Determinants of Condom Use Stage of Change Among Heterosexually-Identified Methamphetamine Users

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There is a paucity of research on the association between methamphetamine use (meth) and sexual risk behavior among heterosexual meth users. This study used a multiple theories approach to identify factors associated with stage of change for condom use in a sample of 181 HIV-negative, heterosexually identified meth users. Background characteristics, drug use variables, and theoretical mechanism of change variables were examined in relation to Prochaska's contemplative and preparation stages of change. Sexual risk behavior was highest among those in the contemplation stage of change. When compared with those in the preparation stage of change, contemplators were more likely to be never married, more likely to have an STD, consumed larger amounts of meth and other illicit drugs, had lower scores on self-efficacy and outcome expectancies for condom use and negotiation of safer sex practices, and had less positive social norms in relation to AIDS preventive behaviors. A multivariate logistic regression revealed that the preparation stage of change was associated with increased self-efficacy for condom use, stronger social norms regarding condom use, and reduced occurrence of sexually transmitted diseases. The findings are discussed in relation to the development of sexual risk reduction interventions for heterosexual meth users.

KEY WORDS: heterosexual; sexual risk behavior; stage of change; methamphetamine.

INTRODUCTION

In recent years, the western United States has seen a dramatic increase in the use of methamphetamine (meth)—a highly potent stimulant (National Institute of Justice, 1999). In San Diego County alone, there are an estimated 30,000 active meth users (San Diego Association of Governments, 1998). One aspect of the meth problem focuses on the association between meth use and increasing incidence of HIV infection and other sexually transmitted diseases (e.g., Molitor *et al.*, 1998). Accordingly, the sexual risk practices of meth users are

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a major concern for health officials in San Diego County where the drug is extremely popular and readily available (San Diego Association of Governments, 1998).

The majority of studies on meth use and sexual risk behavior have been conducted with samples of gay and bisexual men (e.g., Frosch *et al.*, 1996; Gorman *et al.*, 1995; Paul *et al.*, 1993; Reback, 1997; Semple *et al.*, 2002); only a few studies have focused on meth use and sexual risk behavior in heterosexual populations. Overall, studies of gay and non-gay participants report that meth use is associated with a number of risk factors, including multiple partners, casual partners, high rates of sexually transmitted diseases, low rates of condom use, increased desire for high risk activities such as anal sex and fisting, and prolonged sexual activity (Gorman, 1998; Molitor *et al.*, 1998; Morgan, 1994; Morgan and Beck, 1997; Paul *et al.*, 1993; Reback, 1997). In two studies that focused on heterosexual injection users of meth, ∼65% of users reported an increased interest in sex

and increased sexual drive (Hando and Hall, 1994; Klee, 1992). In a more recent study, Molitor *et al.* (1998) used data from HIV testing centers in CA to compare the sexual risk practices of non-IDU users of meth and non-meth-users. Among heterosexuals, meth users had significantly more sex partners, more anal and vaginal sex, lower rates of condom use, and higher rates of STDs when compared to non-users. Meth users were also two times more likely to have sex with a prostitute or exchange sex for drugs, and four times more likely to have sex with an IDU when compared to non-meth users. The researchers concluded that heterosexual, non-injection users of meth engage in multiple sexual risk behaviors that place them at significant risk for contracting HIV and other sexually transmitted diseases. Taken together, these findings suggest an urgent need for health educators to target heterosexually identified meth users for risk reduction interventions in an effort to help curb the potential spread of HIV and other STDs within the heterosexual population. Without adequate prevention efforts, the next decade could witness an alarming increase in the incidence of HIV/STD among heterosexual drug users and their sexual partners.

This research utilized a multiple theories approach to the study of sexual risk behavior and behavior change in a sample of heterosexually identified, HIV-negative, meth-using men and women. Our multiple theories approach combined elements from social cognitive theory (SCT) (Bandura, 1986; 1989), theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), and the transtheortical model (TMM) or stages of change theory (Prochaska and DiClemente, 1983; Prochaska *et al.*, 1994). SCT contends that behavior change is a function of several key constructs, including knowledge, self-efficacy, and outcome expectancies. TRA views intentions as the primary determinant of behavior change. Behavioral intentions, in turn, are determined by the individual's attitude toward performing the behavior and perceptions of social norms associated with the behavior. In the transtheoretical model, the most important and central concept is that of the "stages of change." This concept suggests that in order to achieve behavior change, individuals progress through a series of stages that are marked by differential motivations, behaviors, and cognitions. Prochaska and DiClemente (1982) describe an individual's stage of change as "an internal state" that can be understood as motivation or readiness for change. The ascertainment of an individual's stage of change has been approached in two different ways, both of which utilize self-report methods. The discrete categorical method assesses the stage of change from a series of mutually exclusive questions; the continuous measure yields separate scales for each stage of change (Prochaska *et al.*, 1992).

Prochaska and DiClemente (1992) delineated the following five stages of change in the transtheoretical model: precontemplation, contemplation, preparation or determination, action, and maintenance. Precontemplation is the "entry point to the process of change" (Miller and Rollnick, 1991, p.16). Individuals who are in the precontemplation stage typically have not yet considered the possibility of change. Because the individual does not see his/her behavior as truly problematic, she/he does not perceive a need to change. The contemplation stage is apparent when the individual shows awareness that a true problem exists. At this stage, the individual begins to think about change but has not yet made a commitment to overcome his/her problem behavior. The contemplation stage is characterized by ambivalence toward change. The individual considers reasons to change and simultaneously develops justifications for not changing. In the preparation stage of change, motivation to change is high, and the individual begins to prepare for the changes that are forthcoming. The individual in this stage often needs assistance in identifying effective strategies that will facilitate desired behavior change. The action stage of change is evident when the individual begins to engage in actions that are intended to bring about change in an effort to overcome the problem or risk behavior. The action stage generally involves making modifications to one's environment, experiences, and cognitions. The maintenance stage of change is marked by the challenge of sustaining behavior changes that have been accomplished. Individuals in this stage must work to avoid slips and relapses that return them back to their problem behavior.

The stages of change model imply that different counseling strategies or approaches are necessary for individuals who are in different stages of change (Miller and Rollnick, 1991). Thus, from a clinical perspective, it is important to identify factors that are associated with the various stages of change so that interventions can be tailored accordingly. Miller and Rollnick (1991) contend that client resistance is a function of counseling strategies that do not match the individual's current stage of change. By identifying factors that are important at each stage of change, health educators can tailor intervention approaches and presumably optimize their effectiveness.

Previous research provides support for the utility of the stages of change concept in HIV prevention research. The majority of studies to date have compared individuals in the precontemplative stage of change for condom use with those in higher level stages of change. Taken together, these studies suggest that individuals can be classified according to stages of change model for condom use, and that different stages of change are characterized by a unique pattern of social, psychological, emotional, and cognitive factors. For example, the precontemplation stage of change has been associated with lower outcome expectancy for condom use (Polacsek *et al.*, 1999), lower self-efficacy for condom use (Polacsek *et al.*, 1999; Reddy *et al.*, 2000; Stark *et al.*, 1998), less positive social norms regarding condom use (Morrison-Beedy *et al.*, 2002; Polacsek *et al.*, 1999; Stark *et al.*, 1998), lower scores on emotional closeness and partner support (Santelli *et al.*, 1996), and less communication with steady partners (Santelli *et al.*, 1996). Predictors of condom use stage of change have also been found to vary according to gender (Timpson *et al.*, 2001) and partner type (Morrison-Beedy and Lewis, 2001; Morrison-Beedy *et al.*, 2002; Santelli *et al.*, 1996; Timpson *et al.*, 2001).

The present study contributes to this body of knowledge by examining the relationship between stages of change and theoretical predictors of behavior change in a sample of meth users. The association between meth use and sexual risk behavior raises the fundamental question as to how use of this drug affects the individual's motivations or intentions to use condoms. Two primary questions were addressed. Is stage of change related to sexual risk behavior in a sample of meth-using heterosexually identified men and women? To what extent are background characteristics of the individual, drug use variables, and theoretical mechanisms of behavior change associated with stage of change for condom use in a meth-using population? Using our multiple theories approach, a core set of interrelated constructs were examined in relation to two stages of change: contemplation and preparation. Because this study was voluntary and participants were recruited on the basis of their risk behavior, only a small number of individuals were identified with the precontemplation stage of change, and no participants were identified with the action or maintenance stages of change at baseline. The findings from this study should help to inform the development of sexual risk reduction interventions for meth-using heterosexually identified men and women who are "at risk" for contracting HIV

and other sexually transmitted diseases. We contend that the efficacy of behavioral interventions for this target population will be enhanced by the utilization of counseling approaches that employ stage appropriate strategies for pursing behavioral change.

METHOD

Sample Selection

These analyses used baseline data from a sample of 212 HIV-negative, heterosexually identified meth users who were enrolled in the FASTLANE research project at the University of California, San Diego (UCSD). The FASTLANE project is a theory-based, eight-session behavioral intervention designed to reduce the sexual risk practices of HIV-negative, heterosexual men and women who use meth. Eligible participants were men and women (at least 18 years old) who self-identified as heterosexual and reported having unprotected vaginal, anal, or oral sex with at least one sex partner during the previous 2 months. Eligible participants also reported using meth at least twice in the past 2 months. The latter criterion was imposed as a strategy to avoid the enrollment of one-time, experimental users. Individuals who presented with active psychotic or suicidal symptoms were excluded from study participation because of the difficulties associated with clinical management of this population. All participants were required to undergo testing to confirm their HIV-negative serostatus at baseline assessment. The OraSure HIV-1 Oral Collection Specimen Device was used to collect an oral specimen from all participants. Oral specimens were analyzed by The City of Long Beach Public Health Laboratory, Long Beach, CA. Sensitivity of the Oral Mucosal Transudate testing in 673 true-positive subjects has been reported as 99.9%. The OraSure testing procedure has been deemed a highly accurate alternative to serum testing (George *et al.*, 1997). All participants in the FASTLANE tested negative for HIV antibodies using the OraSure testing procedure.

Recruitment

Participants for the FASTLANE project were recruited through community outreach strategies. Community outreach workers performed street outreach in targeted social environments, and conducted poster campaigns in designated locations, within San

Diego County, that were known to have high concentrations of meth users. Recruitment sources included bars, dance clubs, after hours clubs, coffee shops, cafes, convenience stores, parks, adult bookstores, check-cashing venues, pawn shops, and video arcades. The FASTLANE project was advertised as a university-sponsored program for HIV-negative, heterosexual, meth users who wanted to learn more about safer sex practices, including condom use and negotiation of safer sex practices. Payment incentives were noted in the advertisements. Forty-eight percent of participants were recruited through the poster/media campaign, 46% were referrals from friends or enrolled participants, and 6% were recruited through face-to-face meetings with outreach workers in targeted social environments.

Procedures

The protocol for the FASTLANE project included a baseline assessment and 4 weekly 90-min, one-on-one counseling sessions focused on the context of meth use and unsafe sex, condom use, negotiation of safer sex, and enhancement of social supports. Participants were randomly assigned to one of three intervention conditions: 1) 4 weekly 90-min safer sex counseling sessions described above; 2) 4 weekly safer sex counseling sessions plus 4 weekly maintenance sessions at 8 months post-baseline counseling; or 3) an attention-control condition that focused on diet and exercise. All participants returned for three follow-up assessments at 6, 12, and 18 months post-counseling. Data for the present analyses were gathered at baseline assessment through computer-assisted interview technology (i.e., audio-CASI). The FASTLANE audio-CASI interview covered a range of topics, including meth use patterns, use of alcohol and other substances, sexual risk practices with HIV-positive, HIV-negative, and unknown serostatus partners, HIV-related attitudes, sexual communication skills, social cognitive factors, and background characteristics of the individual. Participants were paid a total of $30 for completing their baseline assessment and first counseling session. Data for these analyses were collected between June 2001 and June 2003.

Measures

Stages of Change

Participants completed a five-item scale that measures stages of change in relation to condom use. Each scale item corresponds with the five stages of change delineated by Prochaska *et al.* (1992): precontemplation; contemplation; determination; action; and maintenance. The following sexual behavior statements were coded 1–5, respectively: I currently do not practice safer sex and do not intend to start practicing safer sex in the next 2 months; I currently do not have safer sex but have been thinking about practicing safer sex during the next 2 months; I practice safer sex some of the time but not all of the time; I currently practice safer sex every time I have sex but have only begun doing so in the last 2 months; and I currently practice safer sex every time I have sex and have done so for over 2 months.

Background Characteristics

Age was coded as a continuous variable. Gender, ethnicity, education, marital status, living arrangement, employment status, income, and sexual orientation were represented by a series of dummy-coded variables: (female = 0, male = 1); (non-White = 0, White = 1); (high school or less = 0, some college or higher = 1); (not married = 0, married = 1); (living alone = 0, living with others = 1); (not employed = 0, employed = 1). The Beck Depression Inventory was used to assess depressive symptoms (Beck, 1967; 1976).

Substance Use

Four substance use variables were examined in relation to stage of change for condom use. Amount of meth used was measured by self-report and recorded as number of grams consumed in the past 30 days. Injection drug use was measured by a single item that queried participants about their injection use of meth or other drugs. Participants who had injected at least once during the past 30 days were coded "1"; non-injection drug users were coded "0." Alcohol use was measured by three items. Two items assessed how often during the past 2 months the respondent had drank alcohol, and become drunk from drinking alcohol. Response categories ranged from 0 (never) to 3 (very often). A third item quantified the number of drinks consumed on a typical day and ranged from 0 (0 drinks) to 4 (12 or more drinks). A summary variable was created to represent intensity of alcohol use (range 0–10). Total number of illicit drugs used during the past 2 months was also used in these analyses. Participants were presented with a

14-item drug use scale developed by the Henry M. Jackson Foundation (Temoshok and Nannis, 1992). Respondents were asked how often during the past 2 months they had taken the following illicit drugs: marijuana or hashish, powder cocaine, crack cocaine, amyl or butylnitrates (poppers), ecstasy, hallucinogens, heroin, GHB, inhalants, and others. Response categories ranged from 0 (never) to 3 (very often). A summary variable was created to represent use of drugs other than meth in the past 2 months.

Theoretical Mechanism of Change Variables

Theoretical mechanisms of behavior change were derived from SCT and TRA. The self-efficacy and outcome expectancies scales were developed for a previous sexual risk reduction intervention (Semple *et al.*, 2000). Each scale corresponds with a theoretical determinant of behavior change as described by Bandura (1986). Self-efficacy captures the individual's personal estimation of his or her ability to perform a given behavior. Self-efficacy for condom use was measured by 11 items with an alpha of .88 (e.g., "I can have condoms available every time I have penetrative sex"). Self-efficacy for negotiation was measured by seven items with an alpha of .90 (e.g., "I can bring up the topic of safer sex with any sexual partner"). All items from the self-efficacy scales were measured on a 4-point scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Outcome expectancies evaluate the extent to which a person believes that a given behavior will result in a specific outcome (Bandura, 1986). Outcome expectancies for condom use were measured by 11 items with an alpha of .72 (e.g., "I believe that condoms will protect me from getting HIV/STDs"). Outcome expectancies for negotiation were measured by 11 items with an alpha of .78 (e.g., " I believe that my partners will still trust me if I suggest safer sex practices"). Response categories for the outcome expectancies scales ranged from 1 (strongly disagree) to 4 (strongly agree). Measures of TRA concepts (i.e., attitudes, intentions, and social norms) were developed by Fisher *et al.* (1998). Attitudes toward condoms were measured by three items with an alpha of .80. (e.g., "I always use condoms for vaginal intercourse with all partners during the next 2 months"). Similar items assessed attitudes toward condoms for anal and oral sex. Response categories ranged from 1 (very untrue) to 5 (very true). Perceived social norms were measured by three items that captured the participant's expectations for AIDS prevention behavior by important others (e.g., "Most people who are important to me think that I should always use condoms for vaginal intercourse with all my partners during the next 2 months"). Two additional items assessed this construct in relation to anal and oral sex. Response categories ranged from 1 (very untrue) to 5 (very true). The alpha for this scale in the present sample was .82. Intentions to engage in AIDS preventive behavior were measured in the study but were not included in these analyses because of potential overlap with the primary outcome of interest (i.e., stages of change).

Sexual Risk Behavior

Sexual risk behavior was defined as unprotected vaginal, anal, or oral sex with opposite sex partners. Four categories of partner-type were assessed: spouse or live-in partner; steady partner other than spouse or live-in (e.g., boyfriend, girlfriend); casual (e.g., one-night stand); and anonymous (e.g., prostitute, someone in the park). For each category of partner-type, participants were asked how many times during the past 2 months they engaged in: a) insertive vaginal sex (i.e., "you inserted your penis into the vagina of your partner"); b) receptive vaginal sex (i.e., "your partner inserted his penis into your vagina"); c) receptive anal sex (i.e., "your partner inserted his penis into your anus"); d) insertive anal sex (i.e., "you inserted your penis into the anus of your partner"); e) receptive oral sex (i.e., "your partner licked or sucked your genitals"); and f) insertive oral sex (i.e., "you licked or sucked your partner's genitals"). Three variables were created to represent the total number of unprotected vaginal, anal, and oral sex acts, respectively. Three additional questions assessed the use of alcohol, meth, and a drug other than meth before or during sex (e.g., during the past 2 months, how often did you use a drug other than meth before or during sex?). Response categories ranged from 1 (never) to 4 (very often).

RESULTS

Baseline data were gathered from 212 HIV-negative meth-using men and women who were enrolled in the FASTLANE intervention project at the UCSD. Fifteen percent of the sample ($N = 31$) described themselves as in the precontemplative stage of change for condom use; 42% of the sample ($N = 89$) identified with the contemplative stage of change

for condom use, and 43% ($N = 92$) identified with the preparation stage of change. The small number of participants in the precontemplative stage of change raised concerns regarding the inclusion of this group in a comparative analysis. To address this concern, we conducted a preliminary examination of differences between the three groups in terms of background characteristics. Only one group difference was noted. Participants in the contemplative stage of change were significantly more likely to have had an STD in the past 2 months when compared with those in the precontemplative and preparation stages of change (35.6% vs. 16.1%, 20.5, respectively, $\chi^2 = 7.1$, $p < .05$). The three groups did not differ in terms of age, gender, ethnicity, education, marital status, living arrangement, or employment status. The paucity of group differences, along with concerns regarding inadequate power due to the small sample size, resulted in the decision to exclude the precontemplative group from further analyses. All subsequent analyses compared participants in the contemplative and preparation stages of change.

Background Characteristics

All 181 participants in the contemplative and preparation stages of change self-identified as "heterosexual" and reported having opposite sex partners only during the previous 2 months. The majority of participants were males (74%). Participants ranged in age from 18 to 60 with a mean age of 38.3 years ($SD = 9.4$). Of the participants, 58% were Caucasian, 8% Latino, 25% African American, 4% Native American, and 5% others. Approximately 75% of the sample had at least a high school education. Seventy percent were unemployed. Sixty-nine percent of the sample had an annual income of $\leq\$19,000$. Thirteen percent of the sample lived with a spouse or steady partner, 34% lived with other adults, 25% lived alone, 20% were homeless, and 8% reported "other" living arrangements. Fifty-five percent of participants were never married; the rest were either divorced/separated (38%), married (5%), or widowed (2%). In terms of partner type, only 23% of the sample had a steady or main partner. The majority of participants reported non-steady partners during the past 2 months. Twenty-eight percent of the sample reported having one or more STDs in the past 2 months. The most common STDs affecting both men and women were genital/anal warts and genital/anal herpes. Eighteen percent of the sam-

ple had a Hepatitis C diagnosis; 9% had a Hepatitis B diagnosis. Among women, 20% reported having a yeast infection, and 4% had been diagnosed with pelvic inflammatory disease during the previous 2 months. Scores on the Beck Depression Inventory ranged from 0 to 36 (mean $= 11.3$, $SD = 7.8$). t-Test and chi-square analyses were used to examine group differences in background characteristics according to participants' stage of change. Only two significant differences were observed. Participants in the preparation stage of change for condom use were significantly more likely to be never married (62.6% vs. 47.2%, $\chi^2 = 7.8$, $p < .05$), and less likely to report having an STD in the past 2 months (20.5% vs. 35.6%, $\chi^2 = 5.0$, $p < .05$) when compared with their counterparts in the contemplative stage of change.

Substance Use

We examined differences between contemplators and those in the preparation stage of change in terms of their current use of meth, other illicit drugs, and alcohol. The groups differed in terms of one meth use variable. Individuals in the preparation stage of change used significantly less meth during the past 30 days when compared with those in the contemplation stage of change (10.3 vs. 6.5, $t = 2.0$, $p < .05$). Snorting meth was the most common method of consumption for participants in both groups. In addition, there were no differences in the percentage of injection meth users in the contemplation and preparation groups (14.6% vs. 10.0%, $\chi^2 = .88$, $p > .05$). In terms of other substances, participants in the preparation stage of change had significantly less use of other illicit drugs during the past 2 months (16.4 vs. 15.4, $t = 2.1$, $p < .05$). The most frequently used other drugs in both groups were marijuana and cocaine (65% and 27% use rate, respectively). With respect to alcohol, the two groups scored similarly on our composite measure of alcohol use (6.7 vs. 6.1, respectively, $p > .05$), and there were no group differences in terms of the frequency of alcohol consumption, number of drinks on a typical day, and frequency of getting "drunk."

Theoretical Mechanism of Change Variables

Group differences in terms of theoretical variables were examined for participants in the contemplation and preparation stages of change. The two

groups differed on all but two of the theoretical variables examined in this study. Those in the preparation stage of change scored significantly higher than contemplators in terms of self-efficacy for condom use (3.3 vs. 2.9, $t = 4.5$, $p < .001$), self-efficacy for negotiation (2.9 vs. 2.2, $t = 2.2$, $p < .05$), outcome expectancies for condom use (2.8 vs. 2.5, $t = 3.2$, $p < .001$), and social norms favoring AIDS preventive behaviors (3.9 vs. 3.3, $t = 2.9$, $p < .01$). Outcome expectancies for negotiation and attitudes toward AIDS preventive acts were not significantly different between the two groups.

Sexual Risk Behavior

Participants in the contemplative and preparation stages of change differed on three measures of sexual risk behavior. Contemplators were significantly more likely to report using meth "very often" before or during sex when compared with those in the preparation stage of change (41.6% vs. 17.2%, $\chi^2 = 8.5$, $p < .05$). Moreover, contemplators were significantly more likely to report using a drug other than meth "very often" before or during sex in the past 2 months (13.8% vs. 6.6%, $\chi^2 = 8.9$, $p < .05$). In addition, contemplators reported significantly more casual partners during the past 2 months when compared with their meth-using counterparts in the preparation stage of change (4.7 vs. 3.2, $t = 3.0$, $p < .01$). The two groups did not differ significantly in terms of total number of unprotected vaginal, oral, or anal sex acts during the previous 2 months; however, total number of unprotected vaginal sex acts was marginally significant. Contemplators reported more unprotected vaginal sex acts when compared with those in the preparation stage of change (35.3 vs. 23.7, $t = 1.7$, $p = .09$).

Multivariate Analysis

Logistic regression analysis was used to examine whether our set of theoretical predictor variables distinguished between individuals in the contemplative and preparation stages of change. Contemplators were coded "0"; those in the preparation stage of change were coded "1." Only variables that were significant in the univariate analyses were entered into the logistic regression. Predictor variables included marital status, number of sexually transmitted diseases, amount of meth used in past 30 days, use of other illegal drugs, self-efficacy for condoms,

self-efficacy for negotiation, outcome expectancies for condom use, and social norms favoring AIDS preventive behaviors. The correlations among predictor variables ranged from .01 to .61. A test of the full model against a constant-only model was statistically significant ($\chi^2 = 45.6$, 8 df, $p < .001$). Using our set of predictor variables, we correctly classified 70% of the cases. Three predictor variables were statistically significant: number of STDs; self-efficacy for condom use; and social norms favoring AIDS preventive behaviors. The Odds Ratio (OR) for condom use self-efficacy revealed that the probability of being in the preparation group increased by a multiplicative factor of approximately five as scores on self-efficacy for condom use increased by one unit. Number of STDs also distinguished between participants in the contemplation and preparation stages of change. Preparation stage individuals were ~50% less likely to have an STD in the past 2 months when compared with those in the contemplative stage of change. The OR for social norms favoring AIDS preventive behaviors indicated that the probability of being in the preparation group increased by a factor of 1.4 as scores on this measure increased by one unit. Taken together, these findings suggest that self-efficacy for condom use, positive social norms, and occurrence of STDs are the predictor variables that best discriminate between heterosexually identified meth users who are in the contemplative vs. preparation stage of change for condom use. Results are presented in Table I.

DISCUSSION

This study used a multiple-theories approach to examine background characteristics, drug use variables, and theoretical mechanism of change variables as predictors of stage of change for condom use in a sample of meth-using heterosexually identified men and women. To our knowledge, this is the first paper to examine the role of meth use in relation to stages of change for condom use within this target population.

Overall, this sample of meth-using heterosexual men and women were very sexually active. On average, participants reported having vaginal intercourse 19.8 times per month. This number is three times greater than the national average of 6.5 acts of intercourse per month (Smith, 1989). Participants also averaged 11.2 sexual partners over a 2-month period when compared with a national average of 1.3

Table I. Logistic Regression to Examine Predictors of Stage of Change for Condom Use Among Meth Users
(N = 181)

						95% CI	
Variable	B	SE	Wald	p-value	OR	Lower	Upper
Marital status	.24	.17	2.0	.15	1.3	.94	1.6
Number of STDs	−.72	.27	7.2	.01	.49	.04	1.0
Self-efficacy for condom use	1.6	.51	9.8	.001	4.9	4.0	5.9
Outcome expectancy for condom use	.35	.48	.53	.46	1.4	.46	2.3
Self-efficacy for negotiation	−.73	.39	3.4	.06	.48	.28	1.2
Social norms for AIDS prevention	.35	.16	4.7	.02	1.4	1.1	1.7
Amount of meth used	−.02	.02	2.8	.09	.97	.94	1.0
Use of other illicit drugs	−.09	.06	2.3	.13	.91	.79	1.0
Constant	−3.9	1.7	5.3	.02			

Note. Model 1: Full model with all predictors (8-factor model); −2 log likelihood (184.5); model chi-square—45.6, 8 df, $p < .001$.

partners per year among non-drug-using heterosexuals. Rates of unprotected vaginal, anal, and oral sex over a 2-month period were also high ($M = 29.6, 13.1, 52.1$, respectively). On the basis of these findings, we may conclude that meth-using heterosexual men and women engage in a variety of sexual activities that place them at risk for contracting HIV infection and other sexually transmitted diseases.

Background characteristics of the individual were generally not related to stage of change in this study. This finding is contrary to previous research, which has shown a relationship between both gender and partner-type in relation to stage of change for condom use (e.g., Morrison-Beedy *et al.*, 2002). The lack of relationship in our study may have resulted from insufficient power to detect effects given that only 23% of the sample reported having a steady or main partner, and only 26% of the sample were women. Marital status and number of STDs were the only two background variables that were related to stage of change in these analyses. Specifically, individuals who were in the preparation stage of change were significantly more likely to be never married, and less likely to have an STD when compared with their counterparts in the contemplative stage of change. To further explicate the finding regarding marital status, we examined the relationship between marital status, age, and partner-type. We explored the possibility that marital status was serving as a proxy for age or partner-type. Partner type was not related to marital status in these data. The never married did not differ from other marital categories in terms of the number of steady, casual, and anonymous partners reported during the past 2 months. However, a significant relationship between marital status and age emerged from these data. Specifically,

never married individuals were significantly younger than those in other marital categories (34.8 vs. 42.6, $t = 6.0$, $p < .001$). Thus, it is possible that condom use is more normative among younger individuals, and that marital status is merely a proxy for age. Further research is necessary to examine the role of age in relation to readiness for change among meth users.

Sexual risk behavior was found to vary according to the two stages of change examined in these analyses. This finding provides further evidence that the stages of change concept may be important in terms of understanding the process by which safer sex practices are adopted in a variety of population. It also justifies our quest to identify factors or unique patterns of variables that are associated with different stages of change in our target population of meth users. In this study, we were able to identify factors that may be important in terms of moving heterosexual meth-using men and women from the contemplation to the preparation stage of change for condom use. These data indicate that the most effective approach for moving individuals from the contemplative to the preparation stage of change may involve enhancement of key mechanism of change variables delineated in our theoretical models. For example, the main goal of counseling in the contemplative stage of change focuses on helping the participant resolve ambivalence toward AIDS preventive strategies. This might be accomplished by eliciting self-motivated reasons for change and enhancing the participant's self-efficacy for change. In particular, this research suggests that a focus on enhancing self-efficacy for condom use, promoting positive social norms favoring AIDS preventive behaviors, and raising awareness of STD risk, may be effective strategies for advancement from the contemplative

to the preparation stage of change. Clearly, there may be different sets of predictor variables that distinguish between meth users who are in the more advanced stages of change.

Another important issue that arises in the development of sexual risk reduction interventions for drug-using population is whether or not modification of drug use behavior is a prerequisite for changing sexual risk behavior. DiClemente and Peterson (1994) argued that drug abstinence is not a realistic goal of safer sex interventions, primarily because changing drug behavior is a difficult and time intensive process that requires specialized treatment programs and facilities. The findings from this study point to an association between drug use variables and stage of change for condom use. Participants who were in the contemplative stage of change differed from those in the preparation stage in terms of the amount of meth used, and their use of drugs other than meth. Because these data were cross-sectional, this finding only suggests that participants may decrease their use of meth as they advanced toward higher stages of change in relation to condom use. Indeed, in our clinical experience, we have found that some participants reduce or even eliminate their use of meth as they begin to use condoms on a more regular basis. Clearly, longitudinal data are necessary to assess concomitant changes in meth use and condom use behaviors across time and through all five stages of change.

Overall, this study makes a contribution to HIV prevention research by identifying factors that appear to be important in terms of helping meth users, who are in the early stages of change, to adopt condom use behaviors. Our findings suggest the need to intervene differently with participants who are in different stages of change. Two of the factors that were identified in this study (e.g., self-efficacy for condom use, positive social norms) are appealing to researchers because they are all modifiable in the context of a sexual risk reduction intervention. Despite this strength, this study has a number of limitations that warrant discussion. The size and composition of our sample precluded our ability to examine important background characteristics such as gender and partner-type in relation to stages of change. Our sample was also highly selective. We recruited only those meth users who reported engaging in sexual risk behavior, and were interested in volunteering for a sexual risk reduction intervention. Accordingly, sexual risk behavior and drug use may be overestimated or underestimated, such that the findings from this

study should not be generalized to the overall population of meth-using heterosexual men and women. The sampling procedure also resulted in a restricted range in terms of the stages of change for condom use. A more compelling analysis would have involved participants in all five stages of change; however, previous research has documented the difficulties encountered in attempting such an analysis. Typically, there are too few volunteers in the advanced stages of change to conduct analyses utilizing all five stages of change (Stark *et al.*, 1998). Moreover, our data were gathered through self-report, which raises the possibility that participants underreported or overreported their risk behaviors. To address the issue of self-report bias, we employed audio-CASI technology, which has been shown to reduce the underreporting of sensitive behaviors with drug-using populations (Des Jarlais *et al.*, 1999). Presumably, the audio-CASI technology is effective with this population because it offers more privacy and confidentiality, and eliminates the judgment of others, which can be introduced in the interviewer–administered format. Lastly, the data that were used in these analyses were cross-sectional. The ultimate design in any stage of change analysis would be to follow participants across time to determine which factors or components of an intervention result in actual behavior change. In short, the process by which individuals adopt condom use behavior can only be fully understood through longitudinal research.

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