研究生学术创新奖申报材料

社会学院 张少哲 2015101170002

材料清单：

一、SSCI 论文

Zhang SZ, Xiang W. Income gradient in health-related quality of life — the role of social networking time. International Journal for Equity in Health. 2019; 18:44.

二、CSSCI 论文

张少哲，杨敏。美好生活视域下城市青少年健康的影响因素研究—基于文化资本理论的视角，《哈尔滨工业大学学报（社会科学版）》，2019年第 1 期。

differences could have adverse psychosocial consequences [13]. People with lower relative income experience higher risks of mental health disorders, including depression and anxiety [14].

Among all the factors linking income and health, the effect of social networks attracts the most attention. However, the measurements of social networks vary across studies, and social networks are often conceptualized in terms of both functions and structures. The functional conceptualizations include supportive social contacts [15] and the availability of support [16]. As a main source of social support, social networks are considered protective factors of health. The structural aspects of social networks encompass the social ties in which people are embedded [17] and the pathways of network influence [18]. Smith and Christakis [19] reviewed the differences between social support and social networks and found that studies on social support focus on the number of contacts and the helpfulness of those contacts, while analyses of social networks concentrate on the nature and types of ties linking people together, including the closeness of the ties and the relationships of the people embedded in the ties, such as friends, relatives and neighbors. The influence of social networks on health appears uncertain when networks are conceptualized structurally. Different types of social ties are not always supportive of or beneficial for health, as a negative effect of neighborhood connections on mental health has been found [20].

Moreover, although income is positively related to the availability of social support, people of different income levels have distinctive preferences in relation to social network types. A study on the association between income and social network choices shows that people with higher income spend more time with their friends, while those with lower income spend more social networking time with neighbors [21]. Since income impacts people's social networking time with their neighbors and neighborhood connections might be harmful for health, is it possible that neighborhood networks mediate the relationship between income and health and help explain the health inequalities between people with different income levels?

This study extends the current research on the income gradient in health by discussing the possible mediating effect of a typical type of social network: neighborhood ties. Income is considered a social contextual factor influencing people's embeddedness in neighborhood ties. Furthermore, health-related quality of life (HRQoL) is adopted to evaluate people's health outcomes [22–24]. HRQoL is described as people's perceived physical and mental health over time [25], reflecting individuals' subjective feelings of the extent to which health problems influence their daily life. In the context of the epidemiological transition to an era in which non-communicable

chronic diseases have become a major risk factor for people's health, HRQoL, which implies a direct linkage to health conditions [26] and subjective assessment of health status, is more reflective of the modern biopsychosocial medical model than objective indicators such as life expectancy and mortality rate [24].

Methods
Data
The cross-sectional data employed for the statistical analysis were drawn from the General Social Survey (GSS) 2002, 2006, 2010 and 2014 [27]. Launched in 1972, the GSS gathers data on contemporary American society to monitor and explain trends and constants in the attitudes, behaviors, and attributes of the adult population in the United States. With the support of the National Science Foundation, the GSS is conducted by the National Opinion Research Center (NORC) at the University of Chicago every one or two years with a strict, full-probability sample design, and the response rates range from 70 to 82.4% [28]. In each survey year, subsamples are randomly selected to answer selected survey questions. HRQoL questions were asked in 2002, 2006, 2010 and 2014, and participants in the subsamples who answered the questions in these four survey years were included in the analysis.

Variables
Dependent variables
The dependent variable, HRQoL, was assessed by the "Healthy Days Measures" developed by the Centers for Disease Control and Prevention (CDC) [29]. These measures include four questions on general health, the number of physically unhealthy days, the number of mentally unhealthy days, and the number of days with activity limitations. General health is assessed with the question "Would you say that in general your health is excellent, very good, good, fair or poor?" Responses range from 5 to 1. The number of days of poor physical health, poor mental health and activity limitations are assessed, respectively, with the questions "Now, thinking about your physical health, which includes physical illness and injury, how many days during the past 30 days was your physical health not good?" "Now, thinking about your mental health, which includes stress, depression, and problems with emotions, how many days during the past 30 days was your mental health not good?" and "During the past 30 days, approximately how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?". The validity of the Healthy Days Measures for measuring HRQoL was confirmed by comparing their outcomes with those of the SF-36 in two previous studies using special samples and statewide samples in the US [30,

31]. The reliability of the Healthy Days Measures was also shown to be excellent in a retest study carried out in the US [32].

Independent variable

The independent variable in this analysis was income. The family real income variable (REALINC) in the GSS data, which is inflation-adjusted constant dollars [33], was used in the analysis. Family income was used rather than the respondent's income because in the GSS, family income measures income from all sources, while the respondent's income is the earnings from a single occupation [33]. The income variable was log transformed in the models.
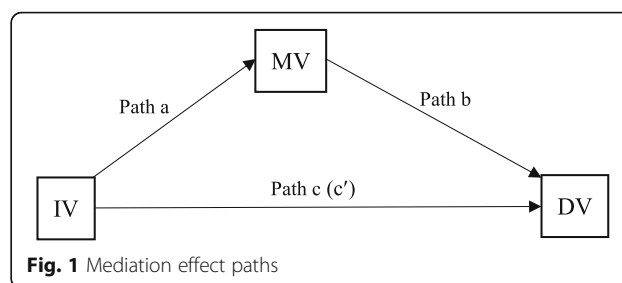
Mediation variable

Social networking time served as the possible mediator in illustrating the reproductive path of income gradients in HRQoL, and it was represented by the number of social evenings the respondents spent with their neighbors per year. This was evaluated with the question "How often do you spend a social evening with someone who lives in your neighborhood?" in the GSS. The original categorical frequencies were transferred into numeric days per year by assigning "almost daily" a value of 300, "once a year" a value of 1 and "never" a value of 0. A value of 4 was assigned to the "several" response. Thus, "several times a week" was coded as 208 (4 × 52), "several times a month" as 48 (4 × 12) and several times year as 4 (4 × 1) [21, 34].

Control variables

Sociodemographic variables that have been confirmed to affect HRQoL were employed as control variables, including age, sex, race, marital status, place of living and working status. Number of children and geographical mobility (whether the respondent had lived in the same city since age 16) were further controlled to assess the robustness of the relationship between income and social networking time with neighbors. Dummy variables for the GSS survey year were also included because the size of people's social networks declines over time [35].

Analytical strategies

The objectives of this research were twofold. First, the study examined the relationships between income, social networking time and HRQoL. Then, the reproduction of health inequalities through social networking time was tested based on the four criteria for mediation paths proposed by Baron and Kenny [36] (Fig. 1): (1) the coefficient of path a is significant in identifying the effect of the independent variable (IV) on the mediating variable (MV); (2) the MV is significantly related to the dependent variable (DV) net of the IV (path b); (3) the

Fig. 1 Mediation effect paths

significant direct association (path c) between the IV and the DV is confirmed; and (4) the association between the IV and the DV is weakened when the MV is controlled (path c′).

Stata/MP 14.2 for Mac was used to carry out the statistical analysis. Multiple linear regression models were formulated to evaluate the associations among income, social networking time and HRQoL. First, the way that individuals' income predicts social networking time with neighbors was tested. Two models were constructed for this question. Sociodemographic control variables were included in Model 1, and variables of geographic mobility and number of children were added to Model 2 based on Model 1. Then, the relationship between income and HRQoL was calculated, and social networking time was further incorporated into the models. Eight models were formulated to assess the relationships. In Models 3, 5, 7 and 9, sociodemographic variables were controlled, and in Models 4, 6, 8 and 10, the indicator of social networking time was included. Third, the possible mediation effect of social networking time was identified using the Sobel mediation test with the bootstrapping process, which overcomes the assumption of a normal distribution of the classical Sobel mediation test [37].

Although social networking time and HRQoL indicators were non-normally distributed, the large sample size (more than 500) justified the use of linear regression [38]. The robustness of the *p* values (Appendix) was confirmed via bootstrapping process [39].

Results

Descriptive statistics

The total number of participants with valid responses to the questions on both HRQoL and social networking time in 2002, 2006, 2010 and 2014 was 3330. Table 1 presents the descriptions of all variables in the analysis. The average numbers of days of poor physical and mental health were less than 4 per month, and the number of days of activity limitation was about 1.5 each month. The respondents spent several evenings per month with their neighbors on average.

Table 2 presents the distributions of the respondents' social networking time with neighbors, income and HRQoL. Participants who were female, white, married

Table 1 Descriptions of the Variables

Variables	Obs	Mean/percent	SD	Value	Value label
Dependent variables					
Days of poor physical health	3322	2.581	6.188	0–30	
Days of poor mental health	3330	3.297	6.964	0–30	
Days of activity limitation	3325	1.230	4.062	0–30	
Assessment of general health	3329	3.652	1.015	1–5	1 = poor, 5 = excellent
Independent variable					
Income ($)	3042	38,281.08	33,832.01	236.5–144,502.7	
Mediator					
Social networking time	3330	54.972	91.971	0–300	
Control variables					
Age	3320	42.898	13.308	18–88	
Sex (male)	3330	48.02%	–	0,1	1 = male 0 = female
Race (white)	3330	75.56%	–	0,1	1 = white 0 = non-white
Marital status (married)	3329	47.10%	–	0,1	1 = married 0 = not married
Working status (working)	3330	97.36%	–	0,1	1 = working, 0 = not working
Geographic mobility (same city since age 16)	3325	39.01%	–	0,1	1 = same city since age 16, 0 = not the same city
Number of children	3327	1.597	1.483	0–8	
Place of living (urban)	3330	89.13%	–	0,1	1 = urban, 0 = rural

Table 2 Descriptive results of social networking time, income and HRQoL

Variables	Social networking time		Family income (1000 dollars)		Days of poor mental health		Days of poor physical health		Days of activity limitations		Assessment of general health	
	mean	t-test	mean	t-test	mean	t-test	mean	t-test	mean	t-test	mean	t-test
Sex												
Female	50.269	−9.794[***]	34.672	−7.509[***]	3.704	0.847[***]	2.832	0.521[**]	1.334	0.217	3.639	−0.028
Male	60.063		42.181		2.857		2.311		1.117		3.667	
Race												
Non-white	60.889	7.832[**]	28.077	−13.478[***]	3.131	−0.22	2.425	−0.207	1.157	−0.097	3.557	−0.127[***]
White	53.058		41.555		3.351		2.632		1.254		3.683	
Marital status												
Non-married	69.119	30.007[***]	26.973	−23.821[***]	3.857	1.186[***]	2.796	0.454[**]	1.439	0.443[***]	3.615	−0.078[**]
Married	39.112		50.795		2.671		2.342		0.996		3.693	
Working status												
Not working	38.841	−16.569[*]	37.158	−1.152	8.432	5.274[***]	10.773	8.414[***]	8.432	7.398[***]	3.057	−0.611[***]
Working	55.41		38.310		3.158		2.358		1.034		3.668	
Place of living												
Rural	53.68	−1.453	29.776	−9.568[***]	3.575	0.311	2.756	0.195	1.222	−0.009	3.434	−0.245[***]
Urban	55.13		39.344		3.263		2.56		1.231		3.679	

and not working spent fewer social evenings with their neighbors. Female, non-white, and non-married respondents and those living in rural areas had a lower family income. Male and married respondents reported better HRQoL.

Income and social networking time

The association between income and social networking time is displayed in Table 3. In Model 1, a significant negative association was captured between the respondent's income and the number of social evenings spent with neighbors net of age, sex, marital status, working status and place of living. Geographical mobility and number of children were controlled in Model 2 to check the robustness of the association between income and social networking time. The result indicated that people with a higher income spent less time in their neighborhood socializing than those with a lower income.

Table 3 Regression results of the association of income and social networking time[a]

Variables	Model 1	Model 2
Income	−0.133[***]	−0.137[***]
	(1.919)	(1.944)
Age	−0.621[***]	−0.603[***]
	(0.765)	(0.775)
Age[2]	0.534[***]	0.528[***]
	(0.008)	(0.008)
Sex (male)	0.063[***]	0.063[***]
	(3.238)	(3.247)
Race (white)	0.007	0.003
	(3.870)	(3.911)
Marital status (married)	− 0.087[***]	−0.080[***]
	(3.567)	(3.676)
Working status (working)	0.024	0.024
	(10.258)	(10.262)
Place of living (urban)	0.009	0.008
	(5.170)	(5.182)
Geographical mobility (same city since age 16)		0.003
		(3.346)
Number of children		−0.032
		(1.214)
Year fixed effects[b]	yes	yes
N	3037	3029
R[2]	0.070	0.071

[a] Standardized beta coefficients; standard errors in parentheses; [*] $p < 0.05$, [**] $p < 0.01$, [***] $p < 0.001$
[b] The variables of GSS years were adopted only to control the effect of time, so the statistical parameters are not presented in the table (the same is true in the following tables)

Income, social networking time and HRQoL

Among the HRQoL measures, income was negatively related to the number of days of poor health and positively related to the general assessment of health (Table 4), reflecting the beneficial role of income in HRQoL. Model 3 and Model 4 calculated how income was related to the respondent's number of days of poor mental health and the effect of social networking time with neighbors. The result indicated a significant positive association between social networking time and the number of days of poor mental health. Female respondents had more days of poor mental health than male respondents, and white respondents had more days of poor mental health than non-white respondents. In Model 6, respondents who were more engaged in socializing with neighbors had more days of poor physical health, which was similar to the relationship between social networking time and mental health. The effect of the respondent's social networking time on the number of days of activity limitations and on the general assessment of health was not significant, as shown in Model 8 and Model 10.

Mediation effect of social networking time

Model 4 and Model 6 showed that social networking time was significantly related to the respondent's number of days of poor mental and physical health. Therefore, the mediating effect of social networking time on the impact of income on these two indicators of HRQoL was further tested through the Sobel mediation test with the bootstrapping procedure.

In Model 1, income was significantly related to the respondent's social networking time with neighbors, which met the requirement of path a (β = − 0.133, $p <$ 0.001). In Model 3 and Model 4, the significant association between income and the respondent's number of days of poor mental health persisted both with and without the adjustment of social networking time. This fulfilled path c (β = − 0.127, $p < 0.001$) and path c′ (β = − 0.118, $p < 0.001$), and the magnitude of income decreased when social networking time was controlled (Fig. 2). The Sobel mediation test indicated a significant indirect effect (Sobel test value = − 0.064, $p < 0.01$), and the result of the bootstrap procedure corroborated the Sobel test result: the 95% bias-corrected CI did not contain zero, indicating that the association of income and the respondent's mental health was mediated by social networking time.

In Model 5 and Model 6, the coefficients of income and social networking time satisfied the requirement of mediation effect paths; however, the result of the Sobel test was not significant, suggesting that social networking time may not be a mediator between income and people's physical health.