



Neighborhood effects on health among migrants and natives in Shanghai, China

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ABSTRACT

This article compares health status between internal migrants and urban natives in Shanghai, China and examines neighborhood effects on self-rated health, chronic conditions, and psychological well-being. Migrants on average exhibit better health than natives in Shanghai. Neighborhood satisfaction, social cohesion and safety show strong association with health after controlling for individual factors. However, these associations tend to be weaker for migrants than for natives in Shanghai. Income, perceived stress, and neighborhood social cohesion jointly explain about 26% of the link between neighborhood satisfaction and an index of overall well-being. Among individual-level SES indicators, income is more strongly linked to self-rated health than education and occupation. Relative to SES indicators, perceived loneliness and stress are more directly associated with health. Study limitations and future research direction are discussed in the end.

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1. Introduction

The relationship between neighborhood contexts and individual well-being has long been recognized in the Western literature (Park et al, 1928; Shaw and McKay, 1969). Recent years have also witnessed a rapidly expanding literature documenting contextual effects of neighborhood characteristics on individual health outcomes using sophisticated multilevel statistical methods (Kawachi and Berkman, 2003). However, studies of neighborhood effects on health are rarely done in developing countries (Pickett and Pearl, 2001). It was predominantly Western settings that provided the ‘field laboratories’ for most of the research on the link between residential neighborhood and health of residents in the neighborhood (Harpham, 2009).

Multiple neighborhood domains have been linked to both physical and mental health outcomes (O’Campo et al., 2009). Neighborhood overall socioeconomic status (SES) influences residents’ health net of the effects of an individual resident’s SES because place-based SES, typically measured by concentrated

economic and human capital, reflects residents’ exposure to different amounts of health-promoting resources such as social capital and neighborhood amenities and health-detrimental hazards such as crime and disorder (Haan et al., 1987; Robert, 1998; Ross and Mirowsky, 2009; Sampson et al., 1997; Wen et al., 2003). Neighborhood physical and built environments, manifested in variables such as air quality (Geelen et al., 2009; Isakov et al., 2009), spatial proximity to solid waste (Downey, 2006; Yang et al., 2008), and neighborhood noise (Balfour and Kaplan, 2002; Wen et al., 2006) can directly affect residents’ health. The positive sides of physical design of neighborhoods, such as neighborhood aesthetics (e.g., levels of quality of green areas) and amenities (e.g., ease of access to park, library and gym) are often linked to higher levels of physical activity (Patterson and Chapman, 2004; Wen and Zhang, 2009) and mental health (Nielsen and Hansen, 2007), thereby indirectly promoting health. In addition, neighborhood social capital or social cohesion, which refers to social relational resources of a physically bounded area characterized by some degree of homogeneity, typically manifested in community solidarity and norms of reciprocity, seems to improve health by increasing community members’ social contact, support, and psychological well-being (O’Campo et al., 2009) and by promoting healthy lifestyles and health-beneficial innovative information (Kawachi and Berkman, 2000; Wen et al., 2007). Taking various

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aspects of neighborhood features into account, perceived neighborhood satisfaction is a comprehensive indicator of perceived neighborhood quality, which is found to have a stronger impact on health than objectively measured neighborhood SES (Wen et al., 2006). According to the social cognitive perspectives (Bandura, 2001), one important pathway from neighborhood satisfaction to residents' health is via personal factors such as enhanced self-efficacy (Morris et al., 2008) and reduced stress (Wen et al., 2006). It is also possible that better neighborhoods are linked to better labor market outcomes such that the neighborhood satisfaction and health link is partly mediated by enhanced individual SES (Robert and House, 2000). Moreover, contextual mechanisms likely also operate for neighborhood effects, since ecological features are typically intertwined and constantly interacting in dynamic and complex ways. It thus follows that neighborhood satisfaction matters to health partly because it enhances individual mental well-being and life circumstances and partly because it reflects perceived quality of neighborhood social, physical and service environments. These theoretical perspectives, albeit primarily originated from Western settings, may also apply to developing settings marked with prominent spatial inequalities in health-related resources and hazards.

China, a rapidly developing country with growing global influence, provides a unique setting to test the empirical association between neighborhood contexts and health and explore the external validity of theoretical perspectives with regard to the health-place link. It is well known that China has experienced sweeping social, economic, and cultural transformations since the beginning of the economic reforms in the late 1970s implemented to restore China's financial status and lift the nation out of destitution (Quach and Anderson, 2008). Concomitant with enormous economic growth and rising political power in the world system during this period, income inequality was intensified (Yang, 1999), spatial inequalities in socioeconomic resources subsequently worsened (Krugman, 1999; Ling, 2009), and health disparities across different strata of the social hierarchy widened in reform-era China (Luo and Wen, 2002; Wen and Wang, 2009). Despite the emergence of empirical work documenting growing health disparities (Chen and Meltzer, 2008; Ling, 2009; Yu, 2008), most studies focus on the individual-level SES and health link, whereas few writers have addressed whether neighborhood contexts constitute an additional key dimension of social contexts contributing to health disparities in China.

Nonetheless, limited evidence points to important neighborhood influences on individual health and mortality in China's urban and rural areas (Ali et al., 2007; Luo and Wen, 2002; Zimmer et al., 2007). These studies share a common emphasis on neighborhood developmental characteristics such as socioeconomic resources, healthcare services, and amenities while omitting local social relational resources and a general extent of neighborhood satisfaction. The body of the extant literature regarding neighborhood effects on health in China, consisting of not more than a dozen or so relevant studies, is far from adequate for gaining a thorough understanding of the health and place link in China.

Parallel to the rapid economic development and dynamic socioeconomic re-stratification processes in the Chinese society is the unprecedented rural-to-urban and, to a lesser extent, urban-to-urban population movement in the last two decades. Through the unique Household Registration System (*hukou*) in China, passed by the Chinese Congress in 1958, rural-to-urban migration was tightly restricted. Meanwhile, urban-to-urban migration was also difficult and unusual for the subsequent two decades. Starting from the late 1970s, the widespread economic reform, the fruitful market transition, and the growing inequalities across regions and between the rich and the poor in China jointly led to

much lessened governmental restrictions on internal population migration and an enormous growth of the size of migrant population in China. According to the 2000 census in China, there were 121.07 million internal migrants and among them, more than 70 percent were rural-to-urban migrants, equivalent to approximately 85 million individuals (Xiang, 2003). Given the sheer size of this population, it is conceivable that migrant health plays an increasingly important role in China's human and economic development.

Based on the western migrant health literature, migrants are generally found to be healthier compared to their co-ethnic natives in the receiving society (LaVeist, 2002). The well-known Hispanic epidemiological paradox found in the USA (Franzini et al., 2002), which refers to the phenomenon that mortality rates among Hispanics tend to be lower than those among other racial/ethnic groups despite their lower SES, exemplifies this migrant health pattern. However, the generalizability of this pattern should not be assumed in other settings as how migrants fare in the receiving community is sensitively responsive to the local socioeconomic, political, and cultural contexts. In fact, a global picture of migrant health is more mixed regarding whether migrants have a health advantage or disadvantage compared to natives in the receiving community (McKay et al., 2003). It is conceivable that there are increased health risks related to migration. For example, challenging new socio-cultural-political environment, harsh contexts of reception, truncated social networks and felt loneliness, and institutional barriers to health-protective services including healthcare delivery may all cause psychological distress unique to migrants including internal migrants in China (Li et al., 2006a, 2006b; Wen and Wang, 2009; Xiang, 2003). These increased health risks are common across all types of migration given the shared uprooting nature of migration, although cross-national migration may be more challenging compared to internal migrants due to generally greater migration distance and stronger legal, structural and cultural barriers in the receiving community. Hence, from the causation perspective, migration is concomitant with increased health risks. At the same time, self-selection is also likely at work in voluntary migration given that healthier individuals are more likely to migrate and migrants afflicted with debilitating health conditions often return to the home selecting themselves out of the urban resident pool. Therefore, the selection hypothesis predicts that migrants are generally healthier than natives as long as their residential tenure in the receiving community is not too extended.

To the present day, anecdotal accounts of health problems, such as reproductive health and occupational hazards to which migrants in urban China are particularly vulnerable (Xiang, 2003), are abundant; yet scientific investigation comparing migrants with natives in a wide range of health outcomes is lacking. Published studies regarding health status and health-risk behaviors among Chinese internal migrants and urban natives do not provide comprehensive data on health disparities between migrants and natives in urban China. Indeed, health disparity and social determinants of health research in China remains in its nascent stage. Little work has examined how larger social contexts beyond intra-personal social factors may affect migrant health in China. With few exceptions (Wen and Wang, 2009; Xiang, 2005), quantitative and comparative research on neighborhood effects on health among migrants in urban China is virtually non-existent. Hence, there is not much China-based evidence we can draw upon to devise our hypotheses regarding neighborhood effects on health for migrants in urban China. Presumably, neighborhood environment should matter for migrant health in a similar way as for native residents' health; yet the magnitude of neighborhood effects on health may differ according to the individual's other characteristics.

Given this background, this study has three aims. First, we compare migrants with native residents in Shanghai in terms of their self-rated health, chronic conditions, and mental well-being to get a general picture of how migrants fare. We hypothesize that migrants are generally healthier than natives in Shanghai because internal migrants in China are self-selected into or out of migration based on many considerations including individuals' baseline health status and also because most of these migrants are first-generation, voluntary, and temporary in the cities, not well assimilated and acculturated to the receiving community. Second, we examine neighborhood effects on individual-level health after SES and psychosocial factors are controlled for. Based on theory and evidence from Western settings, we hypothesize that neighborhood contexts are independently linked to individuals' health net of other health-related individual characteristics. Third, we explore whether neighborhood effects vary according to an individual's migrant status. Given that migrants, who lack personal resources to garner health benefits, may be more sensitive to public goods than urban natives, we hypothesize that neighborhood effects, if observed, are stronger for migrants than for natives. Fourth, we test whether the link between neighborhood satisfaction and a general index of well-being is mediated by perceived neighborhood physical and social environment and individual factors. Considering previous findings in Western settings, we expect that these hypothesized mediators can explain a portion of the neighborhood satisfaction effect, although the magnitude of this explanatory power cannot be determined *a priori*.

2. Methods

2.1. Data

Data used in this study were from the 2008 Shanghai Health and Migration Study, jointly sponsored by Chinese University of Hong Kong, Fudan University, and University of Utah. The study was approved by the survey and behavioral research ethics committee at the Chinese University of Hong Kong. The study collected information on a range of personal, family, and neighborhood characteristics that potentially impact physical and mental health and health behaviors among young and middle-aged migrants as well as local urban natives in Shanghai, China. The data were drawn from five districts in Shanghai with high concentrations of migrants. In each district, four neighborhoods were randomly chosen. Around 25 households in each neighborhood were randomly sampled and 1 person between the age of 18 and 64 in each household was interviewed. The analytical sample included 557 local residents (52.30%) and 508 migrants (47.70%). The majority of the migrants were from rural areas in China's inland provinces with the rest from other urban areas.

2.2. Measures

Three health outcomes were examined in this study. *Self-rated health* was measured by responses to the question "Overall would you rate your health as excellent, very good, good, fair, or poor?" This variable was dichotomized into excellent/very good/good versus fair/poor in the analysis. A measure of *chronic conditions* was constructed based on self-reports of the following conditions: asthma, diabetes, high blood pressure, high cholesterol, heart disease, stroke, arthritis, epilepsy, cancer, hepatitis A and B, and sexually transmitted disease. This variable was denoted '1' if the respondent reported at least one of the chronic conditions asked.

Psychological well-being was assessed by a scale consisting of 6 items: "In the past month, did you ever feel nervous, hopeless, anxious, depressed, worthless, or that everything was an effort?" The scale was valued as the mean scores of the six items and had acceptable internal consistency reliability ($\alpha=0.81$). Based on the three health outcomes, a dichotomous index of overall well-being was constructed and coded '1' if the respondent reported excellent or good health, no chronic conditions and higher-than-median psychological well-being.

There are three sets of independent variables. The first set indicates the respondent's SES. *Educational attainment* was categorized into 7 levels including "no formal schooling" (1), "elementary school" (2), "middle school" (3), "high school" (4), "professional school" (5), "associate degree" (6), "bachelor or higher" (7). *Annual individual income* was continuously measured with its quartiles used in this analysis. Job stability was tapped by a dichotomous indicator of whether the respondent had a *permanent job* or not. Housing condition was captured by the total number of *home amenities* available in the house including bathroom, kitchen, faucet water, gas, land telephone, television, shower, and computers ($\alpha=0.81$).

The second set of independent variables measures the respondent's psychosocial factors. *Perceived stress* was assessed following Cohen's perceived stress scale modified according to the data (Cohen et al., 1983). Eight out of the original 14 items were selected to construct the Chinese version of perceived stress scale because they fit better with the latent factor ($\alpha=0.89$). These items ask that in the last month, how often the respondent has (1) dealt successfully with day to day problems and annoyances, (2) felt that he/she was effectively coping with important changes that were occurring in his/her life, (3) felt confident about his/her ability to handle his/her personal problems, (4) felt that things were going his/her way, (5) been able to control irritations in his/her life, (6) felt that he/she was on top of things, (7) found himself/herself thinking about things that he/she has to accomplish, and (8) been able to control the way he/she spends his/her time. The response categories include 'never' (0), 'occasionally' (1), 'sometimes' (2), 'often' (3), and 'always' (4). The scale was constructed using mean scores of the items. *Perceived loneliness* was assessed by the question "Do you often feel lonely?" The response categories include 'often' (4), 'sometimes' (3), rarely (2), and never (1). *Optimism* was captured by respondents' agreement to the statement "When things are uncertain, you often believe the best results will happen?" with response categories covering 'strongly agree' (4), 'somewhat agree' (3), 'somewhat disagree' (2), and 'strongly disagree' (1). *Social network size* was indicated by whether the respondent had 10 or more close friends or relatives in Shanghai. *Perceived social support* was measured by a modified version of Cohen's Interpersonal Support Evaluation List (ISEL) scale, which was designed to assess perceived availability of support (Cohen and Hoberman, 1983; Cohen et al., 1985). Out of the 12-item version of the ISEL scale, 9 were included in the questionnaire with 7 of them used to construct the Chinese version of perceived social support used in this study. The 7 items fit better with the data than the excluded items ($\alpha=0.81$). Respondents were asked to indicate the extent of their agreement to the following statements: (1) "If I wanted to go on a trip for a day (for example, to the country or mountains), I would have a hard time finding someone to go with me;" (2) "If I were sick, I could easily find someone to help me with my daily chores;" (3) "If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me;" (4) "When I need suggestions on how to deal with a personal problem, I know someone I can turn to;" (5) "If I wanted to have lunch with someone, I could easily find someone to join me;" (6) "If I was stranded 10 miles from home, there is someone I could call who

could come and get me;" and (7) "If I needed some help in moving to a new house or apartment, I would have a hard time finding someone to help me." The response categories include 'strongly agree' (4), 'somewhat agree' (3), 'somewhat disagree' (2), and 'strongly disagree' (1).

The third set of independent variables intends to capture macro-level neighborhood contexts based on self-reported perceptions regarding several aspects of the neighborhood the respondent currently lives in. *Neighborhood safety* was tapped by a question asking whether the respondent felt safe living in the neighborhood with responses dichotomized into 'always or mostly safe' (1) and 'sometimes or never safe' (0). *Neighborhood social cohesion* was measured by a scale ($\alpha=0.81$) constructed using principal component factor analysis based on respondents' agreement with the following statements represented by a five-item Likert scale: (1) "People in this neighborhood are willing to help each other;" (2) "People in this neighborhood get along well with each other;" (3) "People in this neighborhood are trustworthy;" and (4) "Most people in this neighborhood know each other." Higher values in this scale indicate higher levels of neighborhood social cohesion. *Neighborhood physical environment* was measured by summing up values of three dichotomous variables asking about air quality (good versus fair/bad), noise level (good versus fair/bad), and presence of industrious factories (yes or no) within a 15 min walking distance from home ($\alpha=0.65$). *Neighborhood amenities* was indicated by the total number of facilities available in the neighborhood including library, movie theater, gym, exercise facility in the park, bus/subway stop, restaurant/bar/food cart, elementary/middle/high school, and college/university ($\alpha=0.86$). *Neighborhood satisfaction* was tapped by responses to a question asking how much the respondent likes his/her neighborhood with response categories ranging from 'dislike it' (1) to 'like it very much' (4).

2.3. Statistical methods

Two-sided *t*-tests and *chi*-square tests were performed to compare internal migrants with urban natives in Shanghai in terms of variables examined in this study. For the two dichotomous outcomes, self-rated health and chronic conditions, logistic regression analyses were performed to examine our research questions. Ordinary least square regression models were fit to test the hypotheses regarding the continuously measured psychological well-being. Missing values in the independent variables were imputed using multiple imputation method (Royston, 2005).

3. Results

Table 1 illustrates sample statistics of the dependent and independent variables included in the analysis, stratified by migrant status. These statistics describe the crude patterns without statistically controlling for any confounders. Migrants' physical health, captured by self-rated health and chronic conditions, is significantly better than that of natives in Shanghai, whereas the native have a slight advantage in psychological well-being compared to migrants. Not surprisingly, natives' income, job stability, and housing condition are overwhelmingly better than that of migrants. Migrants' average educational level is higher than natives' because the migrant group includes urban-to-urban migrants whose educational attainment is generally high. If we exclude urban-to-urban migrants, then natives' education is significantly

Table 1
Sample Statistics by migrant status.

	Native residents in Shanghai	Migrants in Shanghai
Health Status		
Self-rated health (excellent/good; %)	52.59***	66.60***
Chronic conditions (yes; %)	36.54***	15.88***
Psychological well-being (mean)	3.48*	3.43*
Socioeconomic Status		
Educational attainment (mean)	3.74***	4.56***
Annual individual income (mean)	2.62***	2.29***
Permanent job (yes; %)	81.82***	50.20***
House amenities (mean)	7.59***	5.88***
Psychosocial Factors		
Perceived stress (mean)	2.35	2.40
Feeling lonely (mean)	1.74***	2.00***
Optimism (mean)	2.73	2.74
Social network size (10 or more close friends/relatives;%)	18.72***	7.65***
Perceived social support (mean)	1.60***	1.69***
Neighborhood Characteristics		
Neighborhood safety (mean)	0.84	0.87
Neighborhood physical environment (mean)	0.99	0.95
Neighborhood amenities (mean)	4.71***	4.09***
Neighborhood social cohesion (mean)	1.02	1.05
Neighborhood satisfaction (mean)	2.69	2.65

N=1,065; *t*-tests and *chi*-square tests for group differences.

* significant at 10%; ** significant at 5%; and *** significant at 1%.

higher than migrants from the rural area ($p < 0.0001$). There are remarkable disparities between migrants and natives in three psychosocial factors including perceived loneliness, social network size, and perceived social support. Migrants feel lonelier and their network sizes are smaller; yet at the same time, they enjoy higher levels of perceived social support suggesting that the strength of migrants' networks might be greater. As to neighborhood characteristics, the two groups only differ in neighborhood amenities indicating that neighborhoods more concentrated with migrants have fewer neighborhood resources.

Tables 2 through 4 present analytical results from regression models of the three health outcomes. For each of the three health outcomes, five regression models were fit with the baseline model only including age, gender, and migrant status. Based on the baseline model, the second model adds SES variables; the third model adds psychosocial factors; and the fourth model adds neighborhood variables. The final model includes all significant main effects observed in the first 3 models with interaction effects between migrant status and neighborhood factors, if any, also included.

Consistent with the crude statistics, migrants have higher levels of self-rated health and lower levels of chronic conditions than natives. In contrast to sample statistics shown in Table 1, migrants feature significant advantage in psychological well-being after socioeconomic, psychosocial, and neighborhood covariates are controlled for (see Model 5, Table 4). In fact, migrant status remains a significant factor in the final models of all three health outcomes. Comparing the three final models for the three outcomes (Model 5 in Tables 2–4), SES factors are not as strongly associated with health as we expected. Only individual annual income emerges as significant among all SES factors and only for self-rated health. Among psychosocial factors, perceived stress and loneliness stick out consistently associated with health outcomes although the effect of loneliness is rendered insignificant with individual SES and neighborhood factors

Table 2
Odds ratios of socio-demographic factors on self-rated excellent or good health.

	(1)	(2)	(3)	(4)	(5)
Demographic Variables					
Age	0.95*** (0.94–0.97)	0.96*** (0.95–0.97)	0.95*** (0.94–0.97)	0.95*** (0.94–0.96)	0.95*** (0.94–0.96)
Male	1.45*** (1.12–1.89)	1.31* (0.99–1.72)	1.38** (1.05–1.81)	1.54*** (1.18–2.02)	1.35** (1.06–1.72)
Migrants	1.32** (1.01–1.73)	1.64*** (1.17–2.28)	1.56*** (1.17–2.07)	1.36*** (1.10–1.69)	1.52*** (1.15–2.00)
Socioeconomic Status					
Educational attainment		1.06 (0.94–1.19)			
Permanent job		1.09 (0.81–1.47)			
Individual annual income		1.22*** (1.07–1.41)			1.19** (1.01–1.40)
Household amenities		1.02 (0.93–1.11)			
Psychosocial Factors					
Perceived stress			0.49*** (0.37–0.65)		0.42*** (0.32–0.57)
Feeling lonely			0.85** (0.73–1.00)		
Optimism			1.14 (0.93–1.38)		
Social network size			1.29 (0.87–1.92)		
Perceived social support			0.75** (0.58–0.97)		
Neighborhood Features					
Neighborhood safety				1.22 (0.73–2.06)	
Neighborhood physical environment				1.18 (0.87–1.59)	
Neighborhood amenities				1.03 (0.94–1.12)	
Neighborhood social cohesion				1.07 (0.93–1.22)	
Neighborhood satisfaction				1.44*** (1.13–1.83)	1.54*** (1.24–1.92)

N=1,065; 95% confidence intervals in parentheses.

* significant at 10%; ** significant at 5%; and *** significant at 1%.

simultaneously examined for self-rated health. Perceived social support seems beneficial for self-rated health (Table 2) but not for chronic conditions or psychological well-being. Different neighborhood factors exhibit significant influences for different health outcomes. For self-rated health, neighborhood satisfaction—a general measure of neighborhood overall quality and perceptions—shows significant and positive association. For chronic conditions, neighborhood social cohesion is particularly protective. And for psychological well-being, neighborhood safety matters most with a salient and promoting effect. Moreover, significant interaction effects between neighborhood factors and migrant status are detected, indicating the effects of neighborhood social cohesion and safety are significantly weaker for migrants on chronic conditions and psychological well-being, respectively.

Table 5 presents results of exploring the potential mediators of the association of neighborhood satisfaction with general well-being. We ran a series of models beginning with the baseline model that includes age, male, migrant status, and neighborhood satisfaction. Subsequent models separately add potential mediators to the baseline model. Among the models we ran, we selected five models to present significant results in this table. Model 1 is the baseline model. Models 2–4 add individual annual income, perceived stress, and neighborhood social cohesion to the baseline model, respectively. Model 5 simultaneously examines

the joint explanatory power of these three variables on the neighborhood satisfaction effect. Other hypothesized mediators received little empirical support from these analyses.

The coefficient of neighborhood satisfaction on overall well-being remains positive and significant across the models. However, the magnitude of this coefficient did get reduced when the three explanatory variables were each added to the model. The last row of Table 5 shows percent change in the coefficient of neighborhood satisfaction in the baseline model, with 5.3%, 7.9%, and 21.1% of the neighborhood satisfaction effect attributable to individual annual income, perceived stress, and neighborhood social cohesion, respectively. All together, these three variables help explain 26.3% of the neighborhood satisfaction effect.

4. Discussion

Based on recently collected cross-sectional data, this study examines comparative patterns in self-rated health, chronic conditions, and psychological well-being among internal migrants and urban natives in Shanghai and further explores neighborhood effects on these health outcomes after SES and psychosocial factors are controlled for. Three hypotheses guided our empirical work.

Table 3
Odds Ratios of socio-demographic factors on reporting chronic conditions.

	(1)	(2)	(3)	(4)	(5)
Demographic Variables					
Age	1.09*** (1.07–1.11)	1.09*** (1.07–1.11)	1.09*** (1.07–1.11)	1.09*** (1.08–1.10)	1.10*** (1.09–1.10)
Male	1.19 (0.88–1.63)	1.15 (0.83–1.59)	1.24 (0.90–1.70)	1.19 (0.92–1.54)	1.25 (0.92–1.70)
Migrants	0.58*** (0.42–0.81)	0.61** (0.41–0.91)	0.54*** (0.38–0.76)	0.60*** (0.43–0.82)	0.42*** (0.28–0.62)
Socioeconomic Status					
Educational attainment		1.05 (0.91–1.20)			
Permanent job		1.15 (0.80–1.66)			
Individual annual income		0.99 (0.84–1.17)			
Household amenities		0.97 (0.88–1.08)			
Psychosocial Factors					
Perceived stress			1.45** (1.04–2.03)		1.44** (1.09–1.91)
Feeling lonely			1.30*** (1.08–1.56)		1.32*** (1.09–1.59)
Optimism			1.14 (0.91–1.44)		
Social network size			1.40 (0.91–2.16)		
Perceived social support			1.10 (0.82–1.48)		
Neighborhood Features					
Neighborhood safety				0.81 (0.56–1.19)	
Neighborhood physical environment				1.01 (0.81–1.27)	
Neighborhood amenities				1.02 (0.96–1.08)	
Neighborhood social cohesion				0.89*** (0.83–0.96)	0.84*** (0.76–0.92)
Neighborhood satisfaction				0.93 (0.75–1.17)	
Migrants × Neighborhood satisfaction					1.27** (1.05–1.53)

N=1,065; 95% confidence intervals in parentheses.

* significant at 10%; ** significant at 5%; and *** significant at 1%.

The data fully supports our first hypothesis that migrants on average have a health advantage than natives. This finding is in line with a general pattern of migrant health found among international migrants in the USA (LaVeist, 2002). This finding also seems consistent with the health selection hypothesis emphasizing that migrants are healthier because healthier individuals are more likely to be self-selected into migration holding other factors constant. The average age of migrants in our sample was 34 and their average length of stay in Shanghai was 7 years. It is possible that with migrants' residential tenure in the receiving community increases, stressors particularly afflicting migrants in Shanghai, such as structural barriers and discrimination (Wen and Wang, 2009), may take a greater toll on their health such that migrants as a whole may feature less advantage or even a disadvantage in health over time. In other words, our results suggest that at least in the initial stages of migration, migrants, albeit socioeconomically disadvantaged compared to urban natives, enjoy better health, perhaps largely thanks to a health selection process that influences the composition of the migrant population to begin with. Other than the selection explanation, particularly relevant to mental health, migrants may also be advantaged insofar as many of them still compare their life circumstances with those of fellow

villagers and thus enjoy a relative advantage rather than relative deprivation. This is the core statement of the achievement hypothesis for migrant mental health highlighting lower levels of stress associated with lower achievement expectations among migrants compared to natives (Kuo, 1976). Whether this health advantage for migrants will dwindle with increased time spent in urban new communities remains an unanswered question.

The results also support our second hypothesis that neighborhood contexts matter for health independent of other intra-personal socioeconomic and psychosocial factors. For each of the three health outcomes we examined at least one aspect of neighborhood environment exhibited significant association. Self-rated health seemed to benefit from a stronger sense of neighborhood satisfaction; higher neighborhood social cohesion was linked to lower likelihood of reporting chronic conditions; and neighborhood safety clearly corresponded to better mental health. While it is not known why different aspects of neighborhood environment matter for different health outcomes, it is an important message in its own right that where a person lives matters for his or her health in China; and therefore, health impacts of macro-level contexts are substantial begging further investigation and more policy attention.

Table 4
OLS Coefficients of Socio-demographic Factors on Psychological Well-being.

	(1)	(2)	(3)	(4)	(5)
Demographic Variables					
Age	0.00 (-0.00-0.01)	0.00 (-0.00-0.01)	0.00 (-0.00-0.01)	0.00 (-0.00-0.01)	0.00 (-0.00-0.01)
Male	0.03 (-0.04-0.09)	0.03 (-0.06-0.12)	-0.01 (-0.08-0.05)	0.03 (-0.06-0.12)	-0.01 (-0.07-0.06)
Migrants	-0.04 (-0.10-0.03)	-0.04 (-0.15-0.07)	0.02 (-0.05-0.09)	-0.03 (-0.12-0.06)	0.19** (0.05-0.32)
Socioeconomic Status					
Educational attainment		-0.02 (-0.06-0.03)			
Permanent job		-0.07* (-0.15-0.01)			
Individual annual income		0.03** (0.01-0.06)			
Household amenities		0.02 (-0.03-0.07)			
Psychosocial Factors					
Perceived stress			-0.39*** (-0.48-0.30)		-0.37*** (-0.47-0.28)
Feeling lonely			-0.19*** (-0.24-0.15)		-0.19*** (-0.23-0.14)
Optimism			-0.02 (-0.07-0.02)		
Social network size			0.01 (-0.09-0.12)		
Perceived social support			0.03 (-0.04-0.11)		
Neighborhood Features					
Neighborhood safety				0.13** (0.00-0.26)	0.15** (0.02-0.27)
Neighborhood physical environment				0.01 (-0.10-0.11)	
Neighborhood amenities				0.01 (-0.02-0.04)	
Neighborhood social cohesion				0.02 (-0.02-0.06)	
Neighborhood satisfaction				0.00 (-0.05-0.05)	
Migrants × Neighborhood safety					-0.19** (-0.34-0.04)
Constant	3.36*** (3.22-3.50)	3.32*** (3.06-3.58)	4.66*** (4.30-5.01)	3.17*** (2.99-3.35)	4.47*** (4.15-4.79)

N=1,065; 95% confidence intervals in parentheses.

* significant at 10%; ** significant at 5%; *** and significant at 1%.

Table 5
Coefficients from Logistic Regression of Neighborhood Satisfaction and Mediatin Factors on Overall Well-being.

	(1)	(2)	(3)	(4)	(5)
Age	-0.03*** (-0.04 -0.01)	-0.03*** (-0.04-0.01)	-0.03*** (-0.05-0.02)	-0.03*** (-0.05-0.02)	-0.03*** (-0.05-0.02)
Male	0.44*** (0.19-0.69)	0.36*** (0.09-0.63)	0.39*** (0.20-0.58)	0.44*** (0.15-0.73)	0.34*** (0.10-0.58)
Migrants	0.31** (0.06-0.56)	0.38*** (0.11-0.64)	0.39*** (0.12-0.65)	0.29** (0.00-0.57)	0.40*** (0.12-0.69)
Neighborhood satisfaction	0.38*** (0.13-0.63)	0.36*** (0.12-0.60)	0.35*** (0.07-0.63)	0.30** (0.04-0.55)	0.28* (-0.02-0.57)
Individual annual income		0.17** (0.04-0.30)			0.09 (-0.04-0.23)
Perceived stress			-1.75*** (-2.18-1.32)		-1.70*** (-2.14-1.27)
Neighborhood social cohesion				0.19** (0.04-0.34)	0.16** (0.03-0.29)
% change in the coefficient of neighborhood satisfaction		-5.3%	-7.9%	-21.1%	-26.3%

N=1065; 95% confidence intervals in parentheses.

* significant at 10%; ** significant at 5%; and *** significant at 1%.

Nonetheless, contrary to our third hypothesis, neighborhood seems to matter less for migrants in our sample. We originally hypothesized that because migrants have limited resources on a personal level, they should be more affected by external environmental factors such as neighborhood socio-physical features. However, the results show that neighborhood safety and social cohesion are health-promoting resources only for natives rather than migrants in Shanghai. It is possible that with higher levels of spatial mobility, migrants in urban China tend to be less attached to their current neighborhoods. They are temporary or so-called “floating” populations in the cities and thus may not have been sufficiently exposed to their current neighborhood environment to have a neighborhood effect manifested. While it may be true that disadvantaged individuals are more influenced by external public resources including neighborhood environment, it also follows that it takes time for environmental influence on health to become visible. Assuming neighborhood environment is indeed influential for health, longer exposure should contribute to stronger influence.

As to our fourth hypothesis, with respect to the intervening role individual and neighborhood factors played in the neighborhood satisfaction and well-being link, neighborhood social cohesion, rather than the physical aspects of the neighborhood design or individual-level factors, appeared to be the most salient intervening factor. One implication of this finding is that the appropriate policy is to address the social organization of local neighborhoods, including the provision of opportunities such as community centers or local activities for neighbors to socially interact, for the purpose of enhancing residents’ overall well-being. Traditionally, neighbors’ knowing each other and getting together on a regular basis is not uncommon in China. However, with China becoming more westernized and industrialized, neighborhoods in China’s large cities like Shanghai and Beijing have become less close-knit as a result of modern yet alienating neighborhood design and higher residential mobility. It should be kept in mind though that it is costly in the long run if economic development is achieved at the expense of social organizations at the local level.

This study also found several noteworthy patterns for several intra-personal factors. We held *a priori* expectation that socio-economic factors like income and education should have strong impacts on health based on the vast literature on the SES-health link from Western societies as well as developing countries including China (Chen and Meltzer, 2008; Feinstein, 1993; Luo and Wen, 2002). However, the observed effect sizes for SES factors especially the non-income ones are surprisingly weak. Other than income for self-rated health, none of the SES variables survived multivariate modeling when other hypothesized health factors are simultaneously examined. For chronic conditions, the SES variables were not significant even before psychosocial factors were added to the baseline model, which only controlled for age, gender and migrant status. Among all the SES variables examined in this study, income was clearly a stronger predictor of health than education, permanent job, and living condition. That income has a stronger health impact than other traditionally highlighted aspects of SES may have something to do with the close link between income and consumption inequalities in China, characteristic of many developing societies where the safety net is less comprehensive and the credit industry is less developed. In this analysis, income remained as a significant correlate in the final model of self-rated health and was significant for psychological well-being without psychosocial factors included in the model. However, income failed to get into the final model for psychological well-being because the income effect was entirely explained away by perceived stress and loneliness—the two psychosocial factors

showing consistent and injurious health impact (data not shown but available from the authors by request). Therefore, among intra-personal socioeconomic and psychosocial factors, income matters more than other SES factors but perceived stress and loneliness seem to have more direct and powerful influence on physical and mental health.

Another contribution of this study is to provide test results on external validity and internal consistency reliability in the Chinese context of some health instruments well-validated in the Western settings. For example, the perceived stress scale used in this study included 7 out of the original 14 items of Cohen’s scale (Cohen et al., 1985) because the other 7 items did not fit well. It is inevitable that some established scales functioning well in one setting need adjustments to effectively and efficiently capture the same construct in another culturally different setting. To take advantage of well-developed instruments in the Western literature to measure health and related constructs in China, more psychometric work clearly needs to be done.

Several limitations of this study are noteworthy. First and foremost, this is a cross-sectional study, so only associations are reported here. Second, this study was conducted in Shanghai. While being one of the major migrant-receiving cities in China, Shanghai is by no means representative of all migrant-receiving cities. As such, the results may not be applicable to other areas in China. Third, subjective health assessment was used to capture health, leading to inevitable response bias and reverse causation. That said, self-rated health is a well-validated health measure (Idler and Benyamini, 1997) that has been used and validated in multiple settings including China (Cheng et al., 2007; Luo and Wen, 2002; Salomon et al., 2004).

From a social determinant of health point of view, a take-home message from this study is that distant neighborhood factors as well as proximate intra-personal psychological factors are strongly correlated to both physical and mental health. More research should be conducted to explore the health and place link among internal migrants and natives in urban China. Future research, equipped with longitudinal and nationally representative data, collecting both objective and subjective health information and social environmental factors, would presumably advance the field by making notable discoveries.

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