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## Environmental risk, social cognition, and drug use among young men who have sex with men: Longitudinal effects of minority status on health processes and outcomes

Dorian E. Traube<sup>1,\*</sup>, Sheree M. Schrager<sup>2</sup>, Ian W. Holloway<sup>3</sup>, George Weiss<sup>2</sup>, and Michele D. Kipke<sup>2,1</sup>

<sup>1</sup>University of Southern California

<sup>2</sup>Children's Hospital Los Angeles

<sup>3</sup>University of California, Los Angeles

### Abstract

**BACKGROUND**—Young men who have sex with men (YMSM) continue to be at elevated risk for substance use; however, models explaining this phenomenon have often focused on a limited array of explanatory constructs. This study examined the longitudinal relationship of contextual risk factors, social cognitive processes, mental health, and health protective behavior to identify key mechanisms of illicit drug use of YMSM as they aged through emerging adulthood.

**METHODS**—Our sample included an ethnically diverse cohort of 487 YMSM recruited through venue based probability sampling in Los Angeles. We used latent growth curve modeling to understand relationships between environmental risk factors, changing individual and social process variables, health protective behavior, psychological distress, and illicit drug use outcomes among YMSM.

**RESULTS**—Age, ethnicity, violence and discrimination, depression, and previous histories of illicit drug use were key elements of risk for future illicit drug use among YMSM. During this theoretically distinct time period, health as a value, self-efficacy, and social support are vital social cognitive processes for promoting self-change among YMSM, and YMSM have independent growth within each process. Health as a value, self-efficacy, and social support were dynamic social cognitive processes, which served as key mechanisms by which risk factors were converted into health promotion strategies or psychological distress, and ultimately illicit drug use.

**CONCLUSIONS**—The efficacy of prevention interventions aimed at reducing illicit drug use among YMSM can be enhanced by addressing social cognitive processes for this underserved portion of the male population.

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\*Corresponding Author: Dorian E. Traube, University of Southern California School of Social Work, Montgomery Ross Fisher Building-MRF, 669 West 34th Street, Los Angeles, CA 90089-041, voice: +1-213-740-1989; fax: +1-213-821-2088; traube@usc.edu.

**Contributors.** Dr. Traube designed the study and drafted the manuscript. Dr. Schrager and Dr. Holloway conducted the statistical analysis and contributed to manuscript preparation. Mr. Weiss and Dr. Kipke contributed to manuscript preparation and ensured findings were consistent with prior work completed from the Healthy Young Men Study data. All authors have approved the final manuscript.

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## Keywords

YMSM; Illicit Drug Use; Social Action Theory; Drug Use Prevention

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## 1. INTRODUCTION

Young men who have sex with men (YMSM) experience disproportionately worse health outcomes (Kipke et al., 2007a) including psychological distress (Kipke et al., 2007b), suicidality, violence and victimization (Greenwood et al., 2002; Wong et al., 2010), tobacco use (Gruskin et al., 2007), and high rates of HIV infection (Kipke et al., 2007a) when compared to the general population of young men. Illicit drug use has been identified as a risk factor for all of these health disparities among YMSM (Thiede et al., 2003). Central to addressing these disparities in our public health system is inquiry into theoretically grounded and developmentally driven processes that can increase risk or strengthen resilience among YMSM who are at risk for illicit drug use.

### 1.1. YMSM and Illicit Drug Use

YMSM are more likely than their heterosexual peers to report lifetime use of drugs, including injectable drugs, and to report use of cocaine before 13 years of age (Kipke et al., 2007b; Wolitski et al., 2001). Studies of YMSM in the seven largest urban areas of the United States found that three quarters of the 15- to 22-year-old YMSM reported having previously used an illicit drug and two thirds had used illicit drugs in the past 6 months (Thiede et al., 2003). The drug use behaviors of YMSM must be understood within the context of population specific factors (e.g., the coming out process, gay-related stress), risk factors related to the social environment (e.g., involvement in gay-related social events), and psychological factors (e.g., anxiety, depression; Rosario et al., 1996; Rosario et al., 2004). While the relationship of each of these risk factors for drug use among YMSM has been explored independently, to date, few studies have examined the impact of these risk factors simultaneously.

### 1.2. Risk factors for substance use during volatile developmental periods

The failure to concurrently examine population specific, social, and psychological correlates of illicit drug use is particularly problematic for YMSM given that the transitional stage of late adolescence into early adulthood is a dynamic and sometimes volatile developmental period requiring a nuanced understanding of risk behavior. Strong evidence suggests that youth experimenting with same-sex relationships are not afforded the same social support as their heterosexual peers (Rosario et al., 2001; 2006; Saewyc et al., 2006). Indeed, YMSM, especially YMSM of color, may experience increased disapproval, discrimination, and homophobia from their family, peers, racial/ethnic communities, faith communities, and the predominately white gay community (Rosario et al., 2006; Saewyc et al., 2006). Evidence suggests that lack of social support within social networks can negatively impact health (Ritt-Olson et al., 2005). However, this effect may also be due to an individual's selection of friends as well as to the behaviors they attribute to their friends (Ewart 2009; Frank et al., 2004). Shared norms around health behaviors, like drug use, are powerful sources of social influence with direct consequences for the behaviors of network members.

Additionally, empirical evidence suggests the salience of individual personality factors in understanding illicit drug use. Several studies of YMSM have found that psychological distress is significantly associated with increased risk behaviors (Rosario et al. 2001; 2006). Impulsivity and sensation-seeking may serve as coping strategies for the regulation of negative affect and mental health issues and may bear directly or indirectly on the illicit drug

use behaviors of YMSM (Dudley, et al., 2004; Rosario et al., 2001; 2006). Given the high rates of psychiatric co-morbidity among young sexual minority populations (Bontempo and D'Augelli, 2002), psychological factors may play a key role in understanding associations with increased drug risk behavior (Hart and Heimberg, 2005; Pachankis and Goldfried, 2006; Tate et al., 2006).

### 1.3. Exploring YMSM Illicit Drug Use Through Social Action Theory

To date, examinations of YMSM drug use have often focused on the linear relationship of contextual risk factors on illicit drug use without full consideration of the dynamic social cognitive processes by which risk factors are converted into risk behavior during this watershed developmental time period. Because of this, there is little knowledge about the mechanisms and processes that should be addressed when trying to prevent drug use among YMSM. The Health Belief Model (Ellickson et al., 2003), Social Cognitive Theory (Bricker et al., 2010), and the Theory of Reasoned Action (Morrison et al., 2002), have all guided risk behavior prevention efforts. However, each of these has a relatively limited focus on factors impacting behavioral change. (For a comprehensive evaluation of these theories see Traube et al., 2011). Social Action Theory (SAT; Ewart, 1991) addresses a critical gap left by other behavioral theories by providing a comprehensive model of behavioral change emphasizing structural, social, and psychological mechanisms that result in sustained patterns of health risk and promotive behavior. SAT proposes that health protective behaviors are a result of an interaction among three domains: 1) "contextual influences," or environmental risk factors including background/ demographics, life stressors and violence; 2) "self-change processes," or social cognitive processes including health values, self-efficacy and social support; and 3) "action states," or health behavior outcomes such as mental health, health promotion, and drug use (Ewart, 1991).

SAT is employed in this study as a holistic framework for understanding social and cognitive processes that result in high-risk substance use behavior. SAT was originally developed as a general health promotion model for the adult population, and has been successfully applied to various health behaviors including alcohol use and cardiovascular health, (Maisto et al., 2009). In the current study, we employ SAT to longitudinally examine how social cognitive variables, psychological distress, and health protective behaviors mediate the relationship between environmental risk factors and illicit drug use among YMSM. This investigation offers the opportunity to identify salient environmental and personal prevention opportunities for YMSM prior to the development of illicit drug abuse. Figure 1 depicts the application of SAT for use in this study.

## 2. METHODS

### 2.1. Hypothesis

The analytic plan was guided by the following hypotheses derived from SAT: controlling for previous drug use, contextual influences (e.g., ethnicity, age, and experiences of victimization) would significantly impact the baseline endorsement of self-change strategies (e.g., health values, social support, and self-efficacy) YMSM use to deal with problem behaviors in their lives. Further, contextual influences would determine the rate of growth of these self-change processes over the two years of the study. Baseline levels and changes in self-change processes, and their corresponding effects on distal health promotion and mental health, would mediate the effects of contextual influences on illicit substance use.

### 2.2. Sampling frame and data collection

Data come from the Healthy Young Men (HYM) study, a longitudinal study of YMSM HIV risk and protective behaviors in Los Angeles, California (Ford et al., 2009). A total of 526

subjects were recruited into the study between February of 2005 and January of 2006. Young men were eligible to participate in the study if they were: a) 18 to 24 years old; b) self-identified as gay, bisexual, or uncertain about their sexual orientation and/or reported having had sex with a man; c) a resident of Los Angeles County and anticipated living in Los Angeles for at least six months; and d) self-identified as Caucasian, African American, or Latino of Mexican descent. The inclusion of YMSM allowed for examination of drug use among individuals who engage in same sex intercourse regardless of their sexual self-identification. Although the sample size varied at each wave, a total of 487 participants remained in the study at wave 5, for an overall 93% retention rate. The present study incorporates variables from baseline and the one- and two-year surveys (i.e., waves 1, 3, and 5) so as to preserve statistical power to detect effects.

YMSM were recruited at public venues using a stratified probability sampling design that has been used successfully with similar populations (MacKellar et al., 1996; Muhib et al., 2001). Subjects were recruited from 36 different public venues that had previously been identified as settings in which YMSM spend time and/or “hang out” including bars/clubs (50%); Pride, festivals (14%); special events/private parties (14%); social service agencies (11%); and high-traffic street locations (11%). These venues were chosen for study recruitment because they afforded the opportunity to engage a large number of young men who either identify as gay or were deciding how to classify their sexual identity by exploring same sex attractions via attendance at gay focused venues. Systematic field observations to identify the venues yielded a total of 80 venue-day-time (VDT) sampling periods that met the sampling frame inclusion criteria and represented 36 different venues. Each month, 16–24 VDTs were randomly selected with an equal probability from the updated sampling frames to create monthly sampling calendars. Young men who entered the venues and appeared to be eligible for the study (e.g., they appeared to be 18–24 years of age) were systematically counted and invited to participate in a brief screening interview, conducted in English or Spanish, to determine their eligibility. Young men found to meet the study criteria were given a detailed description of the study, and those who expressed interest provided informed consent and contact information. All interviews were then scheduled within two weeks of the time of recruitment.

The survey itself was administered every six months, at the project office or a public venue that provided internet connectivity, for a total of five waves of data collection spanning two years. The survey was administered in both English and Spanish using computer-assisted interview technologies that incorporated sound files, allowing participants to silently read questions on the computer and/or listen to the questions read through headphones and enter their responses directly into the computer. Each survey required approximately one and a half hours to complete; participants received \$35 as compensation for their time and effort.

### 2.3. Study Measures

We have previously tested and established the best way in which to measure the latent constructs in SAT when studying both illicit drug use and sexual risk behavior among YMSM (Traube et al., 2011; 2012). Below are the measures included in the application of SAT to YMSM illicit substance use.

**Demographics**—Dummy codes represented the respondents’ racial/ethnic category (African American: African American=1, White=0, Latino=0; Latino: Latino=1, White=0, African American=0), and a single continuous variable represented subjects’ age in years at wave 5.

**Violence/Discrimination action contexts**—Given the aforementioned research on the increased disapproval, discrimination, and homophobia YMSM experience (Rosario et al., 2006; Saewyc et al., 2006), action contexts were conceptualized as experiences related to violence and victimization. A factor loading score summarized five measures derived from a previous study with MSM (Diaz et al., 2001) describing history of violence and victimization at baseline: Two binary indicators of witnessing or experiencing physical abuse growing up (0=no, 1=yes) and three continuous measures of racism (institutional racism: 3 items,  $\alpha=0.70$ ; social/sexual racism, 6 items,  $\alpha=0.81$ ) and homophobia (1 item, how often subjects had to pretend to be heterosexual in order to be accepted) all measured on a 4-point scale ranging from 1=never to 4=many times.

**Social support**—A composite score represented the mean at each wave of scales assessing family support (4 items,  $\alpha$  range 0.87–0.89) and friend support (4 items,  $\alpha$  range 0.85–0.90), both measured with four-point Likert scales ranging from 1=strongly disagree to 4=strongly agree. These items were drawn from The Multidimensional Scale of Perceived Social Support. (Zimet et al., 1988)

**Self-efficacy**—A pre-existing four-point scale (Smith et al., 1996) assessed participants' self-efficacy at each wave for nine HIV prevention behaviors (e.g., communication with sexual partners; response range 1=couldn't do it to 4=very sure;  $\alpha$  range 0.81–0.84).

**Health as a value**—A three-item, four-point Likert-type scale adapted from a pre-existing instrument (Lau et al., 1986) assessed the value subjects placed on their health at each wave (response range 1=not true to 4=completely true;  $\alpha$  range 0.60–0.69).

**Health protective behaviors**—In the Healthy Young Men parent study, health promotion measures were collected on physical activity and cigarette smoking as they were deemed the most salient behaviors impacting this community. A factor loading score summarized three measures derived from the Youth Risk Behavior Surveillance Survey (YRBS; Centers for Disease Control and Prevention, 2006) describing health behavior at wave 5: number of days in the past week that participants had engaged in exercise or physical activity (Centers for Disease Control and Prevention, 2006) a cigarette use index, recoded so that higher scores represented healthier behavior (4=lifetime non-users, 3=prior users who had not smoked within the past 30 days, 2=light users who smoked 15 days or less in the past month and 1/2 a pack of cigarettes per day or less, 1=frequent or heavy users who smoked more than 15 days in the past month or more than 1/2 a pack of cigarettes per day); and self-rated health status (ranging from 1=poor to 4=very good).

**Psychological distress**—Subjects completed the Centers for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) as an indicator of their psychological distress at wave 5 (20 items;  $\alpha=.91$ ). A total score was calculated by summing the items.

**Illicit drug use**—At each wave, subjects reported their use of illicit drugs including crack, cocaine, crystal/methamphetamine, ecstasy, poppers, GHB, Ketamine, “other forms of speed,” LSD, PCP, heroin, mushrooms, and prescription drugs without a physician's order. Alcohol and marijuana were excluded given that both substances are readily available and commonly used within the general population of adolescents and young adults. Responses were combined to form a four-category index of illicit drug risk: 1=lifetime non-use; 2=prior lifetime use, but recent (past 30 days) non-use; 3=recent light use (1–2 drugs in the past 30 days, but less frequently than once a week); 4=recent frequent/heavy use (1–2 drugs in the past 30 days, used once a week or more, or 3+ drugs in the past 30 days regardless of frequency). The reliability and validity of this illicit substance use index has previously been

established by Sussman et al. (2011) and Needle et al. (1983). Figure 1 maps these measures onto SAT, the theoretical framework for the study.

## 2.4. Analytic strategy

We used latent growth curve modeling (GCM) techniques (Bollen et al, 2006; Kline, 2010; Muthén, 2001) to represent development of self-change strategies. Trajectories of each self-change process (i.e., the observed measures of social support, self-efficacy, and health as a value) were modeled using a latent intercept and slope to represent longitudinal change in these variables. The wave 5 health protection and psychological distress outcomes were regressed on the latent intercepts and slopes, which were in turn regressed on the baseline violence/discrimination factor score. Finally, wave 5 drug use was regressed on concurrent health protection, psychological distress, and the latent growth parameters, controlling for baseline drug use and socio-demographic covariates. Non-significant paths were removed from the final model, and the indirect effects comprising the remaining significant pathways from violence/discrimination to drug use and psychological distress were computed and tested to assess mediation of contextual and self-change effects on these outcomes. All analyses were conducted using Mplus Version 6 (Muthen and Muthen, 2001).

## 3. RESULTS

Descriptive statistics for all measures, and means and variances for the latent growth parameters, are reported in Table 1. While there is no consensus in the research literature about what constitutes the most appropriate comparison group for YMSM (Clatts et al., 2003), our estimate of YMSM recent substance use (20.9%) was in keeping with national estimates for the general U.S. population, which range between 18.4–21.5% for emerging adults ages 18–25 (Substance Abuse and Mental Health Administration, 2009). As represented by significant growth parameter means, social support and self-efficacy both evinced positive change over time.

### 3.1. Direct Effects

The model predicting wave 5 illicit drug use, presented in Figure 2, displayed excellent fit and good explanatory power (CFI=0.930, TLI=0.919, RMSEA=0.048;  $R^2=0.351$ ). Although all regression paths were tested, only significant paths are depicted in Figure 2. The self-efficacy intercept was positively correlated with the intercepts of social support ( $r=0.36$ ,  $p<0.001$ ) and health as a value ( $r=0.21$ ,  $p<0.001$ ), indicating shared variance between health values, self-efficacy, and social support at baseline. However, the slopes of the self-change process variables were uncorrelated, suggesting independent growth within each process.

Age and race/ethnicity were both significantly associated with illicit drug use: Older participants had a lower likelihood of illicit drug use ( $\beta=-0.092$ ,  $t=-2.464$ ,  $p<0.05$ ), as did Latino YMSM ( $\beta=-0.093$ ,  $t=-2.203$ ,  $p<0.05$ ); African American YMSM trended toward less use of illicit drugs ( $\beta=-0.073$ ,  $t=-1.706$ ,  $p<0.10$ ). Baseline illicit drug use was predictive of illicit drug use at wave 5 ( $\beta=0.558$ ,  $t=17.347$ ,  $p<0.001$ ).

The violence/discrimination factor was significantly related to racial/ethnic minority status (African American:  $\beta=0.358$ ,  $t=7.834$ ,  $p<0.001$ ; Latino:  $\beta=0.109$ ,  $t=2.264$ ,  $p<0.05$ ). Violence and discrimination were negatively related to the social support intercept ( $\beta=-0.312$ ,  $t=-7.042$ ,  $p<0.001$ ) and positively related to the health values slope ( $\beta=0.159$ ,  $t=1.982$ ,  $p<0.05$ ), suggesting that experiences of violence, racism, and homophobia were associated with less social support at baseline but also with the development of greater value for personal health over time.

A negative trend emerged between the health values intercept and illicit drug use ( $\beta=-0.086$ ,  $t=-1.895$ ,  $p<0.10$ ). The health values intercept and slope were associated with health protection (intercept:  $\beta=0.115$ ,  $t=1.955$ ,  $p<0.10$ ; slope:  $\beta=0.322$ ,  $t=3.603$ ,  $p<0.001$ ), suggesting that initially valuing one's health and coming to value health more over time were both predictive of positive health behavior choices.

The intercept of social support was negatively related to psychological distress ( $\beta=-0.318$ ,  $t=-7.310$ ,  $p<0.001$ ), suggesting that baseline social support was strongly protective against later depression. Concurrent health protective behaviors were also protective against psychological distress ( $\beta=-0.168$ ,  $t=-3.968$ ,  $p<0.001$ ). Finally, psychological distress was a significant risk factor for illicit drug use ( $\beta=0.125$ ,  $t=3.356$ ,  $p<0.01$ ).

### 3.2. Mediation Effects

In addition to the direct effects described above, we examined indirect effects using the *model indirect* command in Mplus to test formally for mediation. A number of significant mediation paths emerged that clarify the mechanisms leading to illicit substance use among YMSM. The full statistics associated with these results are reported in Table 2 and the implications of these findings are highlighted in the discussion section.

## 4. DISCUSSION

The objective of this study was to examine the longitudinal relationship of contextual risk factors, social cognitive processes, mental health, and health protective behavior to identify key mechanisms of illicit drug use of YMSM during emerging adulthood. Our results support previous findings identifying age (Clatts et al., 2003), ethnicity (Wong et al., 2010), violence and discrimination (Wong et al., 2010), psychological distress (Kipke et al., 2007a), and previous histories of illicit drug use (Xue et al., 2009) as key risk factors for future illicit drug use among YMSM. Additionally, we confirmed that these risk factors are also related to important self-change processes including levels of social support (Kipke et al., 2007c).

To augment previous findings we focused on identifying key mechanisms that translate these contextual risk factors into illicit drug use behavior. During this theoretically distinct time period, health as a value, self-efficacy, and social support are vital social cognitive processes for promoting self-change among YMSM, and YMSM have independent growth within each process. Moreover, self-change processes are important predictors of health behaviors including health protective behaviors, psychological distress, and illicit drug use. Specifically, health as a value was predictive of actual positive health behavior choices and may be protective against the choice to engage in illicit drug use. Social support was strongly protective against subsequent mental health difficulty.

Mediation analysis clarified how contexts of risk and self-change processes holistically impact illicit drug use among YMSM. The protective effects of baseline social support and health protection on subsequent drug use were fully mediated by decreased psychological distress: Individuals who entered the study with greater levels of social support and individuals more committed to health protective behavior both reported less psychological distress at wave 5, which in turn corresponded with less illicit drug use at wave 5. The reverse was also true: the risks carried by contextual influences of violence and discrimination were fully mediated by lower social support at baseline, which led to greater subsequent psychological distress and illicit drug use. Previous evidence suggests that lack of social support can negatively impact health and mental health outcomes in adolescents and young adults (Ritt-Olson et al., 2005). A protective effect of increasing health values was mediated by greater health protection and lower psychological distress, suggesting that

YMSM who came to care more about their health over the two-year study period may have actually enacted healthier behaviors and experienced less psychological distress, which were both associated with less illicit drug use. Finally, racial minority status was a significant indirect risk factor for illicit drug use and fully mediated by experiences of violence/discrimination, social support, and psychological distress. Although the African Americans in our sample appeared less likely overall to engage in illicit drug use than their White counterparts, the race/ethnicity effects in this model are only interpretable when violence/discrimination are held constant: given a set of YMSM with the *same history* of discrimination and violence witnessed in the home, the Black and Latino young men in that set were less likely to engage in illicit drug use than the Caucasian young men. Considering the strong main effect of ethnicity on self-reported experiences of violence and discrimination, however, the mediated effect provides evidence that among African American YMSM, a history of violence and/or discrimination remains a contextual risk factor for later illicit drug use by creating an environment in which they perceive less social support. As previously described, this reduction in social support is itself a risk factor for subsequent psychological distress and illicit drug use. Collectively, these mediation effects demonstrate that contextual risk factors and self-change processes impact illicit drug use through a complex interplay between social and cognitive mechanisms, mental health, and health protective behavior. These findings underscore the importance of understanding and addressing the health and well-being of YMSM to reduce interconnected behavioral health disparities.

Finally, findings from this analysis support the utility of Social Action Theory (SAT) as a theoretical model for understanding illicit drug use behavior among YMSM. The model presented here highlights the unique relationships between environmental experiences, individual self-change processes, and mental health and illicit substance use outcomes. A complex relationship emerges between the value a young man places on his own health, his ability to promote self-efficacy by envisioning himself in situations that encourage healthy living, and the extent to which he develops positive normative peer groups and social support. Each factor plays a significant role in the individual's mental health, health behavior, and illicit drug use. These findings are of particular public health importance given that the sample represents men who are part of a sexual minority at elevated risk for substance abuse disorders.

#### 4.1. Study Limitations

Limitations to this study may affect the interpretation and generalizability of findings and provide opportunities for new areas of inquiry. The Healthy Young Men Study was initially designed to assess HIV risk and protective behaviors across multiple domains within the YMSM community in Los Angeles. Statistical power necessitated the use of an illicit substance use index rather than examination of patterns related to specific illicit substances. This might be considered a significant limitation by substance abuse researchers who are used to more specific and comprehensive measures of illicit substance use behavior. As this study was a secondary data analysis, we were constrained by the measures and design of the parent study. While limited in the choice of outcomes, this study does provide a within-group perspective about substance use behavior in this longitudinal sample of YMSM. The robustness of our findings may additionally be limited by our inability to detect differential risk profiles of YMSM. This limitation should be considered when designing future studies to examine YMSM's illicit substance use behavior so that a wide array of drug use patterns can be assessed. Inclusion criteria for the original HYM study were limited to YMSM of Caucasian, African American, or Latino of Mexican descent. While this limits generalizability to all YMSM populations, it does enhance our ability to have statistical power to detect racial differences among these three categories of YMSM (the most

prominent racial groups in this community in Los Angeles). Current findings rely on participants' self-reported behaviors, which cannot be independently verified. However, the use of computer-assisted technologies may have minimized underreporting of these behaviors. In addition, self-report measures of racism and homophobia, which are confounded with mental health status, can also lead to biased estimates (Meyer and Wilson, 2009). Furthermore, bias could be a concern in this study because substance use was a key variable of interest and half of the sample was recruited in gay bars and clubs. The fact that half of the sample was drawn from other gay identified venues may balance some of this bias. Furthermore, research related to sampling lesbian, gay, and bisexual populations indicates that a sample recruited from gay-identified venues might be the most appropriate strategy when research questions concerning health, well-being, relationships, social support, identity development, and attitudes (Meyer and Wilson, 2009). Given that a primary goal of this study was to investigate the aforementioned topics as correlates of substance use among YMSM, the use of venue based sampling was the most appropriate strategy.

#### 4.2. Conclusions and implications for prevention efforts

Despite these limitations, we believe this study offers important insight and background for new and existing illicit drug use interventions for YMSM. Two novel elements of this study are particularly important for prevention interventions. First, our results indicate that social cognitive mechanisms, termed "self-change processes," play a unique role during the period of emerging adulthood for YMSM and should therefore be a focus of prevention interventions. To date, few evidence-based interventions have this specific focus, and failure to target these mechanisms may be one reason why efforts to reduce illicit drug use and abuse have had modest outcomes (Johnson et al., 2008). Second, this study lends support to Social Action Theory as a theory that captures the key mechanisms related to YMSM illicit drug use behavior including contextual factors, dynamic social cognitive processes, mental health, and health protective behavior. Substance abuse intervention programs that wish to be included in the Substance Abuse and Mental Health Services Administration (SAMHSA) model program list are required to define the program's underlying theory, and SAT appears to be a relevant theory for intervention program development with this population.

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#### References

- Bollen, KA.; Curran, PJ. *Latent Curve Models: A Structural Equation Perspective*. Wiley-Interscience; New York: 2006.
- Bontempo DE, D'Augelli AR. Effects of at-school victimization and sexual orientation on lesbian, gay, or bisexual youths' health risk behavior. *Adolesc Health*. 2002; 30:364–374.
- Bricker JB, Liu J, Comstock BA, Peterson AV, Kealey KA, Marek PM. Social cognitive mediators of adolescent smoking cessation: results from a large randomized intervention trial. *Psychol Addict Behav*. 2010; 24:436. [PubMed: 20853929]
- Centers for Disease Control and Prevention. 2005 Youth Risk Behavior Survey. 2006. Retrieved February/25, 2011, from <http://www.cdc.gov/mmwr/PDF/SS/SS5505.pdf>
- Clatts MC, Goldsamt L, Neaigus A, Welle DL. The social course of drug injection and sexual activity among YMSM and other high-risk youth: an agenda for future research. *J Urban Health*. 2003; 80:iii26–iii39. [PubMed: 14713669]

- Diaz RM, Ayala G, Bein E, Henne J, Marin BV. The impact of homophobia, poverty, and racism on the mental health of gay and bisexual latino men: findings from 3 US cities. *Am J Public Health.* 2001; 91:927. [PubMed: 11392936]
- Dudley MG, Rostosky SS, Korfhage BA, Simmerman RS. Correlates of high-risk sexual behavior among young men who have sex with men. *AIDS Educ Prev.* 2004; 16:328–340. [PubMed: 15342335]
- Ellickson PL, McCaffrey DF, Ghosh-Dastidar B, Longshore DL. New inroads in preventing adolescent drug use: results from a large-scale trial of project ALERT in middle schools. *Am J Public Health.* 2003; 93:1830. [PubMed: 14600049]
- Ewart CK. Social action theory for a public health psychology. *Am Psychol.* 1991; 46:931–936. [PubMed: 1958012]
- Ewart, CK. Changing our unhealthy ways: emerging perspectives from social action theory. In: DiClemente, R.; Crosby; Kegler, M., editors. *Emerging Theories in Health Promotion Practice and Research.* John Wiley Sons; San Francisco: 2009. p. 359-391.
- Ford WL, Weiss G, Kipke MD, Ritt-Olson A, Iverson E, Lopez D. The healthy young men's study: sampling methods to recruit a random cohort of young men who have sex with men. *J Gay Lesbian Soc Serv.* 2009; 21:357. [PubMed: 20823947]
- Frank, RG.; Wallander, J.; Baum, A. *Handbook of Clinical Health Psychology.* American Psychological Association; Washington, D.C: 2004.
- Greenwood GL, Relf MV, Huang B, Pollack LM, Canchola JA, Catania JA. Battering victimization among a probability-based sample of men who have sex with men. *Am J Public Health.* 2002; 92:1964. [PubMed: 12453817]
- Gruskin EP, Greenwood GL, Matevia M, Pollack LM, Bye LL. Disparities in smoking between the lesbian, gay, and bisexual population and the general population in California. *Am J Public Health.* 2007; 97:1496. [PubMed: 17600265]
- Hart TA, Heimberg RG. Social anxiety as a risk factor for unprotected intercourse among gay and bisexual male youth. *AIDS Behav.* 2005; 9:505–512. [PubMed: 16205961]
- Johnson MO, Carrico AW, Chesney MA, Morin SF. Internalized heterosexism among HIV-positive, gay-identified men: implications for HIV prevention and care. *J Consult Clin Psychol.* 2008; 76:829. [PubMed: 18837600]
- Kipke MD, Kubicek K, Weiss G, Wong C, Lopez L, Iverson E, Ford W. The health and health behaviors of young men who have sex with men. *Adolesc Health.* 2007a; 40:342–350.
- Kipke MD, Weiss G, Ramirez M, Dorey F, Ritt-Olson A, Iverson E, Ford W. Club drug use in Los Angeles among young men who have sex with men. *Subst Use Misuse.* 2007b; 42:1723–1743. [PubMed: 17934992]
- Kipke MD, Weiss G, Wong CF. Residential status as a risk factor for drug use and HIV risk among young men who have sex with men. *AIDS Behav.* 2007c; 11:56–69. [PubMed: 17265143]
- Kline, RB. *Principles and Practice of Structural Equation Modeling.* The Guilford Press; New York: 2010.
- Lau RR, Hartman KA, Ware JE. Health as a value: methodological and theoretical considerations. *Health Psychol.* 1986; 5:25–43. [PubMed: 3720718]
- MacKellar D, Valleroy L, Karon J, Lemp G, Janssen R. The young men's survey: methods for estimating HIV seroprevalence and risk factors among young men who have sex with men. *Public Health Rep.* 1996; 111:138–144. [PubMed: 8862170]
- Maisto SA, Ewart CK, Connors GJ, Funderbunk JS, Krenek M. Use of the social competence interview and the anger transcendence challenge in individuals with alcohol use disorder. *J Behav Med.* 2009; 32:285–293. [PubMed: 19184391]
- Meyer IH, Wilson PA. Sampling lesbian, gay, and bisexual populations. *J Counsel Psychol.* 2009; 56:23–31.
- Morrison DM, Golder S, Keller TE, Gillmore MR. The theory of reasoned action as a model of marijuana use: tests of implicit assumptions and applicability to high-risk young women. *Psychol Addic Behav.* 2002; 16:212–224.

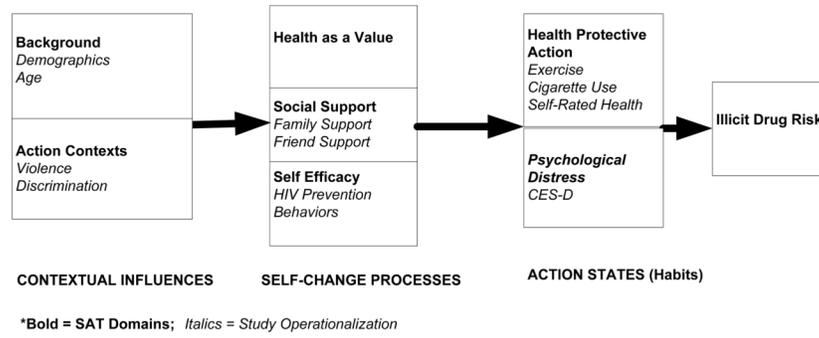
- Muhib FB, Lin LS, Stueve A, Miller RL, Ford WL, Johnson WD, Smith PJ. Community Intervention Trial for Youth Study Team. A venue-based method for sampling hard-to-reach populations. *Public Health Rep.* 2001; 116:216–222. [PubMed: 11889287]
- Muthén, B. Second-generation structural equation modeling with a combination of categorical and continuous latent variables. In: Collins, L.; Sayer, A., editors. *New Opportunities for Latent Class–Latent Growth Modeling*. American Psychological Association; Washington, D.C: 2001. p. 291–322.
- Muthen, LK.; Muthen, BO. *Mplus user's guide. 2*. Muthen Muthen; Los Angeles: 2001.
- Needle R, McCubbin H, Lorence J, Hochhauser M. Reliability and validity of adolescent self-reported drug use in a family based study—a methodological report. *Int J Addict.* 1983; 18:901–912. [PubMed: 6605944]
- Pachankis JE, Goldfried MR. Social anxiety in young gay men. *J Anxiety Disord.* 2006; 20:996–1015. [PubMed: 16500074]
- Radloff LS. The CES-D scale: a self report depression scale for research in the general. *Appl Psychol Meas.* 1977; 1:385–401.
- Ritt-Olson A, Unger J, Valente T, Nezami E, Chou C, Trinidad D. Exploring peers as a mediator of the association between depression and smoking in young adolescents. *Subst Use Misuse.* 2005; 40:77–98. [PubMed: 15702650]
- Rosario M, Hunter J, Maguen S, Gwadz M, Smith R. The coming-out process and its adaptational and health-related associations among gay, lesbian, and bisexual youths: stipulation and exploration of a model. *Am J Community Psychol.* 2001; 29:133–160. [PubMed: 11439825]
- Rosario M, Rotheram-Borus MJ, Reid H. Gay-related stress and its correlates among gay and bisexual male adolescents of predominantly black and hispanic background. *J Community Psychol.* 1996; 24:136–159.
- Rosario M, Schrimshaw EW, Hunter J. Predictors of substance use over time among gay, lesbian, and bisexual youths: an examination of three hypotheses. *Addict Behav.* 2004; 29:1623–1631. [PubMed: 15451129]
- Rosario M, Schrimshaw EW, Hunter J, Braun L. Sexual identity development among gay, lesbian, and bisexual youths: consistency and change over time. *J Sex Res.* 2006; 43:46–58. [PubMed: 16817067]
- Saewyc EM, Skay CL, Pettingell SL, Reis EA, Bearinger L, Resnick M, Murphy A, Combs L. Hazards of stigma: the sexual and physical abuse of gay, lesbian, and bisexual adolescents in the United States and Canada. *J Child Welfare.* 2006; 85:195–213.
- Substance Abuse and Mental Health Services Administration [SAMHSA]. *Results from the 2008 National Survey on Drug Use and Health: National Findings*. Office of Applied Studies; Rockville, MD: 2009. NSDUH Series H-36, HHS Publication No. SMA 09–4434
- Smith KW, McGraw SA, Costa LA, McKinley JB. A self-efficacy scale for HIV risk behaviors: development and evaluation. *AIDS Educ Prev.* 1996; 8:97–105. [PubMed: 8727650]
- Sussman S, Sun P, Rohrbach LA, Spruijt-Metz D. One-year outcomes of a drug abuse prevention program for older teens and emerging adults: evaluating a motivational interviewing booster component. *Health Psychol.* 2011 epub ahead of print. 10.1037/a0025756
- Tate DC, Van Den Berg JJ, Hansen NB, Kochman A, Sikkema KJ. Race, social support, and coping strategies among HIV-positive gay and bisexual men. *Cult Health Sex.* 2006:235–249. [PubMed: 16801225]
- Thiede H, Valleroy LA, MacKellar DA, Celentano DD, Ford WL, Hagan H, Koblin MA, LaLota M, McFarland W, Shehan DA, Torian LV. Regional patterns and correlates of substance use among young men who have sex with men in 7 US urban areas. *Am J Public Health.* 2003; 93:1915–1921. [PubMed: 14600066]
- Traube DE, Holloway IW, Schragr SM, Kipke MD. Utilizing social action theory as a framework to determine correlates of illicit drug use among young men who have sex with men. *Psychol Addict Behav.* 2012; 26:78–88. [PubMed: 21644802]
- Traube DE, Holloway IW, Smith L. Theory development for behavioral health science: can excavating archived health promotion theories move the field into the 21<sup>st</sup> century? *AIDS Care.* 2011; 23:663–670. [PubMed: 21347886]

- Wolitski RJ, Valdiserri RO, Denning PH, Levine WC. Are we headed for a resurgence of the HIV epidemic among men who have sex with men? *Am J Public Health.* 2001; 91:883–888. [PubMed: 11392927]
- Wong CF, Weiss G, Ayala G, Kipke MD. Harassment, discrimination, violence, and illicit drug use among young men who have sex with men. *AIDS Educ Prev.* 2010; 22:286–298. [PubMed: 20707690]
- Xue Y, Zimmerman MA, Cunningham R. Relationship between alcohol use and violent behavior among urban african american youths from adolescence to emerging adulthood: a longitudinal study. *Am J Public Health.* 2009; 99:2041. [PubMed: 19762672]
- Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess.* 1988; 52:30–41.

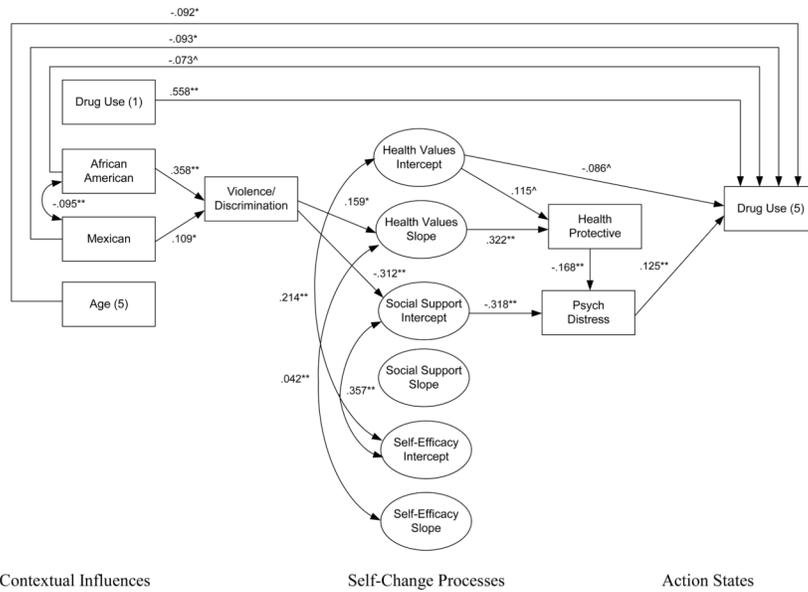
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**Figure 1.**  
Operationalization of Social Action Theory Model.



**Figure 2.** Growth curve model predicting drug risk among 487 YMSM  
 Note: Circles represent latent variables; rectangles represent observed variables. Numbers along regression paths represent standardized regression coefficients. CFI=0.930, TLI=0.919, RMSEA=0.048, R<sup>2</sup>=0.351

**Table 1**

## Descriptive Statistics (n=487)

Variables	Mean (SD) or N (%)	Latent Variable Mean (Variance)
<i>Demographic Characteristics</i>		
Age in Years (range: 19–26) <sup>1</sup>	22.15 (1.57)	
Residential Status – live with family <sup>1</sup>	205 (39.0%)	
Race/ethnicity:		
African American	115 (23.6%)	
Latino of Mexican descent	195 (40.0%)	
White	177 (36.3%)	
<i>Action Contexts</i>		
Violence/Discrimination (range: –0.270 – 0.706) <sup>2</sup>	0.00 (0.19)	
<i>Self-Change Processes</i>		
Social Support		
Wave 1	3.13 (0.60)	
Wave 3	3.21 (0.52)	
Wave 5	3.30 (0.50)	
Intercept		3.125 ** (0.216 **)
Slope		0.085 ** (0.011)
Health as a Value		
Wave 1	3.38 (0.53)	
Wave 3	3.34 (0.55)	
Wave 5	3.34 (0.52)	
Intercept		3.364 ** (0.178 **)
Slope		–0.013 (0.030 **)
Self-Efficacy		
Wave 1	28.52 (3.79)	
Wave 3	29.18 (3.36)	
Wave 5	29.17 (3.49)	
Intercept		28.745 *** (7.175 **)
Slope		0.248 ** (0.816 <sup>^</sup> )
<i>Outcome Variables</i>		
Psychological Distress (range: 0 – 54)	12.47 (9.77)	
Health Protective Behavior Factor (range: –0.545 – 0.547) <sup>2</sup>	0.00 (0.23)	
Drug use <sup>3</sup> :		
Lifetime non-use	157 (29.8%)	
Lifetime use/not past 30 days	211 (40.1%)	
Light use past 30 days	33 (6.3%)	
Frequent/heavy use past 30 days	77 (14.6%)	

<sup>^</sup>p<0.10;

\*  
p<0.05;

\*\*  
p<0.01

<sup>1</sup> Measured at Wave 5

<sup>2</sup> Latent variable factor scores created in Mplus using confirmatory factor analysis to create a single variable from multiple indicator variables.<sup>26</sup> Scores are not maintained on the original scale of any single indicator variable.

<sup>3</sup> N=478

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Table 2

Mediation results from growth curve model

Predictor	Mediator(s)	Outcome	Effect	$\beta$	t	p-value
Health Protective Behavior	Psych Distress	Drug Risk	Direct	0.031	0.797	0.426
			Indirect	-0.022	-2.577	0.010*
Social Support (intercept)	Psych Distress	Drug Risk	Direct	-0.036	-0.811	0.417
			Indirect	-0.037	-2.660	0.008**
Health as a Value (slope)	Health Protective Behavior -> Psych Distress	Drug Risk	Direct	-0.149	-2.077	0.038*
			Indirect	-0.006	-2.033	0.042*
Violence/Discrimination	Social Support (intercept) -> Psych Distress	Drug Risk	Direct	0.037	0.923	0.356
			Indirect	0.012	2.570	0.010*
African American Race	Violence/discrimination -> Social Support (intercept) -> Psych Distress	Drug Risk	Direct	-0.073	-1.706	0.088 <sup>^</sup>
			Indirect	0.004	2.568	0.010*
Violence/Discrimination	Social Support (intercept)	Psych Distress	Direct	0.107	2.368	0.018*
			Indirect	0.085	4.340	0.000**
Health as a Value (slope)	Health Protective Behavior	Psych Distress	Direct	0.171	1.865	0.062 <sup>^</sup>
			Indirect	-0.068	-2.554	0.019*

<sup>^</sup> p<0.10;

\* p&lt;0.05;

\*\* p&lt;0.01