

mss



The Sociological Quarterly

Routledge
Taylor & Francis Group

ISSN: 0038-0253 (Print) 1533-8525 (Online) Journal homepage: <https://www.tandfonline.com/loi/utsq20>

Pathways to Buying Sex among Migrant Labors: The Mediatory Role of Family Bonds and Peer Deviance on Social Network Homogeneity

Xiaozhao Y. Yang & Tingzhong Yang

To cite this article: Xiaozhao Y. Yang & Tingzhong Yang (2020): Pathways to Buying Sex among Migrant Labors: The Mediatory Role of Family Bonds and Peer Deviance on Social Network Homogeneity, The Sociological Quarterly, DOI: [10.1080/00380253.2019.1711254](https://doi.org/10.1080/00380253.2019.1711254)

To link to this article: <https://doi.org/10.1080/00380253.2019.1711254>



Published online: 16 Jan 2020.



Submit your article to this journal [↗](#)




View related articles [↗](#)



View Crossmark data [↗](#)



Pathways to Buying Sex among Migrant Labors: The Mediatory Role of Family Bonds and Peer Deviance on Social Network Homogeneity

Xiaozhao Y. Yang ^{a*} and Tingzhong Yang^b

^aDepartment of Political Science and Sociology, Murray State University, Murray, Kentucky, USA; ^bZhejiang University School of Medicine, Children's Hospital, Hangzhou, China

ABSTRACT

Family bonds and deviant peers constitute two important competing forces of socialization in migrants' social life. This study furthers the theory of family-peer relationship by arguing that migrants' social network homogeneity shapes the development of family bonds and peer deviance and is ultimately associated with increased likelihood of sexual risk behaviors. Applying regression techniques and structural equation modeling with bootstrapped estimates to survey data collected in 2011 among male Chinese migrant labors, this study found that 1) network homogeneity in terms of homeplace and occupation is associated with sexual risk behaviors, and 2) at least half portion of such association is significantly mediated by family bonds and peer deviance.

KEYWORDS

Sexual risk behavior; mediation analysis; family-peer relationship; sex work; migrants

Introduction

There had never been so many migrants who, internally or globally displaced, voluntarily or forced, left their hometown in search of another life with new friends and in a new social order. Since the age of industrialization, the global capitalist economy has become such an ingrained system in a world order that relentlessly demands the free flow of labor force along with capital. Because of the circulating movement between several loci and the mobility, migration has brought itself with the issue of having a large, weakly organized, and fast-moving human vector of great diffusion potential to challenge public health (Prothero 1977). Migrants themselves are the foremost victims of the health issues associated with migration. Migrants are found more likely to engage in sexual risk behaviors in various countries (Apostolopoulos et al. 2006; El-Bassel et al. 2011; Gorbach et al. 2000; Greif and Nii-Amoo Dodoo 2011; Hu et al. 2006; Tucker et al. 2005; Yang 2010). Take China as a specific example, its 200 million rural-urban migrants make the largest mobile population in human history. These rural migrants with minimal income and little legal rights suffer up to seven times higher risk for having STDs as compared to non-migrants (Wang et al. 2010), presenting a unique challenge of diffusing HIV and other STDs to previously unaffected populations.

Make no mistake, not all migrants engage in sexual risk behaviors. In fact, only a very small portion of them have done so and the behavior is highly variable within the

CONTACT Tingzhong Yang  tingzhongyang@zju.edu.cn  University School of Medicine, Children's Hospital, Hangzhou, China

*Current affiliation: School of Sociology and Anthropology, Sun Yat-sen University, Guangzhou, China

© 2020 Midwest Sociological Society

population. However, the transmission of diseases often takes the form of exponential growth, for which small variation at the initial phase makes great difference in outcome. Thus, it is of critical importance to understand the behavioral and social antecedents of those who do engage in sexual risk behaviors.

Scholars have widely discussed the individual attributes of sexual risk behavior, with many studies focusing on the socioeconomic and psychological correlates in particular (Wang et al. 2007; Xantidis and McCabe 2000; Yang et al. 2012; Yu et al. 2017; Zaller et al. 2014). However, both migration and sexual risk behavior are not just an individual choice but a result of the interpersonal and network-based chain of actions. Sexual risk behaviors are constrained and enabled by the interpersonal structures that exercise social control and transmit norms (Bearman, Moody, and Stovel 2004). Among these interpersonal factors, we focus on family bonds and deviant peer influence as significant predictors of sexual risk behaviors. Furthermore, all sexual behaviors can be conceptualized as making a choice in the “mate market” full of potential sex partners with various levels of accessibility, and our social networks have limited our access to some sections of the pool (Laumann et al. 2004). Social networks as an enabling structure may similarly affect sexual risk behaviors among migrants through the mediation of family bonds and peer deviance.

In this article, we will first discuss why family bonds and peer deviance constitute a pair of competing forces that importantly fortress the social life of migrants and why they matter for sexual risk behaviors. We then argue that family bonds and peer deviance do not grow out of a vacuum, instead, both can be traced back to a type of enabling social network structure – which is network homogeneity. In other words, family bonds and peer deviance are positioned as mediators between social network homogeneity and sexual risk behaviors. For this purpose, we peruse the survey data collected among the male migrant labors in two major Chinese cities and apply regressions and structural equation models to test our hypotheses.

Literature Review

Family Bonds and Peer Deviance during Migration

For decades, scholars have extensively studied familial and peer influences in the light of the temporal development of adolescents (for review see Furstenberg (2000)), whereas familial and peer influences during spatial transitions (i.e., migration) receive much less attention. In fact, the competition, rotation, and transition of the familial influence vis a vis peer influence are the most prominent feature during spatial transitions where individuals are voluntarily or forcibly removed from a traditional mode of living and are placed into entirely novel social settings.

Spatial transition such as migration resembles the temporal transition of adolescence in important ways. Both types of the transition require a renewed mode of living with a different set of social statuses and roles, e.g., migrants need to establish a guest identity and its associated social expectations in face of the host population. Both types of the transition remove individuals from the familiar rules of interaction, e.g., migrants will lose considerable contact with former associates and spend significantly more time with friends in the host society, a similar process when adolescents acquaint

new friends in school to replace neighborhood and family as the primary source of socialization. Also, the acculturative stress experienced by migrants is comparable to the stress experienced by adolescents in the transition from family to school (Escobar and Vega 2000). Overall, individuals going through spatial transition undergo the same mechanism that links at-risk behaviors to the differential roles of family bonds and peer deviance.

Peer Deviance and Sexual Risk Behaviors

Peer deviance is a paramount risk factor for a variety of deviance, as recorded in a plethora of contemporary sociology and criminology literature (Hoeben and Weerman 2014; Warr 2002; Warr and Stafford 1991). Differential association theory (Sutherland and Cressey 1994) posits that people learn from their associates the techniques and norms of conducting a deviance. This holds true for sexual deviance, which often provokes sanctions from the criminal justice system as well as a profound set of cultural stigmas rooted in the moral order of the familial and religious institutions.

Like many other types of deviance, people tend to conduct sexual risk behaviors (such as commercial sex) through an association with their deviant friends: deviant friends may directly guide others to the procurement of sexual services, provide information and tips about the sex black market, or influence friends' normative perception of the acceptability of commercial sex. Doing sexual risk behaviors is often impractical without knowing some deviant peers. Men who seek commercial sex need to learn the techniques of successfully hiring a sex worker, which include finding the safe communication channels, avoiding scams and robberies, deploying the appropriate scripts during negotiation, detecting diseased bodies, and understanding the symbolic meaning of the body pertain to the csex subculture (Laumann 1994; McKeganey and Barnard 1996). Particularly in places where commercial sex is offered covertly and evasively for the avoidance of punitive consequences, the shortage economy of sex work almost necessitates novices to complete their first commercial sex encounter under the guidance of an experienced peer.

Migrant laborers from several different countries were found more likely to patronize commercial sex when a larger portion of their networks are composed of deviant peers (Apostolopoulos et al. 2006; González-López 2005; Kelly et al. 2014; Yang, Kelly, and Yang 2016). Several studies based in China and Thailand report that occasions of commercial sex serve as an important socialization platform for men, where they would go to sex workers together in groups (Vanlandingham et al. 1998), exchange information about the sex workers (Havanon, Bennett, and Knodel 1993; Zheng 2009), and even pay for other patrons as an act of favor or bribery (Pan 1999; Zheng 2006). Deviant peer influence exists even beyond face-to-face interaction. Internet-based virtual communities have lately burgeoned to enable peer-to-peer communication and group discussion about the experiences of finding and procuring commercial sex (Sanders 2013). Thus, we summarize the discussed evidence in hypothesis *H1: peer deviance is positively associated with sexual risk behaviors, net of other factors*. The pathway A in Figure 1 is proposed to be statistically significant.

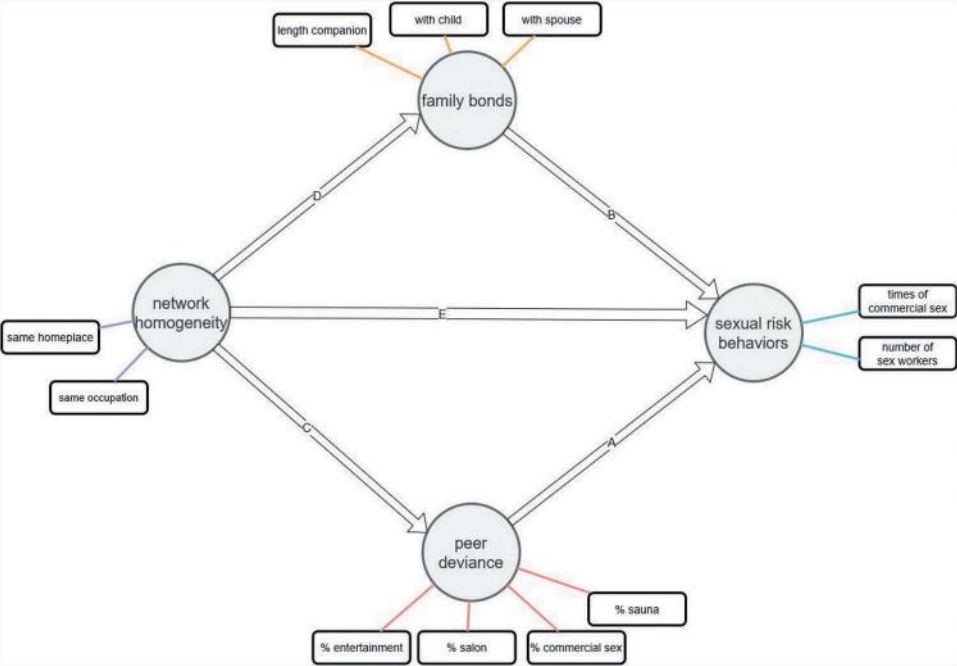


Figure 1. Conceptual paths and measurements.

Family Bonds and Sexual Risk Behaviors

Family bonds constitute a strong inhibitor for sexual risk behaviors, including commercial sex. Family bonds can directly affect sexual risk behavior by providing spousal companionship to fulfill men’s sexual need, the frustration of which may urge some men to seek commercial sex. Second, according to social bond theory, family bonds can also reduce sexual risk behaviors by imposing surveillance and guardianship (Gottfredson and Hirschi 1990; Maume, Ousey, and Beaver 2005; Umberson 1992). Commercial sex cannot occur with the presence of effective family bonds, so long as the actor rationally weighs the social costs of transgressing against the cultural and legal institution of family and marriage. The third mechanism that family bonds indirectly leverage to suppress sexual risk behaviors may relate to the biosocial benefits of stress reduction. Human beings, like other primates, can derive serotonin release when closely bonded with a pacific companion (Sapolsky 2004; Udry 1988; Umberson et al. 1996). This endocrinal reward pathway works comparably similar when a person is enjoying a bonded relationship and is using analgesic substance (Insel 2003; Young et al. 2001). Therefore, family bonds under most circumstances could reduce stress, raise emotional satisfaction, which considerably dilutes the risk of seeking commercial sex for the neuro-psychological fulfillment thereof.

Family bond with a spouse is found to associated with healthier lifestyle, while the dissolution of such bond leads to more risk behaviors (Barnes et al. 2006; Ford 2009; Umberson 1987, 1992). A classic example of the effects of family bonds is shown in Sampson and Laub’s tracking of the development of a few hundred delinquent boys, for whom entering a marriage and having a child was the key turning point for crime desistance (Sampson and Laub 2003). Udry (1988) found that intact family structure

exerts suppressive impact on the association between androgenic hormone level and sexual deviance. Migrant men living apart from spouses showed a greatly elevated risk of sexual risk behaviors compared to those living with a spouse (Mercer et al. 2007; Yang, Kelly, and Yang 2016). Women are also protected by family bonds from the initiation of sexual risk behavior (Taylor-Seehafer and Rew 2000). Stronger family bonds such as marriage and parenthood are found to reduce the use of substances and pornography (Akers and Sellers 2000; Mesch 2009; Yang and Yang 2017). Therefore, we propose in hypothesis H2 that *family bonds are inversely associated with sexual risk behaviors, net of other factors*. The pathway B in Figure 1 will be statistically significant.

Social Network Homogeneity as a Ties-generating Structure

Conventional wisdom may uncritically assume that individuals have the agency in the choice of family bonds or deviant peers, while the structuration of such exercise of choice is rarely discussed. However, an individual's connection to family bonds and deviant peers is constrained or enabled by social network structures such as network homogeneity. The effects of family bonds and deviant peers may become activated only when certain structures of social networks enable the exposure of an individual to these forces. Furthermore, instead of as an individual property, connections to both families and deviant peers are a feature of the interpersonal collectivity, we must focus on the macro-level interpersonal context that provided the structural ecology to make connections possible. In this study, we argue that the homogeneity of social networks is such a structure that conditions the tendency and likelihood for a person to develop connections to family members versus deviant peers.

We broadly define network homogeneity as the share of ties in an ego's social networks that are connected to alter with similar demographic characteristics as the ego. Earlier studies have sometimes touched base with communal homogeneity regarding the formation of friendship and social control (Miethe, Hughes, and McDowall 1991; Sampson 1988; Smith, Frazee, and Davison 2000). Formal theory on group formation posits that heterogeneity/homogeneity in a place shapes the exposure of intergroup contact (Blau 1977, 1994). Yet, the homogeneity of a place is still different from the homogeneity of a person's social networks, much needed are more studies on how network homogeneity affects deviance through the development of familial and deviant ties.

Although we know relatively little about how network homogeneity affects the formation of family bonds, some precursors had rigorously articulated how network homogeneity shapes the quality and quantity of information and resources obtainable through the connections. People have a cognitive predisposition to establish ties with others if they are already both connected to a third party, therefore, creating a tendency that most networks are naturally homogeneous (McPherson, Smith-Lovin, and Cook 2001). As the default mode in most people's social networks, a homogeneous network tends to feature redundant resources and information that do little to advance social mobility. Leveraging Lin's distinction of homogenous ties as a source of identity-based exclusive associations (Lin 2002), Warren (2008) argued that homogeneity may bring forth the dark side of social networking. Overall, homogenous networks tend to feature strong and binding ties at the expense of bridging ties, and consequently limit an actor's span of reach for alternative information, opportunities, as well as the diversity and sum of resources

(Adams and Torr 1998; Granovetter 1973; Kleit and Carnegie 2011; Mullan 1989). Thus, network homogeneity may be detrimental to family bonds because it restricts bridging ties and resource flow. For instance, people with greater resources and social capital are more likely to experience marriage and childbearing, but homogeneous social network decreases individuals' connection to diverse sectors of the society and their very capacity to accumulate capital. Network homogeneity is found the culprit for the lower marriage rate among African American women because their social networks contain fewer bridging ties across communities (Laumann 1994).

Greater network homogeneity may be associated with peer deviance by depriving people of the bridging opportunities to higher social strata. Compared to migrants who possess a diversified portfolio of friends as sorted by nativity and race, those who predominately interact with other fellow migrants tend to report worse mental health wellbeing (Bulut and Gayman 2016; Escobar and Vega 2000) and display a higher likelihood of health-risk behaviors (González-López 2005; Yang, Kelly, and Yang 2016; Yang and Yang 2018). Arguing that homogeneity may "affect the breadth of ties or the extent to which friendship ties bridge racial/ethnic divisions in the neighborhood", Warner et al. (Warner, Swartz, and Hawk 2015) found that homogeneity decreases informal social control at the individual level. In addition, homogenous networks may also generate a social closure for the embedded individuals since they can only rely on limited types of social support and have little leeway to escape when the providers of the support become coercive and deviant (Haynie 2001; Haynie and Osgood 2005). This scenario prevails among the underclass and marginal populations, who are subject to the strong influence of deviant peers because these are the only support and intimacy they have (Cloward and Ohlin 1960; Ilan 2015). Alternatively, the attitudinal divergence seen in a heterogenous network allows for greater room of breaking-up with deviant peers (Bienenstock, Bonacich, and Oliver 1990).

In sum, we hypothesize that network homogeneity is a formative structure to affect peer deviance and family bonds. *Peer deviance and family bonds are both associated with social network homogeneity (H3)*, that is, the pathway C and D in Figure 1 will be statistically significant. *Peer deviance and family bonds also mediate the pathway between network homogeneity and sexual risk behaviors (H4)*, that is, direct path E in Figure 1 will become insignificant or its coefficient is smaller than the product of A x C and the product of B x D.

Methodology

Data

The current study utilizes a survey that collected detailed information on sexual behaviors among a sample of male migrant laborers in China in 2011. China's 200 million migrant laborers hail as the world's largest migrant population. Compared to non-migrants in China, migrant laborers have a considerably elevated risk of using commercial sex (10%-27% vs 6-10%) (Chen et al. 2009; Hu et al. 2006; Yang et al. 2012). The China Migrant Sexual Health Survey used in this study employed multi-stage clustered sampling strategy to recruit male migrant laborers from the capital cities of the two largest migrant-influx provinces (Zhejiang and Guangdong) in China, which altogether received about

30 million migrant laborers in 2012 (National Bureau of Statistics 2012). The survey team first identified several districts in each city, then cooperated with local CDCs and health units to recruit respondents at six types of work sites where migrant laborers concentrated: construction sites, transportation sites, light industry factories or service centers, small business, others. A quota based on the population size of each occupation was imposed during the sampling.

Surveyors were medical professionals who received the protocol training prior to the survey and had reputable educational background in medical ethics. The survey was self-administered individually in residences or in a secluded area, but staffs were present to guide the question flow and assist those with literacy difficulty. Respondents were given a small token of appreciation (toothbrush and tooth-paste) and a health education brochure for their participation in the study.

Measurement

We use the frequency of commercial sex and number of hired sex workers to measure sexual risk behavior. The survey started with a filter question “have you had non-marital sex.” Respondents were directed to “if yes, whom were you having non-marital sex with: fiancée, mistress, girlfriend, prostitute, others” – more than one type of sex partner could be indicated. Those who chose “prostitute” were again directed to another two questions: “how many times have you been to a prostitute” and “how many prostitutes have you had sex with”. The respondents answered these questions from two scales consisting of 1, 2–3, 4–5, 6–7, 8–9, more than 10 times/people.

Peer deviance is the self-reported percentage of peers engaged in a list of sexual deviance. The survey asked respondents to estimate the percentage of their friends who had received massages from a girl in beauty salon, in a bath center, in an entertainment venue, and had sex with a sex worker.

For family bonds, the survey inquired “where is your wife when you work away from your hometown” and “where are your children when you work away from your hometown”. Those who answered “stays with me” were coded 1 for family bond. Months spent with families every year are another indicator of the strength of family bonds.

Network homogeneity refers to the extent that the nodes of a network share similar attributes. Network homogeneity can be measured in many ways depending on what exact attribute is under investigation, and different types of homogeneity may overlap to create multiplex dimensions. McPherson, Smith-Lovin, and Cook (2001) listed the most salient dimensions of network homogeneity discussed by the scholarship as race, sex and gender, age, religion, education, occupation, behavior, attitudes, and network position. For migrants, the most important characteristics that determine the tie formation pattern and their daily interactions are nativity and occupation. Migrants often leave their origin-place with fellows from the same town, people sharing the same nativity also provide most help during the early stage of settlement (Amuedo-Dorantes and Mundra 2007). Afterward, migrants start to acquaint new friends, obtain support, and spend more time with others from the same occupation, in addition to people from their homeplace (Mullan 1989). Because of this rationale, we used two indicators represent migrants’ network homogeneity by nativity and occupation: “how many of your friends are from

your own town”, “how many of your friends are not migrant laborers”. Each item enumerates seven counts ranging from 1 to 7 and above.

Other covariates include income, education, age, length of stay in the city, health behaviors (smoking and drinking), hedonistic beliefs, and health knowledge about HIV.

Statistical Analysis

We tested the path coefficients and mediations as specified in [Figure 1](#) and our hypotheses. First, zero-inflated negative binomial regression was conducted to demonstrate the associations between sexual risk behavior and the explanatory variables, findings at this stage are considered exploratory. Second, to more systematically test the empirical structure between the main factors and to establish the mediations, we employed Structural Equation Model (SEM). SEM uses latent constructs to account for measurement errors, allowing us to create network homogeneity, peer deviance, and family bonds based on both observed indicators and measurement errors, instead of summing the scores of the indicators. Unlike regressing on observed variables, the latent construct approach avoids the issues of multi-collinearity by treating observed variables as sub-dimensions of a common construct rather than covariates.

The classic approach to mediation analysis is a three-step procedure proposed by Baron and Kenny (1986), which concludes with mediation effect if the association between independent and dependent variables drops in magnitude or in significance after introducing a mediator. However, recent scholarship has called for a formal test on mediation effect (Iacobucci, Saldanha, and Deng 2007; MacKinnon and Fairchild 2009; Zhao, Lynch, and Chen 2010). SEM not only calculates direct effects, indirect effects, total effects, and the ratio between them, it also tests the significance of these parameters, thus informing us of the magnitude and significance of the mediations. In the updated literature, scholars recommend bootstrap resampling to quantify mediation effects with confidence intervals (Preacher and Hayes 2008; Zhao, Lynch, and Chen 2010).

We used the Weighted Least Square with Mean-Variance with robust errors for estimating the SEMs and performed 377 bootstrap resampling for 95% Confidence Intervals. We tested mediation effects by comparing the changes in statistical associations after mediators were introduced, and also by the bootstrapped ratio of direct effect to total effect. For the goodness of fit of SEMs, we reported the commonly used fit indices (Kline 2005): the Tucker–Lewis Index (TLI), Comparative Fit Index (CFI), and the root-mean-square error of approximation (RMSEA). CFI and TLI are considered satisfactory when above 0.9, and are excellent when above 0.95. RMSEA below 0.08 is satisfactory and is excellent below 0.05 (Browne and Cudeck 1992). We used the lavaan package in R (Rosseel 2012) to conduct the statistical analyses.

Empirical Results

[Table 1](#) gives a glance of the basic information of our sampled male migrant workers. The prevalence of sexual risk behaviors in terms of frequency and encounters is very high in this population, with an average male rural-urban migrant having used more than two sex workers and having done so between one to two times. The mean homeplace homogeneity is 0.92, which indicates the social life of these migrants relies heavily on hometown friends

Table 1. Descriptive statistics of the sample.

N=1583	Proportion	Mean (s.d.)
Sexual risk behavior		
-Times of commercial sex		2.37 (1.80)
-Number of sex workers		1.88 (2.02)
Homogeneity of social networks		
-Homeplace homogeneity		.92 (.57)
-Occupational homogeneity		.63 (.19)
Bonds with family		
-stay with wife	31.8%	
-stay with child	17.4%	
-months unite with family		3.0 (2.53)
Percentage of deviant peers		
-patronized beauty salons	48.5%	
-been to sauna	44%	
-been to leisure venues	44%	
-solicited sex worker	48.5%	
Length of stay in the city		5.53 (2.31)
Age (min=16, max=64)		30.6 (7.53)
Income (1 =<1000CNY; 6 = 5000CNY+)		3.28 (1.72)
Education		
-elementary school or below	11.0%	
-junior high	52.3%	
-high school or vocational	25.8%	
-college or above	10.9%	
Occupational classification		
-construction	47.3%	
-transportation	25.2%	
-light industry	18%	
-business	7.9%	
-others	1.6%	
HIV safe belief		4.52 (1.48)
Pleasure-seeking beliefs		3.96 (1.66)
Smoking	64.6	
Drinking	46.3	

and they have nearly equal number of hometown friends and generic friends. Occupational homogeneity is slightly lower at .63, meaning that for every generic friend they have, .63 person works in the same occupation. A total of 31.8% of the migrants are accompanied by a spouse, 17.4% are accompanied by a child, and the average time reunited with families is 3 months. Close to half of their friends have engaged in a deviant-sexual behavior. The average age of this population is 31 years old, over a half of them (52.3%) have middle school education. Their mean income of 3.28 translates to US Dollar of \$380. The majority work as construction workers (47.3%). Smoking (64.6%) and drinking (46.3%) are popular activities our migrant respondents love to indulge.

As argued in the methodological discussion, counts of deviant human behaviors often involve an excess of zero-incidence and the difference between zero-incidence and any non-zero count is qualitatively distinct from the difference between counts above one. For example, a man who has never used any sex worker likely has a distinct biography of social, developmental, and economic experiences than men who bought sex once, twice, or a hundred times. Table 2 showed findings of zero-inflated negative binomial regressions with separated full count model and zero-count model. For the number of sex workers, one unit increase in deviant peers is associated with not having had sex worker by a factor of .95 ($p < .001$), net of the effects of all other covariates. For the full-count model that treats zeroes as the same as any other counts,

Table 2. Zero-inflated negative binomial regressions of sexual risk behavior variables on network homogeneity, family bonds, and peer deviance.

	Number of sex workers				Times of commercial sex			
	Total count model		Zero count model		Total count		Zero count	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Focal concepts								
Homeplace homogeneity	1.26***	1.14, 1.39	2.41	.98, 5.87	.92	.81, 1.03	2.73	.74, 10.0
Occupational homogeneity	.98	.68, 1.42	5.91	.29, 11.8	.83	.56, 1.24	4.35	.42, 44.8
Stay with wife	.95	.81, 1.10	1.88	.75, 4.71	.74**	.63, .88	1.84	.51, 6.62
Stay with child	.74***	.63, .87	.49	.19, 1.25	1.07	.90, 1.26	1.05	.32, 3.41
Time stay together	1.00	.98, 1.03	1.06	.90, 1.24	1.04**	1.02, 1.07	1.14	.92, 1.41
Deviant peers	1.01***	1.00, 1.01	.96***	.94, .97	1.01 ***	1.00, 1.01	.95***	.93, .97
Control variables								
Age	1.00	.99, 1.01	.99	.94, 1.04	1.00	.99, 1.01	.99	.94, 1.06
Education	1.07**	1.02, 1.12	.77	.51, 1.16	.97	.91, 1.03	.81	.45, 1.45
Income	1.03*	1.00, 1.05	1.03	.86, 1.24	.99	.97, 1.02	.95	.71, 1.25
Occupation (ref = construction)	1.01	.89, 1.14	.51	.21, 1.21	.95	.83, 1.10	.39	.13, 1.21
Transportation	1.14	.99, 1.30	.82	.32, 2.08	1.00	.87, 1.16	.20	.03, 1.54
Light industry	1.11	.92, 1.34	1.12	.38, 3.23	1.08	.88, 1.32	1.07	.29, 3.93
Business	.90	.66, 1.22	.00	.00, .00	.92	.64, 1.31	.00	.00, .00
Others								
AIDS knowledge	.99	.96, 1.02	1.41*	1.05, 1.88	.98	.95, 1.02	1.58*	1.03, 2.42
Hedonistic beliefs	.98	.96, 1.01	.77*	.61, .97	.97*	.94, 1.00	.63*	.41, .98
Smoking	1.08	.98, 1.18	1.02	.52, 1.99	1.32***	1.18, 1.48	2.17	.55, 8.65
Drinking	1.02	.93, 1.13	.64	.31, 1.30	1.46***	1.31, 1.63	1.39	.49, 3.96
Length in city	1.01	.99, 1.04	1.96	.94, 4.14	1.03*	1.01, 1.06	2.81	.82, 9.65

* $p < .05$, ** $p < .01$, *** $p < .001$.

homeplace homogeneity ($OR = 1.26$, $p < .001$) and peer deviance ($OR = 1.01$, $p < .001$) are found positively associated with having hired more sex workers, while family bonds with child is negatively associated with the number of sex workers hired by a factor of .74 ($p < .001$).

For the zero-count model of the times of commercial sex, we also found that peer deviance reduces the chance of having never paid for sex by a factor of .95 ($p < .001$). For the full-count model, the companionship of a spouse is negatively associated with the times of commercial sex by a factor of .74 ($p < .01$), peer deviance is positively associated with the frequency of commercial sex by a factor of 1.01 ($p < .001$). However, lengthier reunion time with the family is also associated with more times of commercial ($OR = 1.04$, $p < .01$).

With this series of zero-inflated negative binomial regressions, we can confirm that first, hypothesis H1 has its supporting evidence, since peer deviance is positively associated with sexual risk behaviors. Second, we also have preponderately favorable evidence for hypothesis H2, although the finding about family reunion time contradicts the hypothesis. Third, we know that network homogeneity as measured by homeplace homogeneity is associated with sexual risk behavior. So far, regression models yielded estimates for direct associations, but regressions cannot test the mediatory phenomena simultaneously postulated by H3 and H4. Therefore, we turn to SEM for more sophisticated and intuitively appealing analyses.

The confirmatory factor analysis in Table 3 showed that the observed measures loaded significantly on their own latent construct and that the measurements we chose for our focal concepts are valid and internally consistent. For example, peer deviance as a concept

Table 3. Confirmatory factor analysis: factor loadings of observed indicators on latent constructs with standard errors in bracket. Statistics in braces “{}” are standardized covariances between latent constructs.

Observed:	Latent:	Peer deviance	Family bonds	Network homogeneity	Sexual risk behavior
Peer deviance	<i>Patronized beauty salons</i>	1‡	{-.28}***	{.45}***	{.44}***
	<i>been to sauna</i>	1.15(.07)***			
	<i>been to leisure venues</i>	1.11(.06)***			
	<i>solicited sex worker</i>	.82(.06)***			
Family bonds	<i>Stay with wife</i>		1‡	{-.54}***	{-.32}***
	<i>stay with child</i>		.94 (.06)***		
	<i>months united with family</i>		1.36 (.15)***		
Network homogeneity	<i>Homeplace homogeneity</i>			1‡	{.42}***
	<i>Occupation homogeneity</i>			1.11 (.08)***	
Sexual risk behavior	<i>Numbers of sex workers</i>				1‡
	<i>Times of solicitation</i>				.39 (.06)***
Goodness of fit		$\chi^2(df = 35) = 111.9$, CFI = .98, robust CFI = .91, TLI = .98, robust TFI = .85, RMSEA = .04, robust RMSEA = .08			

‡fixed loading for identification, * $p < .05$, ** $p < .01$, *** $p < .001$.

is a latent construct not directly measured but represented by four observed indicators. As all four observed indicators are loaded significantly onto the latent construct in the same direction, we may conclude that these observed indicators are internally reliable and consistent for measuring peer deviance. The goodness of fit of the confirmatory factor analysis exceeds the satisfactory cutoffs. Table 3 also showed the covariances between latent constructs. Confirming hypothesis H1, peer deviance is positively correlated with sexual risk behavior (.44, $p < .001$); confirming hypothesis H2, family bonds are negatively correlated with sexual risk behavior (–.32, $p < .001$); finally, confirming hypothesis H3, network homogeneity is significantly associated with peer deviance (.45, $p < .001$) and family bonds (–.54, $p < .001$).

When paths are “causally” added to the latent constructs, we get the SEM in Figure 2. With CFI and TFI above .95 and RMSEA below .05, the SEM achieved an excellent goodness of fit. According to the significant associations, hypotheses H1, H2, and H3 are all proved. Now, network homogeneity is directly associated with sexual risk behaviors, but it also runs through family bonds and peer deviance to affect sexual risk behaviors, known as the indirect effect that can be calculated as multiplications. For this, we can simply calculate the indirect effect of network homogeneity on sexual risk behavior as $-.56 \times -.12 + .47 \times .31 = .21$. Compare the direct effect (.22) with the indirect (.21), we may conclude their strengths are comparably equal. The next Table 4 shows the estimates of direct and indirect effects by the model as well as by bootstrap resampling. Although the direct effect of network homogeneity is still significant (.71, $p < .001$), peer deviance and family bonds altogether mediate about half of the total effects (.69, $p < .001$) of network homogeneity on sexual risk behavior. By the higher-end estimate on the 95% confidence interval, two thirds ($1 - .33 = .67$) of the total effects are mediated. The mediation analysis from multiple methods has all rendered support to hypothesis H4.

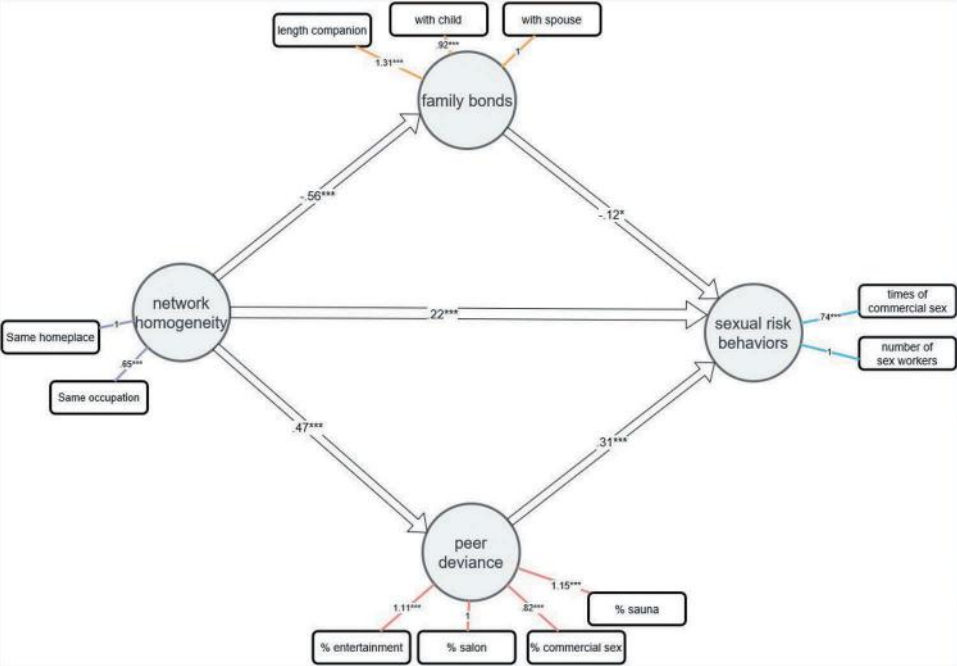


Figure 2. Structural equations between network homogeneity, peer deviance, family bonds, and sexual risk behaviors. All estimates are standardized. Goodness of fit indices: $\chi^2(df = 36) = 113$, CFI .99, TLI .98, RMSEA .05.

Table 4. Mediation effects by model estimation and by bootstrap resampling (repeat = 377).

	Estimates with (s.e.) by the model	Bootstrapped means	Bootstrapped 95% confidence intervals
Direct effect (pathway E)	.71(.14)***	.71	.42 ~ 1.00
Indirect effect (pathway C-A, D-B)	.69(.12)***	.69	.45 ~ .94
Direct-total ratio	.51(.08)***	.51	.33 ~ .69

Discussion

As an unintended consequence, human migration has the great potential of transmitting new infections to previously unconnected populations by creating vectors of interpersonal contacts (Prothero 1977). HIV/STDs among migrants have lately received considerable attention among scholars and practitioners (Apostolopoulos et al. 2006; Tucker et al. 2005; Wang et al. 2010; Yang, Kelly, and Yang 2016). The higher prevalence of STDs and sexual risk behaviors among migrants in many parts of the world has brought up an important question not just of a biological nature but of a very social one: what conditions have made victim of the otherwise normal human beings who just happen to have changed their place of living, working, and thriving?

Much of the scholarship have devoted to investigate the proximal psychological factors and behavioral antecedents of migrants' sexual risk behaviors, and these studies tend to adopt an individualistic, behavioral, and medical intervention-oriented approach. In

contrast, the current study bridged this gap by leveraging two core bodies of literature to analyze sexual risk behaviors among migrant labors, i.e., the notion of homogeneity in social network theory, and the debate over family-peer relationships as seen in life-course studies. We reasoned that the social and lifestyle changes caused by the spatial shift of migration share key features with the similar changes seen during the temporal shift from adolescence to adulthood. Whereas adolescents have to face the competition for influence between the family and peers, with the dissolution of original social institutions, migrants also have to rebalance their social world between family members and friends. Given the importance of family bonds and peer deviance during migration, we hypothesized that family bonds tend to suppress the proclivity toward sexual risk behaviors among migrant men, meanwhile deviant peers do the opposite to increase the likelihood.

We then argued that neither family bonds or deviant peers come to exist solely out of personal choice and preference. Indeed, the type of social networks individual migrants are embedded in may largely constrain or enable certain types of associates one eventually develops. While previous literature has discussed how homogenous networks lead to the closure of one's networks that may hamper social mobility, bridging social capital, and the spread of information (Blau 1977, 1994; Kleit and Carnegie 2011; Mullan 1989; Warren 2008), few have leveraged such theoretical insight to explain how network homogeneity affects family bonds and peer deviance. The current study proposed network homogeneity as a favorable platform for the development of peer deviance and weakening of family bonds.

Focusing on the homogeneity of social networks, the empirical findings through structural equation modeling and mediation analysis support the hypothesis that network homogeneity as measured by homeplace homogeneity and occupational homogeneity is associated with sexual risk behaviors both directly and, by an equal magnitude, via the indirect effects of family bonds and peer deviance. In other words, family bonds and peer deviance significantly mediate the association between sexual risk behaviors and network homogeneity (hypothesis H3 and H4). As anticipated, family bonds and peer deviance are inversely associated with each other: family bonds are associated with fewer sexual risk behaviors (hypothesis H2) and peer deviance is associated with more sexual risk behaviors (hypothesis H1).

By finding these results, this study engages with the scholarship on the behavioral consequences of social network structures. Network homogeneity is often thought of as a mere numeric share of certain connections. Besides, living in homogenous networks is almost a default mode of everyday life for most people. However, this study contends in agreement with several previous studies that a homogenous network can be associated with deviant behaviors. A homogenous network circulates redundant information and resources, gets saturated by similar-content information and resources faster than a heterogeneous network (Baer 2010; Granovetter 1973). A homogenous network, by definition, tends to reduce intergroup contact and subjects people to the stronger pressure of in-group subculture (Bienenstock, Bonacich, and Oliver 1990; Blau 1977). Delinquent people in a homogenous network have harder time of "getting out" to obtain alternative means of respect and livelihood (Ilan 2015), upward mobility may also decrease in these networks (Cattell 2001). In addition, people may easily assimilate the deviant norms shared among fellows who are like themselves (Haynie 2001). This phenomenon is particularly amplified in marginal populations such as migrant labors, whose primary

socialization platform is homogenously composed of other migrants from their hometowns and work in the same place.

Our findings echo the tradition of formal sociology which emphasizes the equal importance of structures and individual psychosocial attributes in understanding sexual behaviors. While family bonds and peer deviance are more proximal factors behind sexual risk behaviors among migrant labors, they also mediate the interpersonal structure that is network homogeneity. Although we do not intend to causally establish the role of network homogeneity due to the cross-sectional nature of the study, this study does elucidate how, via family bonds and peer deviance, network homogeneity is both directly and indirectly associated with sexual risk behaviors among migrant labors.

A Note on Reverse Causality

The rich tradition in the deviance scholarship has brought to our attention the possible reverse causality and selection effect in our conceptual model. First, people who frequent sex workers may develop homogenous social networks as a consequence (reversing path E in [Figure 1](#)). Second, peer deviance may be a projection of one's own sexual risk behavior, rather than its antecedent (reversing path A in [Figure 1](#)). Third, sexual risk behaviors likely disrupt family bonds (reversing path B in [Figure 1](#)).

While the cross-sectional nature of this study does not allow a complete decomposition of the recursive pathways, concerns about reverse causality between the key variables can be ameliorated for two reasons. First for path E, deviance's selection effect is primarily discussed for peer selections, while network homogeneity by origin-place is unlikely a product of one's own behavior. Homogenous networks and homophily are the default mode of human interactions due to the higher likelihood and greater cognitive comfort of socializing with similar others (Mayhew et al. 1995; McPherson, Smith-Lovin, and Cook 2001). For migrant laborers, befriending people from same homeplaces is the default mode for leaving one's hometown and starting new life in the cities (Connelly, Roberts, and Zheng 2011; Jin et al. 2012; Liu, Li, and Breitung 2012). This natural socialization platform is unlikely a result of individual choice.

For path A, some may argue that self-reported peer deviance may be irrelevant to the actual peer deviance and largely a projection of respondent's own behavior (Young et al. 2014). We dispute this with a cross-comparison in Appendix A. The reported levels of peer deviance are consistently and significantly higher among those who initiated commercial sex in the company of peers or referred by peers, compared to those initiated on their own. Since both types of the respondents have conducted the same behavior, the variation in peer deviance cannot just be a projection of their own behavior but has to relate to the different modes of the behavior, i.e., whether peers were present at the time of buying sex. Therefore, our measurement of peer deviance indeed captured a significant variation in the actual peer behaviors. Lastly, for path B, sexual risk behaviors will likely dissolve marriage if detected. However, the risk is typically relevant for spousal bond only. Sexual risk behaviors are less likely to decrease the length of familial companion, which refers to all families including the spouse.

Compliance with ethical standards

The survey protocols were approved by the IRB at the correspondence author's institution (#03BSH010). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This study was funded by National Natural Science Foundation of China [71473221] and Health Culture Research Center of Shaaxi [JKWH2019-Y06].

Informed consent

Informed consent was obtained from all individual participants included in the study.

Notes on contributors

Xiaozhao Y. Yang is an associate professor in the Department of Sociology and Social Work at Sun Yat-sen University, a 2016 Ph.D. from Purdue University. His research on at-risk health behaviors and contextual effects appeared in over 30 peer-reviewed journal articles and has been recognized with awards from organizations including the ASA, SSSP, and USCIS.

Tingzhong Yang is a professor at Children's Hospital of Zhejiang University School of Medicine, a forefront researcher and activist against the harms of the tobacco industry.

ORCID

Xiaozhao Y. Yang  <http://orcid.org/0000-0001-7354-7208>

References

- Adams, Rebecca G. and Rachel Torr. 1998. "Factors Underlying the Structure of Older Adult Friendship Networks." *Social Networks* 20 (1):51–61. doi:[10.1016/S0378-8733\(97\)00004-X](https://doi.org/10.1016/S0378-8733(97)00004-X).
- Akers, Ronald and Christine S Sellers. 2000. *Criminological Theories*. Los Angeles, CA: Roxbury Company.
- Amuedo-Dorantes, Catalina and Kusum Mundra. 2007. "Social Networks and Their Impact on the Earnings of Mexican Migrants." *Demography* 44 (4):849–63. doi:[10.1353/dem.2007.0039](https://doi.org/10.1353/dem.2007.0039).
- Apostolopoulos, Y., S. Sonmez, J. Kronenfeld, E. Castillo, L. McLendon, and D. Smith. 2006. "Sti/Hiv Risks for Mexican Migrant Laborers: Exploratory Ethnographies." *Journal of Immigrant and Minority Health* 8 (3):291–92. doi:[10.1007/s10903-006-9334-2](https://doi.org/10.1007/s10903-006-9334-2).
- Baer, Markus. 2010. "The Strength-of-Weak-Ties Perspective on Creativity: A Comprehensive Examination and Extension." *Journal of Applied Psychology* 95 (3):592–601. doi:[10.1037/a0018761](https://doi.org/10.1037/a0018761).
- Barnes, Grace M., Joseph H. Hoffman, John W. Welte, Michael P. Farrell, and Barbara A. Dintcheff. 2006. "Effects of Parental Monitoring and Peer Deviance on Substance Use and Delinquency." *Journal of Marriage and Family* 68 (4):1084–104. doi:[10.1111/j.1741-3737.2006.00315.x](https://doi.org/10.1111/j.1741-3737.2006.00315.x).

- Baron, R.M. and D.A. Kenny. 1986. "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations." *Journal of Personality and Social Psychology* 51 (6):1173–82. doi:[10.1037/0022-3514.51.6.1173](https://doi.org/10.1037/0022-3514.51.6.1173).
- Bearman, P.S., J. Moody, and K. Stovel. 2004. "Chains of Affection: The Structure of Adolescent Romantic and Sexual Networks." *American Journal of Sociology* 110 (1):44–91. doi:[10.1086/386272](https://doi.org/10.1086/386272).
- Bienenstock, Elisa Jayne, Phillip Bonacich, and Melvin Oliver. 1990. "The Effect of Network Density and Homogeneity on Attitude Polarization." *Social Networks* 12 (2):153–72. doi:[10.1016/0378-8733\(90\)90003-R](https://doi.org/10.1016/0378-8733(90)90003-R).
- Blau, Peter M. 1977. *Inequality and Heterogeneity-a Primitive Theory of Social Structure*. New York, NY: Free Press.
- Blau, Peter M. 1994. *Structural Contexts of Opportunities*. Chicago, IL: University of Chicago Press.
- Browne, Michael W. and Robert Cudeck. 1992. "Alternative Ways of Assessing Model Fit." *Sociological Methods & Research* 21 (2):230–58. doi:[10.1177/0049124192021002005](https://doi.org/10.1177/0049124192021002005).
- Bulut, Elif and Matthew D. Gayman. 2016. "Acculturation and Self-Rated Mental Health among Latino and Asian Immigrants in the United States: A Latent Class Analysis." *Journal of Immigrant and Minority Health* 18 (4):836–49. doi:[10.1007/s10903-015-0258-1](https://doi.org/10.1007/s10903-015-0258-1).
- Cattell, Vicky. 2001. "Poor People, Poor Places, and Poor Health: The Mediating Role of Social Networks and Social Capital." *Social Science & Medicine* 52 (10):1501–16. doi:[10.1016/S0277-9536\(00\)00259-8](https://doi.org/10.1016/S0277-9536(00)00259-8).
- Chen, Xinguang, Bonita Stanton, Xiaoming Li, Xiaoyi Fang, Danhua Lin, and Qing Xiong. 2009. "A Comparison of Health-Risk Behaviors of Rural Migrants with Rural Residents and Urban Residents in China." *American Journal of Health Behavior* 33 (1):15–25. doi:[10.5993/AJHB.33.1.2](https://doi.org/10.5993/AJHB.33.1.2).
- Cloward, Richard A and Lloyd E Ohlin. 1960. *Illegitimate Means and Delinquent Subcultures*. Upper Saddle River, NJ: Pearson/Prentice Hal.
- Connelly, Rachel, Kenneth Roberts, and Zhenzhen Zheng. 2011. "The Settlement of Rural Migrants in Urban China – Some of China's Migrants are Not 'Floating' Anymore." *Journal of Chinese Economic and Business Studies* 9 (3):283–300. doi:[10.1080/14765284.2011.592356](https://doi.org/10.1080/14765284.2011.592356).
- El-Bassel, N., L. Gilbert, A. Terlikbayeva, B. West, P. Bearman, E. Wu, B. Zhussupov, I. Platais, and A. Brisson. 2011. "Implications of Mobility Patterns and Hiv Risks for Hiv Prevention among Migrant Market Vendors in Kazakhstan." *American Journal of Public Health* 101 (6):1075–81. doi:[10.2105/AJPH.2010.300085](https://doi.org/10.2105/AJPH.2010.300085).
- Escobar, I. Javier and A. William Vega. 2000. "Mental Health and Immigration's Aaas: Where are We and Where Do We Go from Here?" *The Journal of Nervous and Mental Disease* 188 (11):736–40. doi:[10.1097/00005053-200011000-00003](https://doi.org/10.1097/00005053-200011000-00003).
- Ford, Jason A. 2009. "Nonmedical Prescription Drug Use among Adolescents." *Youth & Society* 40 (3):336–52. doi:[10.1177/0044118X08316345](https://doi.org/10.1177/0044118X08316345).
- Furstenberg, Frank F. 2000. "The Sociology of Adolescence and Youth in the 1990s: A Critical Commentary." *Journal of Marriage and Family* 62 (4):896–910. doi:[10.1111/j.1741-3737.2000.00896.x](https://doi.org/10.1111/j.1741-3737.2000.00896.x).
- González-López, G. 2005. *Erotic Journeys: Mexican Immigrants and Their Sex Lives*. Berkeley, CA: Univ of California Pr.
- Gorbach, P.M., H. Sopheab, T. Phalla, H.B. Leng, S. Mills, A. Bennett, and K.K. Holmes. 2000. "Sexual Bridging by Cambodian Men: Potential Importance for General Population Spread of Std and Hiv Epidemics." *Sexually Transmitted Diseases* 27 (6):320–26. doi:[10.1097/00007435-200007000-00004](https://doi.org/10.1097/00007435-200007000-00004).
- Gottfredson, Michael R and Travis Hirschi. 1990. *A General Theory of Crime*. Redwood City, CA: Stanford University Press.
- Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78 (6):1360–80. doi:[10.1086/225469](https://doi.org/10.1086/225469).
- Greif, Meredith J. and F. Nii-Amoo Doodoo. 2011. "Internal Migration to Nairobi's Slums: Linking Migrant Streams to Sexual Risk Behavior." *Health & Place* 17 (1):86–93. doi:[10.1016/j.healthplace.2010.08.019](https://doi.org/10.1016/j.healthplace.2010.08.019).

- Havanon, Napaporn, Anthony Bennett, and John Knodel. 1993. "Sexual Networking in Provincial Thailand." *Studies in Family Planning* 24:1–17. doi:10.2307/2939210.
- Haynie, Dana L. and D. Wayne Osgood. 2005. "Reconsidering Peers and Delinquency: How Do Peers Matter?" *Social Forces* 84 (2):1109–30. doi:10.1353/sof.2006.0018.
- Haynie, Dana. 2001. "Delinquent Peers Revisited: Does Network Structure Matter?" *American Journal of Sociology* 106 (4):1013–57. doi:10.1086/320298.
- Hoeben, Evelien and Frank Weerman. 2014. "Situational Conditions and Adolescent Offending: Does the Impact of Unstructured Socializing Depend on Its Location?" *European Journal of Criminology* 11 (4):481–99. doi:10.1177/1477370813509346.
- Hu, Z., H. Liu, X. Li, B. Stanton, and X. Chen. 2006. "Hiv-Related Sexual Behaviour among Migrants and Non-Migrants in a Rural Area of China: Role of Rural-to-Urban Migration." *Public Health* 120 (4):339–45. doi:10.1016/j.puhe.2005.10.016.
- Iacobucci, Dawn, Neela Saldanha, and Xiaoyan Deng. 2007. "A Meditation on Mediation: Evidence that Structural Equations Models Perform Better than Regressions." *Journal of Consumer Psychology* 17 (2):139–53. doi:10.1016/S1057-7408(07)70020-7.
- Ilan, Jonathan. 2015. *Understanding Street Culture: Poverty, Crime, Youth and Cool*. Oxford, UK: Palgrave Macmillan.
- Insel, Thomas R. 2003. "Is Social Attachment an Addictive Disorder?" *Physiology & Behavior* 79 (3):351–57. doi:10.1016/S0031-9384(03)00148-3.
- Jin, Lei, Ming Wen, Jessie X. Fan, and Guixin Wang. 2012. "'Trans-local Ties, Local Ties and Psychological Well-being among Rural-to-Urban Migrants in Shanghai." *Social Science & Medicine* 75 (2):288–96.
- Kelly, Brian C., Tieqiao Liu, Xiaozhao Yosef Yang, Guanbai Zhang, Wei Hao, and Jichuan Wang. 2014. "Perceived Risk of Methamphetamine among Chinese Methamphetamine Users." *International Journal of Drug Policy* 25 (6):1076–83. doi:10.1016/j.drugpo.2014.05.007.
- Kleit, Rachel Garshick and Nicole Bohme Carnegie. 2011. "Integrated or Isolated? The Impact of Public Housing Redevelopment on Social Network Homophily." *Social Networks* 33 (2):152–65. doi:10.1016/j.socnet.2011.01.001.
- Kline, Rex B. 2005. *Principles and Practice of Structural Equation Modeling*. New York, NY: Guilford.
- Laumann, Edward O. 1994. *The Social Organization of Sexuality: Sexual Practices in the United States*. Chicago, IL: University of Chicago Press.
- Laumann, Edward O, Stephen Ellingson, Jenna Mahay, Anthony Paik, and Yoosik Youm, Eds.. 2004. *The Sexual Organization of the City*. Chicago, IL: University of Chicago Press.
- Lin, Nan. 2002. *Social Capital: A Theory of Social Structure and Action*. Cambridge, UK: Cambridge University Press.
- Liu, Ye, Zhigang Li, and Werner Breitung. 2012. "The Social Networks of New-generation Migrants in China's Urbanized Villages: A case Study of Guangzhou." *Habitat International* 36 (1):192–200. doi:10.1016/j.habitatint.2011.08.008.
- MacKinnon, David P and Amanda J Fairchild. 2009. "Current Directions in Mediation Analysis." *Current Directions in Psychological Science* 18 (1):16–20. doi:10.1111/j.1467-8721.2009.01598.x.
- Maume, Michael O, Graham C Ousey, and Kevin Beaver. 2005. "Cutting the Grass: A Reexamination of the Link between Marital Attachment, Delinquent Peers and Desistance from Marijuana Use." *Journal of Quantitative Criminology* 21 (1):27–53. doi:10.1007/s10940-004-1786-3.
- Mayhew, Bruce H., J. Miller McPherson, Thomas Rotolo, and Lynn Smith-Lovin. 1995. "Sex and Race Homogeneity in Naturally Occurring Groups." *Social Forces* 74 (1):15–52. doi:10.2307/2580623.
- McKeganey, Neil P and Marina Barnard. 1996. *Sex Work on the Streets: Prostitutes and Their Clients*. Buckingham, UK: Open University.
- McPherson, M., L. Smith-Lovin, and J.M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27:415–44. doi:10.1146/annurev.soc.27.1.415.
- Mercer, Alex, Rasheda Khanam, Emily Gurley, and Tasnim Azim. 2007. "Sexual Risk Behavior of Married Men and Women in Bangladesh Associated with Husbands' Work Migration and Living Apart." *Sexually Transmitted Diseases* 34 (5):265–73. doi:10.1097/01.olq.0000240384.61924.65.

- Mesch, G.S. 2009. "Social Bonds and Internet Pornographic Exposure among Adolescents." *Journal of Adolescence* 32 (3):601–18. doi:10.1016/j.adolescence.2008.06.004.
- Miethe, Terance D, Michael Hughes, and David McDowall. 1991. "Social Change and Crime Rates: An Evaluation of Alternative Theoretical Approaches." *Social Forces* 70 (1):165–85. doi:10.2307/2580067.
- Mullan, B. P. 1989. "The Impact of Social Networks on the Occupational Status of Migrants." *International Migration* 27 (1):69–86. doi:10.1111/j.1468-2435.1989.tb00347.x.
- National Bureau of Statistics. 2012. "2011 Nian Woguo Nongmingong Diaocha Jiance BaogaoCongress, 2017." Retrieved October 10, 2016. (http://www.stats.gov.cn/ztc/ztfx/fxbg/201204/t20120427_16154.html).
- Pan, Suiming. 1999. *Three "Red Light Districts" in China (Zhongguo Dixia Xingchanye Kaocha)*. Beijing: Qunyan Publishing House.
- Preacher, Kristopher J and Andrew F Hayes. 2008. "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models." *Behavior Research Methods* 40 (3):879–91. doi:10.3758/BRM.40.3.879.
- Prothero, R. Mansell. 1977. "Disease and Mobility: A Neglected Factor in Epidemiology." *International Journal of Epidemiology* 6 (3):259–67. doi:10.1093/ije/6.3.259.
- Rosseel, Yves. 2012. "Lavaan: An R Package for Structural Equation Modeling." *Journal of Statistical Software* 48 (2):1–36. doi:10.18637/jss.v048.i02.
- Sampson, Robert J. 1988. "Local Friendship Ties and Community Attachment in Mass Society: A Multilevel Systemic Model." *American Sociological Review* 53:766–79. doi:10.2307/2095822.
- Sampson, Robert J and John H Laub. 2003. *Shared Beginnings, Divergent Lives: Delinquent Boys to Age 70*. Cambridge, MA: Harvard University Press.
- Sanders, Teela. 2013. *Paying for Pleasure: Men Who Buy Sex*. London: Routledge.
- Sapolsky, Robert M. 2004. *Why Zebras Don't Get Ulcers: The Acclaimed Guide to Stress, Stress-Related Diseases, and Coping-Now Revised and Updated*. New York, NY: Holt paperbacks.
- Smith, William R, Sharon Glave Frazee, and Elizabeth L Davison. 2000. "Futuring the Integration of Routine Activity and Social Disorganization Theories: Small Units of Analysis and the Study of Street Robbery as a Diffusion Process." *Criminology* 38:489. doi:10.1111/j.1745-9125.2000.tb00897.x.
- Sutherland, E.H. and D. Cressey. 1994. "The Theory of Differential Association." Pp. 188–95 in *Theories of Deviance*, edited by S. H. Traub and C. B. Little. Itasca, IL: Peacock.
- Taylor-Seehafer, Margaret and Lynn Rew. 2000. "Risky Sexual Behavior among Adolescent Women." *Journal for Specialists in Pediatric Nursing* 5 (1):15–25. doi:10.1111/j.1744-6155.2000.tb00082.x.
- Tucker, Joseph D, Gail E Henderson, Tian F Wang, Ying Y Huang, William Parish, Sui M Pan, Xiang S Chen, and Myron S Cohen. 2005. "Surplus Men, Sex Work, and the Spread of Hiv in China." *AIDS* 19 (6):539–47. doi:10.1097/01.aids.0000163929.84154.87.
- Udry, J. Richard. 1988. "Biological Predispositions and Social Control in Adolescent Sexual Behavior." *American Sociological Review* 53 (5):709–22. doi:10.2307/2095817.
- Umberson, Debra. 1987. "Family Status and Health Behaviors: Social Control as a Dimension of Social Integration." *Journal of Health and Social Behavior* 28:306–19. doi:10.2307/2136848.
- Umberson, Debra. 1992. "Gender, Marital Status and the Social Control of Health Behavior." *Social Science & Medicine* 34 (8):907–17. doi:10.1016/0277-9536(92)90259-s.
- Umberson, Debra, Meichu D. Chen, James S. House, Kristine Hopkins, and Ellen Slaten. 1996. "The Effect of Social Relationships on Psychological Well-Being: Are Men and Women Really so Different?" *American Sociological Review* 61:837–57. doi:10.2307/2096456.
- Vanlandingham, Mark, John Knodel, Chanpen Saengtienchai, and Anthony Pramualratana. 1998. "In the Company of Friends: Peer Influence on Thai Male Extramarital Sex." *Social Science & Medicine* 47 (12):1993–2011. doi:10.1016/S0277-9536(98)00274-3.
- Wang, Bo, Xiaoming Li, Bonita Stanton, Xiaoyi Fang, Danhua Lin, and Rong Mao. 2007. "Hiv-Related Risk Behaviors and History of Sexually Transmitted Diseases among Male Migrants Who Patronize Commercial Sex in China." *Sexually Transmitted Diseases* 34 (1):1–8. doi:10.1097/01.olq.0000222668.95038.03.

- Wang, W, C Wei, M E Buchholz, M C Martin, B D Smith, Z J Huang, and F Y Wong. 2010. "Prevalence and Risks for Sexually Transmitted Infections among a National Sample of Migrants versus Non-Migrants in China." *International Journal of STD & AIDS* 21 (6):410–15. doi:[10.1258/ijsa.2009.008518](https://doi.org/10.1258/ijsa.2009.008518).
- Warner, Barbara D., Kristin Swartz, and Shila RenÉ Hawk. 2015. "Racially Homophilous Social Ties and Informal Social Control." *Criminology* 53 (2):204–30. doi:[10.1111/1745-9125.12066](https://doi.org/10.1111/1745-9125.12066).
- Warr, Mark. 2002. *Companions in Crime: The Social Aspects of Criminal Conduct*. New York, NY: Cambridge University Press.
- Warr, Mark and Mark Stafford. 1991. "The Influence of Delinquent Peers: What They Think or What They Do?" *Criminology* 29 (4):851–66. doi:[10.1111/j.1745-9125.1991.tb01090.x](https://doi.org/10.1111/j.1745-9125.1991.tb01090.x).
- Warren, Mark E. 2008. "The Nature and Logic of Bad Social Capital." Pp. 122–49 in *The Handbook of Social Capital*, edited by D. Castiglione, J. W. V. Deth, and G. Wolleb. New York: Oxford University Press.
- Xantidis, Luke and Marita P. McCabe. 2000. "Personality Characteristics of Male Clients of Female Commercial Sex Workers in Australia." *Archives of Sexual Behavior* 29 (2):165–76. doi:[10.1023/a:1001907806062](https://doi.org/10.1023/a:1001907806062).
- Yang, T., R.R. Cottrell, X. Yang, and J. Liu. 2012. "Commercial Sex Worker Use among Male Chinese Rural-Urban Migrants." *American Journal of Health Behavior* 36 (1):116–23. doi:[10.5993/AJHB.36.1.12](https://doi.org/10.5993/AJHB.36.1.12).
- Yang, Xiaozhao Y., Brian C. Kelly, and Tingzhong Yang. 2016. "Together We Have Fun: Native-Place Networks and Sexual Risk Behaviours among Chinese Male Rural-Urban Migrants." *Sociology of Health & Illness* 38 (4):559–75. doi:[10.1111/1467-9566.12380](https://doi.org/10.1111/1467-9566.12380).
- Yang, Xiaozhao Y. and Tingzhong Yang. 2017. "Nonmedical Prescription Drug Use among Adults in Their Late Twenties: The Importance of Social Bonding Trajectories." *Journal of Drug Issues* 47 (4):665–78. doi:[10.1177/0022042617722563](https://doi.org/10.1177/0022042617722563).
- Yang, Xiaozhao Yousef and Fenggang Yang. 2018. "Acculturation versus Cultural Retention: The Interactive Impact of Acculturation and Co-Ethnic Ties on Substance Use among Chinese Students in the United States." *Journal of Immigrant and Minority Health* 20 (3):546–60. doi:[10.1007/s10903-017-0598-0](https://doi.org/10.1007/s10903-017-0598-0).
- Yang, Xiushi. 2010. "Migration, Detachment and Hiv Risk among Rural-Urban Migrants in China." Pp. 199–213 in *Mobility, Sexuality, and Aids*, edited by F. Thomas, M. Haour-Knipe, and P. Aggleton. New York, NY: Routledge.
- Young, Jacob. T. N., Cesar J. Rebellon, J. C. Barnes and Frank M. Weerman. 2014. "Unpacking The Black Box of Peer Similarity in Deviance: Understanding the Mechanisms Linking Personal Behavior, Peer Behavior, and Perceptions." *Criminology* 52:60–86. doi: [10.1111/1745-9125.12029](https://doi.org/10.1111/1745-9125.12029)
- Young, Larry J., Miranda M. Lim, Brenden Gingrich, and Thomas R. Insel. 2001. "Cellular Mechanisms of Social Attachment." *Hormones and Behavior* 40 (2):133–38. doi:[10.1006/hbeh.2001.1691](https://doi.org/10.1006/hbeh.2001.1691).
- Yu, Bin, Xinguang Chen, Yaqiong Yan, Jie Gong, Fang Li, and Emily K. Roberson. 2017. "Migration Stress, Poor Mental Health, and Engagement in Sex with High-Risk Partners: A Mediation Modeling Analysis of Data from Rural-to-Urban Migrants in China." *Sexuality Research and Social Policy* 14 (4):467–77. doi:[10.1007/s13178-016-0252-y](https://doi.org/10.1007/s13178-016-0252-y).
- Zaller, Nickolas, Wen Huang, Huan He, YanYan Dong, Dandan Song, Hongbo Zhang, and Don Operario. 2014. "Risky Alcohol Use among Migrant Women in Entertainment Venues in China." *Alcohol and Alcoholism* 49 (3):321–26. doi:[10.1093/alcalc/agt184](https://doi.org/10.1093/alcalc/agt184).
- Zhao, Xinsu, John G. Lynch, and Qimei Chen. 2010. "Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis." *Journal of Consumer Research* 37 (2):197–206. doi:[10.1086/651257](https://doi.org/10.1086/651257).
- Zheng, Tiantian. 2006. "Cool Masculinity: Male Clients' Sex Consumption and Business Alliance in Urban China's Sex Industry." *Journal of Contemporary China* 15 (46):161–82. doi:[10.1080/10670560500331815](https://doi.org/10.1080/10670560500331815).
- Zheng, Tiantian. 2009. *Red Lights: The Lives of Sex Workers in Postsocialist China*. Minneapolis: University of Minnesota Press.