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## HIV/Std Risk Behaviors and Perceptions Among Rural-to-Urban Migrants in China

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### Abstract

Data from 2,153 sexually active rural-to-urban migrants in China were analyzed to examine the relationship between the movement of rural-to-urban migration and increased HIV/STD (sexually transmitted disease) risk and the applicability of constructs of a Western-based theory of behavioral change to the study population. Measurements included migrant mobility, sexual risk, and the seven constructs of the protection motivation theory (PMT). Data in the current study suggest that high mobility among rural-to-urban migrants was associated with increased sexual risk. The PMT constructs are applicable in identifying perceptions and attitudes associated with sexual risk behaviors in this culturally distinct population. Increased sexual risk was associated with increased perceptions of extrinsic rewards, intrinsic rewards, and response cost. Also consistent with PMT, increased sexual risk was associated with perceptions of decreased severity, vulnerability, response efficacy, and self-efficacy. After controlling for a number of key confounding factors, all seven PMT constructs were associated with sexual risk in the manner posited by the theory. The association between mobility and sexual risk underscores the importance of effective HIV/STD prevention efforts among this vulnerable population. The social cognitive theories including the PMT may form a logical base for prevention intervention programs targeting rural-to-urban migrants in China.

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An important issue facing HIV prevention efforts is the development of effective interventions for countries in the early stages of the AIDS epidemic (Potts & Walsh, 2003). A substantial literature from Western nations documents that behavioral prevention intervention programs can reduce risks related to HIV and sexually transmitted diseases (STDs) if certain guiding principles are followed (Kim, Stanton, Li, Dickerson, & Galbraith, 1997; Kirby, 1995). Given the resources and time required to develop and evaluate the effectiveness of HIV/AIDS prevention programs, it would be expedient to adapt interventions that have been shown to be successful in one setting for use in countries at the early stage of the HIV epidemic, such as China.

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*Note.* (R) = reverse coded.

The HIV/AIDS epidemic in China has experienced a rapid expansion over the past decade (Grusky, Liu, & Johnston, 2002). The epidemic has shifted from minorities to the majority Han population, from rural to urban areas, from intravenous drug injection to heterosexual transmission, and from isolation of the epidemic to high risk groups to involvement of the general population (Qi, 2002). The current official estimate of numbers of persons infected with HIV exceeds one million, with an estimated 30% annual increase (China Ministry of Health, 2003). In the absence of effective prevention strategies, it is predicted that 10 million Chinese people will be infected by 2010 (China Ministry of Health, 2003). Although injection drug use and contaminated blood have been the major sources of HIV transmission, sexual transmission accounts for approximately 8% of known seropositive individuals in 2002 (China Ministry of Health, 2003). National surveillance data indicate that the rate of HIV infection among sentinel female sex workers increased 66-fold from 1995 to 2000 (Qi, 2002).

Many of China's HIV-infected population are believed to be among the nation's 100 million rural-to-urban migrants (Grusky et al., 2002; Qi, 2002; Xu, 2001; Zhang & Ma, 2002). These migrants are individuals who move from rural areas to urban areas for jobs without establishing permanent urban residency. Because the existing household registration system in China makes it difficult for people to change from rural to urban residence permanently, most of the rural-to-urban migrants work in the city for a period of time and go back to their home village, or they travel back and forth seasonally (Zhang, 2001). Without having a permanent urban household registration, the migrants become marginalized and cannot access the social welfare benefits available to urban residents, such as subsidized housing, education, and long-term employment contracts (Zhang, 2001).

Limited data in China have shown a high HIV/STD prevalence among rural-to-urban migrants. The Shangxi Province Epidemiological Station reported that two thirds of 176 HIV cases were rural-to-urban migrants (U.S. Embassy Beijing, 2000). Many of the paid blood donors and commercial sex workers are also poor peasants who migrated to cities but could not find means to support themselves other than by selling blood or sex (UNAIDS, 2002; U.S. Embassy Beijing, 2000).

Although data to back these assertions are scant, the rural-to-urban migration trend has repeatedly been characterized as a major contributor to both HIV and STD transmission in China by the Chinese government (China Ministry of Health, 1998), the scholarly community (Xu et al., 2000; Hu, 2000; Xu, Zang, Anderson, Xu, & Chu, 2000), the media (Pomfret, 2001), and international society (U.S. Embassy Beijing, 1997). The Chinese minister of health publicly proclaimed in 1996 that "the 80-120 million people in the 'floating population' who moves throughout the country in search of work carry HIV virus into China's population centers" (U.S. Embassy Beijing, 1997). However, to date there has been essentially no systematic HIV prevention effort among this population. In part this inactivity results from a limited understanding of the behavioral and belief characteristics of individuals included in the migrant population.

Recognizing the vulnerability of China to the HIV/AIDS epidemic and the need to develop effective interventions, our research team sought to assess the actual risk status of the migrant population and to examine the appropriateness of adapting interventions developed in Western settings to the migrant population in China. Specifically, the current study was designed to explore HIV/STD-related risk behavior and perceptions among young migrants from two major metropolitan areas in China. The current study attempted to answer three primary research questions: (a) Is there a relationship between the movement of this rural-to-urban population and increased HIV/STD risk? (b) What is the general pattern of HIV/STD risk behaviors and perceptions among this vulnerable population? (c) Are constructs of a Western-based theory

of behavioral change applicable to this population (e.g., are these constructs associated with the risk and protective behaviors among this population)?

## METHODS

### STUDY SITES

The data were collected from September 2002 through January 2003 among migrants in Beijing, China's capital and Nanjing, the capital city of Jiangsu Province in eastern China. Beijing covers 16,808 square kilometers with a population of 12.85 million. The Beijing municipal government has jurisdiction over eight urban districts, five suburban districts, and five rural counties. There are about 3 million rural-to-urban migrants (69% male and 31% female) in Beijing (Beijing Statistics Bureau, 2002). Nanjing, 1,200 kilometers from Beijing, has jurisdiction over six urban districts, four suburban districts, and five rural counties with a total area of 6,516 square kilometers and a total population of 5.3 million. The rural-to-urban migrant population in Nanjing metropolitan area is estimated at 800,000.

### SAMPLING

The data in the current study were derived from a larger feasibility study of an HIV/STD behavioral prevention intervention among Chinese rural-to-urban migrants. The original sample was recruited using "quota sampling" of occupational groups. Based on available government statistics regarding migrant occupations in China (Beijing Municipal Government Information Office, 2000), 10 occupational clusters (i.e., restaurant, hotel, barbershop/beauty salon, bathhouse/massage parlor, nightclub/dance hall/bar/karaoke, construction, street vender/stall, small retail shop, domestic service, factory) accounting for more than 90% of migrants were selected as the main sampling frame. The number of participants recruited in each occupational cluster was approximately proportionate to the overall estimated distribution of migrants in the cluster. The research teams in each city used workplaces (store, shop, club, office, factory, construction site) as the sampling units. For those migrants who did not have fixed workplaces (such as repairmen, street vendors), the streets were used as the sampling units. Approximately 9% of our sample was recruited from the street. A small percent of migrants (4%) who did not have a job were recruited from job markets. To prevent oversampling migrants from any single sampling unit, the numbers of migrants recruited from any unit did not exceed 10% of total migrants in the unit or 10 individuals, whichever was greater. A number of outreach strategies were used to reach the migrant population. First, employers (or managers) at sampling units were contacted for permission to conduct the survey in their premises. Upon receiving permission, the interviewers randomly approached the migrants at the sampling unit. Migrants would be eligible for participation if they (a) came from rural areas, (b) worked in the city without having a permanent city residency, (c) had been in the city for at least 6 months, and (d) were between 18 and 30 years of age. Interviewers provided eligible individuals with a detailed description of the study design and the consenting procedure and invited them to participate. For those who declined to participate, gender was noted. The study protocol was approved by the institutional review boards at the West Virginia University and the Wayne State University in the United States as well as the collaborating institutes in China (e.g., Beijing Normal University and the Nanjing University).

### PARTICIPANTS

A total of 4,301 migrants in Nanjing and Beijing were approached for a cross-sectional survey in the larger feasibility study. Twenty-four (0.6%) declined to participate. Among the decliners, 10 were in Beijing (5 males and 5 females) and 14 in Nanjing (3 males and 11 females). Sixty-nine participants were deleted from the data file because of either substantial missing data (e.g., more than half of the variables were missing) or missing values on key demographic variables (e.g., gender). A final sample of 4,208 (98%) was retained for the feasibility study. About half

of the participants ( $n = 2,153$ ) was reportedly sexually experienced (i.e., ever had sex). The participants in the current study were the subsample of 2,153 sexually experienced respondents.

## THEORETICAL MODEL

Most effective Western-based HIV/AIDS prevention interventions are based on social cognitive theories (Kim et al., 1997; Kirby 1995). Because we were interested in exploring whether we could adapt one of these previously effective programs to China, the goal was to assess the applicability of a social cognitive theory to risk and protective behaviors among Chinese population. Consistent with our previous research in the United States (Stanton et al., 1995; Stanton et al., 1996) and Namibia (Stanton et al., 1998; Stanton et al., 1999), we organized our risk assessment around the constructs of one of the social cognitive theories, protection motivation theory (PMT) (Rogers, 1983). PMT envisions a potential threat originating from environmental factors to which an individual can respond in an adaptive or maladaptive fashion, which is mediated by a balance between a “threat appraisal” pathway and a “coping appraisal” pathway. The “threat appraisal” pathway consists of a balance between rewards accompanying the behavior and the perceived severity of and personal vulnerability to the threat. The rewards can be either extrinsic (related to social, peer, and parental influences) or intrinsic (addressing individual personality and physical feelings of pleasure). The “coping appraisal” pathway is mediated by balancing the efficacy (i.e., perceived likelihood that the action will reduce the threat and perceived belief that the individual can complete the adaptive response) with the response cost (barriers or inconvenience) of the potential protective behaviors. PMT expands on several models of behavioral change, such as the information, motivation, and behavior model (Fisher & Fisher, 1992), the health belief model (Prentice-Dunn & Rogers, 1996), the AIDS risk reduction model ARRMS (Catania et al., 1989), and other social cognitive theories (Bandura, 1989) by addressing dynamic cognitive process of the behavioral change.

## SURVEY INSTRUMENT

The data in the current study were derived from an HIV/STD prevention feasibility study among young migrant workers in China. A written self-administered questionnaire, the “Migrant Workers Health Behavior Survey,” was developed as an assessment tool as a joint effort between Chinese and American investigators. The instrument was developed with a deliberate emphasis on cultural appropriateness achieved through a prolonged ethnographic phase, which involved 90 individual interviews with young migrants, 20 community leaders and health care providers, and 24 rural youth and their parents over a period of 8 months in 2002 (Hong et al., 2004). The questionnaire was piloted among five young migrants before the final administration. Changes made to the final instrument based on the results of pilot-testing included: (a) reduction of the total length (so the instrument could be finished within 45 minutes); (b) deletion of items that were not appropriate for migrants, (c) rewording some items to which migrants had difficulty in understanding, (d) addition of some items that migrants thought important, and (e) change of response options for some items. The final instrument consists of 285 items, which are organized into seven components: (a) demographic (age, gender, ethnicity, residence of origin, education level, marital status), (b) history and pattern of migration (e.g., years of migration, length of stay, reason of migration), (c) living and working conditions (e.g., housing, leisure time activities, job, income), (d) health status and health care-seeking behaviors (general health condition, availability of health care resource), (e) HIV-related risk behaviors (e.g., multiple sexual partner, commercial sex activities, unprotected sex) and perceptions (HIV/AIDS stigma; attitudes towards protective behaviors), (f) HIV/STD knowledge (e.g., HIV/AIDS awareness, general HIV/AIDS knowledge), and (g) mental health measures (e.g., depression). The survey was either administered individually or in small groups (three-five people) at local sites such as the migrants’ workplace (or nearby available space). The interviewers provided assistance to a few migrants with limited literacy

by reading part of the questionnaire. The surveys required approximately 45 minutes to complete. Each participant received a small stipend in appreciation for their time to participate in the survey.

## MEASURES

*Demographic Characteristics.* Participants' age, gender, ethnicity (Han, Hui, Man, Mongolian, and others), and education level (illiterate, Grades 1-6, Grade 7-9, Grades 10-12, and College) were collected. Because only 3% of the survey sample were non-Han ethnicities, these groups were collapsed into a single category (i.e., non-Han) in the data analysis. Respondents were also asked about their current monthly income in the city (in the Chinese currency RMB).

*Mobility.* Respondents were questioned about the total years of their migratory experience and the number of cities where they had lived during their migration. The correlation between the two variables was .34 ( $p = .000$ ). The ratio of the number of migratory cities to years of total migration was employed as an index of mobility. The mobility index was positively correlated with the number of migratory cities ( $r = .26, p < .0001$ ) and negatively associated with the total years of migration ( $r = -.48, p < .0001$ ). The mobility index ranged from .06 to 10 with bigger values indicating higher levels of mobility.

*Sexual Risk Behaviors.* Participants were asked whether they had engaged in several sexual risk behaviors, including having multiple sexual partners (both lifetime and last month), participating in commercial sex (both selling and buying sex), overall frequency of condom use (never, occasionally, sometimes, often, always), number of times (0-3) they used a condom during their last three sexual encounters, and contracting an STD. In addition, participants were asked whether their sexual partners had sex with other people (yes, no, do not know), whether they had discussed condom use with their sexual partners (yes, no), and whether they (or their sexual partners) knew how to use a condom (yes, no). A composite risk score was created by indexing those who had multiple sexual partners, were involved in commercial sex (either selling or buying sex), never or rarely used a condom, used a condom no more than once during previous three sex episodes, knew or were uncertain as to whether their sexual partners had sex with other people, did not discuss condom use with partners, and did not know how to use a condom. The possible sexual risk composite scores ranged from 0 to 10 with the higher score indicating a higher sexual risk.

*Extrinsic Reward.* This PMT construct consisted of six items measuring external influences (peer pressure, perceived social norms) that may alter an individual's perceptions of and/or decision to engage in risky behaviors. Participants were asked to estimate how many (i.e., none, few, some, and most) of their peers (including those from their home villages) had engaged in HIV/STD risk behaviors (e.g., had multiple sexual partners, did not use condom, involved in sex trade, had an STD, and sold blood illegally). The Cronbach's alpha for this scale was .78. A composite score was obtained by summing responses to items in the scale with higher composite scores indicating higher levels of perceived extrinsic reward.

*Intrinsic Rewards.* The Intrinsic Rewards scale consisted of four items measuring intrinsic factors (anticipated pleasure, personal advantages) for engaging in risk behavior. The Cronbach's alpha for this scale was .64. The 4-point response choices ranged from "strongly disagree" to "strongly agree." A composite score was obtained by summing responses to items with higher composite scores indicating higher levels of perceived intrinsic reward.

*Severity.* This 4-item scale (Cronbach's alpha=.60) assessed respondents' perception of the negative consequences resulting from risky behavior (e.g., "One will lose friends if he/she catches HIV or STD"). The 4-point response choices ranged from "strongly disagree" to

“strongly agree.” A composite score was obtained by summing responses to items with higher composite scores indicating higher levels of perceived severity.

*Vulnerability.* The Vulnerability scale assessed perceived personal vulnerability to negative consequences resulting from risky behavior (e.g., likelihood to get HIV or STD in the future). This two-item scale has a Cronbach’s alpha of .77. A composite score was obtained by summing responses to the two items with higher scores indicating higher levels of perceived vulnerability.

*Response Efficacy.* The response Efficacy Scale assessed perceptions regarding the effectiveness of various protective or health promoting behavior (e.g., “Using a condom is an important way to prevent HIV and STD”). This scale consisted of seven items and had a Cronbach’s alpha of .60. A composite score was obtained by summing responses to the seven items with a higher composite score indicating a higher level of response efficacy.

*Self-Efficacy.* The Self-Efficacy scale assessed belief about one’s own ability to engage in a healthy behavior (e.g., “I will refuse to have sex if my partner does not want to use a condom”). The scale consisted of two items with a Cronbach’s alpha of .45. A sum score was obtained as a composite score with higher scores indicating higher levels of self-efficacy.

*Response Cost.* The Response Cost scale assessed the perceived personal costs associated with protective behaviors (e.g., “Using a condom during sex will reduce sexual pleasure”). The response scale consisted of 6 items with a Cronbach’s alpha of .53. A composite score was obtained by summing responses to items with higher composite scores indicating higher levels of perceived response cost.

*HIV Knowledge.* The AIDS knowledge items were adapted from the scales used in the 1992 U.S. National Health Interview Survey (Schoenborn, Marsh, & Hardy, 1994) and other studies in the United States (DiClemente, Zorn, & Temoshok, 1986; Koopman, Rotheram-Borus, Hederson, Bradley, & Hunter, 1990). The knowledge scale incorporated 22 items such as “AIDS is caused by a virus” and “Taking a shower after sex can reduce the chance of getting AIDS” all of which required true/false or likely/unlikely responding. The internal consistency estimate (i.e., Cronbach’s alpha) is .77 for the scale. The percentage of correct answers was retained as a composite score with higher scores on this scale reflecting increased knowledge about the transmission and symptoms of HIV/AIDS.

## ANALYSIS

First, overall demographic characteristics and the sexual experience of the sample were examined using frequency distributions. Gender and regional differences of these variables were tested using chi-square (for categorical variables) or an analysis of variance (ANOVA, for continuous variables).

Second, the association of mobility with sexual risk and other key demographic variables was examined using Pearson correlation coefficients. Because mobility was highly correlated with age and marital status, and sexual risk was highly correlated with gender, the association between mobility and sexual risk was further examined using a general linear model (GLM) analysis controlling for gender, age, and marital status. To categorize the mobility index into a between-subjects factor in GLM analysis, the sample was divided into five approximately evenly distributed groups using the 20th, 40th, 60th, and 80th percentiles of the mobility index as thresholds. The sexual risk composite score was employed as the dependent variable in the GLM. Gender and marital status (i.e., single vs. married) served as two additional between-subjects factors and age as a covariate in the GLM, which simultaneously assessed the interactions among the between-subjects factors.

Third, bivariate associations between the PMT constructs and risk behaviors were examined using ANOVA. To facilitate the data analysis and data presentation in this procedure, the study sample was arbitrarily divided into three groups (i.e., low risk, medium risk, and high risk) using the 33rd and 67th percentiles of the sexual risk score as thresholds. Accordingly, the association between each of the PMT scales and the risk category was tested using One-way ANOVA. Post hoc comparisons were performed using the least significant difference procedure to identify the pair-wise differences among the categories.

Finally, the multivariate association between PMT constructs and the sexual risk score was examined using a multiple linear regression analysis. The sexual risk score served as the dependent variable. Age and gender were forced into the regression model first, followed by a stepwise selection of PMT constructs, general HIV/AIDS knowledge, and a number of key demographic variables into the model. The demographic variables include education attainment, mobility index, marital status, and current monthly income.

All statistical analyses were performed using SPSS Version, 11.5. Because of the relatively large sample size, a significance level of .01 was adopted in bivariate comparisons instead of the conventional value of .05.

## RESULTS

### SAMPLE CHARACTERISTICS AND SEXUAL PRACTICE

As shown in Table 1, the sample in the current study consisted of 34% females and 66% males; 54% of the sample were recruited from Nanjing and the remainder from Beijing. Gender was equally distributed across cities. Mean age of the sample was 25.6 years ( $SD = 3.62$ ). Most participants were ethnic Han (97%) and had finished a minimum of elementary school education (93%). Four tenths of respondents had never been married. They had been migrating to cities for an average of 5.5 years, with two thirds having been in at least two different cities during their migration. Nearly all (96%) were currently employed or self-employed in the cities with an average monthly income of 992 RMB (an equivalent of U.S. \$120). There were significant gender differences in variables such as age, length of migration, education attainment, and employment in cities. Compared with men, women were younger ( $p < .0001$ ), had a shorter migratory history ( $p < .0001$ ), had less education ( $p < .0001$ ), and went a fewer number of cities ( $p < .0001$ ). As shown in Table 1, sample characteristics and occupational distributions were generally similar between Beijing and Nanjing. However, the Nanjing sample consisted of more migrants who had no jobs (5% vs. 2%) and worked at factories (9% vs. 5%) or other settings (10% vs. 6%), whereas the Beijing sample consisted of more migrants who worked in bathhouse/message parlor (11% vs. 8%), dance hall/bars (9% vs. 6%), and domestic service (5% vs. 2%).

About one third of the sample had more than one sexual partner in their lifetime with 8% having had more than one partner during the previous month. A small proportion of respondents said that they had engaged in commercial sexual activities (8% bought sex and 6% sold sex). About one third either knew or was uncertain as to whether their sexual partners also had sex with other people. Half of them discussed condom use with their partners. Whereas 74% of the respondents said that they or their sexual partners knew how to use a condom, relatively few often (10%) or always (8%) used a condom during sex. Similarly, only 15% reported that they used a condom during each of their previous three sexual episodes, whereas 63% did not use one at all. On average, the sample engaged in about 4 of the 10 sexual risk activities identified in the current study and answered 65% of the AIDS knowledge items correctly.

Compared with women, more men reported engaging in sexual risk activities such as having multiple sexual partners ( $p < .0001$  for both life time and last month) and buying sex ( $p < .$

0001). Although more men than women reported knowing how to use a condom ( $p < .01$ ), there were no gender differences in condom use behaviors (either the frequency of condom use or use during previous three sexual episodes). Men had a higher sexual risk scores than women ( $p < .0001$ ). Again, the sexual practice and sexual risk score were generally similar between the Beijing sample and the Nanjing sample, although some differences (e.g., sexual partners in the recent month, selling sex, buying sex, and communication with their partners regarding condom use) reached statistical significance.

## MOBILITY AND SEXUAL RISK

The mobility index was negatively correlated with respondents' age ( $r = -.23, p < .0001$ ) and marital status ( $r = -.18, p < .0001$ ), suggesting that younger migrants and unmarried migrants were more likely to be mobile. There were no significant bivariate associations of the mobility index with gender ( $r = -.02$ ), educational attainment ( $r = -.02$ ), or current income ( $r = -.02$ ). Sexual risk score was significantly associated with age ( $r = -.13, p < .0001$ ), gender ( $r = .10, p < .0001$ ), and marital status ( $r = -.21, p < .0001$ ). As shown in Figure 1, the mobility index was associated significantly with increased sexual risk across both genders ( $r = .15, p < .0001$  for women and  $r = .08, p < .01$  for men). As shown in Table 2, GLM analysis yielded a significant main effect of mobility while simultaneously assessing the significant effects of gender and marital status. Neither age, nor any of the interaction terms appeared to be confounding factors for the association between mobility and sexual risk in the GLM analysis.

## PMT CONSTRUCTS AND SEXUAL RISK

Table 3 depicts the association between the PMT constructs and sexual risk for each gender. For women, all seven PMT constructs were associated with sexual risk in the manner posited by PMT. Compared with lower risk groups, higher sexual risk groups reported higher perceptions of rewards (both extrinsic and intrinsic rewards) and response cost, and decreased perceptions of vulnerability, severity, and efficacy (both response efficacy and self-efficacy). Likewise, all seven PMT constructs except self-efficacy were associated with sexual risk among men. The post hoc comparison suggested that most of the constructs could efficiently differentiate the various levels of sexual risk: the higher risk group perceived a higher level of extrinsic rewards, intrinsic rewards, and response cost, whereas the lower risk groups perceived a higher level of vulnerability, severity, and response efficacy.

Table 4 displays the results from the stepwise multiple linear regression. After simultaneously controlling for age, gender, mobility, marital status, educational attainment, and general HIV/AIDS knowledge, all seven PMT constructs were retained in the final model. The multivariate analysis confirmed the bivariate analysis that increased perceptions of extrinsic reward, intrinsic reward, and response cost constructs were associated with increased sexual risk; and perceived vulnerability, severity, response efficacy, and self-efficacy served as protective factors for sexual risk. All key demographic variables except age (which remained in the final model as it was forcedly entered into the model) and current income (which was excluded from the final model) appeared to be confounding factors for the association between PMT constructs and sexual risk for this population.

## DISCUSSION

High mobility among rural-to-urban Chinese migrants appears to be associated with increased sexual risk. This finding, coupled with the observations that mobility is higher among single and younger migrants, underscores the importance of effective HIV/STD prevention efforts among this vulnerable population. Consistent with data from other countries (Decosas & Adrien, 1997; Lurie, Harrison, Wilkinson, & Abdool Karim, 1997; Lurie et al., 2003), the findings in the current study suggest a higher level of sexual risk among the Chinese migrant



population, compared with the non-migratory population. For example, the percentage of migrants in the present study who reported multiple sexual partners (i.e., 31%) was substantially higher than similar reports among indigenous rural Chinese (e.g., 7.8%) in other studies (Liu et al., 1998).

In the absence of formalized access to education, employment, and health care, any population is vulnerable to socially based diseases, including HIV and STDs (Booyesen & Summerton, 2002; Krueger, Wood, Diehr, & Maxwell, 1990). Such a description is applicable to migrants in China. For almost half a century, the legal system in China has significantly curtailed entitlement of the migrant population to basic benefits accorded to other segments of the population (Zhang, 2001). However, at any given point in time, it is difficult to characterize the nature of these restrictions because the government has repeatedly changed relevant regulations, particularly during the past decade. As a result, the migrant population is placed in a vulnerable position in two respects. First, regardless of the exact nature of legislative restrictions, migrants experience significant limitations to their entitlements. For example, migrants have to pay more than local residents on many of their daily essentials such as housing, utilities, education, and transportation (Zhang, 2001). Second, the rapid change of legislation and governmental regulations further restrict access of the migrant population to those entitlements to which they might have access because local authorities and programs responsible for policy implementation are uncertain as to the current legislative status. For example, in 2002 the Chinese government mandated reduction of the fees imposed by local governmental agencies on migrants for work, residence, and housing permits. However, rather than increasing migrant access to these necessities, the government's initiatives resulted in the reduction of operations of these respective offices because they could no longer recoup expenses through the fees paid by migrants. As a result, migrants experienced great difficulty in obtaining the necessary permits and accessing legal employment and proper housing and, subsequently, experienced an increased instability or mobility.

The current study is important in its finding that all constructs from a Western-based social cognitive theory (i.e., PMT) are applicable in identifying perceptions and attitudes associated with sexual risk behaviors in this culturally distinct population. Increased sexual risk among sexually experienced young migrants in China was associated with increased perceptions of extrinsic rewards, intrinsic rewards, and response cost. Also consistent with PMT, increased sexual risk was associated with perceptions of decreased severity, vulnerability, response efficacy, and self-efficacy. This is one of the first studies conducted in a non-Western country demonstrating the applicability of all theoretic constructs in behavioral decision making. Other studies have looked at either single constructs (e.g., self-efficacy) or a limited number of the constructs (Cottrell et al., in press; Fitzgerald et al., 1999). PMT has been successfully applied to a number of cultural and geographic settings within the United States (D'Alessandri et al., 2004; Stanton et al., 1996), and in a few instances in non-Western settings such as Namibia (Stanton et al., 1998; Stanton et al., 1999), and China (Cottrell, Li, Stanton et al., in press; Cottrell, Li, D'Alessandri et al., 2004; Zhang et al., 2004). However, in general these studies have only assessed a few of the PMT constructs. An exception is a recent study in which a linear function of seven PMT constructs (e.g., level of protection motivation) was predictive of adolescent drug use intention both cross-sectionally and longitudinally among 832 African American adolescents (Wu, et al., 2004). The current findings provide strong evidence that the PMT model is robust in a new geographic and cultural setting.

## POTENTIAL LIMITATIONS

Some of the PMT subscales presented in this study have relatively low reliability estimates (e.g., .45 for self-efficacy and .53 for response cost). Although these reliability estimates are comparable with those based on other international adolescent and young adult samples

(Stainback & Rogers, 1983; Stanton et al., 1995; Stanton et al., 1999) and other Chinese populations (Cottrell et al., in press), further attention is needed in scale development for more reliable and culturally appropriate assessment of the theoretical constructs. The cross-sectional nature of the data precludes any causality assessment between mobility and sexual risk. Further study, ideally with a longitudinal design, is needed to explore whether the socioeconomic conditions associated with the more frequent migration cause the increase in risky sexual practice, or, alternatively, the lifestyle associated with the risky sexual behaviors results in the high mobility.

## IMPLICATIONS OF FINDINGS

First, HIV/STD prevention efforts need to target young migrants, including women. There are several similarities between the rural-to-urban migration in China and that of several African nations (Lurie et al., 1997; Lurie et al., 2003). Similarities include the observation that migration is driven by economic forces and that although these migrations are temporary, they are characterized by high mobility (e.g., seasonal or circular). However, in contrast to the internal migration in African nations where men predominate, women play a major role in the rural-to-urban migration in China. The 1995 China 1% Population Survey showed that nearly half of the migrants were female, which was consistent with the China 1990 census data (China National Bureau of Statistics, 2002). Both the 1990 and 1995 data indicated that there were more females than males in the 15-19-year-old age group (China National Bureau of Statistics, 2002). Because married and older women in rural areas often have nuclear and extended family responsibilities, it is young and single rural women who tend to migrate more often. These women were less likely to receive reproductive health services and education than permanent urban residents. In Beijing, for example, only 22.5% of migrants received any maternal health or family planning education, compared with almost 100% of urban residents (Zheng et al., 2002). To be effective, HIV/AIDS prevention intervention programs need to address the specific needs, vulnerabilities, and empowerment of these young women in urban settings.

Second, social cognitive theories including PMT may form a logical base for prevention intervention programs targeting the rural-to-urban migrants. The applicability of this Western-based theoretical model (or best practices) will facilitate the rapid adaptation of effective HIV/STD prevention intervention programs to countries at the early stages of the AIDS epidemic (including China). Applying or adapting best practices into different cultural setting may be a cost-effective approach to HIV prevention in developing nations, which often struggle with a lack of resources to combat the AIDS epidemic (Potts & Walsh, 2003; UNAIDS, 2002).

## APPENDIX: ITEMS MEASURING PMT CONSTRUCTS

**Extrinsic Reward** (six items with response option ranging from “none” to “most”)

How many of people your age (including those at your home village) have sex with more than one person?

How many of people your age (including those at your home village) do not use a condom?

How many of people your age (including those at your home village) have sold sex?

How many of people your age (including those at your home village) have bought sex?

How many of people your age (including those at your home village) have (or had) a STD?

How many of people your age (including those at your home village) have sold blood?

**Intrinsic Reward** (four items with response options ranging from “strongly disagree” to “strongly agree”)

A man with multiple sexual partners is cool.

A woman with multiple sexual partners is cool.

Many people have extramarital sexual behaviors because of loneliness and depression.

Many people who have extramarital sex just want to indulge themselves and seek stimulants.

**Severity** (4 items with response options ranging from “Strongly disagree” to “Strongly agree”)

If someone is infected with HIV, his/her family members should keep away from him/her.

If someone in a village is infected with HIV, he/she should be driven away from the village.

If someone becomes infected with HIV, his/her life is ruined.

If someone catches HIV/STD, he/she will lose friends.

**Vulnerability** (two items with response options ranging from “absolutely impossible” to “very possible”)

What is the possibility that you will become infected with HIV?

What is the possibility that you will become infected with STD?

**Response Efficacy** (seven items with response options ranging from “strongly disagree” to “strongly agree”)

(R) When a man and a woman are in a serious relationship, they don't need to use condoms.

(R) If a woman takes contraceptive measures, there is no need to use condoms.

There are many ways to become infected with HIV, one might even become infected without having sex.

You can become infected with HIV by having sex without protection even once.

You can become infected with STD by having sex without protection even once.

(R) A couple can cohabitate or have sex even if they don't want to get married.

Using a condom is an important way to prevent HIV and STD.

**Self-Efficacy** (two items with response options ranging from “strongly disagree” to “strongly agree”)

I can persuade my partner to use a condom during sex even he/she doesn't want to.

I will refuse to have sex if my partner does not want to use a condom.

**Response Cost** (six items with response options ranging from “strongly disagree” to “strongly agree”)

If my parents (or other family members) know I am carrying a condom, they will be upset.

Few men like to use condoms.

Using a condom during sex will reduce sexual pleasure.

People normally don't tell others about their use of condoms.

Condoms often break.

Many girls become *xiaojie* (e.g., female entertainers who often provide sexual service) because they can't find other jobs.

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**FIGURE 1.**  
Level of sexual risk by mobility among Chinese migrants.

**TABLE 1**  
Demographic Characteristics and Sexual Practice of 2,076 Sexually Experienced Young Rural-to-Urban Migrants in China

N (%)	Overall 2,076 (100%)	Female 728 (34%)	Male 1,425 (66%)	Beijing 992 (46%)	Nanjing 1,161 (54%)
<b>Demographic characteristics</b>					
Mean age (years)	25.60 (3.62)	25.10 (3.59)	25.86 (3.61)***	25.03 (3.54)	26.09 (3.62)***
Length of migration (years)	5.53 (3.37)	4.46 (2.80)	6.07 (3.51)***	5.22 (3.19)	5.79 (3.50)***
Han ethnicity	2,069 (97%)	694 (96%)	1,375 (97%)	956 (97%)	1,113 (97%)*
Never married	921 (44%)	330 (47%)	591 (43%)	467 (48%)	454 (41%)*
Finished > 6 years education	1,979 (93%)	647 (90%)	1,332 (94%)***	919 (93%)	1,060 (92%)
Migrated 2 or more cities	1,424 (67%)	379 (53%)	1045 (75%)***	649 (66%)	775 (69%)*
Employed or self-employed	2,063 (96%)	699 (96%)	1,364 (96%)	967 (98%)	1,096 (95%)*
Monthly income (RMB)	992 (885)	949 (993)	1,015 (823)	1,032 (908)	958 (862)
<b>Place of current employment</b>					
No job	82 (4%)	27 (4%)	95 (4%)	24 (2%)	58 (5%)
Restaurant	277 (13%)	102 (14%)	364 (15%)	125 (13%)	152 (13%)
Barbershop/beauty salons	282 (13%)	141 (19%)	211 (9%)	135 (14%)	147 (13%)
Bathhouse/message parlor	202 (9%)	119 (16%)	140 (7%)	113 (11%)	89 (8%)
Nightclub/dance hall/bar/karaoke	156 (7%)	65 (9%)	136 (6%)	84 (9%)	72 (6%)
Construction	409 (19%)	15 (2%)	726 (29%)	188 (19%)	221 (19%)
Street vendor/stall	202 (9%)	59 (8%)	205 (8%)	103 (10%)	99 (9%)
Small retail shop	39 (2%)	21 (3%)	27 (1%)	20 (2%)	19 (2%)
Hotel	105 (5%)	53 (7%)	100 (4%)	39 (4%)	66 (6%)
Domestic service	71 (3%)	29 (4%)	17 (1%)	53 (5%)	18 (2%)
Factory	149 (7%)	62 (9%)	224 (9%)	46 (5%)	103 (9%)
Other	170 (8%)	33 (5%)	250 (10%)	60 (6%)	110 (10%)
<b>Sexual practice</b>					
Having multiple sexual partners (lifetime)	492 (31%)	132 (21%)	460 (36%)***	285 (31%)	307 (31%)
Having multiple sexual partners (last month)	155 (8%)	29 (5%)	126 (10%)***	64 (7%)	91 (10%)***
Paying money or goods for sex	147 (8%)	14 (2%)	133 (10%)***	51 (6%)	96 (10%)***
Receiving money or goods for sex	114 (6%)	40 (6%)	74 (6%)	38 (4%)	76 (8%)**
Knowing or uncertain partners had sex with other people	698 (36%)	221 (35%)	477 (37%)	311 (34%)	387 (38%)
Having discussed condom use with partner	1,010 (53%)	345 (55%)	665 (52%)*	519 (57%)	491 (49%)**
Knowing how to use a condom	1,405 (74%)	439 (70%)	966 (76%)*	693 (76%)	712 (72%)
<b>Frequency of using a condom during sex</b>					
Never	698 (36%)	236 (37%)	462 (36%)	328 (36%)	370 (36%)
Rarely	476 (25%)	146 (23%)	330 (25%)	236 (26%)	240 (24%)
Sometimes	406 (21%)	128 (20%)	278 (21%)	194 (21%)	212 (21%)
Often	200 (10%)	67 (11%)	133 (10%)	88 (10%)	112 (11%)
Always	155 (8%)	59 (9%)	96 (7%)	72 (8%)	83 (8%)
<b>Times used a condom use during last 3 sexual encounters</b>					
None	1,209 (63%)	396 (63%)	813 (63%)	602 (66%)	607 (60%)
Once	210 (11%)	75 (12%)	135 (11%)	97 (11%)	113 (11%)
Twice	211 (11%)	59 (9%)	152 (12%)	87 (10%)	124 (12%)
All three times	289 (15%)	102 (16%)	187 (15%)	124 (14%)	165 (16%)
Sexual risk score	3.55 (1.80)	3.30 (1.62)	3.67 (1.86)***	3.51 (1.74)	3.58 (1.84)
AIDS Knowledge score	65.00 (13.27)	65.49 (13.46)	64.75 (13.18)	64.58 (13.24)	65.36 (13.30)

\*  $p < .01$ ;



1000' > .0001  
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 $p < .0001$   
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General Linear Model for Association Between Mobility and Sexual Risk Among Chinese Migrants

TABLE 2

Source of Variance	Type III Sum of Squares	df	Mean Square	F	Significance
Corrected Model	417.966	20	20.898	6.795	.000
Intercept	262.412	1	262.412	85.327	.000
Age	0.056	1	0.056	0.018	.892
Mobility	41.315	4	10.329	3.359	.010
Gender	41.453	1	41.453	13.479	.000
Marital Status	127.783	1	127.783	41.551	.000
Mobility × Gender	2.850	4	0.712	0.232	.921
Mobility × Marital Status	9.145	4	2.286	0.743	.562
Gender × Marital Status	1.876	1	1.876	0.610	.435
Mobility × Gender × Marital Status	11.091	4	2.773	0.902	.462
Error	5,683.281	1,848			
Total	29,606.000	1,869			
Corrected Total	6,101.247	1,868	3.075		

<sup>a</sup> Dependent variable: Sexual risk score.

**TABLE 3**  
Associations Between PMT Constructs and Sexual Risk Among Chinese Migrants

Level of Sexual Risk	Female				Male			
	Low (1)	Medium (2)	High(3)	Post Hoc Comparison	Low (1)	Medium (2)	High (3)	Post Hoc Comparison
N (%)	283 (39%)	302 (42%)	143 (20%)		462 (32%)	551 (39%)	412 (29%)	
Sex risk score	1.42 (.71)	3.54 (.50)	5.50 (.77)***	(1,2)(1,3)(2,3)	1.40 (.71)	3.48 (.50)	5.86 (1.02)***	(1,2)(1,3)(2,3)
PMT constructs								
Extrinsic reward	8.19 (2.80)	8.16 (3.23)	9.93 (4.08)***	(1,3)(2,3)	8.57 (3.15)	8.88 (3.01)	9.71 (3.42)***	(1,3)(2,3)
Intrinsic reward	7.84 (2.28)	8.30 (2.40)	8.38 (2.10)	(1,2)(1,3)	8.50 (2.28)	8.83 (2.16)	9.67 (2.31)***	(1,2)(1,3)(2,3)
Vulnerability	7.42 (1.02)	7.25 (1.28)	6.97 (1.15)**	(1,3)(2,3)	7.32 (1.08)	7.21 (1.09)	6.84 (1.30)***	(1,3)(2,3)
Severity	10.85 (1.97)	10.54 (2.18)	9.90 (2.26)***	(1,3)(2,3)	10.55 (2.27)	10.66 (2.10)	10.19 (2.24)*	(1,3)(2,3)
Response efficacy	16.23 (3.00)	15.74 (2.85)	15.34 (2.77)*	(1,2)(1,3)	16.11 (3.18)	15.69 (2.70)	15.24 (2.86)***	(1,2)(1,3)(2,3)
Self-efficacy	5.40 (1.27)	5.11 (1.20)	5.07 (1.08)*	(1,2)(1,3)	5.08 (1.26)	5.09 (1.12)	5.09 (1.21)	(1,2)(1,3)(2,3)
Response cost	14.80 (2.67)	15.33 (2.67)	15.71 (2.43)*	(1,2)(1,3)	14.98 (2.92)	15.57 (2.38)	16.01 (2.64)***	(1,2)(1,3)(2,3)
AIDS knowledge	65.89 (13.66)	64.99 (13.35)	65.77 (13.36)		65.22 (12.89)	65.55 (12.56)	63.15 (14.15)	(1,3)(2,3)

Note. PMT = protection motivation theory.

\*  $p < .01$ ;

\*\*  $p < .001$ ;

\*\*\*  $p < .0001$ .

## Regression Results

TABLE 4

	B	Unstandardized Coefficients Standard Error	Standardized Coefficients Beta	t	Significance	95% Confidence Interval for B Lower Bound	Upper Bound
(Constant)	7.952	.732		10.861	.000	6.516	9.388
Age	0.013	.014	.025	0.904	0.366	-0.015	0.041
Gender (1 = female, 2 = male)	0.241	.085	.063	2.851	.004	0.075	0.407
Mobility index	0.152	.066	.051	2.318	.021	0.023	0.280
Marital status (1 = single, 2 = married)	-0.809	.102	-.223	-7.907	.000	-1.010	-0.609
Education attainment	-0.356	.058	-.138	-6.120	.000	-0.470	-0.242
AIDS knowledge	-0.015	.003	-.107	-4.769	.000	-0.021	-0.009
PMT constructs							
Extrinsic reward	0.039	.013	.069	3.042	.002	0.014	0.064
Intrinsic reward	0.073	.019	.093	3.857	.000	0.036	0.110
Vulnerability	-0.202	.035	-.129	-5.827	.000	-0.269	-0.134
Severity	-0.045	.019	-.055	-2.324	.020	-0.084	-0.007
Response efficacy	-0.040	.016	-.061	-2.492	.013	-0.072	-0.009
Self-efficacy	-0.189	.035	-.119	-5.409	.000	-0.257	-0.120
Response cost	0.049	.018	.069	2.709	.007	0.014	0.085

Note. 1. Dependent variable: sexual risk score. 2. Variables excluded from the final model: monthly income. 3. Model fit:  $F(13,1806) = 28.957$ ,  $p = .000$ ;  $R = .45$ ; adjusted  $R^2 = .17$ .