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# Examination of Personality, Social and Cognitive Factors on the Co-Occurrence of Health Risk Behaviors among Multi-Problem Youth: The Utility of An Integrative Framework

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

EXAMINATION OF THE IMPACT OF PERSONALITY, SOCIAL, AND COGNITIVE  
FACTORS ON THE CO-OCCURRENCE OF HEALTH RISK BEHAVIORS AMONG  
MULTI-PROBLEM YOUTH: THE UTILITY OF AN INTEGRATIVE FRAMEWORK

A Dissertation submitted in partial fulfillment of the

requirements for the degree of

DOCTOR OF PHILOSOPHY

in

PSYCHOLOGY

by

Sabrina E. Des Rosiers

2010

To: Dean Kenneth Furton  
College of Arts and Sciences

This dissertation, written by Sabrina E. Des Rosiers, and entitled Examination of Personality, Social and Cognitive Factors on the Co-Occurrence of Health Risk Behaviors among Multi-Problem Youth: The Utility of An Integrative Framework, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Jonathan Tubman, Major Professor

Date of Defense: March 24, 2010

The dissertation of Sabrina E. Des Rosiers is approved.

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Dean Kenneth Furton  
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University Graduate School

Florida International University, 2010

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## DEDICATION

I dedicate this dissertation to all the adolescents that I have had an opportunity to meet and work with over the last seven years. May you also be motivated and encouraged to reach your dreams!

## ACKNOWLEDGMENTS

First, I wish to thank my major professor and advisor, Dr. Jonathan Tubman for all his guidance, patience, and continued support. I am also grateful for the helpful insights, comments and suggestions provided by my committee members, Dr. James Jaccard, Dr. Mary Levitt, and Dr. Eric Wagner.

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## ABSTRACT OF THE DISSERTATION

EXAMINATION OF THE IMPACT OF PERSONALITY, SOCIAL, AND COGNITIVE FACTORS ON THE CO-OCCURRENCE OF HEALTH RISK BEHAVIORS AMONG MULTI-PROBLEM YOUTH: THE UTILITY OF AN INTEGRATIVE FRAMEWORK.

By

Sabrina E. Des Rosiers

Florida International University, 2010

Miami, Florida

Professor Jonathan Tubman, Major Professor

Research has identified a number of putative risk factors that places adolescents at incrementally higher risk for involvement in alcohol and other drug (AOD) use and sexual risk behaviors (SRBs). Such factors include personality characteristics such as sensation-seeking, cognitive factors such as positive expectancies and inhibition conflict as well as peer norm processes. The current study was guided by a conceptual perspective that support the notion that an integrative framework that includes multi-level factors has significant explanatory value for understanding processes associated with the co-occurrence of AOD use and sexual risk behavior outcomes. This study evaluated simultaneously the mediating role of AOD-sex related expectancies and inhibition conflict on antecedents of AOD use and SRBs including sexual sensation-seeking and peer norms for condom use.

The sample was drawn from the Enhancing My Personal Options While Evaluating Risk (EMPOWER: Jonathan Tubman, PI), data set ( $N = 396$ ; aged 12-18 years). Measures used in the study included Sexual Sensation-Seeking Scale, Inhibition

Conflict for Condom Use, Risky Sex Scale. All relevant measures had well-documented psychometric properties. A global assessment of alcohol, drug use and sexual risk behaviors was used.

Results demonstrated that AOD-sex related expectancies mediated the influence of sexual sensation-seeking on the co-occurrence of alcohol and other drug use and sexual risk behaviors. The evaluation of the integrative model also revealed that sexual sensation-seeking was positively associated with peer norms for condom use. Also, peer norms predicted inhibition conflict among this sample of multi-problem youth.

This dissertation research identified mechanisms of risk and protection associated with the co-occurrence of AOD use and SRBs among a multi-problem sample of adolescents receiving treatment for alcohol or drug use and related problems. This study is informative for adolescent-serving programs that address those individual and contextual characteristics that enhance treatment efficacy and effectiveness among adolescents receiving substance use and related problems services.

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## CHAPTER I: Statement of the Problem

The co-occurrence of alcohol and other drug (AOD) use and sexual risk behaviors (SRBs) is a serious public health problem that has been linked to deleterious outcomes among adolescents. Consequently, understanding how relations among putative risk factors increase the co-occurrence of AOD use and SRBs is crucial for developing developmentally-appropriate prevention and treatment efforts. Chapter One of this dissertation has a specific structure. First, this chapter presents a rationale for studying co-occurring AOD use and SRBs from a multivariate perspective. Second, this chapter presents a summary of existing research studies examining putative risk factors associated with both AOD use and SRB among adolescents. Third, this chapter provides a brief discussion regarding the integrative model that guided the current study. Last, the significance of the current study for the development of prevention and intervention programs targeting high risk samples of adolescents is summarized.

### *Current Research on Co-Occurring Alcohol and other Drug Use, and Sexual Risk Behaviors*

Current research on the co-occurrence of sexual risk behaviors (SRBs) and alcohol and other drug (AOD) use supports the importance of a multivariate framework that specifies the influence of multi-level factors (e.g., Capaldi et al., 2002; Duncan, Strycker, & Duncan, 1999). Correlates and predictors of sexual risk and AOD use behaviors can be placed into the following broad categories: personality factors (e.g., sensation-seeking); contextual factors (e.g., peer influences), cognitive factors (e.g.,

inhibition conflict and outcome expectancies). Taken together, empirical evidence regarding the occurrence of AOD use and sexual risk behaviors suggests that these behaviors occur within a complex multivariate framework (e.g., Fisher et al., 2008). However, as evidence regarding the factors associated with AOD use and sexual risk behaviors increases, few research efforts have been directed toward clarifying specific relations among key antecedents and consequences associated with co-occurring sexual risk and AOD use behaviors in samples of high-risk youth. Consequently, the current study used a multivariate framework to identify specific mechanisms by which cognitive factors (i.e., expectancies, inhibition conflict) mediate the influence of distal factors including individual (i.e., personality factors) and contextual (i.e., peer norms) variables on the co-occurrence of AOD use and sexual risk behaviors in an at-risk and multi-ethnic sample of adolescents.

### *Co-Occurring AOD use and Sexual Risk Behaviors: A Multivariate Perspective*

To date, relations between precursors of co-occurring AOD use and sexual risk behaviors (SRBs) have been examined using a multivariate modeling framework in only a small number of studies (e.g., Guillamo-Ramos et al., 2008; Kalichman & Cain, 2004). This type of statistical modeling has not yet been implemented widely in part because many studies have examined AOD use involvement as either a correlate or a predictor of sexual risk behavior (see Weinhardt & Carey, 2001). In addition, conceptualization of the co-occurrence of AOD use and sexual risk behavior as situational in nature has led to the methodological choice to examine relations between risk behavior outcomes and specific single risk factors (see Cooper, 2006; Leigh, 2002). However, growing evidence suggests

that the examination of common antecedent influences linked specifically to co-occurring SRB and AOD use behaviors among adolescents would yield better understanding of the mechanisms underlying co-occurring AOD use and SRB among at-risk youth.

Accordingly, the current study tested a model that summarizes a parsimonious integration of factors that have been shown to predict sexual risk and AOD use behaviors. The conceptual model that this study evaluated incorporates five major themes in AOD use and sexual risk behavior research. They include: a) the association between AOD use and sexual risk behaviors; b) the influence of social context on the co-occurrence of AOD use and sexual risk behavior; c) the influence of personality dispositions (e.g., sensation-seeking) on the onset and maintenance of risk behaviors; d) the conceptualization of expectancies as cognitive representations that evolve within a social network; and, e) inhibition conflict as a proximal cognitive factor associated with AOD use and sexual risk behavior outcomes.

### *Multivariate Influences Associated with Alcohol Use and other Drug Use and Sexual Risk Behaviors*

The hallmark of risk-taking consists of participation in behaviors that may cause or increase the likelihood of injury (CDC, 2001). Therefore, sexual risk behavior (e.g., sex with multiple partners or unprotected sex) is incrementally more risky when it occurs concurrently with AOD use, and in particular, with problem patterns of substance use. That is, the co-occurrence of AOD use and sexual behavior may exacerbate multiple forms of health risk behavior (e.g., Miller et al., 1999). For example, the co-occurrence of AOD use and sexual activity has been shown to be related to adverse health outcomes

(e.g., Lehrer, Shrier, Gortmaker & Buka, 2006). National survey data suggest that adolescents are more likely to engage in unprotected sexual intercourse when intoxicated by alcohol or other drugs (CDC, 2006; Kann et al., 1998).

Unsafe or unprotected sex practices may expose adolescents to HIV, as well as other potentially harmful sexually transmitted infections (STIs). For example, DiClemente and colleagues (1992, 2002) found that approximately 20% of sexually active adolescents do not consistently use condoms during sexual encounters. In addition, the tendency for adolescents to get involved in opportunistic sexual encounters with multiple partners places them at increased risk for STIs and other serious health consequences (Capaldi et al., 2002; Duncan, Strycker & Duncan, 1999; Leigh, Ames, & Stacy, 2008; Overby & Kegeles, 1994). In addition, studies also have demonstrated that the incremental, cumulative risk posed by the co-occurrence of AOD use and sexual behaviors is associated with psychosocial maladjustment among adolescents (Guo et al., 2002; Shrier, Emmans, Woods & DuRant, 1997; Tapert, Aarons, Sedlar & Brown, 2001). Consequently, these findings underscore the need to develop research efforts aimed at identifying putative mechanisms of risk and protection underlying the co-occurrence of AOD use and sexual risk behaviors among adolescents. In view of that point, the purpose of the current study was to test the direction of influence among potential pathways (i.e., sexual sensation seeking and peer beliefs, expectancies and inhibition conflict) leading to the co-occurrence of AOD use and sexual risk behaviors. Specifically, a goal of the current study was to evaluate potential mechanisms by which AOD-sex related expectancies mediate relations between distal and proximal putative risk factors associated with co-occurring sexual risk and AOD use behaviors.

### *AOD-Sex Related Expectancies: Mechanisms of Risk and Protection*

Research on expectancies or anticipated beliefs about the effects of behavioral outcomes suggests that expectancies serve as “memory templates” that prepare the individual for future behavior (Goldman, 1999). Within this conceptualization, an individual’s expectancies about a specific behavioral outcome impact their involvement in that behavior. Particularly noteworthy for their hypothesized roles in the etiology of alcohol use in different age groups, alcohol expectancies have been shown to mediate the influence of AOD use on putative risk factors for AOD use (e.g., Dunn & Goldman, 1998; Finn, Sharkansky, Brandt, & Turcotte, 2000; Scheier & Botvin, 1997; Stacy, Newcomb, & Bentler, 1991), and to moderate the impact of putative risk factors on sexual risk behaviors (Dermen & Cooper, 1994; Fromme, D’Amico, & Katz, 1999; Labrie, Shiffman, & Earlywine, 2002; Leigh, 1999; O’Hare, 2001).

During the past decade, the emergence of expectancy-specific conceptualizations, such as AOD-sex related expectancies (Dermen & Cooper, 1994; Leigh, 1990) has provided a useful conceptual model for investigating relations among correlates and predictors of co-occurring sexual risk and AOD use behaviors (Maisto et al., 2004a). For example, a number of studies have found that the magnitude of associations between co-occurring sexual risk and AOD use behaviors were more robust among youth reporting favorable endorsements of AOD-related sex expectancies (Dermen & Cooper, 1994a; 1994b; Dermen, Cooper, & Agocha, 1998). Leigh (1990) also demonstrated that items reflecting sexual enhancement and social facilitation expectancies were associated with the co-occurrence of AOD use and sexual risk behaviors. Despite recent advances in this line of research, very little is known about the processes by which positive and negative

expectancies influence co-occurring AOD use and sexual risk behaviors among at-risk youth, such as those manifesting AOD use problems. Therefore, the current study will use a multivariate framework to examine putative mechanisms by which AOD-sex expectancies impact relations between distal influences, such as social context and personality characteristics, and co-occurring AOD use and sexual risk behaviors in a sample of adolescents receiving treatment services for substance use and related problems.

*AOD-Sex Related Expectancies, Peer Norms, Sensation-Seeking, and Inhibition Conflict: Putative Mechanisms and Directions of Influence*

To date, many studies have focused on investigating the predictive role of AOD-sex related expectancies, peer norms, sensation-seeking, and inhibition conflict on SRBs and AOD use using a univariate approach. These studies documented that AOD-sex related expectancies, peer norms, sensation-seeking, and inhibition conflict are variables that were associated significantly with both SRB and AOD use.

*AOD-Sex Related Expectancies.* The concept of expectancies suggest that individuals who endorse sexual enhancement beliefs (i.e., positive expectancies) about the effects of alcohol and other drug use will report greater involvement in co-occurring AOD use and sexual risk behaviors. In contrast, individuals with less positive or more negative beliefs (i.e., negative expectancies) about the effects of alcohol and other drugs are less likely to participate in AOD use and sexual risk behaviors concurrently (Cooper & Orcutt, 1997; Leigh, 1990). For example, Goldman and colleagues (1999) using a

memory cue paradigm, have shown that when alcohol expectancies are activated, individuals who endorse beliefs that alcohol enhances sexual experiences are more likely to initiate alcohol use or to continue to drink in situations where a sexual encounter is anticipated. The latter finding is also consistent with the notion that expectancies are memory templates that evolve within a social network that are significant antecedents of behavioral outcomes (Goldman, 2002).

*Peer Norms.* The extant literature has documented the influence of peer norms on risk behaviors among adolescents (e.g., Kandel, 1985, 1987). Most research has shown that peer influences are among the strongest predictors of subsequent AOD use among adolescents (e.g., Callas, Flynn & Worden, 2004). Of particular relevance to the current study, peer norms have been shown to influence significantly the formation of favorable or unfavorable sexual enhancement and social facilitation expectancies (Epstein, Botvin, Bake, & Diaz, 1999; Martino, Collins, Ellickson, Schell, & McCaffrey, 2006; Wood, Read, Palfai, & Stevenson, 2001). The importance of peers in the initiation and maintenance of sexual risk behaviors has also been demonstrated. The likelihood of involvement in co-occurring SRB and AOD use is likely to be compounded when adolescents select deviant peer affiliations.

*Sensation-Seeking.* Although adolescents in general are more likely to be peer-oriented than parent-oriented, adolescents characterized by the personality characteristic of sensation-seeking are more likely to choose deviant friends. Adolescents reporting high scores for the personality characteristic of sensation-seeking also tend to show an

affinity for novel experiences and disinhibition (Zuckerman, 1971; Zuckerman, Eysenck, & Eysenck, 1978). Such adolescents tend to engage in activities deemed stimulating and adventurous. The related construct of sexual sensation-seeking is a significant predictor of SRB. Moreover, adolescents characterized as sexual sensation-seekers are more likely to engage in opportunistic sexual encounters, have multiple sex partners and participate in unprotected intercourse (Kalichman, Heckman, & Kelly, 1996).

*Inhibition Conflict.* Inhibition conflict is a cognitive factor that is noticeably less examined in literatures related to SRB and AOD use, and in particular among adolescents. The concept of inhibition conflict suggests that individuals with low inhibition conflict are least likely to exhibit extreme behavioral impairment (Steele & Southwick, 1985). In the sexual risk behavior literature, the notion of inhibition conflict for condom use has been used to show that individuals who are conflicted about using condoms are less likely to use a condom when a sexual encounter occurs concurrently with AOD use (Dermen & Cooper, 2000). Furthermore, social influences have been shown to predict degree of self-reported inhibitory conflict (Steele, Critchlow, & Liu, 1985) which impacts directly sexual risk behavior and AOD use outcomes (Dermen et al., 2000). In the current study, it is expected that inhibition conflict will be a proximal mediator of the relation between sensation-seeking and co-occurring AOD use and sexual risk behaviors. AOD-sex related expectancies, peer norms, sensation-seeking and inhibition conflict are a brief list of empirically-supported risk factors associated with higher scores for SRB and AOD use variables among adolescents. The multivariate framework that the current study used expanded upon existing empirical findings that

show that these variables are putative risk factors associated with AOD use and sexual risk behaviors.

### *The Current Study*

The conceptual basis for the current study is centered on the proposition that the examination of multi-level factors via an integrative data analytic approach provide a broader explanatory framework for understanding the co-occurrence of AOD use and sexual risk behaviors among high-risk adolescents.

### *Study Aims*

The first aim of the current study was to examine possible mechanisms by which AOD sex-related expectancies are related to pathways that lead to the co-occurrence of sexual risk behaviors and AOD use among adolescents receiving substance use treatment services. The current study implemented a multivariate analytical framework using specific individual and contextual variables that are associated with co-occurring sexual risk and AOD use behaviors. The integrative model (Figure 1) included: Specific indicators of personality characteristics, social norms, expectancies, inhibition conflict and indicators of alcohol use, drug use and sexual risk behaviors. The primary aim of the current study was to test whether AOD-sex related expectancies and inhibition conflict mediate distal influences of sexual sensation-seeking and peer norms on the co-occurrence of AOD use and sexual risk behaviors. The current study examined whether the integrative model fits the data reported by a multi-problem sample of adolescents receiving treatment of AOD use and related problems. Discussion of the study's findings

focused on the importance of the results for risk assessment and HIV prevention efforts among adolescent populations reporting involvement in AOD use and sexual risk behaviors.

### *The Significance of the Current Study*

The current study provided data that expand existing knowledge regarding the influence of AOD sex-related expectancies on the co-occurrence of sexual risk and AOD use behaviors among adolescents. This study used a methodological and an analytic approach that examine the influence of individual-level, as well as contextual factors in the co-occurrence of sexual risk behavior and AOD use. The multivariate model was tested using Structural Equation Modeling (SEM). The use of SEM allows for accurate path estimates between variables by using all available data (e.g., Jaccard, 2001). The implementation of a multivariate analytic framework using SEM helped to clarify relations among putative risk factors that influence co-occurring sexual risk and AOD use behaviors among adolescents receiving AOD treatment services. The clarification of relations among putative risk factors provided important data for the enhancement of HIV/STI prevention and AOD treatment initiatives for adolescents who engage in sexual risk and AOD use behaviors.

## CHAPTER II: Literature Review

The primary focus of this literature review is to integrate and synthesize key conceptual models and empirical findings that have been used to explain the co-occurrence of alcohol and other drug (AOD) use and sexual risk behaviors (SRBs) among high-risk adolescents. Current research findings show that both contextual- and individual-level variables are related to concurrent AOD use and SRBs. Consequently, this chapter will direct its focus on a review of available literatures regarding social norms, personality factors, inhibition conflict and expectancy conceptual frameworks. Based upon conceptual and empirical advances that have been made in health risk behavior research, the current review was guided by the proposition that the testing of a model within a multivariate perspective can promote a more comprehensive understanding of factors associated with co-occurring SRBs and AOD use behaviors.

Toward that end, the following review describes conceptual models and empirical findings that demonstrate how key individual- and contextual level variables (i.e., personality, expectancies, inhibition conflict and social norms) influence the co-occurrence of AOD use and SRBs. Next, the co-occurrence of SRBs and AOD use behaviors as a public health issue and their prevalence among multi-problem youth is summarized. The literature on alcohol sex-related expectancies and their impact on behavioral outcomes (i.e., co-occurring sexual risk and AOD use behaviors) is also presented. Another goal of the literature review is to discuss the potential influence of inhibition conflict and its associations with alcohol sex-related expectancies and co-occurring AOD use and sexual risk behaviors. Also, a review of relevant literatures on

the personality characteristic of sensation-seeking, on peer influences, as well as their associations with co-occurring SRBs and AOD use behaviors is presented.

The rationale for the current review builds upon the premise that a multivariate approach to data analysis has significant explanatory value for improving understanding of complex and dynamic processes, including relations between individual-level (i.e., personality, alcohol expectancies, inhibition conflict) and contextual factors (i.e., peer norms) associated with co-occurring AOD use and sexual risk behavior among high-risk adolescents. Such an approach provides a useful tool for identifying relations among variables and empirical data regarding the direction of influence of these relations. In addition, such data may elucidate potential mechanisms of risk and protection underlying the co-occurrence of AOD use and SRBs. Finally, such findings may identify important amenability to treatment factors associated with the reduction of sexual risk behaviors, AOD use in samples of multi-problem youth.

#### *Prevalence of the Co-Occurrence of Sexual Risk and AOD Use Behaviors among Adolescents*

The concept of health risk behavior encompasses a wide range of specific behaviors that compromise health (CDC, 2002). Research on the prevalence and incidence of health risk behaviors involves large-scale epidemiological studies. The Youth Risk Behavior Survey (YRBS) is a reliable epidemiologic survey conducted by the Centers for Disease Control and Prevention (CDC) to monitor the prevalence of health-impairing behaviors in national sample of youth. The YRBS has been used as a surveillance survey that provides data on risky behaviors among youth. Six major classes

of behaviors characterized as risky or health impairing were examined. They included: Alcohol and other drug (AOD) use, tobacco use, sexual behaviors, unhealthy dietary behaviors, and physical inactivity. While current research findings suggest that a wide range of putative risk factors is associated with health risk behaviors among adolescents (Shrier & Crosby, 2003), this review of the literature focuses specifically on the prevalence of AOD use and sexual risk behaviors among high-risk adolescents.

*Alcohol and Other Drug (AOD) Use.* In general, use of alcohol and other drugs is a normative risk behavior among adolescents. For example, the Methods for the Epidemiology of Child and Adolescent Disorders (MECA) Study showed that nearly half of children and adolescents aged 9 to 18 years reported alcohol and other drug use. Similarly, the Monitoring the Future Study showed that nearly 80% of adolescents have reported an episode of drunkenness by the end of their senior year in high school and nearly 50% of them have reported the use of at least one illegal substance (Rey et al., 2004). The normative developmental course of AOD use has been characterized as a "maturing out" process (Donovan & Jessor, 1985; O'Malley & Johnston, 2002; Schulenberg & Maggs, 2002), whereby involvement in AOD use behaviors tends to decline as individuals transition to increasing numbers of adult roles (e.g., full-time employment, marriage and family formation). However, among multi-problem youth trajectories of AOD involvement tend to progress rapidly beyond stages of normative experimentation (Sattler, 1998) and to progress to maladaptive patterns associated with more deleterious consequences (e.g., Kassel et al., 2005; McGue & Iacono, 2004).

The highest prevalence rates of AOD use have been documented among multi-problem adolescents. A study by Aarons, Brown, Hough, Garland and Wood (2001) documented that over 80% of adolescents receiving treatment for AOD use problems were diagnosed with a substance use disorder (SUD). Among high-risk samples of adolescent, higher rates of co-occurring problems were also documented. For example, 63% of high-risk adolescents were found to be involved with the juvenile justice system (Abram, Teplin, & McClelland, 2003), 41% received treatment in community mental health clinics, 24% were diagnosed as emotionally handicapped by school systems and 20% were involved in the child dependency system (Brown et al., 2005).

Prevalence rates for alcohol and other drug use also vary by age, gender, and ethnic group membership. The onset of AOD use tends to occur during early adolescence. Among high-risk adolescents, experimentation with AOD use tends to begin as early as elementary school (Kandel et al., 1997; Zucker et al., 2008). While the prevalence rates for AOD use are relatively low among children prior to age 12 years, early onset of AOD use has been shown to be associated with more maladaptive developmental outcomes (e.g., Ellickson, Tucker, & Klein, 2003). Age of onset constitutes a significant risk factor for life-course persistent maladaptive developmental outcomes such as externalizing behavior problems (Caspi & Moffit, 2004). In general, AOD use tends to peak during middle to late adolescence with older adolescents reporting the highest rates of AOD use (Gilvary, 2000).

AOD use also varies by gender. However, findings regarding gender differences in patterns of AOD use remain inconsistent. In general, differences in prevalence rates by gender remain equivocal and complicated (Duncan et al., 2003). Some studies suggest

that AOD use patterns are comparable between adolescent males and females (e.g., Wallace, Bachman, O'Malley, Schulenberg et al., 2003). In contrast, other studies report significant gender effects (e.g., Dakof, 2000). Such significant gender differences have more often been found among samples of high-risk youth, in which adolescent girls who exhibited AOD use-related problems tended to be more debilitated than their male counterparts (Beatty, Wetherington, Jones & Roman, 2006; Dakof, 2000).

Patterns of AOD use among adolescents also vary by race and ethnic group membership. The Monitoring the Future Study (Johnston, O'Malley, Bachman, & Schulenberg, 2009) showed that African-American high school seniors reported lower levels of AOD use compared to Caucasian and Hispanic seniors. However, when patterns of problem AOD use (i.e., AOD abuse and dependence patterns) were examined, African-American youth reported the highest rates, compared to Caucasian and Hispanic adolescents. In addition, a number of studies have shown that involvement in AOD use is a strong predictor for African American youth involvement with the criminal justice system (e.g., Centers & Weist, 1998). While there are a number of factors that universally characterize AOD use among youth (e.g. peer influence), there are unique characteristics associated with ethnic differences in patterns of problem AOD use among at-risk adolescents (Brook, Balka, & Whiteman, 1999a).

In summary, then, AOD use problems and related consequences are more prevalent among multi-problem youth. However, even low levels of AOD use by youth can lead to maladaptive developmental outcomes, compared to adolescents who do not use alcohol or other drugs (e.g., Windle & Wiesner, 2004). The evidence provided in the paragraphs above suggests that AOD use among contemporary youth is a serious public

health issue that merits additional scientific inquiry in order to identify intervention targets for programmatic efforts designed to mitigate or reduce levels of AOD use.

*Sexual Risk Behaviors (SRBs)*. Sexual risk behaviors (e.g., sex with multiple partners, unprotected intercourse) are another prevalent class of health-impairing behaviors that often co-occur with AOD use among multi-problem adolescents. According to data from the 2005 Youth Risk Behavior Survey, 33.9% of high school students reported current sexual activity (Eaton et al., 2006). Current data suggest that the selection of multiple sex partners and participation in unprotected sexual intercourse place adolescents at higher risk for deleterious health consequences (Bearinger & Resnick, 2003). According to the CDC, adolescents and young adults between the ages of 15 to 24 years represent nearly 25% of sexually active persons in the United States. Yet, they accounted for 50% of all new sexually transmitted infection (STI) cases in 2007.

During adolescence, risk for acquiring human immunodeficiency virus (HIV) and other STIs is heightened, compared to younger or older age periods. About 20% of individuals infected with HIV are between the ages of 13 and 24 years (Samples, Goodman & Woods, 1998). Complications related to HIV and AIDS have emerged as a leading cause of death among youth (e.g., Brown et al., 2000; Donnenberg & Pao, 2005). The Adolescent Health Study (AD-Health) also found that nearly 40% of participants reported being sexually active (Bearman, Jones, & Udry 1997). Of these adolescents, almost half reported to have had four or more sexual partners, and two-thirds reported inconsistent condom use (Henry, Schoeny, Deptula, & Slavick, 2007). Among adolescents, sexual activity is the primary mode of transmission of HIV and other STIs

(Hutchinson, 2002). Involvement in AOD use behaviors increases the likelihood of risky sexual behavior (i.e., inconsistent condom use, multiple sex partners) which presents another layer of complexity for efforts to reduce health risk behaviors among youth.

Current evidence shows that the co-occurrence of AOD use and sexual behavior is common among adolescents (Bryan, Ray & Cooper, 2007). More than 25% of sexually active adolescents reported AOD use during their last sexual encounter (Grunbaum et al., 2002) and youth who reported sexual activity while under the influence of AOD use were more likely to have contracted an STI (George et al., 2006). Many studies have shown that sexual risk behavior is incrementally more harmful when it occurs concurrently with AOD use (e.g., Bailey, Pollock, Martin, & Lynch, 1999). The magnitude and variability of health risk behaviors are also evident when risk behavior patterns are examined by gender or ethnic group membership.

*Prevalence Rates for Sexual Risk Behavior by Gender and Ethnic Group.* Results from the 2008 YRBS suggested significant gender and ethnic differences with regard to the co-occurrence of AOD use and sexual activity (Eaton et al., 2006). First, with regard to gender differences, male adolescents (27.6%) were more likely to report co-occurring AOD use and sexual activity compared to female adolescents (19.0%). Prevalence rates were higher among White males (29.9%) and Hispanic males (32.2%) compared to rates for White females (20.5%) and Hispanic females (18.7%), respectively. Second, significant ethnic differences were also noted for the frequency of co-occurring AOD use and sexual activity. White participants reported higher rates (25.0%) of co-occurring risk behaviors, compared to Hispanic/Latino (25.6%) or Black (14.1%) study participants. It

is also worth noting that the prevalence rates for sexual activity alone were higher among currently sexually active Black adolescents (47.4%) than among Hispanic/Latino (35.0%) or White adolescents (32.0%). These differences in prevalence estimates remained consistent across gender groups. Prevalence rates were higher among Black female adolescents (43.8%) than among White female (33.5%) or Hispanic female (33.7%) adolescents (Eaton et al., 2008).

There is substantial evidence that suggest that involvement in AOD use increases participation in SRB, which may promote maladaptive short- and long-term health outcomes, including exposure to HIV and other STIs. Among minority populations, and in particular, African-American youth, these effects have been accounted for by sexual risk behavior alone, without concurrent AOD use (Crosby et al., 2008). Other extraneous factors seem to account for ethnic differences in patterns of sexual risk behavior. For example, the average age of sexual debut among inner-city youth is thirteen years of age, the timing of which is approximately three years earlier than the national average (Kaestle, Halpern, Miller, & Ford, 2005; Weinstock, Berman, & Cates, 2004). In general, African-American adolescents tend to initiate sexual activity at significantly earlier ages compared to Caucasian or Hispanic adolescents, and are more likely to transition to sexual activity prior to age thirteen compared to Caucasian adolescents (Crockett, Bingham, Chopak, & Vicary, 1996; Martin et al., 2005).

To date, available data suggest that earlier onsets of sexual activity among minority adolescent populations contribute to existing minority health disparities, especially with regard to the rates of HIV and other STIs, which are disproportionately higher among African-American adolescents (Kingree & Betz, 2003). Recent estimates

from the Centers for Disease Control and Prevention demonstrate that nearly 75% of individuals infected with HIV/AIDS are under 25 years of age and self-identify as either African-American or Hispanic/Latino (CDC, 2008; Morris et al., 2006). Adolescent girls between the ages of 13 and 24 years are at increased risk for HIV/STI exposure, and together, African-American and Hispanic adolescent girls account for 80% of HIV/AIDS diagnoses among high-risk adolescents (CDC, 2008).

The high prevalence rates for co-occurring AOD use and sexual risk behaviors among adolescents reported in this section of the review underscore the need to promote research efforts to better understand potential mechanisms of risk and protection underlying health risk behaviors among youth, and in particular, minority youth. In the next section of this review, a discussion of known risk factors associated with the co-occurrence of AOD use and SRBs will be presented. While the examination of demographic differences described earlier is a secondary goal of the current study, the following review of the literature will consider the significance of the health threat posed by prevalence rates for SRBs among minority youth, while discussing risk factors associated with co-occurring AOD and SRBs. In fact, some studies suggest that the severity of maladaptive outcomes (i.e., HIV or STIs) associated with SRBs is due in part to minorities' greater exposure to key risk factors compared to other at-risk youth samples (e.g., Miller, 2002; Santelli et al., 2004). The current study is informed by a conceptual framework that highlights the multivariate influences of personality factors, peer norms, expectancies and inhibition conflict on the onset and maintenance of co-occurring SRBs and AOD use.

*Multivariate Approaches to Understanding Co-Occurring AOD Use and Sexual Risk Behaviors: The Role of Sensation-Seeking, Peer Norms, AOD-Sex Related Expectancies and Inhibition Conflict.*

The conceptual models that have guided studies on health risk behaviors (e.g., regarding AOD use and sexual risk behaviors) have been influenced significantly by personality, cognitive-affective and social learning theories. One important observation is that theoretical approaches to explaining the co-occurrence of AOD use and sexual risk behavior appear to be dichotomous. For example, the sexual risk behavior literature has long been dominated by empirical studies that have adopted conceptual approaches including: The Health Belief Model (HBM; Janz & Becker, 1984), the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980), the Theory of Planned Behavior (TPB; Ajzen & Madden, 1986), Social Cognitive Theory (SCT; Bandura, 1986), the Information-Motivation-Behavioral Skills Model (IMBSM; Fisher & Fisher, 1992), the HIV Risk Reduction Model (Catania, Kegeles, & Coates, 1990), and the Transtheoretical Model (TTM; Prochaska, DiClemente, & Norcross, 1992). The literatures on alcohol and drug use development, maintenance and risk reduction have also included variables specified by many different conceptual models, including those derived from Social Learning and Cognitive-Affective Theories (Petraitis, Flay, & Miller, 1995). These conceptual frameworks have generally focused on the effects of theoretically-derived core variables on various aspects of health risk behaviors.

For example, in a meta-analytic review of the sexual risk behavior literature, Sheeran and colleagues (1999) highlighted significant effects of variables derived from Social Cognitive Theory (SCT) including peer norms and self-efficacy on sexual risk

behaviors. Similarly, available alcohol and drug use literature have demonstrated that alcohol and drug use expectancies are among the strongest predictors of involvement in AOD use behaviors (e.g., Reich, Darkes & Goldman, 2005). In the same vein, personality theories have been drawn upon as a conceptual basis for explaining observed associations between personality characteristics such as sensation-seeking and AOD use (e.g., Sher et al., 1996; 2002). Personality theories have also been used to explain correlations between sensation-seeking and sexual risk behaviors (e.g., Donehew et al., 2000). Many individual-difference processes and situational-contextual level processes have been associated with the development of SRBs and AOD use. One important proposition that has emerged from this vast theoretical landscape is that the underlying mechanisms of health risk behaviors include a number of dynamic and complex multivariate processes that can be best explained by integrative models (e.g., Leigh, 1991; 2002; Guillamo-Ramos, Litardo & Jaccard, 2005; Pinkerton & Abramson, 1995; Zimmerman et al., 2007). Therefore, the empirical examination of these two commonly co-occurring health risk behaviors should not be implemented in isolation from one another.

The current study addressed this gap in the literature by using an integrative conceptual approach designed to identify relations among complex and dynamic processes underlying the mechanisms of risk and protection associated with the co-occurrence of AOD use and sexual risk behaviors among multi-problem youth. The use of a multivariate perspective can provide a broader explanatory framework that may elucidate relations among multi-level factors that influence the co-occurrence of AOD use and SRBs. For example, the testing of a multivariate model can identify the mechanisms by which adolescents who strongly endorse characteristics of sensation-

seeking continue to engage in sexual risk behaviors and the putative role of inhibition conflict in specific maladaptive behavioral outcomes. Toward this end, the current study proposes a parsimonious selection of related factors (i.e., sexual sensation-seeking, inhibition conflict, peer norms for condom use and AOD-sex related expectancies) from which to test the adequacy of a structural model. The selection of these variables was based on compelling theoretical and empirical evidence suggesting their links to the co-occurrence of AOD use and SRBs (e.g., Fergus et al., 2007; Kandel, 1986; Meier & Slutske, 2007; Schulenberg et al., 2001; Simons-Morton et al., 2006). The next section of this literature review will summarize important findings that support the testing of a multivariate model (see Figure 1) that includes indices of sexual sensation-seeking, inhibition conflict, peer norms for condom use and AOD-sex related expectancies.

*Sensation-Seeking and Sexual Sensation Seeking.* The co-occurrence of AOD use and sexual risk behavior has been shown to be related to a complex set of risk factors that probabilistically interact to influence directly or indirectly co-occurring sexual risk behavior and AOD use (e.g., Duncan et al., 1999; Ellickson et al., 2005; Leigh, 1999). Psychosocial studies of adolescent health risk behaviors include research that has examined the role of personality characteristics (e.g., sensation-seeking) and their impact on risk for problem behaviors among adolescents, including the co-occurrence of sexual risk behavior and AOD use (e.g., Donehew, Hoyle & Colder, 2005; Sher & Schulenberg 1999). For example, the Five-Factor Model of Personality (Costa & McCrae, 1992) has been used widely as a conceptual basis for guiding research on risky behaviors including sexual risk behavior and AOD use. The Three-Factor Approaches (e.g., Eysenck &

Eysenck, 1975; Zuckerman et al., 1988) also have been used for the interpretation of findings regarding the co-occurrence of AOD use and sexual risk behaviors. For the most part, studies have found that the three-factor solution (e.g., Zuckerman et al., 1988) of Sociability, Impulsive-Unsocialized-Sensation-Seeking, and Emotionality to be more suitable for describing associations among correlates of co-occurring AOD use and sexual risk behavior (Justus, Finn, & Steinmetz, 2000; Zuckerman, 2007).

Studies involving adolescents have not identified specific sets of personality traits that uniquely predict AOD use and sexual risk behaviors. However, some traits were shown to account partially for both AOD use and sexual risk behaviors among youth (e.g., DiClemente et al., 2007). While past research examining the role of personality characteristics and involvement in health risk behaviors has not shown significant direct influences between personality factors and health risk behaviors, a number of studies have suggested that personality traits such as sensation-seeking, impulsivity, and social deviance proneness may play important roles in both sexual risk and AOD use behaviors (e.g., Kalichman, Jooste, Cain, & Cherry, 2006; Zuckerman et al., 1997). Most studies have found that the personality characteristic of sensation-seeking was the strongest predictor of both sexual risk behavior and AOD use (Hoyle, Fejfar, & Miller, 2000).

The most informative data from studies that have examined the co-occurrence of sexual risk and AOD use behaviors supported the proposition that relations between AOD use and sexual risk behavior may be explain in part by the personality characteristics of sensation-seeking and impulsivity. For example, Zuckerman and Kuhlman (2000) examined relations between personality characteristics and six areas of health risk behaviors (i.e., tobacco use, AOD use, sexual risk-taking, driving and

gambling). This study documented that impulsivity and sensation-seeking indirectly influenced all six domains of risk behaviors. In addition, personality characteristics have been conceptualized as predisposing factors associated with co-occurring problem behaviors. In this conceptualization, personality factors were thought to lead to AOD use and sexual risk behavior (e.g., Trobst et al., 2000). That is, personality traits may be intrapsychic constructs that affect the likelihood of participation in AOD use and sexual risk behaviors. To date, the study of sensation-seeking as a general risk factor for co-occurring risk behaviors among adolescents is complex (Sher et al., 1999) and specific mechanisms underlying these processes remain unclear, and in particular, among adolescents (Jackson, Sher, & Schulenberg, 2008).

*Sexual Sensation Seeking (SSS)*. As described previously among the personality characteristics that have been examined, sensation-seeking or novelty-seeking were shown to be associated significantly with health risk behaviors including sexual risk and AOD use behaviors (e.g., Earlywine, 1994; Hoyle et al., 2004; Zuckerman, 1993). Several researchers (e.g., Jaccard & Wilson, 1991) have highlighted two major shortcomings of studies that have documented associations between sensation-seeking and sexual risk behaviors. First, most studies used broad operational definitions of sensation-seeking that were not related necessarily to sexual behavior (Hoyle et al., 1999). Second, studies that reported associations between sensation-seeking and health risk behaviors did not appear to have conceptual frameworks that supported these associations (e.g., Bankerson, 1995; Jaccard & Wilson, 1991). These criticisms led to the

development of a construct that captures specific characteristics of sensation-seeking and sexual behaviors in a manner that was both conceptually and methodologically sound.

Consequently, the concept of sexual sensation-seeking has been operationalized to include associations between personality and sexual risk behavior variables (Kalichman, 1994; Kalichman & Rompa, 1995). Sexual sensation-seeking is defined as a dispositional characteristic that includes both an affinity for participation in novel sexual experiences, as well as engagement in behaviors that produce high levels of sexual pleasure and arousal (Kalichman, 1994). A number of studies have shown that sexual sensation-seeking accounted for significant proportions of unique variance in sexual risk behaviors (e.g., Dodge et al., 2004; Kalichman et al., 1994; Kalichman & Rompa, 2001, Kalichman et al., 2006). Specifically relevant for the current study, there is also evidence to support significant correlations between sexual sensation-seeking, peer norms and AOD-sex related expectancies. To date, there are no available studies that have evaluated relations between sexual sensation-seeking and inhibition conflict.

*Relations between Sexual Sensation-Seeking, SRB Outcomes, AOD Use, AOD-Sex Related Expectancies and Peer Norms*

*Sexual Risk Behavior outcomes.* The influence of sexual sensation-seeking (SSS) on sexual risk behaviors has been documented in a number of studies (e.g., DiClemente & Wingood, 2003; Norris et al., 2009). In general, these studies showed that positive endorsements of sexual sensation-seeking were related to an increased likelihood for engagement in sexual risk behaviors. Positive relations were documented for all indices

of sexual risk behaviors including: unprotected intercourse, frequency of condom use and self-reported multiple sex partners (Spitalnick, et al., 2007).

*AOD Use and AOD-Sex Related Expectancies.* In addition, indices of sexual sensation-seeking have been incorporated into larger conceptual models of HIV-risk behavior to evaluate the influences of sexual sensation-seeking, indices of alcohol and other drug use (Kalichman, Heckman, & Kelly, 1996), and peer norms (DiClemente, 1992). With regard to AOD use and SRBs, Kalichman and colleagues described reciprocal relations between AOD use and SRBs. Specifically, the researchers found that individuals who reported high scores for sexual sensation-seeking were also more likely to use alcohol and other drugs in high-risk sexual contexts.

In addition, participation in high-risk sexual contexts was more likely to occur while these same individuals were under the influence of alcohol. In another study by Kalichman, Cain, Zweben, and Swain, (2003), AOD-sex related expectancies mediated relations between sensation-seeking and the co-occurrence of AOD use and sexual risk behaviors. These findings are noteworthy for the conceptualization of the current study, which is based on the proposition that AOD-sex related expectancies serve as cognitive templates that may mediate relations between distal factors (i.e., sexual-sensation seeking) and co-occurring sexual risk and AOD use behaviors.

*Peer Norm Processes.* Thus far, studies that have examined the role of sensation-seeking in facilitating sexual risk behaviors suggest that greater endorsement of sensation-seeking is related to socialization processes that promote the selection of

deviant peers, which in turn supports involvement in health risk behaviors (e.g., DiClemente, 1992; 2008). In general, these studies account for these social processes by controlling for the effects of peer norms, that is, by treating peer norms as a covariate (e.g., Spitalnick, 2007). The existing research knowledge base regarding relations between peer norms and sexual-sensation seeking behavior in the context of AOD use and SRB is scarce. However, it is commonly accepted in health risk behavior literatures that both sexual sensation-seeking and peer norms are important predictors and correlates of co-occurring sexual risk and AOD use behaviors (Donehew et al., 1999).

#### *Measurement Issues in Sexual Sensation-Seeking*

Despite noteworthy findings that emerged from empirical investigations of sexual sensation-seeking, complete support for these findings are limited by several methodological shortcomings. First, the construct of sexual sensation-seeking has been evaluated primarily among individuals receiving medical treatment services for STIs (Kalichman et al., 2003), college student samples in the United States (Gaither & Sellbom, 2003; Gullette & Lyons, 2005; Kalichman & Rompa, 1995), college students in South Africa (Kalichman et al., 2006), and homosexual men (e.g., Kalichman, 1994). Initial findings suggested that the construct of sexual sensation-seeking was a fairly stable correlate and predictor of self-reported SRBs. Nevertheless, similar associations are uncertain among specific adolescent populations, including multi-problem youth.

Second, the degree to which gender may alter relations between sexual sensation-seeking and specific risk behaviors has not been established. In a review of the literature, Gaither and Sellbom (2003) reported gender differences in correlations between sexual

sensation-seeking and sexual risk behaviors. Another study using a sample of African-American adolescents provided support for an association between sexual sensation-seeking and sexual risk behaviors (Spiltanik et al., 2007). Nevertheless, potential developmental and demographic differences in relations between sexual sensation-seeking and risk behavior outcomes require additional empirical examination.

Third, Kalichman and colleagues, in two different studies, evaluated the mediating role of alcohol expectancies in relations between sexual sensation-seeking and sexual risk behaviors. Studies conducted in the United States found that alcohol expectancies mediated relations between sexual sensation-seeking and sexual risk behaviors (Kalichman & Cain, 2004a; Kalichman et al., 2003). However, these findings were not replicated in a similar study conducted in South Africa (Kalichman et al., 2006). This lack of congruence may highlight methodological differences in the implementation of the studies or, alternatively, shortcomings associated with the validity of the measure of sexual sensation-seeking (Kalichman & Rompa, 1995). In addition, discrepancies in results across studies raise questions about the existence of the construct in other samples.

The hypothesized conceptual model presented in Figure 1 employed a data analytic framework that permitted the evaluation of the validity and reliability of the construct of sexual sensation-seeking among multi-problem youth. The evaluation of the the multivariate model integrated four theoretically-derived variables (i.e., sexual-sensation seeking, peer norms for condom use, AOD-sex related expectancies and inhibition conflict) using a diverse sample of adolescents that includes both genders and members of three ethnic groups. This approach is both methodologically and conceptually substantive in that it yielded information regarding whether sexual

sensation-seeking is a developmentally appropriate construct in a diverse sample of multi-problem youth.

*Peer Influences in the Co-Occurrence of Sexual Risk-Taking and AOD Use Behaviors*

Another factor that has been examined with regard to the co-occurrence of sexual risk behavior and AOD use is peer relationships. The influence of peers on adolescents' behavior is well documented in the research literature (e.g., Ennett & Bauman, 1996; Prinstein & Dodge, 2005). Many studies have shown that the significance of peer influence is explained in part by the developmental notion that adolescents' social ecologies are embedded in their relationships within their peer groups (Bronfenbrenner, 1979; Lerner, 1998). Theory also suggests that adolescents who engage in health risk behaviors, such as AOD use and sexual risk behaviors, tend to select peers who also value involvement in these health risk behaviors (e.g., Catalano & Hawkins, 1996). Such a social influence framework (Blanton & Christie, 2003) has provided a useful basis for the study of peer social norm processes associated with co-occurring AOD use and sexual risk behaviors, including peer socialization, peer selection and perceptions of peer behavior.

*Selection Effects.* Current research shows that adolescents tend to develop social networks over time with groups of adolescents whose values and beliefs they perceive to be similar or congruent to theirs (e.g., Crosnoe & McNeely, 2008). This process is known as selective association and it suggests that multi-problem youth actively will select friends who participate in risk behaviors consistent with their own behaviors, rather than

being influenced strictly by their friends' behaviors in a unidirectional process (e.g., Engles, Knibbe, DeVries, Drop, & Van Breukelen, 1999). The connection between peer affiliations and one's own involvement in health risk behaviors is unequivocal, but the mechanisms by which onset and maintenance occur require further study. Because selection and socialization processes are interdependent, the proportion of variance accounted for by each mechanism is still not well defined. In a review of the literature, Crosnoe and Mcneely (2008) emphasized that although selection and socialization processes are often discussed as if they are competitive influences, they are not likely to be mutually exclusive, and may influence each other within developmental systems.

In fact, some studies have demonstrated spurious relations, in which third variables may be moderating associations between selection and socialization and their influences on health risk behaviors. For example, Donohew and colleagues (1999) showed that these relations are moderated by the personality characteristic of sensation-seeking. That is, adolescents who reported high scores for sensation-seeking tended to select friends who also reported high scores for sensation-seeking. Furthermore, peers with similar intra-individual characteristics tended to influence each other with regard to involvement in health risk behaviors. The selective association process has not received as much empirical support in available research studies that evaluated the co-occurrence of AOD use and sexual risk behaviors, compared to studies that focused on processes of peer socialization and peer perceptions.

*Socialization Effects.* It is clear that peer socialization processes are a potent influence on adolescent sexual behavior, as well as involvement in AOD use (Buhi &

Goodson 2007; Dishion, McCord & Poulin; Pedlow & Carey 2004). Longitudinal studies that evaluated the role of peer socialization processes among high-risk adolescents have demonstrated that they are intricately linked to adolescent health risk behaviors (e.g., Dishion et al., 1999). These studies suggest the importance of bidirectional relations between perceived peer behavioral norms and adolescents' involvement in AOD use and sexual risk behaviors (Simons-Morton & Chen, 2006). Findings from these studies show that involvement in health risk behaviors leads to selection into peer networks that value high risk behaviors. In turn, socialization experiences strengthen relations between peers which lead to increased involvement in health risk behaviors. Clearly, processes at the level of the peer group serve as significant facilitators of involvement in health risk behaviors, such as sexual risk and AOD use behaviors (Jaccard, Blanton & Dodge, 2005).

*Peer Perception Processes.* Another hallmark of specific relations between risk behaviors and peer influence processes includes adolescents' perceptions of peer involvement in risk behaviors. Perceived peer norms about sexual behavior have been shown to be consistently significant predictors of adolescent sexual behavior in a number of studies (e.g., Voisin et al., 2006). For example, DiClemente et al., (1996) found that condom use was four times more likely to occur among adolescents who reported perceived peer norms that were supportive of condom use. In general, available research literature that examined the impact of perceived peer norms on adolescent sexual behavior suggests that adolescents tend to adopt risk or protective behaviors consistent with their perceptions of their peers' behaviors. Similar findings have underscored the generalization of this proposition to adolescents' involvement in alcohol and other drug

use, i.e., adolescents' patterns of AOD use reflects their perceptions of their peers' AOD use patterns (Bachanas et al., 2002).

As mentioned previously, one of the methodological limitations associated with peer influence studies is that peer socialization is often confounded with parallel processes such as selection effects (e.g., Billy, Rodgers, & Udry, 1984; Jaccard et al., 2005; Kandel, 1996). Other studies have suggested both processes may occur simultaneously. The goal of the current study was to evaluate the role of peer norms for condom use on co-occurring sexual risk and AOD use behaviors by clarifying relations between sensation-seeking, AOD-sex related expectancies, inhibition conflict, and peer norms for condom use. The evaluation of this multivariate model using a parsimonious selection of key theoretically-derived, empirically-supported constructs may elucidate current gaps in the available research literature.

The rationale for the inclusion of perceived peer norms for condom use in the hypothesized conceptual model is derived from empirical findings that demonstrate that the maintenance and acceleration of co-occurring AOD use and sexual risk behaviors are facilitated through complex cognitive processes associated with SRBs and AOD use among multi-problem adolescents (Duncan et al., 2007; Maisto & Carey, 2004). Consequently, the current study evaluated the predictive utility of perceived peer norms for condom use for co-occurring AOD use and sexual risk behaviors. It is expected that AOD-sex related expectancies will partially mediate the relation between perceived peer norms for condom use and co-occurring AOD use and SRBs, and that inhibition conflict will also mediate the relation between perceived peer norms for condom use and sexual risk behavior outcomes.

### *AOD-Related Sex Expectancies*

An important line of research that evolved from cognitive-affective and social learning conceptualizations of AOD use has identified alcohol and other drug-related expectancies as predictors and correlates of the co-occurrence of AOD use and sexual risk behaviors. Alcohol expectancy research has played a significant role during the last several decades in the formation of explanations for the co-occurrence of sexual risk and AOD use behaviors via multivariate statistical frameworks. Alcohol expectancies have been defined as cognitive representations or anticipated beliefs about the effects of alcohol use, based on relations between the physiological effects of alcohol and an individual's learning history (Goldman, Del Boca, & Darkes, 1999). Alcohol expectancies have been identified as reliable predictors of both the onset of alcohol use and patterns of problem drinking behaviors (e.g., Botvin & Scheier, 2001; Christiansen, Smith, Reohling, & Goldman, 1989). In addition, alcohol expectancies have been shown to mediate multiple pathways between AOD use and AOD-related problems (Goldman et al., 1999). Longitudinal analyses of alcohol expectancies from adolescence to young adulthood have provided evidence regarding prospective relations between alcohol- and other drug-related expectancies and specific maladaptive behavioral outcomes (Stacy, Newcomb, & Bentler, 1991). Alcohol expectancies not only predict subsequent use of alcohol, but are also associated with later AOD-related problems.

Growing numbers of researchers have directed their investigations toward understanding the mechanisms by which AOD expectancies may play a causal role in promoting a range of health risk behaviors, including the co-occurrence of sexual risk behavior and AOD use. In general, these studies have found that expectancies were a

significant predictor of involvement with AOD, as well as unsafe sexual behaviors. For example, Dermen and colleagues (1998) interviewed 13 to 19 year-old adolescents regarding recent sexual behaviors, AOD use, and alcohol expectancies. They found that involvement with alcohol and other drugs, social facilitation and sexual risk-taking expectancies were positively associated with sexual risk behaviors. Moreover, the magnitude of associations between the co-occurrence of sexual risk and AOD use behaviors were more robust among youth reporting stronger endorsements of AOD-related sexual risk-taking expectancies.

The role of expectancies in AOD use contexts and their relation to sexual risk behavior have been addressed in previously published experimental research. For example, a study by Wilson and Lawson (1976) using a balanced placebo design tested whether alcohol enhanced sexual behavior and sexual interest. Four groups of male college students, randomized into a balanced placebo design were presented sexually explicit materials after consuming alcoholic and non-alcoholic beverages. The investigators found that sexual arousal was nearly as intense in the participant groups that received alcoholic beverages compared to those in the placebo conditions. These findings suggested that physiological arousal is not merely a function of the pharmacological properties of alcohol but were also a function of expectancies, a psychological process. This is clear evidence for relations between expectancies, AOD use, and sexual risk behavior outcomes.

### *Measurement Issues Related to AOD-Related Sex Expectancies*

To date, only a few measures have been developed to assess expectancies. The Alcohol Expectancy Questionnaire-Adolescent version (AEQ-A), developed by Christiansen et al. (1982), has been used to measure specific dimensions of alcohol expectancies among adolescent populations. Using measures such as this one, different types of expectancies have been identified among adolescents. Studies that used the AEQ-A for example, have found that the strongest associations were between expectancies of social facilitation and sexual enhancement and AOD use among adolescents (Greenbaum et al., 2001; Smith & Goldman, 1995). The Alcohol Expectancy Questionnaire (AEQ) was developed by Brown, Goldman, Inn and Anderson (1980) using college aged samples of late adolescents and young adults. The AEQ has been used in studies that examined the role of expectancies in the co-occurrence of sexual risk and AOD use behaviors. The AEQ measures six expectancy domains that are similar to those measured by the AEQ-A. The AEQ subscale of sexual enhancement has been shown to be related to the co-occurrence of sexual risk behavior and AOD use (Brown et al., 1987). In addition to the predictive power associated with positive alcohol expectancies (Brown, Goldman, Inn & Anderson, 1980; Brown, Christensen & Goldman, 1987; Christiansen, Goldman & Inn, 1982) and increased involvement with AOD use, sexual risk behaviors have been associated significantly with social facilitation (e.g., disinhibition) and sexual enhancement expectancies (Cooper, 1992; Norris, 1994).

Studies that have evaluated the psychometric properties of the AEQ have reported mixed findings with regard to the discriminant validity of the AEQ (e.g., George et al., 1995; Leigh & Stacy, 1989; Schafer & Fals-Stewart, 1997). Positive expectancies for

sexual enhancement have been shown to have good discriminant validity for the co-occurrence of AOD use and sexual risk behaviors (Dermen & Cooper, 1994b; O'Hare, 1998a; Shafer & Leigh, 1996). Given the limitations of earlier expectancy measures, new research has emerged to evaluate and develop self-report measures that assess concurrently the role of expectancies in sexual risk behavior and AOD use contexts. The prevalence of sexual risk behaviors among AOD users has also influenced the development of assessment instruments for understanding better AOD-related sexual beliefs.

An initial study by Leigh (1990) demonstrated that items related to sexual enhancement and social facilitation expectancies were associated with the co-occurrence of AOD use and sexual risk behavior. More importantly, this study found that AOD-related sexual beliefs were specifically related to involvement in AOD use and the proximity of the sexual encounter, thereby increasing the likelihood of unprotected sex. Dermen and Cooper (1994a; 1994b) using a sample of adolescents, found that social facilitation and sexual enhancement expectancies were significantly predictive of co-occurring AOD use and sexual risk behaviors. The Risky Sex Scale (RSS; O'Hare, 2001) has also been used to measure reliably the role of AOD sex-related expectancies in co-occurring AOD use and sexual activity among college students. Another study by Tubman and colleagues (2006) indicated that the Risky Sex Scale also measured reliably sex-related expectancies in AOD use contexts among multi-problem adolescents.

### *AOD-Sex Related Expectancies and Co-occurring AOD Use and SRBs*

Current perspectives regarding the co-occurrence of sexual risk and AOD use behaviors suggest that expectancies are related to AOD use and AOD-related problems (Maisto et al., 2001). Goldman and colleagues (1994) have shown using a memory cue paradigm, that when expectancies about the effects of alcohol are activated, individuals who endorse the belief that alcohol enhances sexual experiences and pleasure are more likely to initiate alcohol use or to continue to drink in situations where a sexual encounter is anticipated. Furthermore, it has been shown that sexual enhancement expectancies may contribute to sexual risk behavior even in the absence of alcohol and other drug use (Darkes & Goldman, 1998; Fromme et al., 2002).

Of relevance to the current review regarding the role of expectancies in the co-occurrence of AOD use and sexual risk behaviors are experiments that have evaluated the effects of alcohol and alcohol expectancies on other variables that are related to participation in sexual risk behavior. Perceptions of risk, attitudes and intentions to engage in sexual risk behavior (i.e., attitudes toward condom use, behavioral ability to negotiate condom use) were conceptualized as direct influences on sexual risk behaviors (Ajzen, 1991; Fisher & Fisher, 1992). However, when these variables were evaluated within an expectancy-based framework, AOD-related sex expectancies were more strongly related to AOD use, as well as sexual risk behavior (Maisto, Carey & Gordon, 2002; Fromme, D'Amico & Katz, 1999).

Furthermore, these studies showed that AOD-related sex expectancies had moderating effects on specific constructs (i.e., attitudes toward condom use, perceptions of risk, behavioral or self-efficacy skills to negotiate condom use) that were

conceptualized to influence directly sexual risk behavior (Maisto et al., 2002). AOD-related sex expectancies were positively related to unprotected sex (i.e., sex without a condom) with a new partner. In addition, perceptions of intoxication and positive expectancies were negatively associated with behavioral skills or the ability to negotiate condom use (Maisto et al., 2002). Finally, AOD sex-related expectancies appeared to be an important construct that could help explain links between antecedents to both AOD use and sexual risk behavior that were not accounted for completely in previous research. Nonetheless, previous research (e.g., Cooper, 2002; Dermen & Cooper, 2000) identified inhibition conflict as another cognitive process that might impact significantly the co-occurrence of sexual risk and AOD use behaviors. Therefore, the multivariate model tested the contribution of both AOD sex-related expectancies and inhibition conflict. Such a multivariate model is supported both by current theory and available empirical data that show that co-occurring sexual risk and AOD use behaviors are associated with a complex and dynamic set of related variables (Guillamo-Ramos & Jaccard, 2005.)

#### *Inhibition Conflict and Co-Occurring Sexual Risk and AOD Use Behaviors*

The concept of inhibition conflict has been a longstanding component in the health risk behavior literature. Several studies have provided evidence for the role of inhibition conflict in the onset and maintenance of risk behaviors that lead to maladaptive outcomes (e.g., Weinhardt et al., 2001). The construct of inhibition conflict emerged from Alcohol Myopia Theory (Steele & Josephs, 1990). Within this perspective, the use of alcohol interferes with information processing skills that allow an individual to attend to all available environmental cues when making a decision. In AOD use contexts, because

available cues regarding sexual behavior are made more salient, an individual is more likely to attend to proximal cues that may promote sexual risk behavior (e.g., level of sexual arousal). Such cues are referred to as instigatory cues. Furthermore, alcohol is said to create myopia because the individual attends more to more proximal and instigatory cues (e.g., intercourse) rather than more distal or inhibitory cues (e.g., exposure to STIs). Alcohol Myopia Theory posits that such situations create an inhibition conflict between proximal salient cues (i.e., instigatory cues) and more distal, complex outcomes (i.e., inhibitory cues). As a consequence, individuals who are highly conflicted about proximal instigatory cues and distal inhibitory outcomes are more likely to engage in higher level of alcohol use in situations associated with specific inhibition conflicts.

The proposition that alcohol has stronger effects on behavior under high conflict conditions was supported by a meta-analytic review that showed that alcohol use leads to more extreme behavioral outcomes during situations where instigating and inhibiting cues are in conflict (Steele & Southwick, 1985). In a study of college students, Cooper and colleagues (2000) found that alcohol consumption was associated negatively with condom use among students who reported high scores for inhibition conflict. Similar findings were revealed in a study of male college students in Canada (MacDonald, MacDonald, Zanna, & Fong, 2000). In another study, Cooper and Orcutt (1997) found that male adolescents who were highly conflicted about intercourse on a first date reported higher levels of alcohol use. In a study that evaluated simultaneously the roles of inhibition conflict and alcohol expectancies, Dermen and Cooper (2000) found that inhibition conflict and alcohol expectancies moderated the relation between alcohol use

and condom use. This finding suggested that both inhibition conflict and alcohol expectancies were associated with sexual risk and AOD use behaviors.

The rationale for including inhibition conflict in the proposed multivariate model is to evaluate the direction of influence of two opposing cognitive processes associated with co-occurring sexual risk and AOD use behaviors. Inhibition conflict models contend that the pharmacological effects of alcohol restrict an individual's attentional capacity for an adaptive evaluation of potentially harmful instigatory cues, while inhibitory cues that serve a protective function are ignored. The competing demands exerted by inhibiting and instigating cues lead to inhibitory conflict responses that promote increased involvement in health risk behaviors.

In contrast, expectancy models posit that individuals with positive beliefs about the effects of alcohol in sexual contexts are more likely to engage in specific health risk behaviors, even before AOD use occurs. The social learning conceptualization of expectancies suggests that expectancies are learned vicariously in, and evolve through contact with, social networks. Based on this formulation, it is expected that the putative influence of expectancies is related distally to co-occurring AOD use and sexual risk behaviors. In contrast, processes of inhibition conflict focus on the physiological effects of alcohol, and therefore, are more proximally related to co-occurring AOD use and sexual risk behaviors. The inclusion of both cognitive processes in a single structural model fits with the notion that the evaluation of related or competing factors within a multivariate framework has broader explanatory value for understanding potential mechanisms underlying co-occurring sexual risk and AOD use behaviors among at-risk adolescents. Within this multivariate framework, the direction and significance of both

psychological and physiological influences on co-occurring AOD use and sexual risk behaviors were assessed.

*Summary of Literature on the Co-occurrence of Sexual Risk and AOD Use Behaviors*

The literature summarized in this review chapter was directed toward describing specific variables (i.e., sensation-seeking, perceived peer norms, expectancies, and inhibition conflict), that were included in a structural model evaluated in the current study. All of these variables have been shown to influence sexual risk behaviors in AOD use contexts. First, sensation-seeking and sexual sensation seeking were described as important correlates of AOD use and sexual risk behaviors among adolescents. Peer influence processes were also described as important correlates of both AOD use and sexual risk behaviors. While many studies have shown perceived peer norms to influence adolescents' involvement in AOD use (e.g., D'Amico et al., 2001) and sexual risk behaviors (e.g., DiClemente, 1992), there is a paucity of research regarding: (a) the specific mechanisms that underlie relations between perceived peer norms and sexual sensation-seeking; and, (b) how they may be related to the co-occurrence of AOD use and sexual risk behaviors among multi-problem youth.

Second, research on peer norm processes and their relations with the co-occurrence of AOD use and sexual risk behaviors were summarized briefly. In general, research on peer norm socialization processes has been particularly useful for identifying qualitative differences between normative adolescent populations and their counterparts labeled as deviant or maladjusted. Findings from this research domain suggest that adolescents overestimate consistently the frequency and quantity of risk behaviors that

are undertaken by their peers. Although such findings are meaningful, and in particular for intervention and prevention programs, health risk behavior research continues to evolve with the goal of identifying the directions of influence among key target variables associated with processes promoting co-occurring AOD use and SRBs. To date, health risk behavior research has identified important correlates and predictors of specific risk behaviors. A number of empirically-supported conceptual models have offered tentative explanations for these associations by examining bivariate relations or highlighting the influence of single-level factors on risk behavior outcomes. Such research has been informative in the sense that it has propelled a paradigm shift with regard to the examination of complex associations among variables. To date, it is clear that a single explanation does not account completely for participation in specific risk behaviors such as AOD use or sexual risk behavior. These findings have led to the examination of key constructs, such as AOD sex-related expectancies, that account in part for multiple pathways to AOD use and SRBs.

Third, AOD-related sex expectancies were discussed. In general, research in this area has shown that AOD-related sex expectancies are an important mediating variable that takes into account both distal and proximal factors to model and predict the co-occurrence of AOD use and sexual risk behaviors (Labrie, Shiffman, & Earlywine, 2002). While there is significant evidence regarding the role of expectancies in the co-occurrence of AOD use and sexual risk behaviors, there are also some significant weaknesses that the current research has not yet addressed. For example, language has been used primarily as a proxy to assess expectancies. That is, expectancy research has relied largely on words to label the anticipated effects of AOD use (i.e., expectancies).

An expectancy stem like “alcohol makes me loose,” may have different meanings (i.e., substantial ambiguity) that could vary by gender or ethnic group membership. While expectancy researchers have begun to address these issues (e.g., Reich et al., 2004), the role of individual-level processes, such as demographic variables, on expectancies have not been examined sufficiently in current research. Furthermore, the vast majority of available expectancy scales have been developed using samples of White college students (Brown et al., 1987; Cooper & Dermen, 1994b; Darkes et al., 1998; Dunn et al., 1999). Given that expectancies develop within social networks (Goldman, 1999), the assessment of expectancies must account for individual differences that occur between groups, including specific types of samples (i.e., high risk, clinical treatment versus community or traditional college samples). In fact, current conceptualizations of risk-taking behaviors suggest that the co-occurrence of problem behaviors is more likely to take place among high-risk samples of adolescents (e.g., Willoughby, Chalmers, & Busseri, 2004). Therefore, it may be necessary to assess and describe differences in AOD-sex related expectancies among multi-problem youth. Data from the current study could be useful for the purpose of constructing a more comprehensive explanation regarding the role of expectancies in co-occurring AOD use and sexual risk behaviors in diverse samples of multi-problem youth.

Finally, the conceptualization of inhibition conflict was described. Inhibition conflict is the least studied construct in health risk behavior research that was included in the structural model evaluated in the current study. Nevertheless, there is sufficient compelling empirical evidence (e.g., Dermen & Cooper, 2000; Murphy, Monahan & Miller, 1998) to warrant further investigation of its association with the co-occurrence of

sexual risk and AOD use behaviors. In addition, its inclusion in the hypothesized structural model (see Figure 1) was guided by both theory and empirical data that emphasize the utility of the construct with regard to health risk behavior in samples of youth. The current study extended the current research literature by examining inhibition conflict within a multivariate statistical framework by integrating empirically-supported factors associated with co-occurring sexual risk and AOD use behaviors. In conclusion, the current study is guided by a conceptual framework that emphasizes the notion that multiple explanations work in concert to account for processes related to health risk behaviors among adolescents (e.g., Fromme, D'Amico & Katz, 1999; Guillamo-Ramos, Jaccard, Dittus, Gonzalez & Bouris, 2008). The conceptual formulation for the current study is based on the integration of four major conceptual approaches that explained health risk behaviors among adolescents. They include: personality, peer socialization, expectancies and inhibition conflict conceptual approaches. The primary focus of the current study is to use a multivariate framework to data analysis in order to evaluate the nature of relations between four core theoretically-derived constructs that have been shown to influence AOD use and sexual risk behavior among adolescents. Toward that end, the conceptual model depicted in Figure I represents hypothesized relations between sensation seeking, peer norm socialization, AOD-related sexual expectancies and inhibition conflict previously described in the current review.

### *The Current Study*

The evidence for the co-occurrence of sexual risk and AOD use behaviors suggests the importance of a multivariate framework that outlines structural relations

among multi-level factors. Given the prevalence rates among youth for co-occurring AOD use and sexual risk behaviors and the potential for gender and ethnic differences as suggested by epidemiological data, a multivariate framework should include: (a) demographic variables, such as gender and ethnicity; in addition to (b) contextual factors such as perceived peer norms; and, (c) individual-level factors, such as inhibition conflict, personality characteristics and expectancies.

The co-occurrence of AOD use and sexual risk behavior among multi-problem youth is manifested within a complex, dynamic system that includes many related factors, such as those described in the current review. Furthermore, the between-group variability reported in prevalence estimates across high-risk groups (e.g., CDC, 2006) suggests the potential for non-linear relations between specific factors (Leigh & Stall, 1993; Leigh, 1999).

The current study was directed toward specifying processes of influence among related factors associated with the co-occurrence of AOD use and SRBs. Specifically, this study used a multivariate statistical perspective to examine direct and indirect paths between key variables associated with the co-occurrence of AOD use and SRBs. The primary aim of this study was to evaluate simultaneously the mediating role of two important cognitive variables (AOD-sex related expectancies and inhibition conflict) on antecedents of AOD use and SRBs, including an individual-level factor (i.e., sexual sensation-seeking) and a contextual factor (i.e., peer norms for condom use) in a high-risk sample of adolescents. Data from the current research study increases knowledge about the putative mechanisms of risk and protection underlying the co-occurrence of AOD use and sexual risk behaviors among multi-problem adolescents. Such findings may offer a

useful framework for scientists examining health risk behaviors and may provide considerable insights into preventive interventions for multi-problem youth.

On the basis of existing research described earlier in this chapter, we expected that the conceptual model of hypothesized relations depicted in Figure 1 will demonstrate adequate fit to the data collected, accounting for both distal and proximal factors thought to contribute to the co-occurrence of AOD use and sexual risk behaviors. It was predicted that both alcohol sex-related expectancies and inhibition conflict will partially mediate relations between distal antecedent factors and the co-occurrence of AOD use and sexual risk behaviors. It was also expected scores (high versus low) for inhibition conflict would predict specific types of alcohol sex-related expectancies (i.e., positive versus negative).

There is very little research examining differences in these relations by gender or ethnic group. In addition, there is not a compelling conceptual basis from which to specify clearly expected differences in the depicted relations by gender or ethnic group membership. However, data from epidemiological surveys such as those reported in this literature review suggest important base rates differences with regard to the co-occurrence of alcohol and other drug use as well as sexual risk behaviors by gender and ethnicity. The possible gender and ethnicity effects will be controlled for by using gender and ethnic group membership as covariates for all endogenous variables in the integrative model.

*Specific Hypotheses:*

Hypothesis I. AOD-sex related expectancies will partially mediate the relation between sexual sensation-seeking and co-occurring AOD use and sexual risk behaviors.

- 1a. Higher scores in sexual sensation-seeking will predict higher scores for positive AOD-sex related expectancies.
- 1b. Positive expectancies will be related to higher involvement in co-occurring AOD use and sexual risk behaviors.
- 1c. Higher scores on sexual sensation-seeking will be associated with higher scores for involvement in co-occurring AOD use and sexual risk behaviors.

Hypothesis II. Inhibition conflict will partially mediate the relation between sexual sensation-seeking and co-occurring AOD use and sexual risk behaviors

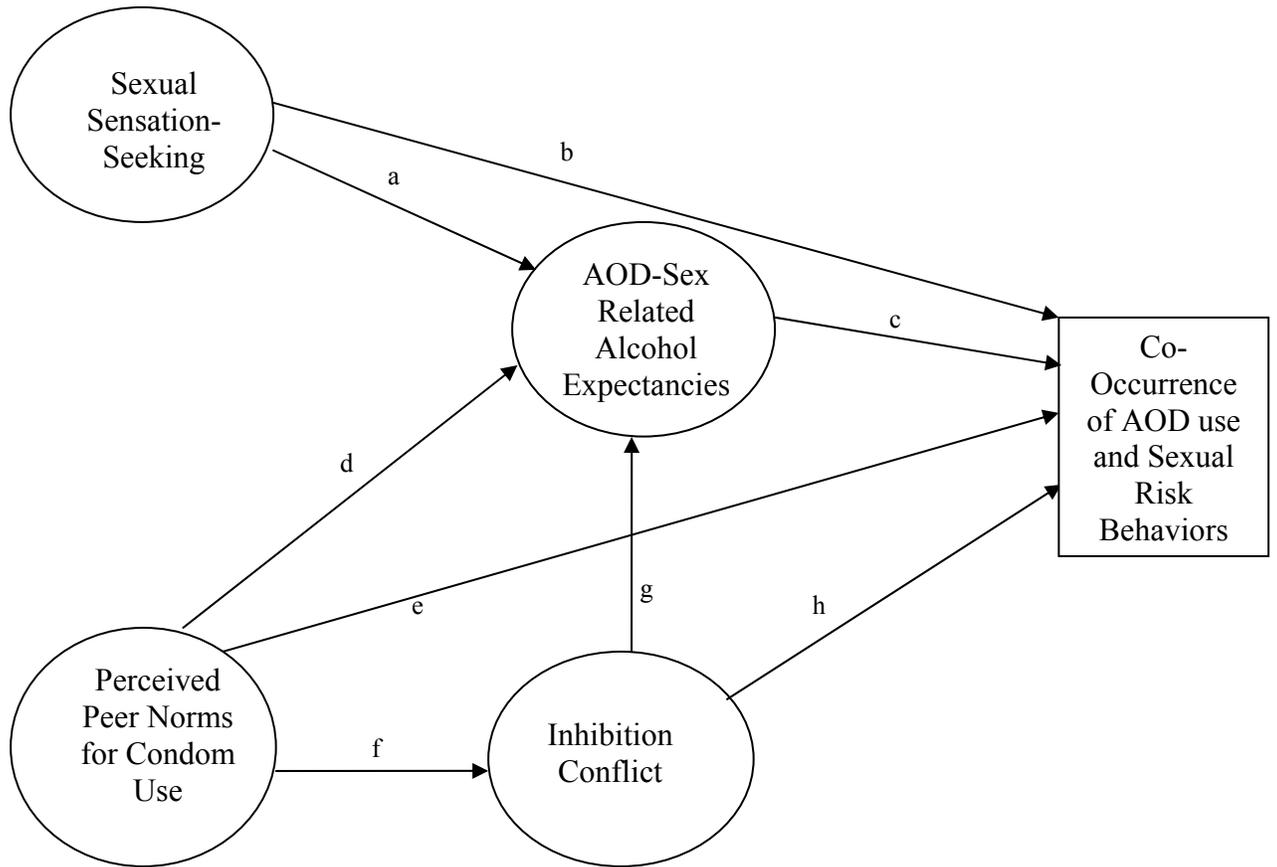
- 2a. Inhibition conflict will have a direct influence on the co-occurrence of AOD use and sexual risk behaviors.

Hypothesis III. Peer norms for condom use will have a direct influence on AOD use and sexual risk behaviors

- 3a. Endorsements of perceived peer norms for condom use will predict the strength of endorsements for AOD-sex related expectancies

Hypothesis IV. The influence of perceived peer norms for condom use on co-occurring AOD use and risky sexual behaviors will be mediated partially by AOD-sex related expectancies and inhibition conflict.

Figure 1. *Conceptual Model of Hypothesized Relationships*



## Chapter III: Methods

### *Description of Database*

The baseline data set included 396 adolescents. The sample was drawn from the Enhancing My Personal Options While Evaluating Risk (EMPOWER) project conducted in South Florida. This NIAAA-funded study (R01 AA014322; PI: Tubman) was a randomized clinical trial (RCT) that evaluated the efficacy of a brief motivational intervention (BMI) designed to reduce HIV-risk behaviors among adolescents receiving outpatient treatment services for alcohol and other drug (AOD) use problems. The conceptual basis of this HIV-risk reduction program was modeled after the Guided Self-Change (GSC) Intervention (Sobell & Sobell, 1998).

### *Participants*

The sample consisted of 396 adolescents, including 282 males (71.2%) and 114 females (28.8%), receiving AOD use treatment services at three outpatient facilities in South Florida. The ages of the participants ranged from 12 to 18 years old ( $M = 16.36$  years;  $SD = 1.18$ ). The ethnically diverse sample included 100 (25.23%) non-Hispanic White, 146 (46.8%) Hispanic White, 31 (7.8%) Hispanic Black, 83 (21%) African American, 21 (5.3%) Asian and 15 (3.8%) adolescents self-identified as being from more than one race/ethnic group or from other racial/ethnic groups. With regard to nativity, 329 (83.1%) of the participants were born in the United States, while out of the entire sample, 183 (46.9%) and 212 (54.0%) of their fathers and mothers, respectively, were

also born in the United States. The majority of the sample ( $N = 304$ , 76%) reported their father, mother, or both as primary caregiver(s).

### *Measures*

*Demographics Questionnaire.* This questionnaire was only administered at the baseline assessment. It was used to record each adolescent's age, school grade, gender, ethnic background, referral source, drug of choice, parental educational attainment, socioeconomic status and the student's involvement with other counseling services, as well as self-help and support groups.

*AOD-Sex Related Expectancies.* The Risky Sex Scale (RSS; O'Hare, 2001) measured AOD-sex related expectancies. The RSS is a 14-item instrument that uses a 5-point Likert response format ranging from *strongly agree* (5) to *strongly disagree* (1). This measure contains three factor analytically derived subscales. In the present study, only the Risky Sex Expectancies subscale was used. Psychometric properties of the RSS using a multi-problem youth sample suggested that it reliably assessed alcohol and drug use expectancies among at-risk samples of adolescents (e.g., Tubman et al., 2006). Reliability estimates were calculated for the current sample. An alpha coefficient of .84 was obtained, suggesting good internal consistency in this sample of multi-problem youth.

*Peer Norms for Condom Use.* The Sexual Risk Behavior Beliefs Scale (Basen-Engquist, 1999) was used to measure adolescents' perceptions of peer norms regarding

condom use. The subscale used in the current study is a 3-item measure that uses a 5-point Likert response format, ranging from *true for all my friends* (5) to *true for none of my friends* (1). In the current sample, the measure has a documented internal consistency coefficient of  $\alpha = 0.85$ .

*Sexual Sensation-Seeking.* The Sexual Sensation Seeking Scale (SSSS; Kalichman & Rompa, 1995) is a measure that assesses an individual's affinity for seeking novel or risky sexual stimulation. The SSSS contains 9 Likert scale items that are measured on a four-point response format. The scale ranges from 1 *not at all like me* to 4 *very much like me*. The sexual sensation-seeking scale was first evaluated with 106 homosexual men with a reported internal consistency of 0.75. Kalichman and Rompa (1995) used a sample that included 98 men and women and validated the SSS Scale documenting both internal consistency ( $\alpha = 0.81$ ), and 3-month test-retest reliability (0.73). This measure was also validated in a heterosexual college student sample with a reported internal consistency of  $\alpha = 0.81$  (Beck, Thombs, Mahoney & Fingar, 1995). A more recent study revealed an alpha coefficient of .83 suggesting good internal consistency (Kalichman & Cain, 2004). The measure has been shown to correlate with sexually permissive behaviors (Gaither & Sellbom, 2003). In the current study, an alpha coefficient of .68 was obtained.

*Inhibition Conflict.* The Inhibition Conflict Scale (Dermen & Cooper, 2000) is a brief measure composed of three items that asks participants the extent to which they perceive ambivalence regarding condom use in specific situations (e.g., *I had a hard time*

*deciding whether or not to use a condom or to insist that my partner use one*). The measure uses a Likert scale response format ranging from, *not at all how I felt* (1) to *never thought about it* (9). The Alpha coefficient for this measure is .89 (Cooper & Orcutt, 1997; Dermen & Cooper, 2000). In the current sample, an alpha coefficient of .85 was obtained, suggesting good internal consistency in this sample of multi-problem youth.

*Timeline Follow Back Calendar (TLFB)*. The timeline follow back calendar is an interviewing technique that asks participants to reconstruct their daily drinking and drug use for a specific previous time period using a calendar with specific anchoring points. This technique was developed by Sobell, Maisto, Sobell, and Cooper, 1979 to obtain information about the quantity and frequency of alcohol use among problem drinkers. Studies that have examined the reliability of this data gathering technique indicated that self-reports about drinking were reliable over 6-week intervals ( $r = .79$ ). In order to minimize errors of calculation, a standardized metric was utilized where a 1-ounce mixed drink, one 5-ounce glass of wine, a 12-ounce beer or a 12-ounce wine cooler were defined as one standard drink. In addition, the TLFB-Sexual Risk Behavior calendar (TLFB-SRB) was used to gather information about participants' frequency of unprotected sex during the last 6 months. In the current study, TLFB summaries were used to describe event-level involvement of alcohol and other drug use during the last 6 months from the baseline assessment. Event-level data regarding the frequency of unprotected sex during the last 6 months from the baseline assessment were also described using the TLFB.

*Assessment of the Co-occurrence of Alcohol, Drug Use and Sexual Risk Behavior.*

A global measure of the assessment of alcohol use and sexual risk behavior, as well as drug use and sexual risk behavior was used. This measure consisted of two questions. One asked participants whether they used alcohol before or during sex in the last 12 months and the other asked whether participants used drugs before or during sex in the last 12 months. Responses to the two items were obtained using a Likert format ranging from (1) *always* to (5) *never*. In the current study, the items were reverse coded to facilitate interpretation of findings.

*Procedure*

Adolescent clients were approached within one week of enrollment in outpatient AOD treatment services and invited to participate in a brief motivational HIV/STI risk reduction intervention. Each adolescent client was screened for sexual activity participation during the prior six months as an inclusion criterion. Adolescents who: (a) were not sexually active during the previous six months; (b) exhibited significant cognitive deficits or developmental delays; (c) reported current suicidality; or (d) did not provide assent in addition to parental consent were excluded from study participation. Next, adolescents were assessed for DSM-IV psychiatric symptoms and were administered a battery of questionnaires before being enrolled in the HIV/STI risk reduction intervention. In the broader NIAAA-funded intervention program, participants completed a 60- to 90-minute baseline assessment focused on multiple variable domains including: substance use, sexual risk behaviors, demographics, as well as putative mediators and moderators of intervention impact. Trained graduate students collected

data using a structured interview protocol on laptop computers at the facilities in which clients were receiving AOD treatment services. Active consent was obtained from both adolescents and a primary caregiver via procedures approved by the Institutional Review Board (IRB) at the sponsoring university. Participants were compensated \$25.00 for completing the baseline assessment.

### *Data Analytic Plan*

*Preliminary Analyses.* Data analyses for the current study were conducted in three steps. Preliminary analyses included summaries of descriptive results. Bivariate statistics were also conducted, as well as the assessment of missing data, non-normality and outliers. Confirmatory factor analyses were pursued as part of preliminary analyses to evaluate the factor structure of measures in this sample of multi-problem youth. While measures used in the current study had well documented psychometric properties, they have been used primarily with college student samples and school-based samples of adolescents (e.g., Cooper, 2006; Gaither & Sellbom, 2003 ).

*Primary Analyses.* Primary analyses were pursued using robust Maximum Likelihood (ML) procedures in Mplus (Muthen & Muthen, 2002). A multi-group approach was applied to document gender and ethnic group differences in structural relations among variables examined in the current study. All major analyses included the following set of covariates: Gender, ethnic group membership, treatment facility attended, level of parental education, the adolescent's school grade and age.

Data were collected in three different treatment facilities. To control for possible clustering effects, treatment facility was entered as a covariate for all endogenous variables in the SEM models. Treatment facility, gender, and ethnicity variables were dummy-coded prior to mean centering of the data. Parental education was used as a proxy variable for socio-economic status. Parental education included four categories: (1) non-High School graduate, (2) High School graduate, (3) Vocational training, (4) College graduate. The parental education variable was also dummy-coded and mean-centered. The adolescent school grade variable was measured at the ordinal level. It was also mean-centered. The adolescent's age variable was also entered as a covariate in the SEM models evaluated. The age variable was a continuous variable and it was also mean-centered. Supplemental analyses included power analyses.

## CHAPTER IV: Results

The analyses reported in this section were conducted in three steps. First, descriptive results suggested that the adolescent participants in the current study were involved in multiple risk behaviors. Preliminary analyses in Step 1 also included: descriptive statistics computed for continuous variables used in the model analyses, the assessment of missing data, non-normality, outliers, as well as bivariate analyses that assessed the magnitude of correlations between continuous measures. Univariate analyses were conducted for gender and ethnicity variables included as covariates in the model. In addition, in Step 1, confirmatory factor analyses were conducted using AMOS 17. The goal of the CFA was to investigate the factor structure of four latent constructs associated with the co-occurrence of sexual behavior and alcohol use or drug use. In Step 2, the primary analyses were conducted using a robust Maximum Likelihood procedure in Mplus to evaluate the integrative model. In Step 3, supplemental analyses were conducted to assess whether the evaluation of the model was sufficiently powered to draw reasonable conclusions about identified structural differences.

### *Background Characteristics*

This study included a sample of 396 adolescents receiving treatment services for alcohol and other drug use problems. The adolescents were recruited in three different community substance use treatment facilities. The mean age of the sample was 16.37 years ( $SD = 1.2$  years). The gender distribution of the sample was unequal and included 282 (71.2%) males and 114 (28.8%) females. The sample was ethnically diverse. It was

composed of 100 (25.3%) non-Hispanic White, 31 (7.8%) Hispanic Black, 146 (36.9%) Hispanic White, 83 (21%) African-American, 21 (5.3%) Asian and 13 participants (3.3%) self-identified as being of another ethnic group. With regard to nativity, the majority of adolescents reported that they were US born (83.1%). The sample was also diverse in terms of educational attainment and socio-economic status. About 12% of parents reported some high school education, 30% of parents were high school graduates, 23% were college graduates and 14% had some vocational education. Most adolescents (60.1%) identified their mother as their primary caregiver. Over 75% of the adolescent participants were from single-parent households. About 32% of this sample reported a religious affiliation. Religiosity was measured on a Likert scale that asked adolescents how religious they were, from “very religious” to “not at all religious.” About 47 % of them reported themselves to be “a little” religious.

### *Indicators of Problem Behaviors*

#### *Academic and Social Functioning*

Over 90% of adolescents in this sample did not belong to a social organization including: youth groups or interest groups such as a reading club or a sport team. More than half (53%), reported that they had repeated at least one school grade, and nearly 25% of them reported that they had stopped attending school during the past school year. Most adolescents discontinued their attendance in school either due to problems related to alcohol and other drug use or due to involvement with the juvenile justice system. About 45% of participants were court-mandated to be in substance use treatment.

### *Psychiatric Symptomatology*

Externalizing disorders were the most prevalent psychiatric diagnoses in this multi-problem sample of youth. Nearly 80% of participants were diagnosed with Drug Abuse and 47% were diagnosed with Drug Dependence. About 42% of the sample was diagnosed with Alcohol Abuse and 16% met criteria for Alcohol Dependence. Another common psychiatric diagnosis in this sample of adolescents was Conduct Disorder (CD). Over half of the sample (53%) met criteria for a diagnosis of Conduct Disorder. The prevalence rates for Attention Deficit Hyperactivity Disorder (ADHD) Inattentive and Impulsive types were 38% and 29%, respectively. In contrast, ADHD - combined type (21%) was the least prevalent externalizing disorder.

The prevalence of internalizing problems among this sample of adolescents was lower compared to externalizing problems. About 4% of adolescents were diagnosed with Major Depression and 6% with Dysthymia. The most prevalent psychiatric disorder was Generalized Anxiety Disorder (GAD). Nearly 8% of adolescents were diagnosed with GAD. Other anxiety disorders such as Social Phobia and Specific Phobia were assessed. About 1.5% of adolescents were diagnosed with Social Phobia and nearly 1% with Specific Phobia. Significant gender differences were observed in the rates of diagnoses with an internalizing disorder. Female adolescents were more likely ( $p < .01$ ) to be diagnosed with Major Depression, GAD and Dsythymia than male adolescents. These results are consistent with the current epidemiological finding with regards to gender differences in the prevalence of internalizing disorders.

### *Sexual Risk Behaviors*

Consistent with the existing research literature that describes multi-problem adolescents, these multi-problem adolescents were involved in multiple risk behaviors that placed them on a pathway for increased likelihood for maladaptive outcomes. A wide range of scores represented the distribution of lifetime sexual partners. The distribution of lifetime sexual partners ranged from 1 to 150, with 5 lifetime sexual partners as the mode of this distribution. Nearly 15% of the adolescents reported 5 lifetime sex partners. About 20% of the adolescents reported 4 or more sexual partners during the past year.

### *Alcohol and Other Drug (AOD) Use.*

Results obtained from the measurement of lifetime alcohol and other drug involvement in this sample indicated that most adolescents (80%) who participated in the study were polydrug users. Most adolescents (75%) reported marijuana as their drug of choice over their lifetime. Other substances that were most frequently consumed included alcohol (55%), cigarette smoking (48%), powdered cocaine (45%), sedatives or barbiturates (35.4%), painkillers (30.1%), tranquilizers (26.6%) and amphetamines (18.1%).

### *Service Utilization*

All adolescents who participated in the study were receiving AOD treatment services at the time of enrollment in the study. More than 75% of the adolescents in this sample reported previous general counseling services and previous AOD use treatment. More than half (52%) of the participants had received outpatient substance abuse

treatment prior to their current treatment involvement. Also, half of the sample had received intensive substance abuse treatment either as an inpatient or as an outpatient via a “day treatment” format. Over 10% of the adolescents had been hospitalized for detoxification as a result of an alcohol or drug use overdose. With regard to STI and HIV knowledge, 39% of the adolescents reported receiving HIV/STI education in school while 15% had received HIV/STI counseling at the office of a physician or in a clinic setting.

### *Sample Characteristics*

*Missing Data Analysis.* A descriptive exploration of missing data revealed a rate of less than 6%, ranging from 3.3% to 5.6% missing data across the 12 indicators that were included in the evaluation of the integrative model. Given the rate of missing data was not systemic and not substantial (i.e., > 10%), its assessment was pursued via SPSS 17 - Missing Value Analysis (MVA) using the Expectation Maximization (EM) method. For those participants with missing data, missing values were imputed to conform to covariance estimates (Schafer, 1997).

*Non-Normality.* To conform with the assumptions regarding traditional maximum likelihood methods of SEM, i.e., that continuous variables in the model have multivariate normal distributions, non-normality was assessed in this study using the Mardia’s test for multivariate normality. The multivariate index yielded a statistically significant result (critical ratio = 19.85,  $p < 0.05$ ) providing statistical evidence for non-normality. Skewness and kurtosis were evaluated at the univariate level. Examination of univariate indices of skewness and kurtosis revealed one value of skewness greater than an absolute

value of 2.0, i.e., 2.46 for the indicator for inhibition conflict factor. One value of kurtosis was significantly greater than 2.0, i.e., 5.11 for the indicator of inhibition conflict). Given that these data were not normally distributed, parameter estimates were pursued using bootstrapping with 2000 bootstrap replicates. Bootstrap replications were performed for the purposes of estimating standard errors,  $p$  values, and confidence intervals. The  $p$  value for the overall fit of the tested models was calculated using the Bollen-Stine bootstrap method in lieu of the traditional Chi-Square statistic (Bollen & Stine, 1993). All significance tests and confidence intervals reported are from the bootstrap analyses.

*Outlier Analyses.* The assessment of outliers was conducted prior to all major analyses to verify whether their inclusion in the analyses would prove to be consequential. Toward this end, model-based and non-model-based strategies were employed. In the model-based method, a leverage score was calculated for each participant based on their multivariate profile for the 12 variables included in the model analyses. The mean leverage score across participants was .038. An outlier was defined as any participant with a leverage score three times greater than the value of the mean leverage score (Jaccard & Wan, 2003). Based on this criterion, six participants were identified as possible outliers. The data were examined for possible coding errors. There were no apparent coding errors and the six outliers proved to be inconsequential in subsequent analyses.

In addition, a model-based outlier analysis was pursued using ordinary least squares regression in a limited information regression framework. This analysis involved pursuing a regression analysis evaluating the effect of the indicator for each endogenous

variable onto the indicators for variables of which the endogenous variable was assumed to be a linear function (Bollen, 1996). Standardized *dfbeta* values were examined for each participant relative to each path coefficient to isolate influential outliers in parameter estimation. An outlier was defined as any participant who had an absolute standardized *dfbeta* larger than 1.0. This analysis revealed that no outliers were evident. Therefore, no cases were excluded in the model evaluation analyses. Furthermore, subsequent analyses were performed both with and without the potential outliers. Both sets of analyses yielded similar results and the outliers were not omitted.

### *Descriptive Statistics*

Table 1 describes measures of central tendency for sexual sensation-seeking, one of the exogenous variables used in the integrative model. The ratings of items describing characteristics associated with sexual sensation-seeking reported by this sample of adolescents were comparable with ratings from other studies. The item “I like wild freaky sex” was the most frequently rated item with a mean score of 2.84 (*SD* = .97). The second highest mean score was for the item “I like new and exciting sexual experiences and sensations” with a mean score of 2.75 (*SD* = 1.08). In this sample, adolescents tended to endorse statements that reflected a disposition for sexual sensation-seeking characteristics that are significant risk factors for higher levels of AOD use and related consequences (Norris et al., 2009).

A number of studies have shown significant associations between individual and peer sexual risk behavior (e.g., Baurmeister et al., 2009). Perceptions of peer beliefs regarding condom use have been shown to be an important risk factor contributing to

participation in sexual risk behaviors. In the current study, perceived social norms related to condom use were measured by the Peer Norms for Condom Use Scale. Table 2 shows descriptive summaries for items included in the Peer Norms for Condom Use Scale, another exogenous variable included in the evaluation of the integrative model. The observed ratings of items in this study were consistent with previous studies (e.g., Shrier et al., 1999).

As noted in Chapter 2, sex-related alcohol and other drug use expectancies have been shown to be significant predictors of sexual risk behaviors in AOD use contexts in a number of studies (e.g., LaBrie et al., 2005). Furthermore, there is strong evidence that support AOD sex-related expectancies as an intervening variable between distal factors such as sexual sensation-seeking and involvement in risky behaviors including alcohol and other drug use and sexual risk behaviors. In the current study, the Risky Sex Scale (RSS) was selected because it reflects beliefs that represent sexual behavior in both alcohol and drug use contexts. Most adolescents in the study were self-identified as polydrug users, including consumers of alcohol and other drugs. Therefore, the Risky Sex Scale was used to measure sex-related alcohol and other drug expectancies. Table 3 presents both means and standards deviations for items included in the Risky Sex Scale.

Inhibition conflict is another cognitive variable associated with risky behaviors including sexual risk behaviors and alcohol and other drug use. In the current study, inhibition conflict was conceptualized as a partial mediator of the relation between perceived peer norms for condom use and the co-occurrence of sexual risk behaviors and alcohol and other drug use. Responses to the Inhibition Conflict Scale were measured on

a 7-point Likert scale. Participants who endorsed “never thought about it” had their responses recoded to 1

Table 1.

*Item Statistics for the Sexual Sensation-Seeking Scale*

Item	N = 396	M	SD
1. I like wild freaky sex		2.84	.97
2. I made promises I did not keep to get a person to have sex		2.31	1.18
3. I am curious about having anal sex without a condom		2.09	1.30
4. I enjoy the company of sexual or sexually active people		2.23	1.12
5. I enjoy watching x-rated or porno videos		2.03	1.10
6. I said things that were not true to get a person to have sex		2.06	1.13
7. I am interested in trying out new sexual experiences		2.26	1.09
8. I am proud to be sexually active		2.10	1.15
9. I like new and exciting sexual experiences and sensations		2.75	1.08

Note: Items are coded: Not at all like me = 1; Somewhat not like me = 2; Somewhat like me = 3; Very much like me = 4.

This recoding was based on the rationale that adolescents who “never thought about it” may have experienced lower levels of conflict regarding condom use (Dermen & Cooper,

2000). Only 2% of the participants in this sample had at least one response recoded as aforementioned. Table 4 summarizes items statistics for the Inhibition Conflict Scale.

The outcome of interest in the current study was the co-occurrence of sexual risk behaviors and substance use. A global approach was undertaken to the measurement of specific outcome variables. Two items were used to measure the co-occurrence of sexual behavior and alcohol or drug use. One item asked participants how often they drink alcohol before or during sex and the other item asked how often in the past year they used drugs to get high before or during sex. Responses to both items were recoded on a scale from 1 “never” to 5 “always.”

The mean score for the co-occurrence of sex and alcohol in the past year was 2.19 ( $SD = 1.13$ ). The mean score for the co-occurrence of sex and drugs to get high was 2.64 ( $SD = 1.33$ ). Event-level data for the co-occurrence of AOD and unprotected sex were also recorded using the Timeline Follow Back (TLFB). These data were summarized by computing the number of days unprotected sex occurred while alcohol or drugs were consumed during the past 180 days. The mean number of days for the co-occurrence of unprotected sex and AOD use was 1.06 ( $SD = 5.11$ ) with a distribution of scores ranging from 0 days to 73 days. Descriptive results from the global measures of co-occurring behaviors revealed frequent involvement in co-occurring AOD use and SRB outcomes.

When asked whether they used a condom when consuming alcohol before or during sex, 35.9% of adolescents who reported co-occurring sexual behavior and alcohol or drug use reported unprotected sex. The TLFB data (i.e., event-level measure) indicated that 22% of adolescents reported co-occurrence of unprotected sex and AOD use during the same timeframe.

Table 2.

Item statistics for Peer Norms for Condom Use Scale

Item	<i>N</i> = 396	<i>M</i>	<i>SD</i>
1. My friends believe condoms should always be used		2.14	1.06
2. My friends believe condoms should be used even if using other birth control		2.40	1.18
3. Condoms should be used even if the two people know each other well		2.38	1.19

Note: High scores indicate norms supporting abstinence. Items were coded: True for all of my friends = 1; True for most of my friends = 2; True for some of my friends = 3; True for a few of my friends = 4; True for none of my friends = 5.

The descriptive results describe demographic, substance use, individual-level and contextual-level characteristics in this sample of multi-problem adolescents. Taken together, descriptive results suggest that this sample of adolescents is reflective of youth beginning to experience deleterious consequences as a result of co-occurring risky behaviors with the potential for further escalation of problem behaviors (Jessor & Jessor, 1977). Preliminary bivariate analyses were also conducted to assess the magnitude of intercorrelations among items from scales used in the current study.

Table 3.

## Items Statistics for the Risky Sex Scale.

Item	N = 396	M	SD
1.	I often feel hornier after a couple of drinks	3.02	1.37
2.	I am a better sex partner after a few drinks	3.58	1.14
3.	Women have orgasms more easily if they drink	3.15	1.05
4.	I enjoy having sex more if I have had some alcohol	3.51	1.19
5.	I am more romantic when I drink	3.87	1.02
6.	I feel more masculine or feminine after a few drink	3.61	1.19
7.	It is easier for me to have sex after a few drink	3.52	1.20
8.	If I drink or use drugs I am more likely to have unprotected sex	3.46	1.30
9.	If I drink or use drugs on a new date I am more likely to have sex	3.12	1.30
10.	I am more likely to have unplanned sex if drinking or using drugs	2.81	1.27
11.	If I drink or use drugs with a friend I am more likely to have sex	3.12	1.25
12.	Women are more likely to get sexually assaulted after drinking	2.15	1.04
13.	Women seem more likely to have sex after drinking	2.19	1.01
14.	Men are more likely to commit sexual assault after drinking	2.27	1.09

Note: All Items were reversed coded. Strongly Disagree = 1; Disagree = 2; Agree = 3; Strongly Agree = 4.

Table 4.

Items statistics for Inhibition Conflict Scale

Item	N = 396	M	SD
1. I have a hard deciding whether or not to use a condom or to ask partner		2.27	1.91
2. I am very unsure about using a condom or insist that my partner use one		1.99	1.72
3. I am really confused about whether or not to use a condom or ask my partner		1.65	1.47

Note: Items were coded: Disagree a lot = 1; Disagree somewhat = 2; Disagree a little bit = 3; Agree a little bit = 4; Agree somewhat = 5; Agree a lot = 6; Never thought about it = 7.

*Bivariate Analyses*

Preliminary bivariate analyses were conducted to describe further adolescents' self-reported data. While it was noted a priori that sets of theoretically-derived continuous variables would be correlated, the next step of analyses assessed the magnitude of intercorrelations among sexual sensation-seeking, AOD sex-related expectancies, inhibition conflict and peer norms for condom use to guide empirically the item parceling approaches used to identify indicators representing latent factors that were examined in the planned integrative model evaluation.

Results documented significant intercorrelations among items for the Sexual Sensation-Seeking Scale. The majority of items were significantly positively correlated, p

< .01). However, no significant correlation was observed between “I made promises I did not keep to get a person to have sex” and I am interested in trying out new sexual experiences.” Intercorrelations among items were largely significant, with small to moderate correlations ( $r = .18$  to  $.44$ ) observed.

Bivariate analyses were also conducted among items for the Risky Sex Scale. Correlations of small to moderate magnitude ( $r = .19$  to  $.60$ ) were observed among the RSS items. While most observed correlations between the RSS items were significant ( $p < .01$ ), one item “women are more likely to get sexually assaulted after drinking” was not significantly correlated with any other item of the RSS. Correlations between the item “women are more likely to get sexually assaulted after drinking” and other items on the RSS ranged from ( $r = .04$  to  $.06$ ). A small significant correlation  $r = .15$ ,  $p < .01$  was observed between this item and “If I drink or use drugs I am more likely to have unprotected sex.” The item “women are more likely to get sexually assaulted after drinking” was excluded from main analyses.

A different yet consistent pattern of bivariate correlations were noted among the three items that composed the Inhibition Conflict Scale. Significant moderate to strong inter-item correlations were observed ( $r = .55$  to  $.74$ ). A similar pattern of significant moderate to strong correlations were observed among the three items of the Peer Norms for Condom Use Scale ( $r = .62$  to  $.70$ ). Results from bivariate analyses guided the strategies used for item parceling to construct multiple indicators that represented the latent factors in the integrative model that was subsequently evaluated.

### *Construction of Indicators Representing Latent Factors*

*Item Parceling.* The practice of item parceling involves combining items of a scale into smaller groups of items. In the current study, a rational item parceling (Hall et al., 1999) procedure was implemented to construct indicators representing sexual sensation-seeking and AOD sex-related alcohol expectancies. The use of item parceling is recommended for a more reliable assessment of model fit (Floyd & Widaman, 1995; Because it is assumed that model fit and parameter estimates in a confirmatory factory analysis are due to the covariance among indicators in the model, related items were grouped to guide how items would be collapsed into a unique indicator. This follows the practice described in Rindskopf and Rose (1988).

*Sexual Sensation-Seeking.* Three indicators represented the latent factor of sexual sensation-seeking. The first indicator was labeled SSS1. It was constructed by grouping the following items: “I like wild freaky sex,” “I am interested in trying out new sexual experiences,” and “I like new and exciting sexual experiences and sensations.” Intercorrelations among these items ranged between  $r = .36$  to  $.40$ . Reliability analysis of the SSS1 indicator revealed that  $\alpha = .64$ . The second indicator was labeled SSS2. This indicator was constructed by grouping the following items: “I enjoy the company of sexual or sexually active people,” “I enjoy watching x-rated or porno videos,” “I am proud to be sexually active.” Significant intercorrelations were observed among these items, ranging between  $r = .25$  to  $.28$ , ( $\alpha = .50$ ). The third indicator labeled SSS3 was constructed by grouping “I made promises I did not keep to get a person to have sex,” “I am curious about having anal sex without a condom,” and, “I said things that were not true

to get a person to have sex.” Intercorrelations among this group of items ranged between  $r = .44$  to  $.60$ , ( $\alpha = .72$ ). Major analyses were pursued given indicators were correlated with other variables in the system (e.g., Bentler & Chou, 1987; Floyd & Widaman, 1995).

*AOD-Sex Related Expectancies.* Two indicators represented the latent factor of AOD-sex related expectancies. These indicators were constructed by grouping items with the strongest intercorrelations from the Risky Sex Scale. The first indicator was labeled RSS1. This indicator was composed of seven items including: “I often feel hornier after a couple of drinks, I am a better sex partner after a few drinks, I enjoy having sex more if I have some alcohol, It is easier for me to have sex after a few drinks, It is more likely to have unplanned sex if drinking or using drugs, If I drink or use drugs with a friend I am more likely to have sex.” Intercorrelations among these items ranged between  $r = .33$  and  $.58$  ( $\alpha = .83$ ). The second indicator was labeled RSS2. It included six items: “Women have orgasms more easily if they drink, I am more romantic when I drink, if I drink or use drugs on a new date I am more likely to have sex, I feel more masculine or feminine after a few drinks, if I drink or use drugs I am more likely to have unprotected sex, and I am more romantic when I drink.” Intercorrelations between the six items ranged between  $r = .30$  to  $.53$  ( $\alpha = .75$ ).

The latent factor of inhibition conflict was represented by three indicators. Each item of the Inhibition Conflict Scale was entered in the model as an indicator of that factor. A similar procedure was employed to introduce the three indicators that represented the latent factor of Peer Norms for Condom Use.

### *Univariate Analyses of Observed Variables in Integrative Model by Gender*

Preliminary analyses were also conducted to assess mean differences by gender group in scores for indicators representing Sexual Sensation-Seeking, Peer Norms for Condom Use, AOD-Sex Related Expectancies, Inhibition Conflict for Condom Use and the Co-occurrence of Alcohol or Drug Use and Sexual Risk Behaviors. Gender Differences were examined using a one-way analysis of variance (ANOVA) for the three indicators derived from the Sexual Sensation-Seeking Scale (SSSS) that were later used in the model evaluation as the dependent variables. Results showed that adolescent males reported significantly higher scores than adolescent females on the SSS1 indicator,  $F(1,395) = 62.548, p < .001$ , as well as on the SSS2 indicator,  $F(1,395) = 53.42, p < .001$  and the SSS3 indicator,  $F(1,395) = 4.67, p < .05$ . Means and standard deviations are presented in Table 5.

Means and standard deviations for indicators representing AOD-sex related expectancies are summarized in Table 6. ANOVA results also suggested that adolescent males and females differed significantly on self-reported scores for indicators representing the latent construct of AOD-sex related expectancies. These results documented that adolescent females reported significantly higher scores for the RSS1 indicator compared to adolescent males,  $F(1, 395) = 4.88, p < .05$ . There were no significant gender differences for self-reported scores on the RSS2 indicator,  $F(1, 395) = 3.12, ns$ .

Table 5.

*Mean Differences by Gender for Indicators of Sexual Sensation-Seeking*

Indicators	Gender	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>F</i>
SSS1	Male	7.83	2.40	.143	62.55**
	Female	5.78	2.17	.203	
SSS2	Male	6.83	2.31	.137	53.43**
	Female	5.03	1.96	.183	
SSS3	Male	7.27	2.38	.141	4.68*
	Female	6.69	2.56	.239	

Note: \*\*  $p < .001$ ; \*  $p < .05$ ; Females:  $N = 114$ ; Males :  $N = 282$

ANOVA results documented that male and female adolescents differed on one indicator representing the Inhibition Conflict latent construct. Specifically, female adolescents reported higher average scores for the “really confused about using a condom” indicator ( $M = 1.67$ ,  $SD = 1.37$ ), compared to adolescent males, ( $M = 1.38$ ,  $SD = 1.02$ ),  $F(1,395) = 5.07$ ,  $p < .05$ . Other indicators of the Inhibition Conflict construct, “have hard time deciding “( $M = 1.95$ ,  $SD = 1.61$ ),  $F(1,395) = .148$ , *ns* and “very unsure about using a condom”, ( $M = 1.71$ ,  $SD = 1.39$ ),  $F(1,395) = 2.93$ , *ns*, demonstrated no significant differences by gender in self-reported scores. In addition, there were no observed significant gender differences on the indicators representing the latent construct of Peer Norms for Condom Use. Similarly there were no observed significant gender

differences in scores for the co-occurrence of alcohol or drug use and sexual risk behaviors in this sample of multi-problem adolescents.

Table 6.

*Mean Differences by Gender for Indicators of AOD-Sex Related Expectancies*

Indicators	Gender	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>F</i>
RSS1					
	Male	23.83*	5.75	.342	4.88*
	Female	25.28*	6.36	.596	
RSS2					
	Male	18.83	5.06	.301	3.12
	Female	19.82	5.10	.478	

Note: \*  $p < .05$ ; Males  $N = 282$ ; Female :  $N = 114$

*Univariate Analyses of Observed Variables in Integrative Model by Ethnicity*

Preliminary analyses were also conducted to assess mean differences by ethnic groups in scores for indicators representing Sexual Sensation-Seeking, Peer Norms for Condom Use, AOD-Sex Related Expectancies, Inhibition Conflict for Condom Use and the Co-occurrence of Alcohol or Drug Use and Sexual Risk Behaviors. Ethnic group differences were examined using a one-way analysis of variance (ANOVA) for the three indicators derived from the Sexual Sensation-Seeking Scale (SSSS), that were later used in the model evaluation as the dependent variables. Results indicated that White non-

Hispanic adolescents reported significantly higher scores than African-American adolescents on the SSS3 indicator,  $F(1,395) = 3.92, p < .01$ . There were no significant differences by ethnic group observed for the SSS1 and SSS2 indicators. Means and standard deviations are presented in Table 7. ANOVA results indicated significant ethnic group differences for the RSS1 indicator,  $F(1,395) = 3.18, p < .05$  and the RSS 2 indicator,  $F(1,395) = 9.01, p < .001$ . African-American adolescents reported significantly higher scores for both the RSS1 and RSS2 indicators compared to Hispanic White and White non-Hispanic adolescents. Means and standard deviations for indicators representing AOD-sex related expectancies are summarized in Table 8.

There were no significant differences by ethnic group for the indicators representing the latent construct of Inhibition Conflict for Condom Use. However, significant differences by ethnic group were documented for scores on two indicators representing the latent construct of Peer Norms for Condom Use. Specifically, White non-Hispanic adolescents reported significantly higher scores compared to Hispanic White and African-American adolescents on the indicator “condoms should be used even if other birth control is used,”  $F(1,395) = 6.25, p < .001$ . African-American adolescents reported significantly lower scores on the indicator “condoms should be used even if the two people know each other,”  $F(1,395) = 4.80, p < .01$ . Means and standard deviations for all indicators representing Peer Norms for Condom Use are presented in Table 9.

In addition, ANOVA results indicated significant ethnic group differences in self-reported scores for the co-occurrence of alcohol use and sexual risk behaviors. African-American adolescents reported significantly lower scores for the co-occurrence of alcohol and sexual risk behaviors, while White non-Hispanic adolescents reported significantly

Table 7.  
*Mean Differences by Ethnic Group for Indicators of Sexual Sensation-Seeking*

Indicators	Ethnicity	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>F</i>
SSS1	White	6.97	2.48	.247	1.94
	Hispanic	7.62	2.54	.210	
	African-American	6.93	2.41	.265	
SSS2	White	6.56	2.28	.228	1.52
	Hispanic	6.46	2.34	.194	
	African-American	5.91	2.41	.264	
SSS3	White	7.50	2.44	.244	3.92*
	Hispanic	7.24	2.38	.197	
	African-American	6.33	2.55	.280	

Note: \*  $p < .01$ ; Whites:  $N = 100$ , Hispanics:  $N = 146$ ; African-Americans:  $N = 83$

higher scores for the co-occurrence of alcohol use and sexual risk behaviors compared to Hispanic adolescents. There were no significant ethnic group differences in self-reported scores for the co-occurrence of drug use and sexual risk behaviors. Means and standard deviations for the two variables are presented in Table 10.

Table 8.

*Mean Differences by Ethnic Group for Indicators of AOD-Sex Related Expectancies*

Indicators	Ethnicity	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>F</i>
RSS1	White	23.40	5.54	.554	3.18*
	Hispanic	23.65	6.08	.503	
	African-American	25.66	5.87	.644	
RSS2	White	17.93	4.44	.444	9.01**
	Hispanic	18.29	5.24	.433	
	African-American	21.15	5.12	.561	

Note: \*\* $p < .01$ , \* $p < .05$

Whites:  $N = 100$ ; Hispanic Whites  $N = 146$ ; African-Americans:  $N = 83$

Table 9.

*Mean Differences by Ethnic Group for Indicators of Peer Norms for Condom Use*

Indicators	Ethnicity	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>F</i>
Condoms should always be used					
	White	2.19	.99	.099	1.49
	Hispanic	2.22	1.03	.086	
	African-American	1.93	1.09	.120	
Condom use even if using other birth control					
	White	2.63	1.12	.112	6.25**
	Hispanic	2.55	1.21	.100	
	African-American	1.96	1.06	.116	
Condom use if two people know each other					
	White	2.56	1.01	.107	4.80*
	Hispanic	2.55	1.22	.101	
	African-American	2.01	1.17	.128	

Note: \*\*  $p < .001$ , \*  $p < .01$

Whites:  $N = 100$ ; Hispanic Whites  $N = 146$ ; African-Americans:  $N = 83$

Table 10.

*Mean Differences by Ethnic Group for Indicators of Co-Occurring Alcohol or Other Drug Use and Sexual Risk Behaviors.*

Indicators	Ethnicity	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>F</i>
Co-Occurrence of Alcohol and SRB					
	White	2.49	1.09	.109	9.77**
	Hispanic	2.22	1.13	.093	
	African-American	1.73	.99	.109	
Co-Occurrence of Drug and SRB					
	White	2.74	1.29	.129	.82
	Hispanic	2.63	1.36	.113	
	African-American	2.44	1.34	.149	

Note: \*\*  $p < .001$

### *Confirmatory Factor Analyses*

The following CFA results were part of preliminary analyses pursued in the current study. The study of sexual risk behavior in AOD use contexts has been undertaken by numerous studies (e.g., Cooper, 2006). It is documented widely that both individual and contextual factors contribute to AOD use and sexual risk behaviors (e.g., DiClemente, 1998; Dishion & Dodge, 2005). However, the literature is less informative

when it comes to specifying relations among the multiple risk and protective factors associated with health risk behaviors. There are even fewer studies that have examined the nature of relations among putative risk factors associated with risk behavior outcomes among multi-problem youth. Toward that end, a confirmatory factor analysis (CFA) was employed as part of preliminary analyses to estimate both the factor structure of, and relations among four risk factors for sexual risk behavior.

The fit of the model was evaluated with AMOS 17.0 using a maximum likelihood (ML) algorithm. The model was statistically overidentified suggesting that there was meaningful evidence that the integrative model was a reasonable representation of the data. The assessment of non-normality revealed data was not normally distributed. The evaluation of the model employed a bootstrapping strategy with 2000 replicates due the presence of non-normality. The model was also evaluated using traditional Maximum Likelihood (ML) estimation. Inspection of focused indices of fit suggested points of ill-fit in the model. In particular, inspection of the modification indices (MIs) revealed that 2 MIs were greater than 3.84. Both modification indices focused on correlated errors between two exogenous variables. One modification index focused on correlated error between the observed variable of Sexual Sensation Seeking and the latent variable of Peer Norms for Condom Use (MI = 15.15, PAR change = -2.52) and the other focused on correlated error between two exogenous observed variables representing the latent variable of Sexual-Sensation Seeking (MI = 10.47, PAR change = .935).

Correlated error terms in the CFA model suggested that the unique variances of the associated indicators for Sexual Sensation Seeking and Peer Norms for Condom Use overlapped. This overlap signified that the indicators representing the latent variables of

Sexual Sensation Seeking and Peer Norms for Condom Use may measure a shared unobserved variable other than the latent constructs that are represented in the model. The introduction of correlated error parameters accounted for the unanalyzed association between Sexual Sensation Seeking and Peer Norms for Condom Use. Because this assumption was conceptually meaningful, the model was refitted to include both correlated error parameters. Each correlated error term was introduced individually into the model.

After the model was re-specified, no significant points of ill-fit were observed. Comparable results were obtained from both traditional maximum likelihood estimation and bootstrapping with  $N = 2000$ ,  $M = 38.35$  with  $SE = .226$ . Comparable results were obtained from both analyses. The results reported below are from the bootstrap analyses. The overall Bollen-Stine bootstrap  $p = .745$ . The Root Mean Square Error of Approximation (RMSEA) was .013. The  $p$  value for the test of close fit was 0.99. The Comparative Fit index was .99 and the traditional GFI was 0.98. The standardized root mean square residual was 0.01. More focused analyses revealed no absolute standardized residuals greater than 1.96. All indices pointed toward good model fit. Inspection of the standardized residuals and modification indices revealed no meaningful and significant points of ill-fit in the model. The residuals for each of the observed variables were low, suggesting that the measures are reasonable indicators of the latent constructs they represented. Factor loadings are presented in Table 11. All factor loadings were significant,  $p < .001$ .

Table 11.

*Factor Loadings in the Confirmatory Factor Analysis*

Latent Variables and Indicators	Factor loadings*
<b>Sexual Sensation-Seeking</b>	
SSS1	.65
SSS2	.76
SSS3	.49
<b>Peer Norms for Condom Use</b>	
My friends believe condoms should always be used	.81
My friends believe condoms should be used .....	.82
Condoms should be used even if the two people know....	.76
<b>AOD-Sex Related Expectancies</b>	
RSS1	.68
RSS2	.76
<b>Inhibition Conflict</b>	
Hard deciding whether or not to use a condom	.70
Very unsure about using a condom	.91
Really confused about whether or not to use a condom	.62

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\* Note:  $p < .001$

*Evaluation of the Utility of an Integrative Model for the Co-Occurrence of Alcohol and Other Drug Use and Sexual Risk Behaviors*

The primary research aim of the current study was to assess mechanisms by which AOD sex-related expectancies and inhibition conflict mediate relations between distal factors such as sexual sensation-seeking and the co-occurrence of AOD use and sexual risk behaviors. Also, the present study sought to specify relations among multiple pathways that lead to the co-occurrence of sexual risk behaviors and AOD use among adolescents receiving substance use treatment services.

The structural model evaluated relations among four latent factors (i.e., sexual sensation-seeking, peer norms for condom use, AOD-sex related expectancies and inhibition conflict) and evaluated their contribution to the co-occurrence of AOD use and sexual risk behaviors. As aforementioned in the section on preliminary analyses, the data characteristics included non-normality and missing data. Consequently, the model was tested via Mplus using a robust maximum likelihood (MLR) estimator.

The integrative model included four latent factors represented by two or three indicators each, as described previously. The outcome of interest, the co-occurrence of alcohol and other drug use and sexual risk behaviors, was introduced in the latent measurement model as an observed variable. The purpose of this evaluation focused on the overall fit of the integrative model and examined the mediating role of both AOD-sex expectancies and inhibition conflict, and specified relations among the four latent factors included in the model.

### *Integrative Model Fit*

All indices pointed toward good model fit. The scaling correction factor for MLR was .98. The Root Mean Square Error of Approximation (RMSEA) was .04 (90% CI of the difference = 0.026 to 0.047) and the Comparative Fit Index (CFI) was .96. The Standardized Root Mean Square Residual (SRMR) was .03. Examination of more focused indices revealed no points of ill-fit in the model.

### *Relations among Latent Factors in the Integrative Model*

Path coefficients showing relations among variables are depicted in the final model in Figure 2. Sexual Sensation-Seeking predicted AOD-sSex Related Expectancies, such that higher scores for the endorsement of sexual sensation-seeking behaviors were associated with more positive ratings of AOD-sex related expectancies. Scores for Peer Norms for Condom Use were predictive of levels of Inhibition Conflict. Lower scores for endorsement of norms associated with abstinence were positively associated with Inhibition Conflict. AOD-Sex Related Expectancies predicted involvement in co-occurring alcohol and other drug use and sexual risk behaviors. It was estimated that Sexual Sensation-Seeking and Peer Norms for Condom Use accounted for 57.7% of the variance in AOD-Sex Related Expectancies. Inhibition Conflict did not predict involvement in the co-occurrence of alcohol or other drug use and sexual risk behaviors. Peer Norms for Condom Use predicted significantly Inhibition Conflict for Condom Use and accounted for 8.5% of the variance in Inhibition Conflict for Condom Use. A positive correlation was documented between the latent factors of Sexual Sensation-

Seeking and Peer Norms for Condom Use. Resulting residual terms associated with observed variables are summarized in Table 12

*Table 12. Estimates of Residual Terms associated with Observed Variables in the Integrative Model*

Variable	Estimate	<i>S.E.</i>	<i>P</i>
IC1	0.500	0.078	0.000
IC2	0.832	0.093	0.000
IC3	0.390	0.073	0.000
ALCOHOL AND SEX	0.287	0.046	0.000
DRUGS AND SEX	0.264	0.046	0.000
NORM1	0.659	0.064	0.000
NORM2	0.727	0.050	0.000
NORM3	0.600	0.059	0.000
RSS1	0.511	0.070	0.000
RSS2	0.530	0.076	0.000
SSS1	0.535	0.061	0.000
SSS2	0.464	0.062	0.000
SSS3	0.095	0.045	0.034

### *Analyses Evaluating the Mediating Role of AOD-sex Related Expectancies*

The primary focus of the current study was to evaluate simultaneously the mediating role of AOD-sex related expectancies and inhibition conflict. Results showed that AOD-sex related expectancies mediated relations between sexual sensation-seeking and the co-occurrence of alcohol and drug use among this sample of multi-problem youth. The mediating role of AOD-Sex Related Expectancies was determined by the joint significance test recommended by MacKinnon, Lockwood, Hoffman, West, and Sheets, 2002). The joint significance test has been shown to have more statistical power and accurate Type I error rates compared to other tests of mediation (McKinnon et al., 2002, 2004). The hypothesis that inhibition conflict would also mediate the relationship between sexual sensation-seeking and the co-occurrence of alcohol and drug use was not supported in the current integrative model.

### *Supplemental Analyses*

*Statistical Power and Sample Size Considerations.* To pursue the evaluation of the integrative model using a structural equation modeling, sample size for the current study was determined by considering issues related to statistical power, stability of the covariance matrix, and the use of asymptotic theory (Jaccard & Wan, 1996).

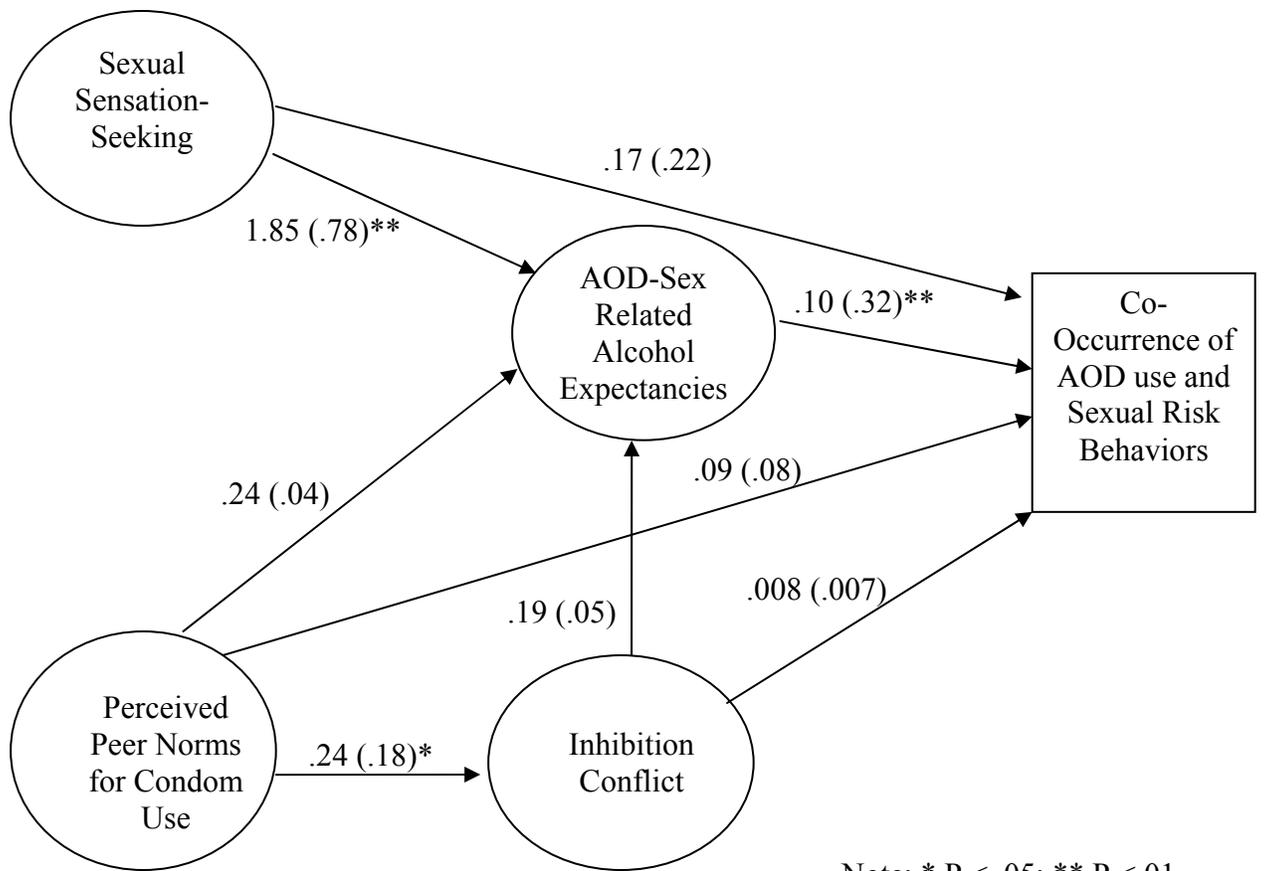
*Statistical power.* The use of traditional power analysis via SPSS revealed a sample size with a minimum of 100 participants was required to detect a significant result. The evaluation of the power associated with each path coefficients in complex SEM models such as the integrative model evaluated in the current study is challenging

due to the large number of assumptions that must be made regarding population parameters (Brown, 2006; Jackson, 2003).

A rough approximation of power was obtained by using a limited information approach with single indicators of the path models conceptualized in Figure 1. In terms of asymptotic theory and covariance stability, simulation studies have suggested that sample sizes of 100 to 125 often yield adequate results when measures with sound psychometric properties are used. In general measures with reliabilities greater than .65 are considered adequate. Also, the use of multiple indicators per latent variable also tends to yield appropriate results.

This sample of multi-problem adolescents reasonably supported the detection of significant findings and there were no offending estimates suggesting the stability of the covariance matrix.

Figure 2. *Final Model for The Co-Occurrence of AOD Use and Sexual Risk Behaviors among Multi-Problem Youth.*



Note: \* P < .05; \*\* P < .01

## Chapter V: Discussion

The overarching purpose of the present study was to evaluate simultaneously the mediating role of AOD-sex related expectancies and inhibition conflict in relations between (a) distal factors such as sexual sensation-seeking and peer norms for condom use, and (b) alcohol use, drug use and sexual risk behaviors. Also, the present study attempted to specify mechanisms of influence among established predictors of AOD use and sexual risk behavior outcomes, including sexual sensation-seeking, peer norms for condom use, AOD-sex related expectancies and inhibition conflict. In order to achieve these goals, the present investigation used a multivariate approach to: (a) evaluate a model (Figure 1) that integrated both individual-level and contextual factors and, (b) specify relations among multivariate factors including sexual sensation-seeking, peer norms for condom use, AOD-sex related expectancies and inhibition conflict.

### *Summary of Research Findings*

Results of the current study supported the proposition that AOD-sex related expectancies act as mediators of the relation between distal factors and the co-occurrence of alcohol or drug use and sexual risk behavior outcomes. Specifically, AOD-sex related expectancies mediated the relation between sexual sensation-seeking and the co-occurrence of alcohol or drug use and sexual risk behavior among adolescents receiving treatment services for AOD use-related problems. In this study, adolescents who endorsed stronger positive AOD sex-related expectancies were more likely to report higher levels of co-occurring alcohol or drug use and sexual risk behavior. The current study was informative because it illustrated the predictive utility of AOD-sex related

expectancies for the co-occurrence of alcohol or drug use and sexual risk behaviors. Furthermore, the evaluation of the integrative model using a multivariate approach highlighted relations among key individual-level and contextual variables that are essential for devising prevention and treatment efforts for multi-problem adolescents. The identification of AOD-sex related expectancies as a mediating variable for relations between individual factors such as sexual sensation-seeking and sexual risk behavior outcomes in this sample of multi-problem youth is an important first step for understanding how multiple processes work in concert to contribute to involvement in problem behaviors among vulnerable adolescent populations. This finding is relevant for adolescent-serving programs that address those individual and contextual characteristics that enhance treatment efficacy and effectiveness. The current findings highlight the utility of the latent measurement strategy employed in this study, the mediating role of AOD-sex related expectancies, structural relations among individual-level and contextual factors evaluated in the study.

*The Utility of a Latent Measurement Strategy for the Evaluation of an Integrative Model among Multi-Problem Youth*

There were no formal hypotheses regarding patterns of relations at the measurement level. The results presented in the previous chapter included findings from the predictive utility of a latent measurement model in the co-occurrence of drug use and sexual risk behaviors. Given that previous studies mostly used measured variables (e.g., Sheeran, Abraham, & Orbell, 1999; Spitalnik et al., 2006), little is known about the

validity of latent constructs such as sexual sensation-seeking or inhibition conflict among multi-problem youth.

The current results suggested that all indicators represented accurately specified latent factors. Consequently, the procedures employed in the current study provided evidence that the indices of sexual sensation-seeking, peer norms for condom use and inhibition conflict measured appropriately the intended behaviors in a sample of multi-problem youth. The latent modeling strategy implemented in this study not only established the construct validity of specific latent factors, but it also enhanced the usefulness of the current indices for measuring these individual-level and contextual factors in samples of multi-problem adolescents. As a result, adolescent-serving programs can apply these findings across a wider range of adolescent groups with diverse demographic and clinical characteristics with greater confidence than previously permitted by findings from other studies.

#### *Integration of Current Findings with Existing Literature: The Usefulness of an Integrative Model*

The conceptual model of hypothesized relationships among latent factors presented in Figure 1 proposed that all four factors were related. This hypothesis was supported by both global and focused indices that pointed uniformly toward a good fitting model, suggesting that the hypothesized integrative model was an adequate representation of observed data in this sample of multi-problem youth. Few attempts have been made to study mechanisms by which distal factors such as sexual sensation-seeking influence SRB behaviors (e.g., Gulette & Lyons, 2005; Hoyle et al., 2000). In the current

study, the hypothesis that AOD-sex related expectancies would mediate the relation between sexual sensation-seeking and the co-occurrence of alcohol or drug use and sexual risk behaviors was supported. This finding is important because it clarifies the mechanisms by which dispositional characteristics such as sexual sensation influence sexual risk behaviors.

A growing body of literature supports the direct and indirect influences of sexual sensation-seeking on sexual risk behavior (e.g., Kalichman et al., 2006; Kalichman, Weinhardt, DiFonzo, Austin, & Luke, 2002). The direct influence of sexual sensation-seeking on the co-occurrence of SRB behaviors hypothesized in the current study was not supported. Such a formulation extended a conceptual model that had been used previously among adults receiving treatment services at a HIV-STI clinic (Kalichman et al., 2006). In that study, sexual sensation-seeking had a direct influence on HIV-risk behavior outcomes. The findings observed in the current investigation suggested that dispositional tendencies such as sensation-seeking may be important individual characteristics for understanding adolescents' participation in specific forms of health risk behavior. This is significant because there are considerable differences between the characteristics of the current sample and those of previous studies (e.g. Kalichman et al., 2006; Spitalnik et al., 2006).

In addition, another study by Horvath and Zuckerman (1993) found that the inclusion of cognitive processes explained significant additional variance in sexual risk behavior among individuals who endorsed higher ratings for sensation-seeking behaviors. These researchers found that individuals who reported high and low scores on sensation-seeking did not differ on their initial appraisals of sexual risk behaviors. However,

following a high-risk sexual event, participants who reported higher scores for sensation-seeking were least likely to appraise their involvement in sexual risk behaviors as risky. Although not tested directly in the current study, such findings are congruent with the current results that indicate that cognitive processes such as AOD-sex related expectancies underlie relations between sexual sensation-seeking and the co-occurrence of sexual risk behaviors among samples of at-risk adolescents.

Similar to previous studies, the current findings demonstrated that AOD-sex related expectancies are a common causal pathway through which sexual sensation seeking influences sexual risk behavior outcomes (e.g., Kalichman & Cain, 2004; Cooper et al., 2006). In addition, the current study evaluated the role of AOD-sex related expectancies in a sample of multi-problem youth. The testing of cognitive processes among adolescents currently exhibiting problem behavior is essential in light of the fact that expectancies are largely amenable to change (e.g., Jones, Corbin & Fromme, 2001). AOD-sex related expectancies can be targeted effectively as a strategy for reducing involvement in SRB and promoting safer sex practices among multi-problem adolescents in treatment for AOD use and related problems. In particular, such a strategy has been shown to be useful among adolescents who self-identified as high sensation-seekers (e.g., Hendershot et al., 2007).

Another process that has been associated with alcohol or drug use and sexual risk behaviors are perceptions of peer norms. As described in the literature review for the current study, peer norms are among the strongest predictors of involvement in risky behaviors (e.g., Fergus et al., 2007; Kandel, 1986). Based on this finding, and the fact that AOD sex-related expectancies evolve within an adolescent social ecology (e.g.,

Goldman et al., 1999; 2009), the current study hypothesized that AOD-sex related expectancies would mediate relations between peer norms for condom use and alcohol or drug use and sexual risk behaviors. However, this hypothesis was not supported.

The discrepancy between past research and the findings of the current study suggest that the mechanism by which Peer Norms for Condom Use is related to sexual risk behaviors does not occur through AOD-sex related expectancies among multi-problem youth. Cooper (2006) has pointed out that, given the complexity of processes associated with risky behaviors, different models may explain the conditions under which, and the adolescents for whom, different causal and non-causal processes are most likely to operate. In integrating four theoretically-derived variables, the current study confirmed that Peer Norms for Condom Use was associated with Inhibition Conflict for condom use among multi-problem adolescents. To date, no other studies have evaluated the association between peer norms and inhibition conflict. The current finding highlighted that for multi-problem adolescents, the social and cultural contexts in which they develop may be associated with perceiving greater benefits relative to costs for engaging in sexual behaviors without a condom.

The existence of multiple pathways associated with risky sexual behavior outcomes also suggests that prevention and intervention programs need to be diverse and multi-faceted in their approaches to risk reduction. For example Dilorio and colleagues (2001) found adolescents' perceptions of their friends' attitudes and beliefs regarding condom use were associated with their own involvement in condom use. Those adolescents who believed that their friends held favorable attitudes toward using condoms were less likely to initiate unprotected intercourse, compared to those

adolescents who perceived that their friends had more negative views regarding condom use (Weinman, Small, Buzi & Smith, 2008). The current study extended existing knowledge by clarifying relations between peer norm-related processes and inhibition conflict. The results suggested a similar association between peer norms for condom use and involvement in sexual risk behavior outcomes. In addition, this study confirmed that the perceived peer norms-sexual risk behavior association contributed to inhibition conflict, whereby perceptions of peer beliefs or attitudes toward condom use was related to participants' levels of conflict between instigatory and inhibitory cues for involvement in sexual risk behaviors. Taken together, the findings of the current study supported the contention that multiple processes account for involvement in co-occurring AOD use and sexual risk behaviors, and that relations among individual-level and contextual factors influence the co-occurrence of alcohol and other drug use as well as sexual risk behaviors among multi-problem adolescents.

#### *Implications of the Current Findings*

The findings reported here both expand and build upon the current literature on adolescent sexual risk behavior outcomes. First, the examination of a multivariate model that integrated individual-level and contextual variables in a study of multi-problem adolescents provided important information that adolescent-serving programs can apply to high-risk multi-ethnic samples of adolescents.

Second, the present results provided evidence supporting the use of an integrative model for specifying relations among theoretically-derived constructs associated with co-occurring alcohol or drug use and sexual risk behaviors. In general, the literature

supporting the use of integrative approaches to study putative risk factors associated with sexual risk behaviors has been theoretical (e.g., Buhi & Goodson, 2007; Kotchick, Shaffer & Forehand, 2001). For the most part, this literature has highlighted methodological shortcomings associated with univariate analyses and the limited information that may be derived from such approaches (e.g., Leigh et al., 2008; Wienhardt & Carey, 2000). The current study bridged this gap and contributed to the literature by examining a multivariate model that integrated four core variables from four distinct conceptual approaches. Consequently, four main hypotheses were tested to clarify relations among these four-theoretically derived constructs associated with the co-occurrence of alcohol or drug use and sexual risk behaviors. The findings of the current study demonstrated that multi-level factors work in concert to contribute to adolescents' involvement in alcohol or drug use and sexual risk behaviors and highlighted the significance of individual differences associated the co-occurrence of alcohol and other drug use among multi-problem adolescents receiving treatment services.

Third, the integrative model was evaluated via a latent measurement approach which allowed for examination of variables representing latent factors of sexual sensation-seeking, AOD-sex related expectancies, peer norms for condom use and inhibition conflict. The use of latent variables for the evaluation of the model among multi-problem youth enhanced construct validity by accounting for possible metric biases in the integrative model

### *Clinical Implications of the Current Findings*

The range of multivariate factors (i.e., risk and protective factors for alcohol use, drug use and sexual risk behaviors) used in this study provided relevant data with regard to the clinical conceptualization of risk and protective factors associated with sexual risk behaviors among ethnically diverse multi-problem groups of adolescents. Overall, the current results suggested that prevention and intervention strategies may need to be conducted at the individual and contextual levels while taking into account socio-cultural differences in multi-problem youth.

Personality characteristics are generally characterized as intransigent or non-responsive to interventions (e.g., Carey & Lewis, 1999). However, it has been noted that they may play an important role in screening for high-risk adolescents with high scores on sexual sensation-seeking. Many studies have conceptualized sexual sensation-seeking as a distal risk factor for involvement in health risk behaviors (e.g., Kalichman et al., 2004, Norris et al., 2009). Consequently, fewer studies have proposed ways to induce behavioral change via the mechanism of modifying sexual sensation-seeking. A recent study by Noar and colleagues (2006) investigated the utility of sexual sensation-seeking as a potential change agent by making the use of self-protective strategies emotionally salient. Within this characterization, the goal was not to change individuals' affinity for novel sexual experiences as demonstrated by high scores for sexual sensation-seeking but to build awareness among those who reported high levels of sensation-seeking by making the use of protection (e.g., condom use) a novel and appealing behavior. The results of such an intervention strategy resulted in sustained short-term behavior changes (e.g., Donohew et al., 2000, Noar et al. 2006). Knowledge regarding the role of sensation-

seeking may increase intervention effectiveness by making treatments more engaging to individual adolescents (Bancroft et al., 2004). In addition, integrating AOD-sex related expectancies which can be modified into intervention programs (e.g., Jones, Corbin & Fromme, 2002; Wood et al., 2007) via behavioral strategies for reducing sexual risk behaviors may be a viable strategy for adolescents with a dispositional characteristic associated with sexual risk behaviors.

As mediators of distal influences on alcohol or drug use and sexual risk behaviors, AOD-sex related expectancies can be critical amenability to treatment factors that could be targets of intervention efforts when devising treatment services for multi-problem youth. Similarly, the link between peer norms for condom use and inhibition conflict among adolescents is likely informative in that these associations identified possible socio-culturally-influenced processes that may make high-risk adolescents more or less responsive to HIV/STI prevention and intervention efforts.

The multivariate strategy used in this study is especially informative for clinical practice in that such a strategy takes into account both individual-level and contextual factors related to adolescent sexual risk behavior. Specifically, this study has meaningfully specified unique processes (i.e., the link between AOD-sex related expectancies and sexual risk behaviors, or the link between peer norms and inhibition conflict) that potentially distinguish adolescents on key processes such as treatment engagement, amenability to treatment and treatment response. Peer norms for condom use predicting levels of inhibition conflict for condom use among this sample of high-risk adolescents is relevant information that can be used to tailor HIV/STI intervention efforts. It is conceivable that there may be individual differences associated with

adolescents' ecological niches that impact their perceptions of their peers' participation in risky behaviors, that in turn impact their involvement in sexual risk behaviors, suggesting that socialization experiences can be important targets for HIV/STI prevention (e.g., Kirby et al., 2004). As a result, adolescent-serving programs that focus on the promotion of health behaviors must consider these between-group differences that may directly or indirectly contribute to differential outcomes with regard to treatment engagement or response among ethnically diverse groups of adolescents receiving services for AOD use and related problems.

While it is beyond the scope of the present study to speak of the clinical implications of the current findings with regard to response to intervention, the present findings do have important and useful implications for treatment engagement and/or amenability to treatment. The amenability to treatment model specifies that prevention and intervention programs may be differentially effective for subgroups with similar characteristics (Kazdin, 1988; Snow, Tebes, & Ayers, 1997; Tubman, Wagner, Gil, & Pate, 2002; Wagner, 2003). In this study, a sample of multi-problem adolescents were distinguished by key individual-level and contextual processes (i.e., via structural path differences in the model) that distinguished them with regard to risk and protective mechanisms associated with sexual risk behaviors. The results of the present study suggested that the association between peer norms and inhibition conflict may constitute specific amenability to treatment factors that may need to be addressed differently in the context of a treatment in order for it to be efficacious or effective. Accordingly, intervention approaches may need to be sensitive to between-group differences in

individual and contextual-level processes that contribute to alcohol or drug use and sexual risk behaviors among diverse groups of multi-problem adolescents.

### *Study Limitations*

The use of a cross-sectional design, the clinical status of the sample and self-reported data are limitations that must be considered when interpreting the results of the current study. First, any inferences regarding causal links cannot be established due to the use of a cross-sectional design.

Second, given the severity and the frequency of adolescents' involvement in multiple problem behaviors documented in this sample, the current findings can not be generalized to other, non-clinical groups of adolescents. Nevertheless, the findings reported here are informative for devising prevention and intervention programs that focus on the reduction of risks associated with alcohol or drug use and sexual risk behaviors among multi-problem youth.

Third, the present findings were based on self-reports by adolescents participating in the study. Therefore, the results may be confounded by the effects of social desirability. Also, the archived data used for this dissertation research were obtained from a single group of informants (i.e., the adolescent receiving treatment services) that may have affected in part ratings of alcohol or drug use and sexual risk behaviors.

### *Directions for Future Research*

One of the fundamental ideas that emerged from this study is that individual-level and contextual processes associated with sexual risk behaviors may contribute differently

to sexual risk behaviors among multi-problem adolescents from different ethnic groups. Furthermore, the current findings supported the predictive utility of a multivariate model that integrated individual-level and contextual factors promoting co-occurring alcohol or drug use and sexual risk behaviors. As mentioned above, the use of a cross-sectional design has limited our ability to draw conclusions with respect to causal links between latent constructs evaluated as components of this model. Therefore, longitudinal analyses are warranted in order to elucidate time-related changes that may impact health risk behaviors. The use of longitudinal data would provide information about processes that strengthened AOD-sex related expectancies, as well as processes of continuity and discontinuity with regard to any critical periods and normative shifts from negative to positive expectancies (e.g., Brown et al., 2008).

The application of a model that integrates person-centered and variable-centered analytic techniques to data analysis (e.g., Muthén & Muthén, 2000) may be an effective strategy for improving future studies. Recent methodological advances indicate that integrative data analytic approaches increasingly take into account heterogeneity and allow the examination of functional relations between putative risk and protective factors influencing a diversity of outcomes (e.g., Des Rosiers, Gray & Tubman, 2008; Hix-Small, Duncan, Duncan, & Okut, 2004). Longitudinal measurement of heterogeneity via an integrative model would yield information about individual differences, as well as the mechanisms underlying the relations between factors associated with co-occurring alcohol or drug use and sexual risk behaviors.

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- Tubman, J.G., Snyders-Feldman, J, Taylor, H.H. & Des Rosiers, S.E. (2006) Use of the Risky Sex Scale (RSS) with Adolescents Undergoing Alcohol Treatment: Initial Reliability and Validity Data. Poster presented at the 29th Annual Scientific Meeting of the Research Society on Alcoholism, Baltimore, MD.
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## VITA

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### EDUCATION

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### SELECTED PUBLICATIONS AND PRESENTATIONS

**Des Rosiers, S.E.**, Tubman, J.G., & Wagner, E.F., (2007) A Person-Centered Perspective to Understanding Variation in Alcohol Expectancies Among Teenage Drinkers. *The Addictions Newsletter*, 14, 1.

**Des Rosiers, S.E.**, Noll, J.A., & Goldman, M.S. (2002). An exploratory study of alcohol expectancies in semantic space as a function of gender. *Alcoholism: Clinical and Experimental Research*, 25 (supplement) 26, 5, 35A.

**Des Rosiers, S.E.**, Noll, J.A., & Goldman, M.S. (2002). An exploratory study of alcohol expectancies in semantic space as a function of gender. Poster presented at the 25th

Annual Scientific Meeting of the Research Society on Alcoholism. San Francisco, CA.

**Des Rosiers, S.E.**, Tubman, J.G., & Wagner, E.F. (2003). Descriptive profiles of alcohol expectancies in a treatment sample of adolescents. *Alcoholism: Clinical and Experimental Research* (supplement) 27, 7, 767A

**Des Rosiers, S.E.**, Tubman, J.G., & Wagner, E.F. (2004). Relations between alcohol expectancy profiles and psychosocial factors among high-risk adolescents. Poster presented at the 27th Annual Scientific Meeting of the Research Society on Alcoholism (June 2004). Vancouver, B.C., Canada

**Des Rosiers, S.E.**, Burrow, A.L., Tubman, J.G., & Gil, A.G. Cumulative Alcohol and Other Drug Use: A Descriptive Study of African-American Early Adolescents. Poster presented at the Biennial SRCD meeting April 2005, Atlanta, GA

Burrow, A.L., **Des Rosiers, S.E.**, Tubman, J.G., & Gil, A.G. Multivariate patterns of African-American Substance Use during Early Adolescence. Poster presented at the Biennial SRCD meeting (April 2005) Atlanta, GA

**Des Rosiers, S.E.**, Burrow, A. L., Tubman, J.G, & Gil, A.G. An Exploratory Study of Self-derogation and Substance Use in an African-American Sample of Young Adults. Poster presented at the Emerging Adult Conference (February 2005), Miami, FL

Tubman, J.G., Snyders-Feldman, J, Taylor, H.H. & **Des Rosiers, S.E.** Use of the Risky Sex Scale (RSS) with Adolescents Undergoing Alcohol Treatment: Initial Reliability and Validity Data. Poster presented at the 29th Annual Scientific Meeting of the Research Society on Alcoholism. (June 2006) Baltimore, MD

**Des Rosiers, S.E.**, Gray, C., Surace, F.I., Tubman, J.G. Integrating Person-Centered and Variable-Centered Frameworks: An Evaluation of Sex-Related Alcohol Expectancies Among Adolescents. Poster presented at the Society for Research on Adolescence (SRA) Biennial meeting (March, 2008), Chicago, IL.

Oshri, A., Tubman, J.G., **Des Rosiers, S.E.**, Mira, L. & Surace, F.I. Alcohol And Condom Use Expectancies, AOD Psychiatric Symptoms and Sexual Risk Behavior Among Adolescents in AOD Treatment: Mediation Analyses. Poster presented at the 30th Annual Scientific Meeting of the Research Society on Alcoholism (June 2008), Washington, D.C.

**Des Rosiers, S.E.** & Tubman, J.G. Sex-related Alcohol Expectancy Risk Profiles in Multi-Problem Youth: A Mediation Analysis. Poster presented at the 31st Annual Scientific Meeting of the Research Society on Alcoholism (June 2009), San Diego, CA