



# Studying Psychosocial Barriers to Drug Treatment Among Chinese Methamphetamine Users Using A 3-Step Latent Class Analysis



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## ABSTRACT

Given the growth in methamphetamine use in China during the 21st century, we assessed perceived psychosocial barriers to drug treatment among this population. Using a sample of 303 methamphetamine users recruited via Respondent Driven Sampling, we use Latent Class Analysis (LCA) to identify possible distinct latent groups among Chinese methamphetamine users on the basis of their perceptions of psychosocial barriers to drug treatment. After covariates were included to predict latent class membership, the 3-step modeling approach was applied. Our findings indicate that the Chinese methamphetamine using population was heterogeneous on perceptions of drug treatment barriers; four distinct latent classes (subpopulations) were identified – Unsupported Deniers, Deniers, Privacy Anxious, and Low Barriers – and individual characteristics shaped the probability of class membership. Efforts to link Chinese methamphetamine users to treatment may require a multi-faceted approach that attends to differing perceptions about impediments to drug treatment.

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## 1. Introduction

Increasing attention has been placed on drug treatment programs for non-opiate dependent individuals in China. Given the considerable growth in the Chinese drug using population since the early 1990s (Huang, Zhang, & Liu, 2011), there remains a continued need to identify pathways for linking drug users to treatment. A significant expansion of drug treatment modalities in China has occurred during the 21st century, and treatments for drug abuse have become increasingly medicalized (Tang & Hao, 2007). Thus, drug treatment within China has moved further from the purview of the criminal justice system and more squarely within the domain of health care. This shift has been important in providing greater opportunities for voluntary drug treatment without threats of formal sanction. Yet, much of the Chinese drug treatment system remains equipped primarily to handle opiate dependence, long a problem within China. The growth in the use of synthetic drugs among Chinese drug users has complicated pathways to drug treatment that have traditionally been made available for opiate dependent individuals. Examinations of how this growing population of users of other substances perceives their abilities to access drug treatment is critical for the provision of appropriate intervention.

Among the growth in synthetic substance use, methamphetamine use in particular has grown considerably in China during the past decade (Huang et al., 2011). Much like in other regions, studies have identified a range of problems among Chinese methamphetamine users, including syphilis (Liao et al., 2013), Hepatitis C (Liao et al., 2014), psychiatric symptoms (Zhang et al., 2014), and drug problems and dependence (Kelly, Liu, Hao, & Wang, 2015). These problems lead to a need to increase both harm reduction efforts targeting this population and straightforward pathways to drug treatment. Yet, Chinese methamphetamine users indicate numerous barriers to accessing drug treatment services (Qi et al., 2013, 2015). These may relate to the aforementioned primacy of treatment for opiate dependence, which includes the wide availability of methadone maintenance treatment that is not quite useful for methamphetamine users or other synthetic drugs. Furthermore, other studies have identified that drug dependent individuals do not view economic and structural barriers to treatment in a homogeneous fashion (Qi et al., 2013), indicating that Chinese drug users may be a heterogeneous population with respect to how they view access to drug treatment. Further research on the variation in psychological barriers to drug treatment remains equally important as those that assess economic or institutional barriers to treatment.

### 1.1. Current study

To further address the issue of access to drug treatment among non-opiate dependent individuals in China, we aimed to develop a typology of perceived psychosocial barriers to drug treatment among Chinese

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methamphetamine users. Specifically, we use Latent Class Analysis (LCA) to identify possible distinct latent groups among Chinese methamphetamine users on the basis of their perceptions of psychosocial barriers to drug treatment. Members of each latent group are more similar to one another, while individuals vary across groups, with respect to their perceptions of psychosocial barriers to accessing drug treatment. The relationships of the latent class membership with individual socio-demographic characteristics, drug use status, and treatment experience were examined using the newly developed 3-step LCA with covariates. Such an approach serves to identify a general range of types of drug users on the basis of their perceptions of barriers, which may facilitate more strategic engagement with such users and enable entry into drug treatment for treatment seeking individuals.

## 2. Methods

### 2.1. Sampling

We used Respondent Driven Sampling to recruit the study sample (RDS; Heckathorn, 1997; Wang et al., 2005; Wang, Falck, Li, Rahman, & Carlson, 2007; Abdul-Quader et al., 2006). To initiate RDS, we recruited 20 “seeds” from the community. These seeds provided the foundation for recruitment of our sample. In addition to the incentive received for their own participation (150 Chinese Yuan/~\$23 USD), each seed was given 3 recruitment coupons coded with numeric digits confidentially linkable to them. Seeds were encouraged to invite network members to be screened for study participation. When a new recruit enrolled in the study and presented a coupon, the seed received an additional incentive (50 Chinese Yuan/~\$8 USD) for facilitating the participation. A limitation of 3 recruitment cards reduced the likelihood of bias towards those with large networks (Heckathorn, 1997; Wang et al., 2005). All recruits received the regular incentive for participation. The enrolled recruit also received three recruitment coupons and invited to encourage participation among network members. The process continued through successive waves to build momentum within the networks to foster participation. Analyses of the RDS cohort indicated that the sample converged to equilibrium, indicating success with the RDS method in terms of penetrating deep into the networks tapped for recruitment and relative stability of the sample referral chains. As a means of hidden population sampling, these analyses indicate that the sample is reflective of the population of methamphetamine users in this region of China.

Inclusion criteria for the study were: 1) self-reported methamphetamine use in the past three months; 2) reside in Changsha, Hunan; and 3) the capacity to volunteer for research. Subjects were excluded if they: 1) were currently enrolled in drug treatment; 2) were incarcerated; 3) planned to move from Changsha within 6 months; 4) had a psychotic disorder (severe enough to prevent capacity to consent), or 5) displayed impairment by drug use at time of the assessment. IRB approval was received from both Purdue University and Central South University.

### 2.2. Measures

#### 2.2.1. Socio-demographic information

The first section of the survey gathered basic demographic information. Participants self-reported their gender: female or male. They were asked their birth year, subsequently used to assess age. Employment was coded as employed versus not currently employed. Educational attainment was coded as less than a high school diploma versus high school diploma or greater. Income was coded as whether individuals earned less than 50,000 Chinese Yuan versus at least 50,000 Yuan. The marital status variable assessed whether the individuals are currently married or cohabiting.

#### 2.2.2. Substance use

The substance use measures generated information consisting of drugs used, frequency of use, and dose per use. Heavy methamphetamine

use was coded as using at least four days per week. We also assessed whether or not the individual had any history of drug treatment. The Short Inventory of Problems with Alcohol and Drugs (SIP-AD) assessed methamphetamine related problems (Blanchard, Morgenstern, Morgan, Lobouvie, & Bux, 2003) and the Composite International Diagnostic Inventory (CID) substance abuse module assessed symptoms of dependence on methamphetamine (Cottler, Robins, & Helzer, 1989).

#### 2.2.3. Measures of psychosocial barriers to drug treatment

We used the Barriers to Treatment Inventory (BTI; Rapp et al., 2006) to assess internal barriers to drug treatment. The BTI scale was translated into Chinese using the back translation method and then pilot-tested prior to use in this study. Five domains of internal barriers [absence of problem (AP), negative social support (NSS), fear of treatment (FT), privacy concerns (PC), and committed life style (CLS)] to drug treatment were measured with 20 items. The participants were asked to indicate how much each type of barrier influenced their access to treatment services. Each specific internal barrier was measured on a 5-point scale (1-strongly disagree, 2-disagree, 3-neutral, 4-agree, and 5-strongly agree). The original Likert scales were treated as either numeric or categorical measures in our exploratory modeling, but the CFA model did not fit data in either way because the measures were highly skewed. As such, the items were recoded as dichotomous measures (1-agree/strongly agree; 0-otherwise) in this study. The dichotomous measures are meaningful because the barrier items represent specific problems of accessing drug treatment programs.

### 2.3. Statistical analysis

Latent Class Analysis (LCA) was used to analyze a typology of internal barriers to drug treatment among the 303 methamphetamine users. LCA is a person-centered analytical approach that allows the determination of whether there are heterogeneous subpopulations within the population under study (Collins & Lanza, 2010; Heinen, 1993; Múthen, 2001; Vermunt & Magidson, 2002). In the LCA model, the latent class is a categorical latent variable representing subpopulations that are unknown a priori and include individuals with shared characteristics, such that individuals within a latent class are more similar than those between latent classes. Unlike the traditional cluster analysis, LCA is a model-based approach to clustering. It identifies subgroups based on posterior membership probabilities rather than ad hoc dissimilarity measures. The general probability model underlying LCA allows for formal statistical procedures to determine the number of latent classes, and more interpretable results stated in terms of probabilities.

A series of LCA models with an increasing number of latent profiles were estimated and iteratively compared. Information criterion statistics, such as AIC, BIC, and SABIC, as well as the Lo-Mendell-Rubin likelihood ratio (LMR LR) test, the adjusted LMR LR (ALMR LR) test, and the bootstrap likelihood ratio test (BLRT) were used for model comparisons. Once the optimal number of latent classes was identified, individuals were classified into their most likely latent classes on the basis of the estimated posterior probabilities, and the quality of membership classification was assessed via average posterior probabilities and the entropy statistic. Next, the class prevalence (i.e., unconditional probability) was evaluated and the patterns of internal barriers were identified by examining the conditional probabilities of specific psychosocial barriers by latent class.

The relationships of the latent class memberships with individual sociodemographic characteristics, such as age, marital status, education, employment, income, meth use, drug treatment history were examined using the newly developed three-step LCA with covariates approach. The first step of the modeling used the LCA model discussed above as a measurement model, from which the most likely class variable was estimated as the latent class indicator and saved in a new data set using Mplus SAVEDATA command with the option SAVE = CPROB. In Step 2, we computed the classification uncertainty rates (measurement

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