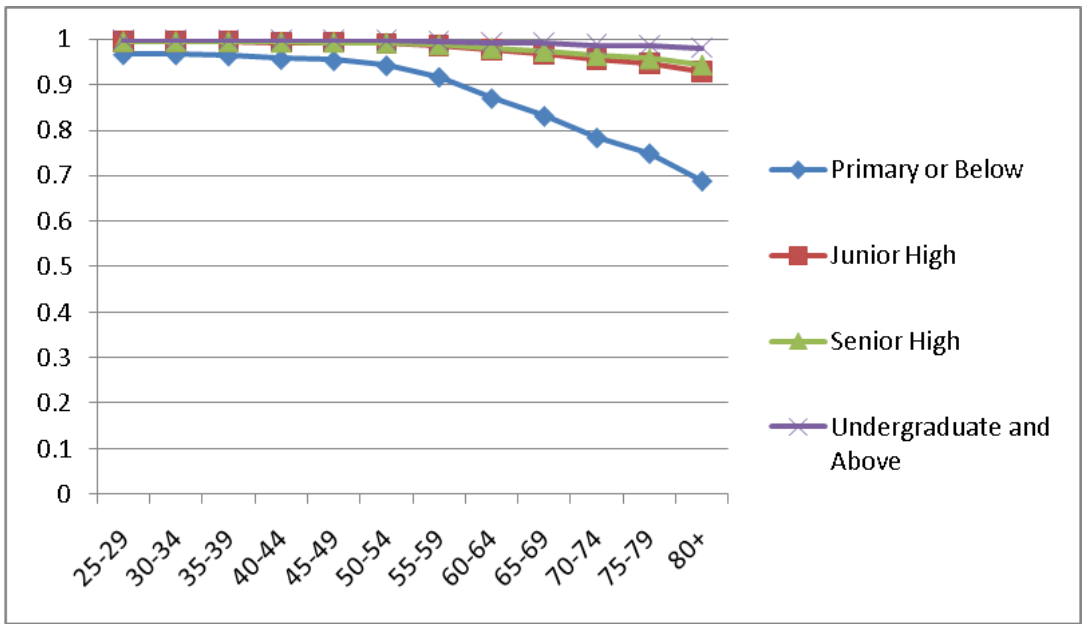


Figure 3(b). Predicted Probability of Reporting Good Health by Income Quartile, Rural China



Urban China. Figure 4(a) shows the predicted probability of reporting good health by educational group and age for urban Chinese. At all ages, people with education at primary level or below are markedly disadvantaged in terms of health. Unexpectedly, people in their 20s with primary/no education report worse health than do their older counterparts up through age 60. This finding may reflect growing importance of education for younger urban cohorts. It is also likely that, after China's 1986 compulsory education law came into effect, this educated group among the young may contain a large proportion of persons who could not continue education due to health problems. Health differentials by education begin to diverge among all education levels at age 60, but the declining trend in health with age is much sharper for urban respondents in the lowest educational level than for other respondents.

Figure 4(a). Predicted Probability of Reporting Good Health by Education Level, Urban China

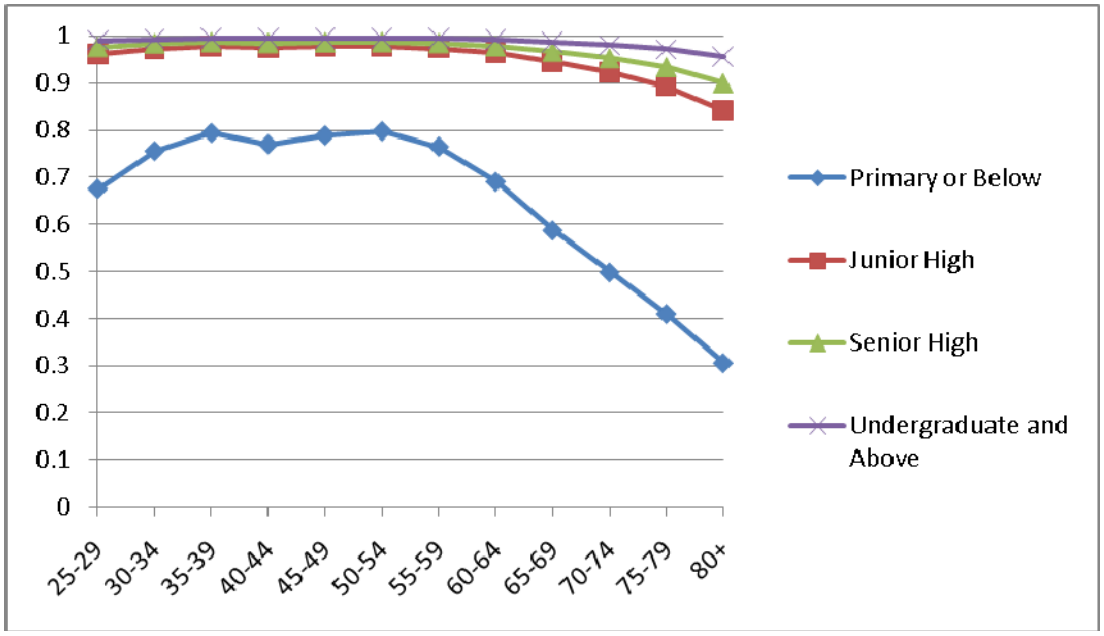
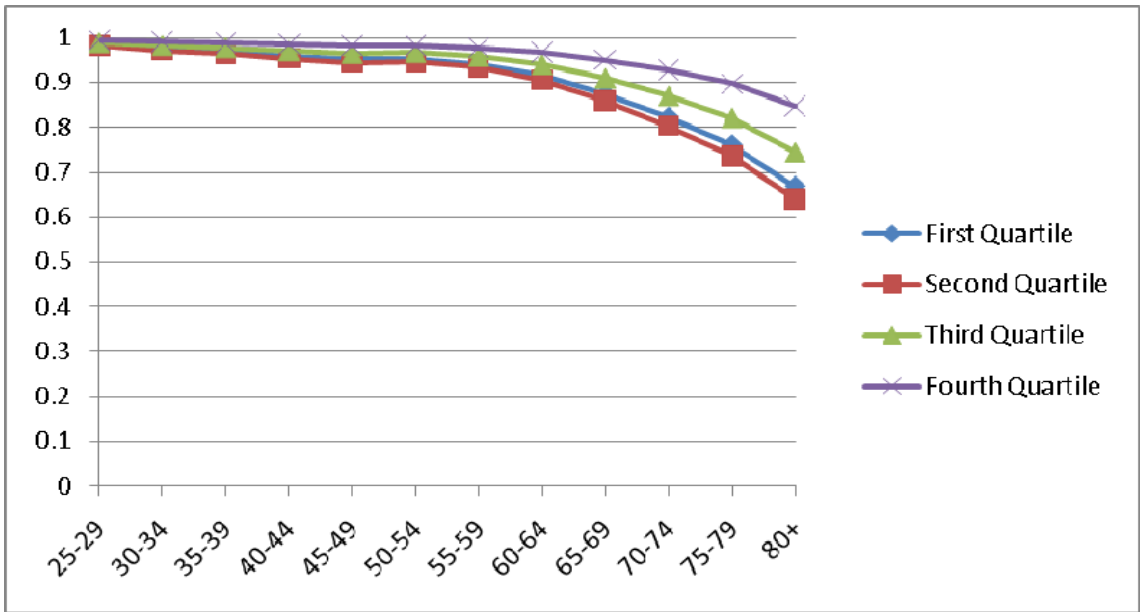


Figure 4(b) shows the predicted probability of reporting good health by income quartile and age for urban respondents. As is true for rural residents, health differentials by income are not large for youth and the middle-aged, but begin to diverge slightly around age 60. Health status does not differ much between persons in the first income quartile group and those in the second income quartile group, although it is expectedly lower for the former than for the latter.

Figure 4(b). Predicted Probability of Reporting Good Health by Income Level, Urban China



DISCUSSION AND CONCLUSION

This study adds to research on socioeconomic inequalities in health by establishing empirically, in the Chinese context, SES-health associations and age patterns of these associations. We find that income, education, occupation, and home ownership are all related to self-reported health in China. Somewhat consistent with our expectations, health differences by these measures of SES are of moderate sizes, with one exception: having little or no education is a particular health liability in general, but especially for urban Chinese. One notable finding is that health differentials by education above the junior high level are small in rural China. There are three alternative interpretations for this finding. The first interpretation is one of a threshold, as good health in rural areas may be associated mainly with basic literacy, beyond which there is little gain for additional education. The second interpretation is one of selective migration, as the healthier persons with some education from rural areas may have a higher likelihood of migration to urban areas than their less healthy counterparts. The third interpretation is one of overall physical conditions in rural China, which may mitigate differences due to individual-level SES factors due to its relative lack of modern medical facilities and demand for physical labor.

Our main finding is concerned with age patterns of SES-health differentials. Here, we find a pattern of divergence, instead of convergence, in health status among elderly Chinese by both education and income level. The protective effects of having at least a junior high education are particularly strong at older ages in China, and associations between self-rated health and earning above median income are also strongest among the elderly. Divergence at higher levels of education and income are observed but less pronounced.

These findings are consistent with our expectation that SES-health gaps do not necessarily converge with aging among Chinese. We suggest that social conditions such as political context, family forms, and collective cultural norms may make the divergence-converge pattern observed in the US context (House et al. 1994) less applicable in China. However, additional research is needed to understand better both the mechanisms as well as the processes through which the health is more strongly linked with income and education among elderly Chinese than among younger Chinese. The process may be due to cumulative advantage/disadvantage over the life course (Dannefer; 2003; Ferraro and Kelley-Moore 2003; Merton 1968), but it may also be caused by age-specific mechanisms through which SES affect health. For example, health-protective factors (social or biological) may be less accessible to the disadvantaged in old ages. It may also be that the social or biological mechanisms which counter the negative effects of low education and income among younger disadvantaged people lose potency at older ages.

We acknowledge several limitations to this study. First, the use of cross-sectional data prevents us from distinguishing the effects of aging and of birth cohort. Our findings reveal the greater importance of education and income for health among elderly Chinese than among their younger counterparts in 2005. Secondly, our study faces the problem of endogeneity, as we are not able to disentangle the direction of causality in the SES-health association. In other words, health could affect SES (as we suspect is true for a portion of young, lowly educated urban Chinese), or both health and SES could be caused by unobserved factors. Finally, our outcome measure is self-rated health, which is crudely measured dichotomously and thus and does not allow examination of gradations of good or poor health with SES. Because respondents are asked to choose between reporting "good health" or difficulties in completing daily tasks, it may be reasonable to consider this variable a measure of "no functional limitations" rather than of self-rated health as conventionally measured on a scale ranging from excellent to poor. To check the robustness of our results, we repeated our analyses using the outcome measure of "unable to perform daily tasks" and found a similar pattern of divergence in health status by education and income beyond age 60. We also performed separate analyses for women and men in both rural and urban samples and found no significant gender differences in SES-health association or age-variation.

Overall, our research lends support to the divergence hypothesis: SES differentials in health diverge in old ages in contemporary China. However, as we argued in this paper, the strength of SES-health associations is likely to vary across socio-political-economic contexts, as social conditions concerning familial relations, public health infrastructures, and economic structures may shape the extent to which SES and health associate generally and over the life course. By this logic, it is quite possible that our conclusion may not hold true elsewhere or even in future China. As we extend research on health and SES to other social setting, we will accumulate more knowledge about the relationships between SES and health and how these relationships vary over the life course in diverse social contexts.

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