
Together we have fun: native-place networks and sexual risk behaviours among Chinese male rural-urban migrants

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Abstract Some scholars argue that the maintenance of social networks contributes to the lower prevalence of deviant behaviours and fewer adverse health effects among migrants. But others suggest that if migrants are embedded in homogeneous networks, such networks may enable the formation of a deviant subculture that promotes risk taking. Facing this dilemma, the present study investigates how native-place networks influence sexual risk behaviours (SRBs), specifically the pursuit of commercial sex and condomless sex with sex workers, for male rural-urban migrants. Using a multi-stage sample of 1,591 male rural-urban migrants from two major migrant-influx cities within China, we assessed migrants' general friend network ties and native place networks (townsmen in migrants' local networks) and tested their associations with SRBs. Multiple logistic regression analyses indicate that native-place network ties are associated with paying for sex (OR = 1.33, $p < 0.001$) and condomless sex with sex workers (OR = 1.33, $p < 0.001$), while general friendship network ties reduce such risks (OR = 0.74, $p < 0.001$; OR = 0.84, $p < 0.01$) even after controlling for demographic background, housing conditions, length of stay, health beliefs and behaviours, and spousal companionship. Our findings suggest that native-place networks among Chinese male rural-urban migrants are associated with SRBs because homogenous networks may serve as a platform for the emergence of a deviant subculture that promotes risk behaviours.

A Virtual Abstract of this paper is available at: <https://www.youtube.com/watch?v=3Wg20I6j8XQ>.

Keywords: sexual risk behaviour, rural-urban migrant, native-place network, social networks, deviance

Introduction

In the extensive literature on migrants' health issues, sexual risk behaviours (SRBs) have received considerable attention. Migration is sometimes accompanied by an increase in deviant behaviours, a phenomenon sociologists have attempted to explain since the early twentieth century. The study of internal migration within China has become a more significant issue in recent years, and provides further opportunities for such research. China has an estimated 158 million

lowly skilled rural-urban labour migrants (National Bureau of Statistics 2012), the largest migrant population in the world; they are often referred to as the 'floating population'. These migrants face numerous challenges to health, including risks to sexual health. Studies have established the association between migration experiences and SRBs among Chinese rural-urban migrants: they are more likely to engage in commercial sex (Möbrant 2006, Wang *et al.* 2007), have multiple sexual partners (Hu *et al.* 2006), have lower disease prevention knowledge (Hu *et al.* 2006, Li *et al.* 2004), and to engage in unprotected sex (Wong *et al.* 2008, Yang 2004). Yet, the social influences of these adverse consequences are less well articulated.

There is not a single pathway by which migration impacts the social experiences of individuals. Some have proposed that disrupted social networks and weakened social control contribute to norm ambiguity and related deviant behaviours (Sampson and Laub 1990). The socially dismantling nature of migration experiences and the accompanying solitude, dislocation, alienation, and stigma, may lead to elevated risk taking for people removed from their places of origin. Alternatively, when individuals have their own community to provide support, exert control, and maintain surveillance, they may be less likely to engage in deviance (Jensen 2003, Sampson *et al.* 1997, Shaw and McKay 1969). Yet, others argue that when migrants with similar ethnic and social backgrounds form a strongly homogeneous group for mutual support, they may gradually develop parochial codes of behaviour and a subculture that favours values and behaviours deemed deviant by the mainstream sector of the society (Bellair 1997, Cohen 1955, Fine and Kleinman 1979). A collective consideration of these bodies of literature leads to the conclusion that there are multiple mechanisms by which migration may impact the behaviours of rural-urban migrants, some positively and others negatively.

Which is the case for the rural-urban Chinese migrants? Despite the media portraying them as lost and wandering (Williams 1999), Chinese rural-urban migrants often establish connections within their own social world in cities, often through strong native-place networks and hometown identities. The identity of townsmen (*laoxiang*) constitutes a special place in migrants' daily lives and their interactions have profound symbolic significance. The concentration of migrants in occupations and living spaces based on hometown identities and native-place networks has led to the phenomenon of the migrant enclave and a related lifestyle (Connelly *et al.* 2011, Ma and Xiang 1998). Lifestyles have been shown to be important influences of health behaviour that bridge the individual with the social (Cockerham 2005). Yet, it remains unclear how a native-place network may influence sexual risk behaviours, and potentially provide an explanation of the mechanisms shaping the sexual risks described above. In this study, we explore this question with the case of male rural-urban migrants in China to determine how a migrant's native-place network influences his risk of engaging in two types of SRB: paying for commercial sex and having condomless sex with sex workers.

Migration and deviance

Generally, migration can disrupt pre-existing social networks but also potentially expand social networks and, thus, may shape deviance and specifically sexual risk behaviours, within a migrant community in several ways. Long ago, Sutherland concluded that the migration process is a major social influence that introduces social disorganisation, undermines traditional institutions, and ultimately leads to delinquency and deviance. He stated: 'mobility is the universal and most significant element in the process of social disorganization' (Sutherland 1939: 77). Some scholars have proposed that the breakdown of previous social networks within migrants' communities due to their mobility is responsible for crime and other forms of deviance in migrant influx neighbourhoods (Brockerhoff and Biddlecom 1999, Greif and Nii-

Amoo Doodoo 2011, Muñoz-Laboy *et al.* 2009). Others have found that a lack of network connections among community residents – connections which might provide social support, facilitate conflict solving, exert surveillance, and organise collective activities – contributes to greater deviant behaviours within the community (Kornhauser 1978, Sampson 2002, Sampson *et al.* 1997). Yet, recent studies on Chinese rural-urban migrants found that trans-local ties to a home community can help migrants to relieve stress and mitigate adverse coping reactions (Cheung 2013, Jin *et al.* 2012). Thus, although the process of migration can be socially disorganising, network components can serve to ameliorate these effects. Given the wide implications of the migration experience on social networks, we may consider that the social networks of migrants may have either positive or negative effects on deviance and health.

The deterrent effects of native-place networks

As described above, the migration experience can be socially disorganising and impact the health of migrants. HIV-risk behaviours among Chinese rural-urban migrants may be influenced by detachment from familial and peer support, which they received in rural hometowns but may lack in the cities (Yang 2004, 2006, 2010). Such detachment from hometown communities may also deprive rural-urban migrants of familiar understandings and social scripts on how to perform sexuality while also introducing an incomplete image of sexual liberation, leaving migrants confused about how to negotiate and protect themselves from risky sex scenarios (Hoy 2007). Apostopoulos and colleagues (2006) argued that labour migrants on the East Coast of the United States are more sexually active than those in Arizona because their weaker social connections to fellow Mexicans, especially family members, disinhibits a permissive sex attitude. In this manner, the disruption of ties to one's native place may heighten SRBs because of diminished levels of social control from the hometown community. However, the continued presence of native-place ties within a migrant's network may maintain some degree of social control and thus minimise deviance and promote health.

Due to the importance that origin identities have in migrant workers' lives, native-place networks may be of particular importance in the provision of social support (Cheung 2013). As existing social networks are disrupted, formal and informal control weakens and social support withdraws, and the migrant population may consequently experience greater risk of SRBs according to the theories described above. Furthermore, Browning and colleagues (2008) have argued that residence within locales of concentrated immigration may promote safer sex due to social homogeneity and community cohesion around more traditional norms and sexual mores. Thus, concentrations of migrants may facilitate adherence to traditional sexual norms. Additionally, studies of gay men who migrated to new places revealed that the quality of help from other gay men considerably reduced the odds of buying sex and using drugs (Buttram *et al.* 2013, O'Donnell *et al.* 2002). Overall, the literature indicates that support from familiar others may be important for optimising health promoting behaviours among migrants. In light of the literature identifying migration as a socially disorganising experience and the role of social networks as potentially mitigating adverse effects, having strong native-place ties may provide social support, familiarity, and social control that inhibits engaging in risk behaviours. Thus, we can study the hypothesis that male rural-urban migrants with more friends from a native-place network are less likely to engage in SRBs during their stay in the cities.

The facilitative effects of native-place networks

A contrasting theory contends that homogeneous networks, consisting of the same type of people, contributes to parochial norms and peer pressure that may favour behaviours deemed deviant by mainstream society. An early study conducted by Whyte (1943) among young Italian men in Boston found that gangs were far from being loosely connected, instead their members

were fellow Italians closely linked to local neighbourhoods and had rules of their own. Studies continue to confirm the existence of dense networks and complex relationships within subcultural groups (Bursik 1988, Pattillo 1998, Stack 1974), and some studies suggest that insular networks may promote deviance in some instances, including sexual risk taking (Kelly *et al.* 2012). For example, Browning and colleagues (2004) found that although dense networks in a community promote social capital and support, the community becomes tolerant of deviance because regulation is weaker under such conditions. Sutherland and Cressey (1994) proposed differential association theory to elaborate on how deviant behaviours are learned in interactions within intimate personal groups where certain deviance is defined more favourably. Such circumstances may occur within migrant networks that are less well linked beyond the subcultural group. For members of a subcultural group, who are neither entirely integrated into the wider society nor scattered as atomised individuals, codes of honour within the group also may pose more pressing concerns than law and civic norms (Simmel 2009 [1908]). If certain deviant behaviours are honoured in a particular status group, for example, migrant workers, the rationale to engage in sexual risk taking may override legal, health, or moral reasons for people within this group. As McPherson *et al.* (2001: 415) noted, 'homophily limits people's social worlds in a way that has powerful implications for the information they receive, the attitude they form, and the interactions they experience'. When a social network consists mostly of homogeneous ties, it can inhibit resources from other social groups and entrench insular norms for its members, thus limiting the breadth of social support received and becoming less effective to adapt to the behavioural codes and norms of the wider community (Granovetter 1973, Lin 2002).

Native-place networks among rural-urban migrants are a type of homogeneous social network in terms of demographic background, life history, experience of discrimination, cultural practices, etc. Scholars identified that most Chinese rural-urban migrants learn from and follow their hometown predecessors into the city, concentrate in an occupation based on native place identity, and develop relationships in the same neighbourhood their hometown fellows had already occupied (Ma and Xiang 1998). Because 'our dependence upon our social milieu provides us with a strong incentive to select our solutions from among those already established and known to be congenial to our fellows' (Cohen 1955: 52), it is likely that rural-urban migrants develop native-place network-based subcultures with 'a set of modal beliefs, values, norms, and customs associated with a relatively distinct social subsystem (a set of interpersonal networks and institutions)' (Fischer 1975: 1323). These, in turn, provide norms and create opportunities that shape their sexual behaviours. Although few studies have investigated social networks and deviance among Chinese rural-urban migrants, peer influences have proven to be factor for substance use (Lin *et al.* 2005, Yang *et al.* 2009b), sexual risk behaviours (Li *et al.* 2004, Puri and Cleland 2006, Wang *et al.* 2007), and general delinquency (Le *et al.* 2005). Yang (2005) also highlighted that community social norms may be even stronger predictors than poverty when it comes to SRBs. Since Chinese rural-urban migrants undergo similar underprivileged experiences in cities, this may further facilitate SRBs within a homogenous network. Given that these identified mechanisms may produce adverse effects for a homophilous network of migrants, we may also hypothesise that male rural-urban migrants with more ties to a native-place network are more likely to adopt SRBs during their stay in the cities.

Current study

In this paper, we describe the role of native-place networks in shaping risk behaviours that may impact sexual health of migrant males. Based upon the existing literature, we consider two competing hypotheses: (i) that native-place ties will promote health by reducing sexual risk behaviours; and (ii) that native-place ties will inhibit health by increasing sexual risk

behaviours. We do so by situating these native-place ties within contexts of general friendship networks in the destination city.

Methods

Sampling

This study's data source, the Male Floating Migrant Population Health Survey, used a multi-stage systematic sampling procedure to recruit participants in two Chinese cities in 2012. At stage 1, two cities – Hangzhou and Guangzhou – were selected; both are hubs of rural-urban migration influx in coastal China. Hangzhou and Guangzhou are the capital cities of Zhejiang and Guangdong provinces, which together received more than 30 per cent of China's rural-urban migrants in 2011 (National Bureau of Statistics 2012). At stage 2, two municipal districts were randomly sampled within each city. Industries within these districts were then used as the sampling units: the six most common categories of labour-employing industries in China (Yang *et al.* 2009a) were chosen to help ensure the diversity of migrant participants: (i) construction; (ii) machinery and transportation; (iii) spin electronics; (iv) family services; (v) business; and (vi) others. At stage 3, a quota-sampling procedure was used at worksites within these industries to recruit a composite sample of individuals approximately proportionate to the overall distribution of the migrant population by occupational clusters. The survey team stopped recruiting participants from a specific occupational background in a specific worksite when the quota had been filled, thus preventing overrepresentation and occupational biases. Survey investigators confirmed during the interview that all selected participants were rural-urban migrants who have rural household registration (*hukou*), and currently reside in the city.

The final version of the survey required approximately 30 minutes to complete. Eligible individuals were contacted at their work sites or dormitories by medical professionals from local health departments, who received intensive training prior to the survey. The survey team employed a number of strategies to reach the migrants at their work sites. First, employers at sampling units were contacted for permission to conduct the survey on their premises. Having obtained permission, the 'leaders' of migrant worker groups were contacted to ask them to mobilise and encourage their fellow workers to participate. Second, because some of the questions collected intimate information such as sexual behaviour, it was critical to ensure privacy and a trusted environment. In order to achieve this, all subjects were first informed of the purpose of the study and assured of their security and privacy. The survey was self-administered individually in dormitories or in a secluded area away from colleagues. Staff were on-hand to assist with any questions about the questionnaire; assistance was offered to those participants who had difficulty completing the questionnaire due to literacy obstacles. Finally, investigators checked the returned questionnaires for completeness, and answers were clarified when appropriate. Respondents were given a small token of appreciation (toothbrush and toothpaste) for their participation in the study. The Ethics Committee of the Medical Centre, Zhejiang University approved the study protocol and informed consent was obtained from each participant.

Measurement

Dependent variable To measure sexual risk behaviours (SRB), the survey first asked a filter question 'have you had non-marital sex', and people who answered no were coded as 0 in the subsequently generated dichotomous variable about 'sex with a prostitute'. Respondents who answered yes moved to another question 'if yes, what type of people did you have non-marital sex with: fiancée, mistress, female friend, prostitute, others' - more than one type of sex partner could be indicated. Those who chose 'prostitute' were coded 1 in the generated

dichotomous variable 'sex with a prostitute'. A follow-up question measured whether condoms were regularly used during sexual intercourse with sex workers: 'Usually when you have sex you would: use condoms; not use condoms'. Then a new variable 'sex with a prostitute without condom' could be generated from this variable: people who answered 'not use condoms' were coded 1 while the others were set to 0. Our decision to create two dependent variables for multinomial regression rather than using ordinal logistic modelling is due to the violation of the parallel regression assumption (Long and Freese 2006).

To assure reliability, before the respondents answered the above questions, several questions on other intimate behaviours were asked in the preceding section of the survey (such as 'Have you received massage in beauty salon/Sauna?' 'Was the massage on an intimate body part?' 'Have you ever watched porn/erotic material?' etc.). Such design of question flow reduces coarseness and missing answers caused by shyness, reluctance, and concerns about privacy (Czaja and Blair 2005).

Network measures

Social network assessments are an approach to measuring social context. Native-place networks, as we have argued, may constitute qualitatively distinct platforms to contrast with those formed by a general friendship networks. To investigate the unique impact of native-place network ties on SRBs, we utilise two network variables for the analyses of network influences on SRBs. In the same section of the questionnaire, the respondents were asked: 'How many general friends do you have in the city?' with options from 1 to '7 or more'. A follow-up question asks: 'How many friends from your own county do you have in the city?' These measures provide the same scale from 1 to '7 or more'. The number of ties reported is undirected, which serves the purpose of measuring degree centrality in an ego-centric survey about friendship (Marsden 2002). We use the first variable as a measurement for the size of a general friendship network, representing a rural-urban migrant's self-reported degree centrality in the city. The second variable measures the size of one's native-place network, hence his self-reported degree centrality specifically within a native-place network.

Covariates

Demographic background factors used as control variables include: marital status, age, education, income level, and length of stay. Marital status is measured in three categories never married; married; divorce or widowed. Age is calculated from reported birth year and month at the date of interview. Four highest educational levels are ordinal: elementary school or lower; junior high; senior high; college or above. For income level, respondents were asked to estimate their family income per capita per year in CNY (1 CNY = 0.16 US\$) and chose from less than 1,000; 1,000 to less than 2,000; 2,000 to less than 3,000; 3,000 to less than 4,000; 4,000 to less than 5,000; 5,000 or above. We also use 'the length of stay in city' as another control variable, as the average length of stay may influence the quality and degree of integration into an urban social network. The questionnaire asked 'How long do you work away from your hometown every year', respondents chose from 1–2 months, 3–4 months, 4–5 months, 5–6 months, 6–7 months, 8–9 months, more than 10 months. Other health behaviours were assessed, including smoking and drinking. Smoking status is directly operationalised as 'Do you currently smoke?' Drinking is operationalised as 'Do you currently drink alcohol (not including a few sips)?' Both smoking and drinking are dichotomous variables.

Having a stable relationship with a spouse not only gives rural-urban migrants a stable sex life, it also constitutes an important source of social support. People who live with a spouse are richer in social capital and social support (Dehle *et al.* 2001, Umberson 1992). Since rural-urban migrants have undergone a series of changes that limit their ability to coordinate family

issues, marriage status alone does not sufficiently capture the regularity of migrants' marital sexual activity or the social support available from a spouse. Scholars have long pointed out the important role that marriage quality as measured by length of companionship and emotional attachment plays in the decision of reacting to non-marital sex opportunities (Spanier and Margolis 1983, Treas and Giesen 2000). Instead of marital status alone, spousal companionship during the stay in the city can indicate more about marital sexual opportunities as well as the potential availability of spousal social support. Therefore, we used an indicator 'Where is your wife when you work away from your hometown?' to assess the spousal companionship of our respondents. Those who answered 'stays with me' were coded 1, those answered 'stays in my hometown' or 'in another city' were coded 0.

Deteriorated housing conditions are related closely to both deviance and poor sexual health (Cohen *et al.* 2000, Smedley 2012). Housing conditions in this survey are measured as a categorical variable. Respondents were asked about the type of housing they reside in, four common types of housing for Chinese labour workers were available to choose: working camp or tent; rental apartment; relative or friend's place; and apartment provided by employer. Hedonism is also associated with deviance in previous studies (Quinn 1987, Yang *et al.* 2009a); therefore we adopted a seven-point Likert scale to measure hedonism beliefs. Four questions on hedonism were used to form a seven-point ordinal variable: 'Life is a dream, living is to have fun'; 'I'd rather spend money on eating, drinking, and having fun'; 'People shouldn't worry too much to have fun'; and 'Drink your cup as long as you can, life is short'.

Analytical strategy

Bivariate analyses are presented to compare the mean, proportion, and 95 per cent confidence interval of each independent variable by categories of the dependent variable. The 95 per cent confidence interval was attained by bootstrapping. Multiple logistic regression models were performed to regress the two SRB dependent variables – sex with a sex worker, sex with a sex worker without using condoms, on our explanatory variables. Covariates are included in the logistic regression models to control the net influence of demographic background, residence with a wife, length of stay, and health behaviours. We report adjusted odds ratio (OR) and 95 per cent confidence intervals for significant associations and use a p-value of 0.05 as the cutoff point of statistical significance. Given the integrity of the survey, we chose list-wise deletion for missing data management. After the regression, two post-estimation indices (classification accuracy rate; AUROC) that assess the predictive power of the model are reported. Classification accuracy rate is calculated by matching the true values with the predicted values, and report the ratio of true positive and true negative versus false positive and false negative. AUROC is a performance diagnosis that discriminates a positive population from negative population, and compares true positive rate with false positive rate in a ROC graph. The closer the AUROC score is to 1, the better fit for the model (Zweig and Campbell 1993). We also use McFadden's pseudo R-square to indicate the log likelihood ratio of the full models as departing from an intercept model. Stata software version 12 was used to perform all analyses.

Results

Descriptive statistics

The total sample size is 1,591. The demographic characteristics of our sample are comparable to those in the 2011 Chinese national census on rural-urban migrants in many aspects including age, housing types, income, and education (National Bureau of Statistics 2012). This further suggests that the study's sample is approximately representative. Table 1 summarises the

Table 1 Means and standard deviation of variables ($n = 1,591$)

Variable (coding)	Mean(SD)	Percentage (%)
Had commercial sex (1 = yes)		31.43
Had condomless sex with sex workers (1 = yes)		15.08
Number of general friend ties	4.72 (1.83)	
Number of native-place ties	4.02 (2.25)	
Age (min = 16, max = 64)	30.65 (7.55)	
Income (1 = <1000CNY; 6 = 5000CNY+)	3.29 (1.73)	
Education (1 = elementary or below; 4 = college or above)	2.37 (.82)	
Marriage		
Never married		31.55
Married		65.93
Divorced or widowed		2.51
Living with wife in city (1 = yes)		31.87
Housing type		
Worker's camp		34.30
Rental apartment		40.09
Relative or friend's place		2.89
Company's house/dorm		22.72
Smoking (1 = yes)		64.63
Drinking (1 = yes)		46.28
Length of stay per year (1 = 1–2 months, 7 = more than 10 months)	5.54 (2.31)	

descriptive statistics of our sample. For the two dependent variables measuring SRBs, 31.4 per cent of the respondents reported having had sex with a sex worker, and 15.1 per cent reported having had sex with a sex worker without regularly using a condom. The average number of general friends is 4.35, while the average number of network ties to individuals from the same native-place as the respondent is 4.98. The average age of rural-urban migrants in our sample is 31 years, indicating this population is mostly comprised of younger men. The average income is 2,000 to 3,000 Yuan (about \$300–500). An average respondent has completed junior high school as his highest education. About a third (31.6%) have not been married, 2.5 per cent are currently divorced or widowed, and 65.9 per cent are married at the time of interview. Among all the respondents, 31.9 per cent are currently living with their wives in the city, this indicates that less than half of all married men have spousal companionship while working in cities. Most rural-urban migrants live in three types of housing: worker's camp (34.3%), rental apartment (40.1%), or company provided house/dorm (22.7%), with a small minority living on the property of a relative or friend (2.9%). The average length of stay in the city per year is 6 to 7 months. Smoking (64.6%) and drinking (46.3%) are relatively prevalent behaviours among rural-urban migrants, reflecting the general pattern among Chinese males.

Table 2 is a contingency table presenting the results from bivariate analyses including mean, proportion, and 95 per cent confidence interval of each independent variable by categories of the dependent variables. By reviewing Table 2, one can see noticeable differences between those who engaged in SRB and those who did not. The rural-urban migrants who had sex with a sex worker have fewer general friends than who did not (4.35 vs. 4.93), and the difference is significant by the 95 per cent confidence intervals. Those who engaged in unprotected commercial sex also indicated having fewer general friends than those who did not (4.68 vs. 4.75),

Table 2 Descriptive statistics by category of dependent variables: means/percentage, 95% CI (n = 1,591)

	Mean or percentage (95% CI)		Condomless commercial sex	
	Commercial sex Yes (n = 500)	No (n = 1091)	Yes (n = 240)	No (n = 1351)
Number of general friend ties	4.35 (4.2–4.52)	4.93 (4.81–5.04)	4.68 (4.44–4.92)	4.75 (4.65–4.85)
Number of native-place ties	4.98 (4.78–5.18)	3.56 (3.43–3.69)	4.75 (4.44–5.06)	3.88 (3.76–4.0)
Age	31.10 (30.44–31.76)	30.66 (30.20–31.12)	31.46 (30.48–32.45)	30.68 (30.27–31.09)
Income	3.29 (3.14–3.45)	3.31 (3.20–3.41)	3.21 (2.99–3.42)	3.32 (3.22–3.42)
Education	2.36 (2.29–2.43)	2.36 (2.31–2.41)	2.40 (2.30–2.51)	2.35 (2.31–2.40)
Marriage				
Never married	26.3% (22.4–30.2%)	33.8% (31–36.6%)	22.08% (16.8–27.4%)	33.1% (30.6–35.7%)
Married	72.9% (69–76.8%)	62.8% (60–65.7%)	75.00% (69.5–80.5%)	64.4% (61.8–67%)
Divorced or widowed	0.8% (0–1.6%)	3.30% (2.3–4.4%)	2.92% (1–5.1%)	2.5% (1.6–3.3%)
Living with wife in city	20.5% (16.9–24%)	37.2% (34.3–40%)	25.42% (19.9–31%)	33.1% (30.5–35.6%)
Housing type				
Worker's camp	62.4% (58.2–66.7%)	21.3% (18.8–23.7%)	47.1% (40.7–53.4%)	31.9% (29.4–34.4%)
Rental apartment	26.5% (22.6–30.4%)	46.3% (43.3–49.3%)	41.3% (35–47.5%)	39.9% (37.2–42.5%)
Relative or friend's place	1.0% (1–1.9%)	3.8% (3.6–4.9%)	1.3% (–0.1–2.7%)	3.2% (2.3–4.2%)
Company's house/dorm	10.0% (7.4–12.7%)	28.7% (26–31.3%)	10.4% (6.5–14.3%)	25% (22.7–27.3%)
Smoking	72.9% (69–76.8%)	60.7% (57.8–63.6%)	83.8% (79–88.5%)	61.1% (58.5–63.7%)
Drinking	40% (35.6–44.3%)	49.2% (46.2–52.2%)	60% (53.8–66.2%)	43.8% (41.1–46.5%)
Length of stay	4.05 (3.80–4.31)	6.17 (6.07–6.27)	4.98 (4.64–5.31)	5.58 (5.46–5.71)

but the confidence intervals for that statistic overlaps, so we cannot conclude the difference is significant. When it comes to the number of native-place network ties, the difference between the SRB-engaging population and others is more conspicuous. Men who had sex with a sex worker have on average 4.98 native-place network ties, in comparison to 3.56 among those who had not paid for sex. The average number of native-place network ties among men who had unprotected commercial sex is 4.75, in compared with 3.88 among those who had not done so. Both differences are strongly significant as judged by 95 per cent confidence intervals. There are more married men among those who had sex with a sex worker (72.9%) and sex with a sex worker without condom (75%). Among people who have had sex with a sex worker 20.5% are currently living with their wives. For those who had unprotected sex with a sex worker, the difference is not significant among those living with a wife in comparison to their counterparts (25.4% vs. 33.1%). The large majority of those who had sex with a sex worker live in a worker's camp compared to people who have not paid for sex (62.4% vs. 21.3%). Also, more people who had unprotected sex with a sex worker are living in workers' camps (47.1% vs. 31.9%). Of those who had sex with a sex worker, 26.5 per cent live in a rental apartment, only 10 per cent live in company provided housing; in contrast, among those who have not bought sex, many are living in rental apartment (46.3%) and company provided housing (28.7%). Interestingly, there are no age, income, or education differences between people who engage in SRBs and who do not. The prevalence of smoking is higher in the SRB engaging group (72.9% for those had sex with a sex worker, 83.8% for those who had unprotected sex with a sex worker), relative to the SRB-free group (60.7%, 61.1% respectively). People who had sex with a sex worker (4.05) and unprotected sex with a sex worker (4.98) also have shorter average length of stay in city per year, compared to the SRB-free group (6.17, 5.58 respectively).

Bivariate analysis does not take into account confounding factors and hold their impact constant. In order to predict SRBs with the independent variables net of the influence of control variables, Table 3 presents the logistic models that regress SRB indicators on all independent variables, with adjusted odds ratios (OR) and 95 per cent confidence intervals reported for each model. For each dependent variable, a model with both general friend ties and native-place ties (model 2) nests with a model with only general friend ties (model 1). As the statistics in Table 3 shows, the number of general friends is not a significant predictor of having sex with a sex worker (95% CI of OR = 0.89 to 1.03). However, when the number of native-place ties enters the model, the number of general friends has a significant inverse relationship with having sex with a sex worker (OR = 0.79, $p < 0.001$), while the number of native-place ties significantly increases the odds of having sex with a sex worker (OR = 1.33, $p < 0.001$). Thus, the results from the final model indicate that the number of general friendship ties in the city have a protective effect, the number of native-place ties heightens the likelihood of seeking sex with sex workers.

Some of the covariates are associated with this outcome as well. Although living with a wife is associated with lower odds of SRB in the binary descriptive statistics, here it is not associated with SRB after controlling for other variables. This may relate to the confounding influence of other demographic factors, especially marriage status. Compared with those living in a workers' camp, migrants in all other types of housing have lower odds of having sex with a sex worker: living at relative or friend's place has the lowest odds of sex with a sex worker (OR = 0.12, $p < 0.001$) when compared with those in a worker's camp, followed by company provided housing (OR = 0.28, $p < 0.001$) and rental apartment (OR = 0.43, $p < 0.001$). Hedonism is associated with higher odds of sex with a sex worker (OR = 1.38, $p < 0.001$). Regarding health behaviours, smoking is significantly related to sex with a sex worker (OR = 1.8, $p < 0.001$), but the association is not significant for drinking. Longer length of

Table 3 Logistic regression estimates for SRBs, reported with odds ratio, 95% CI, diagnostic indices (n = 1,591)

	Commercial sex			Condomless commercial sex				
	Model 1		Model 2		Model 1		Model 2	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Number of general friend ties	0.96	0.89–1.03	0.79 ^{***}	0.72–0.87	1.02	0.94–1.12	0.84 ^{**}	0.75–0.94
Number of native–place ties	–	–	1.33 ^{***}	1.23–1.43	–	–	1.33 ^{***}	1.21–1.45
Age	0.98	0.97–1.01	0.99	0.97–1.01	0.99	0.98–1.02	1.00	0.98–1.02
Income	1.07	0.99–1.16	1.05	0.97–1.13	0.94	0.86–1.03	0.93	0.85–1.01
Education	1.06	0.90–1.25	0.99	0.84–1.19	1.27	1.06–1.52	1.18	0.98–1.43
Marriage (ref. = never married)								
<i>Married</i>	1.20	0.89–1.62	1.15	0.84–1.57	1.33	0.93–1.91	1.21	0.84–1.75
<i>Divorced or widowed</i>	0.37	0.12–1.15	0.29	0.08–1.06	1.97	0.75–5.13	2.26	0.87–5.87
Living with wife in city (1 = yes)	0.76	0.55–1.04	0.79	0.57–1.09	0.59 ^{**}	0.40–0.87	0.66 [*]	45–0.97
Housing type (ref. = worker's camp)								
<i>Rental apartment</i>	0.43 ^{***}	0.31–.60	0.60 ^{**}	0.42–0.85	1.21	.081–1.79	1.83 ^{**}	1.19–2.81
<i>Relative or friend's place</i>	0.12 ^{***}	0.04–.31	0.17 ^{***}	0.06–0.45	0.24 [*]	0.07–0.82	0.32	0.91–1.12
<i>Company's house/dorm</i>	0.28 ^{***}	0.19–.42	0.34 ^{***}	0.22–0.52	0.47 ^{**}	0.28–0.80	0.63	0.36–1.08
Hedonism beliefs	1.39 ^{***}	1.28–1.51	1.38 ^{***}	1.26–1.5	1.33 ^{***}	1.21–1.47	1.33 ^{***}	1.21–1.46
Smoking (1 = yes)	1.70 ^{***}	1.28–2.28	1.8 ^{***}	1.32–2.44	2.44 ^{***}	1.66–3.57	2.65 ^{***}	1.8–3.92
Drinking (1 = yes)	0.77	0.59–1.00	0.89	0.68–1.18	1.97 ^{***}	1.45–2.69	2.60 ^{***}	1.85–3.65
Length of stay per year	0.79 ^{***}	0.74–.84	0.83 ^{***}	0.77–0.88	.94	.87–1.01	.99	0.92–1.07
Post-estimation indices:	0.23/79.5%/0.81		0.23/79.6%/0.83		0.11/84.4%/0.74		0.14/84.1%/0.76	
Pseudo R ² /Correctly classified/AUROC								

*p < 0.05; **p < 0.01; ***p < 0.001

stay is associated with lower odds of having sex with a sex worker (OR = 0.83, $p < 0.001$), but none of the demographic variables and socioeconomic indicators are significantly associated with sex with a sex worker. The McFadden pseudo R^2 for both models of the commercial sex dependent variable are 0.23. Two other post-estimation indicators reported in the bottom of Table 3 are also robust: 79.6 per cent of the cases are correctly classified by the full model; the area under the ROC curve is 0.83, indicating a large majority of the cases are correctly identified by the sensitivity test.

The right side columns of Table 3 show models predicting sex with a sex worker without using a condom. The results for the network ties on this outcome are generally similar to the previous outcome. Similarly, when general friend ties stand alone in the model, they are not significantly related to the dependent variable (95% CI of OR = 0.94–1.12). In the full model, the number of general friends is inversely associated with having condomless commercial sex (OR = 0.84, $p < 0.01$), while the number of native-place ties significantly increases the likelihood of having condomless commercial sex (OR = 1.33, $p < 0.001$). Thus, similar to the previous outcome, general friendship ties in the city have a protective effect, the number of native-place ties heightens the likelihood of unprotected sex with sex workers.

Living with a wife in the city leads to significantly lower odds of having sex with a sex worker without condom (OR = 0.66, $p < 0.05$), even when native-place ties and other variables are controlled for. When compared with those living in a workers' camp, living in relative/friend's and company provided housing are associated with lower odds of unprotected sex with a sex worker in model 1, but such associations disappeared after controlling for the number of native-place ties. By contrast, living in rental properties increases the likelihood of having unprotected commercial sex (OR = 1.83, $p < 0.01$). Hedonism is associated with higher odds of unprotected sex with a sex worker (OR = 1.33, $p < 0.001$). Smoking is also a significant factor associated with unprotected sex with a sex worker (OR = 2.65, $p < 0.001$). Drinking is a significant risk factor for having unprotected commercial sex (OR = 2.6, $p < 0.001$). Coefficient parameters of the other demographic and socioeconomic variables remain not significant. The full model here has a Pseudo R^2 of 0.14, it correctly classified 84.1 per cent of the cases, and has a 0.76 area under ROC curve.

Discussion

This study explored how native-place networks influence SRBs among Chinese male rural-urban migrants. In brief, our findings indicate that general social network ties inhibit participation in both the pursuit of commercial sex and condomless sex with a sex worker. This speaks to the potential for social support and social control via general social networks in the destination city. However, greater ties to a native-place network appear to promote participation in these sexual risk behaviours. Below, we consider these findings in light of the hypotheses outlined above.

One branch of the literature projected lower levels of deviance (i.e. SRBs) for those with more ties to native-place networks. In this framework, when people migrate from rural origins to urban areas for better working opportunities, social support and surveillance via ties to rural friends and relatives break down. With the support and surveillance stemming from relationships to people from their origins, rural-urban migrants tend to behave with greater control, and thus are less likely to deviate from the norms held by mainstream society. In considering this hypothesis, we anticipated that the social support and surveillance within a native-place network would be strong enough to deter deviance because Chinese rural society is founded upon close kinships. Thus, we hypothesised that individuals with stronger native-place

networks would report lower levels of sexual risk behaviours. We found no evidence to support this hypothesis.

However, our findings point to an alternative hypothesis posited: that strong native-place networks are a type of homophilous association that may lead to a deviant subculture that promotes risk behaviours. Especially for disadvantaged migrants with adjustment problems in the city, people seek solutions and support from the social milieu established as most congenial to them. As a result, the subculture emerges out of a common underlying condition through mutual reinforcement of the norms and skills that deal with adjustment problems (Cohen 1955). Our results indicate that migrants with more native place ties in their social networks displayed elevated likelihood of having sex with a sex worker in general, and having sex with a sex worker without condoms. These associations are significant even after controlling for other factors such as spousal companionship, socioeconomic status, demographic background, length of stay in the city, other health behaviours, and housing types. After accounting for the number of native-place ties, the number of general friend ties inversely influences SRBs. We may briefly summarise these findings as: having more friends in general lowers the odds of SRBs, but having native-place network ties elevates these risks. Indeed, subjects described a collective nature of commercial sex consumption during interviews: our respondents claimed to be led by their adventurous peers to look for sex workers in a group of two or three; very rarely is such activity done in solitude. The magnitude of the coefficient parameters of native-place networks is very large in both models, suggesting its importance in understanding and tackling sexual risk in this population. These considerations are important not only for the male migrants, but also for improving the health of the women whom they are paying for sex.

The number of Chinese rural-urban migrants is quite large, 158 million as of the end of 2012. This population is a key target for public health professionals because of its large size, and more so due to the bridging effect it brings: as migrants travel between hometowns and the city seasonally, two otherwise separated populations are connected for potential disease transmission. But the current household registration system (*hukou*) has severely undermined efforts to draw migrants into the urban health care system and created barriers for them to formulate connections with people outside their native-place networks. Another finding of the study, that a longer stay within the city reduces having commercial sex in general, also points to the importance of migrants' integration into the city environs and wider social networks. Greater efforts to work on their integration into the city's communities may not only improve health care accessibility for those without a *hukou* registration, it may also reduce the impact of the risk-inclined subcultural cliques among the migrant workers.

We should note that certain other factors in our models were also associated with SRBs in this population. While marital status does not deter this population from seeking sex with a sex worker, having spousal companionship in the city lowers the likelihood of having condomless sex with a sex worker. In other words, rural-urban migrants tend to avoid unprotected sex with sex workers when their spouses stay in the city with them, possibly out of the concern for their wives' health. However, not all of them have this concern because about 25 per cent of subjects reporting unprotected commercial sex also reported living with wives, and spousal companionship is not significantly related to seeking sex with a sex worker in general. Not surprisingly, other health behaviours including smoking and drinking are related to SRBs, and holding hedonism beliefs is also associated with SRBs. Housing conditions among rural-urban migrants are another strong predictor of having sex with sex workers. The poor housing conditions that some rural-urban migrants reside in usually are situated around disorganised sectors of the city, which often feature an underground sex industry. Rural-urban migrants living in poor housing conditions thus may have more opportunities to learn of the availability of sex workers in these environs.

Limitations

While having many strengths, this study has a few limitations due to the feature of the survey design and methodology. First, in the future, the friendship network ties might be defined more specifically, including the assessment of different types of friends to more fully depict the composition of a network, such as friends known from workplaces, friends known from entertainment venues, etc. Second, the survey assessed the living conditions of each respondent, but could have also recorded the information of each neighbourhood in which subjects lived, so that a multilevel mixed effect model could be performed to more fully account for the influence of neighbourhood factors on SRBs and examine how much of the individual's variation of SRB is nested within the neighbourhood. Third, spousal companionship constitutes only one dimension of marital quality, whereas emotional attachment and good communication may help our migrant population overcome the opportunities for purchasing commercial sex even when spouses are absent. Further investigations may test whether other dimensions of marital quality explains a portion of probability of having commercial sex among married rural-urban migrants. Despite these limitations, this paper provides important information on the role of native-place networks in SRBs among Chinese male rural-urban migrant workers.

Concluding Remarks

In this paper, we identified competing hypotheses that indicated that native-place networks may ameliorate problems brought on by migration and related risk taking, but they may also introduce subcultural values and social pressures insular to the native-place network. Our results suggest that native-place networks may in fact promote sexual risk taking, even within the context of general friendship networks promoting health. Further research into these dynamics is important, especially since Chinese society is rapidly changing. Recent reports have noted that Chinese rural-urban migrants have started to settle down and may not be best described as 'floating' any more (Connelly *et al* 2011). Despite their *hukou* status, these young people may not fully identify themselves as rural people since their experiences are also derived from the urban life they have experienced. So far, while regulating the floating population is still a priority for the Chinese government, no policies addressing the gradually growing community among rural-urban migrants have made an impact in this area. When migrants attempt to assimilate, they encounter harsh obstacles posed by discrimination, the household registration system, and limited upward mobility; in some instances, they have to develop their own community based on bloodline and hometown identity to survive. But this may be a mixed blessing among the migrant population; native-place networks may lead to deviant subculture that poses risks to sexual health.

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