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**A MOTIVATIONAL PERSPECTIVE ON ALCOHOL USE AND SEXUAL
BEHAVIOR AMONG COLLEGE STUDENTS**

A Dissertation in
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by

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ABSTRACT

Although research has identified a global overlap of alcohol use and sexual behaviors, the ways in which these behaviors may be intricately linked within individuals across occasions are not yet well understood. College students, specifically, engage in both alcohol use and sexual behaviors that have important developmental and health implications. Based on the theory of reasoned action, links between motivations for and engagement in drinking and sexual behaviors were examined among college students in three studies. First, a multi-dimensional measure addressing distinct motivations for and against sex was developed. Three sub-scales were designed to measure motivations *against* sexual behavior among college students: Values, Health, and Not Ready. This scale was used in conjunction with a set of sub-scales (Intimacy, Enhancement, and Coping) assessing motivations *for* sexual behavior by Cooper, Shapiro, and Powers (1998). The resulting six subscales were shown to be reliable, valid, and configurally invariant across gender and European and Asian American ethnicity ($N = 1653$; 41.6% male, $M = 17.99$ years, $SD = 0.38$) using confirmatory factor analysis. Second, in an independent sample, latent profile analysis was used to identify profiles of motivations for alcohol use and profiles of motivations for sexual behavior ($N = 227$, 51.1% male, $M = 18.85$ years, $SD = 0.38$). For alcohol use motivations, four profiles were identified: Anti Drinking, Average Drinking, Pro Drinking, and Pro Drinking for Sex Motivations. Three profiles of motivations for sex were identified: Anti Sex, Pro Sex, and Pro Sex for Coping Motivations. Third, a within-person approach was used to model the event-level links between drinking and sex over 14 days ($N = 218$ people, 51.4% male). Multi-level

models were used to model up to 14 days of data for each person (2879 days). After controlling for average alcohol use, the number of drinks consumed on a given day was associated with greater likelihood of having oral sex, a greater number of sexual behaviors, and more short-term positive consequences of sex on that day. A significant Drinking \times Alcohol-related sex expectancies interaction indicated that individuals with more positive expectancies were most likely to have sex after drinking. In total these results highlight the importance of motivations and expectancies for understanding and predicting alcohol use and sexual behavior. Implications for prevention include the importance of assessing cross-behavior motivations and expectancies and the potential to simultaneously address alcohol use and sexual behavior in interventions to promote college student health.

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Chapter 1

General Introduction

New freedoms and the ability to explore make the early years of college an especially important time to understand the co-variation of alcohol use and sexual behavior (e.g., Larimer, Kilmer, & Lee, 2005; Leigh, 1989b; Schulenberg & Maggs, 2002; Turrisi, Jaccard, Taki, Dunnam, & Grimes, 2001). During the college years, individuals begin to make decisions about drinking and sex in a new social context (Schulenberg, 2006). The theory of emerging adulthood (Arnett, 2000, 2006) applies directly to individuals pursuing full-time post-secondary education, who are approximately 18 to 25 years old. Typically, these individuals have the freedom to explore identities in both romantic relationships and leisure pursuits, including alcohol use and sexual behavior (Schulenberg & Maggs, 2002). Campuses provide an important context in which to study links between alcohol use and sexual behavior because the availability of opportunities and experiences of physical and social consequences affect the social system of the university (NIAAA, 2002).

Being a part of the college environment may pose a particular risk to emerging adults (White & Jackson, 2004/2005) due to environmental influences on health risk behaviors. Alcohol use, for example, may be a specific health risk for individuals transitioning to college (DEPR, 2006) who surpass their age mates in consumption during the college years (O'Malley & Johnston, 2002). College students engage in heavier episodic drinking than individuals not in college (Jackson, Sher, & Park, 2006). In addition, college is a context in which most individuals begin to explore sexual

relationships (Cooper, 2002) as individuals face the developmental task of forming romantic partnerships (Roisman, Masten, Coatsworth, & Tellegen, 2004). Engagement in sexual behavior increases across college (Cooper, 2002; Siegel, Klein, & Roughmann, 1999). These behavioral changes make it especially important to more fully understand motivations for drinking and for sex, and how these behaviors influence each other, to inform much-needed health promotion efforts on college campuses.

Prevalence of Alcohol Use and Risky Sexual Behavior Among College Students

Although there is an ever-expanding literature on alcohol use among young people, there are at least three areas of future research that have not been fully addressed. First, further research regarding the motivations surrounding alcohol use and their differential associations with drinking behavior is needed (Cooper, Frone, Russell, & Mudar, 1995). Second, the extent to which consumption of alcohol varies on a day-to-day basis and the predictors of such variation in use are not well understood (Cooper, 2006; Del Boca, Darkes, Greenbaum, & Goldman, 2004). Finally, the impact of previously experienced positive and negative consequences on subsequent alcohol use behavior must be better understood to inform prevention and intervention efforts (Mallett, Lee, Neighbors, Larimer, & Turrisi, 2006).

Alcohol use reaches its peak level between the ages of 18 and 25 (Johnston, O'Malley, Bachman, & Schulenberg, 2005). Among college students in the U.S., 87% have tried alcohol and 40% report drinking five or more drinks in a row at least once during the prior two week period (Johnston, O'Malley, Bachman, & Schulenberg, 2006). Drinking alcohol, and particularly consuming large quantities of alcohol in single

episodes, is associated with numerous specific and serious health risks; therefore, alcohol use by adolescents and emerging adults is a widely recognized international public health issue (e.g., Chassin et al., 2004; Hulse, Robertson, & Tait, 2001; Johnston et al., 2005; Kuntsche, Knibbe, Gmel, & Engels, 2005).

Consequences of alcohol use include immediate and tragic events, such as drunk driving fatalities (US Department of Transportation, 2002), as well as long-term negative effects, such as alterations in the developing brain (Spear, 2000) and negative effects on the liver and endocrine system (NIAAA, 2006). Among American college students, severe consequences resulting from alcohol use have a high prevalence, including damage to self, others, and institutions (Perkins, 2002). Consequences of alcohol use on college campuses include death, injury, assault, unsafe sex, academic problems, vandalism, and alcohol dependence (DEPR, 2006). Over 500,000 students in the United States are unintentionally injured each year as a result of their own drinking and over 600,000 are hit or assaulted by other drinking students (Hingson, Heeren, Winter, & Wechsler, 2005). Men both drink more and experience more negative consequences from drinking, while women report more psychological distress associated with alcohol use (Geisner, Larimer, & Neighbors, 2004).

Despite these severe consequences, college students continue to consume alcohol at alarming rates. This raises important questions regarding why individuals consume alcohol and their perceptions of the functions drinking serves. According to the functional perspective, behaviors may meet multiple needs which are important to understand in order to understand behavior (Cooper, Agocha, & Powers, 1999). Past research has shown that adolescents and young adults typically drink to get social

rewards, to enhance positive mood, to reduce negative mood, or to avoid social alienation (Cox & Klinger, 1988; Kuntsche et al., 2005). Research on individual factors predicting alcohol use has supported the role of alcohol expectancies and motivations in predicting alcohol use cross-sectionally and longitudinally over months and years (Baer, 2002; Goldman, Del Boca, & Darkes, 1999; Komro et al., 2001; Leigh, 1989a).

Sexual behavior is a second domain of critical importance to college students. The majority of individuals face decisions about engaging in sexual behaviors during their college years, and these behaviors have potentially serious health implications. About half of college freshmen have ever had sex (Patrick, Maggs, & Abar, 2007; Siegel et al., 1999), and those emerging adults who have not are likely to have their first experience with sex during college (Cooper, 2002). The percentage of students who have ever had sex rises steadily during the college years, reaching about 86% by senior year (Siegel et al., 1999). Cooper (2002) reports that across population-based studies, college students have an average of eight new sexual partners during their four university years. Many sexual behaviors place emerging adults at significant risk for unwanted pregnancy and sexually transmitted diseases (STDs), especially because significant numbers of college students fail to use contraception and effective methods of disease protection (Centers for Disease Control and Prevention (CDC), 2000). For example, Civic (1999) found that 28% of college undergraduates failed to use contraception consistently. Half of the 19 million STDs occurring annually in the U.S. are among youth aged 15 to 24 (Weinstock, Berman, & Cates, 2004).

Although most emerging adults are sexually active (defined as ever engaging in sexual intercourse), there is no theory that adequately describes the development and

impact of individual motivations for having or not having sex (Brooks-Gunn & Paikoff, 1993; Lefkowitz & Gillen, 2005). One reason for the lack of theory is the limited amount of developmental research in this area, despite the fact that understanding the motivations underlying decisions about sex is vital for creation and refinement of programs to promote sexual health (Cooper, 2002). Better understanding of the factors leading to sexual risk behavior at different ages and in different contexts is required (Kotchick, Shaffer, Forehand, & Miller, 2001b), including the potential impacts of alcohol use on sexual risks during the college years.

Co-occurrence of Alcohol Use and Sexual Behavior

A large proportion of emerging adults consume alcohol before having sex (Cooper, 1994) and, on average, heavy drinkers tend to have more sexual partners than non-heavy drinkers over time (Santelli, Lowry, Brener, & Robin, 2000; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). The associations between alcohol use and sexual behavior are complex (Leigh & Stall, 1993), and likely bidirectional. Alcohol is believed to be a contributor to risky sexual behavior, defined as behavior that increases the probability of negative outcomes (e.g., unwanted pregnancy, STDs). One particular danger of alcohol use among college students is the reported increase in risky sexual behavior (Cooper, 2002; Kaly, Heesacker, & Frost, 2002). For example, Hingson et al. (2005) reported that 8% of college students in the U.S. aged 18 to 24 (474,000) in 2001 had unprotected sexual intercourse resulting from alcohol use. College students tend to overestimate the number of drinks they could consume without experiencing negative consequences, such as unwanted sex (Mallett et al., 2006), and may be more likely to

have sex with a new partner after drinking (Cooper, 2002; Leigh & Stall, 1993; Testa & Collins, 1997). Furthermore, drinking prior to sex is associated with decreased condom use, particularly with casual partners (LaBrie, Earleywine, Schiffman, Pedersen, & Marriot, 2005). However, the desire for sexual behavior may also lead to heavier drinking because of strong beliefs about the influence of alcohol on sexuality and sexual inhibitions (Abbey, McAuslan, Ross, & Zawacki, 1999; Dermen & Cooper, 2000; Goldman & Roehrich, 1991; Kotchick et al., 2001b). Drinking also provides opportunities to interact with potential partners (Abbey, Saenz, & Buck, 2005; Cooper, 2002; Dermen & Cooper, 2000). Therefore, the direction of effects, questions regarding how motivations and expectancies may be linked, and for whom they operate are yet undetermined.

Motivations and Expectancies

Individuals engage in health risk behaviors for a variety of reasons, including hereditary factors, personality, immature cognitive processing leading to risk taking, the environment, and expectancies about the effects of alcohol use (NIAAA, 2006). Theories about substance use, including social learning theory (Bandura, 1977), problem behavior theory (Jessor & Jessor, 1977), and expectancy-value theory (Hays, 1985; Wigfield & Eccles, 2000) highlight the importance of perceptions of the consequences of substance use and substance-specific cognitions (Petraitis, Flay, & Miller, 1995). These theoretical traditions propose that individuals' evaluations of the rewards and costs of substance use behavior determine the level and frequency of use.

Motivations for behavior are the needs or functions the behavior serves for an individual (Cooper, 1994; Cox & Klinger, 1988; Kuntsche et al., 2005). For example, individuals who use alcohol to enhance their mood and their enjoyment of a situation are more likely to drink than individuals who are not motivated by enhancement effects (Cooper et al., 1995). The same behavior can meet different needs for different individuals and people who have distinct motivations for behavior are believed to have different patterns of predictors and consequences (Kuntsche et al., 2005). Motivations represent the subjective evaluation of the effects of a behavior and it is necessary to have a motivation to precipitate behavior, according to the motivational model (Cox & Klinger, 1988).

Expectancies, however, are the beliefs individuals have about the probability of experiencing consequences of a behavior (Leigh, 1989a), regardless of whether a given consequence is motivating for a given individual. For example, some people who anticipate that alcohol leads to more relaxed social behavior may be more likely to drink than people who do not expect that alcohol will help them relax. However, expectancies do not necessarily lead to the behavior (e.g., Baer, 2002; Cooper, 1994; Cooper et al., 1995; Kuntsche et al., 2005; Leigh, 1989a). For instance, an individual may have expectancies that alcohol leads to disinhibition but not want to lose control and therefore choose not to consume alcohol because that effect is deemed undesirable. In addition, expectancies may or may not be conscious (Goldman & Roehrich, 1991).

Both motivations and expectancies are described in the theory of reasoned action (TRA), which is a model for understanding behavioral intentions (Madden, Ellen, & Ajzen, 1992). TRA asserts that intentions, expected consequences, and perceived social

norms explain engagement in risk behavior (Fishbein & Ajzen, 1975; Petraitis et al., 1995). TRA has been applied to both safer sex behaviors and alcohol use (Ajzen, 2001; O'Callaghan, Chant, Callan, & Baglioni, 1997). According to a comprehensive review by Petraitis et al. (1995), these hypothesized predictors (e.g., substance-specific attitudes) are “among the most consistent predictors” of experimental substance use (p. 70). The current proposal focuses on the role of expectancies and motivations for use because behavior is often goal-directed (Furby & Beyth-Marom, 1992; Maggs, 1997).

Acknowledging the functions behaviors serve and the consequences that are anticipated is especially important for understanding the process of behavioral engagement and for predicting behaviors. Perceived utility of a behavior is important for both understanding its etiology and for informing intervention approaches to promote public health. For example, distinguishing specific motivations for sex may lead to more precise prediction of sexual behavior as well as an improved understanding of the ways motivation affects behavior (Cooper et al., 1998). Understanding why individuals behave in a given way and identifying those who are at greatest risk for experiencing the most serious negative consequences of a behavior are important pieces of information in order to intervene effectively. Therefore, this dissertation focuses on understanding the motivations and expectancies individuals have for alcohol use and sexual behavior, and the ways that these are differentially associated with behavior and consequences.

Research Aims

Based on research demonstrating the importance of motivations for risk behavior engagement among college students and the potential for motivations for sexual behavior

and alcohol use to be associated with one another in a patterned manner that has significant intervention implications, the current research investigated three aims. The first aim was to pilot test a multi-dimensional scale designed to assess sexual motivations. In order to utilize the construct in further research, a scale with sound measurement properties is needed. The second aim was to identify types of people with profiles of motivations for drinking alcohol and having sex, and the profiles of individuals who may be most likely to engage in behaviors putting them at risk for severe negative consequences. The final aim was to model the day to day fluctuations and covariations in alcohol use and sexual behavior among colleges students. Specifically, the following describes the three aims.

Aim 1 To develop a reliable and valid scale to assess motivations for and against sexual behavior in a college student population.

A multi-dimensional measure addressing distinct motivations for and against sex was shown to be reliable, valid, and configurally invariant across gender and ethnicity. Three sub-scales were developed to measure motivations *against* sexual behavior among college students: Values, Health, and Not Ready. This scale was designed to be used in conjunction with a set of sub-scales (Intimacy, Enhancement, and Coping) assessing frequency of motivations *for* sexual behavior by Cooper, Shapiro, and Powers (1998). Participants were surveyed the summer prior to college entrance ($N = 1653$; 41.6% male, $M = 17.99$ years, $SD = 0.37$). Exploratory factor analysis on a random one-quarter of the sample supported the existence of the six hypothesized factors. Multi-group confirmatory factor analysis with simple structure demonstrated good overall fit to the data. Motivation types were associated with lifetime sexual behaviors and past 12 week risk and protective

behaviors. Motivations for having and for not having sex were distinct and appropriately measured with the developed scales.

Aim 2 To identify groups of individuals with unique profiles of motivations for alcohol use and sexual behavior.

Although research has identified a global overlap of alcohol use and sexual behaviors, the ways in which these behaviors may be intricately linked within individuals, including by motivations, are not yet well understood. Participants in the present analyses ($N = 227$, 51.1% male, $M = 18.85$ years, $SD = 0.38$) were recruited as part of a study to examine alcohol use and sexual behavior among traditionally-aged college students. Latent profile analysis was used to identify profiles of motivations for alcohol use based on six scales (four motivations to drink: Fun/Social, Relaxation, Image, Sex; and two motivations against drinking: Physical, Behavioral) and profiles of motivations for sexual behavior based on six scales (three motivations for sex: Enhancement, Intimacy, Coping; and three motivations against sex: Not Ready, Health, Values). Four profiles were identified for alcohol use motivations: Anti Drinking Motivations (31.4%), Average Drinking Motivations (39.6%), Pro Drinking Motivations (15.7%), and Pro Drinking for Sex Motivations (13.1%). Three profiles of motivations for sex were identified: Anti Sex Motivations (35.3%), Pro Sex Motivations (41.8%), and Pro Sex for Coping Motivations (22.8%). Drinking motivational profile was associated with frequency of alcohol use, frequency of binge drinking, and alcohol problems. Sex motivational profile was associated with number of lifetime oral sex partners and number of penetrative sex partners in the past 12 weeks. The existence of distinct profiles of motivations for alcohol

use and sexual behavior implies the need for intervention programs targeted to individuals with different reasons for engaging in risk behaviors.

Aim 3 To assess daily fluctuations and co-variations in experiences of alcohol and sexual behaviors.

Most research on the links between alcohol use and sexual behavior has used cross-sectional and between-subjects designs. A pivotal unanswered question is whether sexual behavior is more likely when the same persons drink more heavily than when they do not. A within-person approach was used in the current study to model the links between drinking and sex over 14 days. Participants ($N=218$ people, 51.4% male) were traditionally-aged first year college students. Multilevel models were used to model up to 14 days of data for each person with occasions (Level 1, 2879 days) nested within people (Level 2, 218 people). Between-person (Level 2) effects were gender, relationship status, person means of alcohol (aggregated across days), and alcohol expectancies regarding sex (sexual affect and sexual drive, tested separately). Within-person (Level 1) effects were the number of drinks of alcohol consumed on a given day and the interaction between daily alcohol use and alcohol expectancies regarding sex. After controlling for average alcohol use, daily number of drinks was associated with more oral sex, a greater number of total sexual behaviors, and experiencing more short-term positive consequences of sex. A significant Drinking \times Alcohol-related Sex Expectancies interaction was found for oral sex and total sex behaviors, indicating that individuals with more positive expectancies were most likely to have sex after drinking. Therefore, the results pointed to the possibility of promoting sexual health by focusing on cross-behavior alcohol-sex expectancies among late adolescents.

Chapter 2

Motivations For and Against Sex Scales: Measurement Properties

Most emerging adults have engaged in sexual behavior, yet there is little understanding of the development of underlying motivations for behaviors such as oral and penetrative sex (Lefkowitz & Gillen, 2005). Furthermore, the ways in which these motivations may differ based on gender, ethnicity, and previous sexual behavior are largely unknown. Given that behavior is often goal-directed (Furby & Beyth-Marom, 1992; Maggs, 1997), identifying the importance of perceived costs (i.e., health risks) and benefits (i.e., pleasure) of sexual behavior for various individuals may provide insights for etiology and health promotion. In particular, there is a pressing need for a measure assessing motivations against sexual behaviors. The current study is an important first step toward understanding sexual decisions and promoting safer sexual behaviors by creating an appropriate measurement tool to assess the reasons individuals engage in and avoid sexual behavior.

Sexual motivations are important for at least two reasons. First, sexual intimacy is a developmental task that is central to human behavior (Erikson, 1968). Understanding sexual motivations and their changes over time is, therefore, an important component of describing adolescent and young adult development. Second, sexual motivations may be especially important to helping to understand why individuals engage in risky or safer sexual behaviors (e.g., multiple partners, condom use) that have significant health and social consequences. Despite the widely documented prevalence of sexually transmitted diseases (STDs) and unwanted pregnancy among adolescents and young adults, little is

known about the prevention of sex-related consequences (Kotchick, Shaffer, Forehand, & Miller, 2001a). On average, American adolescents initiate sexual intercourse at 17.7 years of age (Else-Quest, Hyde, & DeLamater, 2005). In the U.S., 60.5% of 12th-graders have had sex (Grunbaum et al., 2002), although individuals who go on to attend college are somewhat less likely to have had sex than those who do not. Half of the 19 million STDs occurring annually in the U.S. occur among 15- to 24-year-olds (Weinstock et al., 2004) making this issue especially critical among adolescents and young adults.

Emerging adults, for example, face the developmental task of developing intimacy and making decisions about sexuality. About half of first-year college students have ever had sex (49% in Patrick et al., 2007; 52% in Siegel et al., 1999). Those who have not had sex are likely to transition to sexual activity during the college years (Cooper, 2002) so that upon graduating from college, the majority have engaged in sexual intercourse (Lefkowitz & Gillen, 2005). Sexual behaviors are increasingly common from freshman to senior year in college (Siegel et al., 1999), and many emerging adults place themselves at serious risk for negative consequences including STDs and unwanted pregnancy by failing to use contraception and effective methods of disease protection (Centers for Disease Control and Prevention (CDC), 2000). Therefore, a measure of sexual motivations appropriate for adolescents and college students would be a valuable tool in investigating changes in motivations and their associations with sexual behaviors.

Motivations for Sexual Behavior

A first step toward understanding how to promote healthier sexual behavior is understanding the motivations for engagement, or why people do what they do (Cooper & Shapiro, 1997). For example, individuals' perceptions of consequences of behavior as pleasant or unpleasant are expected to be associated with their actions (Moore & Gullone, 1996). Identifying the perceived needs sexual behavior meets will provide insight into how people make behavioral decisions. For example, sexual motivations may be related to needs to regulate affect, affiliate with others, or maintain self-image (Cooper & Shapiro, 1997). With so many possible types of sexual motivations, distinguishing specific motivations for sex may lead to more precise prediction of sexual behavior as well as an improved understanding of the ways motivations develop and lead to behavior (Cooper et al., 1998).

Surveys among adolescents or emerging adults (Eyre & Millstein, 1999; Hill & Preston, 1996; Leigh, 1989b) have identified both practical reasons for sex (e.g., reproduction) and emotional reasons (e.g., expressing closeness). Hill (2002; Hill & Preston, 1996) articulated a sexual motivation model to describe perceptions of the potential to experience rewarding interpersonal consequences as a result of sexual behavior. College students reported that the most salient rewards were pleasure, feeling valued, providing and receiving comfort, and feeling and expressing affection. Men have reported that self-focused reasons for sex (e.g., pleasure and to feel loved) are the more important reasons for sex, while women have reported that partner-focused reasons (e.g., expressing intimacy) are more important reasons (Patrick et al., 2007). Eyre and Millstein (1999) identified a core set of reasons adolescents reported for sex that seemed to be true

across gender and ethnicity, including having an available and attractive partner, positive partner attributes (e.g., intelligence, ease of communication, sense of humor), love for the partner, belief that the “time is right,” and available condoms.

Consistent with this literature, Cooper, Shapiro, and Powers (1998) developed a six-dimension measure of motivations for sex. Three subscales, intimacy, enhancement, and coping as motivations for sex, are utilized in the current study because of their sound theoretical basis and demonstration of strong measurement properties. Across African American and European American, adolescent and adult, and college and community populations, Cooper et al. demonstrated the factor invariance, reliability, and validity of this six-dimensional measure in predicting sexual behavior patterns. The current study extends the work of Cooper et al. in three ways. First, whereas Cooper and colleagues developed a multi-dimensional measure of motivations for sexual behavior, we aim to create a complementary multi-dimensional scale of motivations not to have sex and demonstrate that these motivations are distinct from motivations for sex. Second, the participants in Cooper and colleagues’ research were sexually active adolescents and adults. Given the importance of understanding the development of adolescent and emerging adults’ sexual motivations and behaviors, we aim to adapt this measure for use among adolescents and young adults regardless of their past or current sexual behavior (i.e., for sexually inexperienced or inactive individuals as well as sexually active individuals). Third, the motivations for sex subscales were replicated by Cooper et al. among European American and African American samples; the current study is therefore an extension that explores measurement properties among Asian American and European American students.

Motivations Against Sexual Behavior

Motivations not to have sex, or the perceived costs of engaging in sexual behavior, have been particularly understudied (e.g., Sprecher & Regan, 1996). However, it is precisely these motivations that are often targeted for enhancement in programs to promote sexual health (e.g., teaching about health risks in an effort to increase condom use) (e.g., Jemmott, Jemmott, & Fong, 1992; Weinhardt, Carey, Johnson, & Bickham, 1999). Understanding why individuals choose to abstain from sex at particular times in their lives or on particular occasions is also necessary to fully describe the behaviors of adolescents and young adults. Therefore, developing a measure of motivations not to engage in sexual behavior represents a distinct contribution to the study of sexual development and behavior.

Research suggests three motivations to avoid sexual behavior: health, morals, and not being ready for sex. A primary motivation identified against sexual behavior has been avoiding pregnancy and disease (Sprecher & Regan, 1996). Moral or ethical objections to sex, sometimes based on religious beliefs, are also prevalent among adolescents (Regenerus, 2007; Sprecher & Regan, 1996). A study focused specifically on college student sexual abstiners by Sprecher and Regan (1996) reported that the primary motivation for not having sex for both genders was that students had not yet found a person with whom they were in love. Similarly, emotional readiness is also identified as an important issue for adolescent sexual decision-making (Regenerus, 2007). In an adult sample, Leigh (1989b) also identified reasons not to have sex as including emotional motivations, such as fear of rejection. The current study focuses on developing a reliable and valid multi-dimensional scale of motivations not to have sex that parallels in format

an existing scale of reasons to have sex (Cooper et al., 1998). Together, these measures will enable researchers to reliably and validly study the importance of motivations for and against sexual behavior among adolescents and young adults.

Differences in Sexual Behavior and Motivations by Gender and Ethnicity

Public health research has documented that the prevalence of sexual behaviors varies across demographic groups, including ethnicity and gender. For example, African American and Hispanic/Latino American adolescents are generally more likely to engage in sexual intercourse and risky sexual behavior (e.g., multiple partners, lack of contraception, or disease protection) compared to European American adolescents (Blum et al., 2000; Neumark-Sztainer et al., 1996; Santelli et al., 2000). Compared to African American adolescents, European Americans may be more likely to engage in pre-coital behaviors (e.g., touching) (Smith & Udry, 1985). European American university students consume more alcohol and more often drink with a single member of the opposite sex than do Asian American students (O'Hare, 1995). Asian Americans consistently report the lowest levels of sexual behavior (e.g., among high school students in Neumark-Sztainer et al., 1996). Men report more sexual partners, but women are more likely to report having had penetrative sex (among 18-19 year-olds in the U.S., 66% of men and 74% of women) in their lifetime (e.g., Mosher, Chandra, & Jones, 2005).

The explanations and meanings underlying these demographic behavioral differences, including potential differences in sexual motivations and experiences, have received relatively little attention (Brooks-Gunn & Paikoff, 1993; Diamond, Savin-Williams, & Dube, 1999). A much more limited literature suggests there may also be

group differences in sexual motivations. In a community sample, Cooper et al. (1998) demonstrated factor invariance of a multi-dimensional measure of motivations for sex by race (i.e., European American and African American individuals), age (i.e., under age 21, over age 21), and gender. European American participants reported greater intimacy motives for sex than African Americans; African American participants reported greater coping motives for sex than European Americans.

Potential gender differences in motivations surrounding sexual behavior require further investigation (Ozer, Dolcini, & Harper, 2003; Paradise, Cote, Minsky, Lourenco, & Howland, 2001). Previous work, conducted largely in the 1980s, emphasized traditional gender disparities by concluding that men were more interested in pleasure and women were more interested in intimacy in sexual relationships (e.g., Leigh, 1989b). More recent research suggests historical change, such that today's youth have a more complicated pattern of sexual motivations. Ozer et al. (2003) found no gender differences in the most commonly endorsed reason to have sex: pleasure. In a sample of 14- to 20-year old African American adolescents, the majority of young women (82%) and young men (89%) identified "feels good and to satisfy sexual desires" as a reason to have sex. The second primary reason, "having a boyfriend/girlfriend you love" was also identified by a majority of both genders, although females (80%) were more likely to endorse this reason than males (66%). Cooper et al. (1998) found that men reported greater enhancement motives and coping motives than women, but there were no gender differences in intimacy motives. In a study by Patrick et al. (2007), college men reported that self-focused reasons to have sex (e.g., enjoyment) were more important than did women. Women rated partner-focused reasons to have sex (e.g., expressing intimacy) and ethical reasons not to have sex (e.g., moral beliefs) as more important than did men. Men

and women did not differ in the reported importance of avoiding pregnancy and STD infection as reasons not to have sex.

It is important to understand the variation in motivations for and against sexual behavior, and whether or not a single measure has the same meaning across these groups (Horn & McArdle, 1992). Therefore, the current study addresses two types of information: (1) Are the structures of motivations the same for men and women who have different ethnic backgrounds? And (2) Do levels of motivations differ by gender and ethnicity?

Importance for Advancements in Intervention

Motivational enhancement techniques for intervention are gaining popularity with prevention scientists and clinicians. Among programs targeting alcohol use among college students, for example, motivational enhancement approaches have reported some of the largest effect sizes (Larimer & Cronce, 2002; Tevyaw & Monti, 2004; Walters & Neighbors, 2005; White et al., 2006). Impressively, when reductions in alcohol use have been produced, they have been maintained over time (Burke, Arkowitz, & Menchola, 2003). Preliminary evidence for the promise of these approaches for sexual behavior comes from a brief intervention program focused on sexual behavior norms. Following a 20-minute paper-and-pencil intervention combining goal setting and normative feedback for sexual behavior, men in the treatment group reported increased condom use and women in the treatment group reported a reduction in number of sexual partners compared to the control group at 30 days post-intervention (Chernoff & Davison, 2005).

However, the mechanisms underlying these successful motivational enhancement interventions are poorly understood (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Tevyaw & Monti, 2004). The key goal of motivational techniques for intervention is to enhance motivation for healthy behavior (Miller & Rollnick, 1991). Therefore, a primary need in order to improve these promising approaches is a better understanding of individuals' existing motivations for behavior and the types of intervention messages that would be most salient. According to a meta-analysis, motivational approaches have not yet shown significant effects in reducing sexual risk behaviors (Burke et al., 2003). However, Sanderson and Cantor (1995) found that response to safer sex intervention conditions (i.e., technical skills, communication skills) varied based on self-reported dating goals. Three months post-intervention, for individuals who received the technical skills education, having identity goals was associated with greater intention to use condoms; for individuals who received the communication skills intervention, having intimacy goals was associated with intention to use condoms. Research on patterns of developmentally normative motivations for sex is needed to understand how intervention programs can most effectively target sexual behavior. Adequate measures are a primary need for conducting such research.

The Current Study

The current study is designed to: 1) create a multi-dimensional scale to measure motivations *against* sexual behavior; 2) adapt Cooper et al.'s (1998) measures of enhancement, intimacy, and coping motivations *for* sex for use with sexually abstinent and sexually experienced college students; 3) demonstrate that motivations against sex

are distinct from motivations for sex; 4) assess the factor structure of the combined multi-dimensional motivations for and against sex subscales; and 5) test measurement invariance of this measure across gender and European American and Asian American subgroups. Though often overlooked, demonstrating invariance across demographic groups is a pre-condition for meaningful comparison of group means and exploration of other statistical associations (Horn & McArdle, 1992).

The present paper describes the development of a multi-dimensional scale designed to measure motivations *against* sexual behavior among college students in three domains: Values, Health, and Not Ready. This scale was designed to be used in conjunction with a set of sub-scales assessing frequency of motivations *for* sexual behavior by Cooper, Shapiro, and Powers (1998) in terms of appropriate age range and response format. The original Cooper et al. scale was adapted in the current study to assess importance of motivations for all individuals, regardless of whether they had ever been sexually active. Originally, as noted by the authors (Cooper et al., footnote on p. 1535), individuals with little or no sexual experience may have had significant difficulty answering the original question, “select the response which best describes how often you personally have sex for each of these reasons.” The adaptation, therefore, makes the measure applicable to sexually inexperienced, previously but not currently sexually active, and currently sexually active individuals.

In order to understand both motivations *for* and motivations *against* sexual behavior, the items for the Cooper et al. scale and the currently developed scale were administered together. A six-factor solution was hypothesized, with three factors capturing motivations for sexual behavior and three factors describing motivations against sexual behavior. Differences in motivation sub-scales by gender and ethnicity are

reported. Motivations are also explored as predictors of sexual risk and protective behaviors.

Method

Participants

Participants were recruited to participate in a screening study about health risk behaviors in June and July of the summer immediately following their graduation from high school and preceding their first year at a university in the Northwestern US as part of a larger study designed to test a preventative intervention for marijuana use during the transition to college (Lee, Neighbors, Kilmer, & Larimer, 2008). Participants were asked to complete an online 20-minute screening questionnaire assessing marijuana and other illicit substance use and consequences, as well as sexual behavior. Participants received \$10 as compensation for their completion of the online survey. The Institutional Review Board approved the study and a Certificate of Confidentiality from the U.S. Federal Government was obtained to protect participant data. The consent process was conducted online for individuals over age 18; parents of those under age 18 were asked to return a signed informed consent form for their teenager to be contacted for study participation.

Of 4052 invited students, 2123 (52.4%) responded to the web-based survey, which is consistent with other web-based studies. Self-reported racial background was European American (64.5%), Asian American (22.2%), and Multiracial/Other (13.3%). Based on an independent question, 6.9% reported Hispanic/Latino ethnicity. Current analyses focus solely on Asian American and European American non-Hispanic students

in order to compare the two highest prevalence groups in the sample. Complete data on all sexual motivations were available for 94.5% ($N = 1653$; 41.6% male; 25.3% Asian American). Mean age was 17.99 years ($SD = 0.37$; range = 17 – 20 years).

Measures

The sexual motivations sub-scales contained a total of 24 items rated by participants on a scale from 1 = *not at all important* to 5 = *very important*. Item-level descriptive statistics and rotated factor loadings are shown in Table 2-1 for the randomly selected exploratory factor analysis (EFA) sub-sample. Cooper et al.'s (1998) sub-scale items for Intimacy motivations (5 items, $\alpha = .94$; e.g., *express love*), Enhancement motivations (5 items, $\alpha = .90$; e.g., *for the thrill of it*), and Coping motivations (5 items, $\alpha = .87$; e.g., *feel better when lonely*) were used. The original version of the sub-scales has demonstrated invariance across gender, European American and African American racial groups, and age (i.e., under age 21 and over age 21), as well as reliability and validity in college and community samples (Cooper et al.). The original question used by Cooper et al. was, "select the response which best describes how often you personally have sex for each of these reasons." In the current study, the stem was adapted to be applicable to all incoming students regardless of sexual experience to read, "Listed below are different reasons why people have sexual intercourse. How important is each of these reasons in influencing your decisions about whether or not to have sex?" The 15 items were ordered randomly. Cooper et al.'s scales for Self Affirmation, Partner Affirmation, and Peer Approval sexual motives are not included in the current study because they had less

consistent associations with sexual behavior, lower mean importance, and higher intercorrelations.

The motivations against sex items were created to reflect three hypothesized factors with three items each. The stem question read, “Listed below are different reasons why people do not have sexual intercourse or take actions to minimize risks. How important is each of these reasons in influencing your decisions about whether or not to have sex.” Values motivations not to have sex (3 items, $\alpha = .91$) included, *Against my beliefs*, *Moral/religious values*, and *Ethical principles*. Health motivations (3 items, $\alpha = .79$) were *Desire to avoid pregnancy*, *Fear of STDs (sexually transmitted diseases)*, and *Want to avoid exposure to HIV/AIDS*. Not Ready motivations (3 items, $\alpha = .76$) included *Not in love with anyone*, *Not old enough*, and *Not ready for the commitment*. The 9 items were presented in a random order.

Lifetime sexual behavior experiences were assessed with two items. Participants were asked, “Have you ever had oral sex?” (no = 0, yes = 1) and “Have you ever had sexual intercourse (sex in which the man inserts the penis into a partner’s vagina or anus)?” (no = 0, yes = 1). If participants indicated that they had engaged in penetrative sex on at least one occasion in the past 12 weeks, there were asked three follow-up questions about frequency of risk and protective behaviors in the past 12 weeks. Frequency of contraceptive use (i.e., *use contraception/birth control when you had sexual intercourse*), condom use (i.e., *use a condom when you had sexual intercourse*), and alcohol use prior to sex (i.e., *consume alcohol before or during sexual encounters*) were reported on a scale of 1 = *never*, 2 = *some of the time*, 3 = *most of the time*, 4 = *every time except once*, and 5 = *every time*. Each of these measures regarding sex and risk or protective behaviors is used as the dependent variable in separate regression analyses.

Gender was coded as 0 = female and 1 = male. Ethnicity was coded as 0 = European American and 1 = Asian American.

Plan of Analysis

First, EFA was used on a randomly selected quarter of the full sample to determine whether the hypothesized structure was supported. Second, a confirmatory factor analysis (CFA) was conducted on the full sample to investigate the fit of the overall structure, as well as potential factor structure differences by gender and ethnicity. CFA models were assessed via objective model fit indices, and tested for measurement invariance across sub-groups. Third, MANOVA was used to determine whether gender and ethnicity were associated with mean level differences in endorsement of the computed subscales. Finally, gender, ethnicity, and motivations were used to predict sexual risk and protective behaviors using linear and logistic regression.

Results

Exploratory Factor Analysis

Principal axis factoring with oblique rotation was used on a randomly selected 25% of the sample ($N = 432$; 40.5% male, 25.2% Asian American) in SPSS 15.0 (SPSS, 2006) to explore the structure of the 24-item measure. The common factor model was used, rather than principal components analysis, because of a focus on latent constructs (Conway & Huffcutt, 2003; Fabrigar, Wegener, MacCallum, & Strahan, 1999). Six factors were hypothesized. Eigenvalues, scree plots, and percentage of variance explained

were used to identify the optimal solution (Conway & Huffcutt, 2003). Multiple methods were used to determine the appropriate solution because relying solely on eigenvalues may produce results with an inaccurate number of factors (Comrey, 1978; Conway & Huffcutt, 2003; Fabrigar et al., 1999). After examination of the scree plot, the contents of the factors, the eigenvalues, and the percent of variance explained, 6 factors were deemed optimal. Oblique rotation was used because the factors (i.e., types of motivation) were expected to be correlated, and because oblique rotation has been found to more often identify simple structure (Conway & Huffcutt, 2003; Fabrigar et al., 1999).

Descriptive statistics on each of the items and the final rotated factor solution of the EFA using principal axis factoring with direct oblimin rotation are shown in Table 2-1. The scree plot and percent of variance explained by each factor indicated a 6-factor solution, as compared to 5-, 7-factor solutions. Initial eigenvalues of the 6 factors ranged from 1.15 to 7.22, with rotated eigenvalues from 2.81 to 5.26 and a cumulative 66.83% variance explained. The factor correlation matrix (see Table 2-2) indicated that factors were moderately related, yet represented distinct constructs. The six hypothesized factors were clearly indicated by factor loadings on items reflecting *Enhancement* (5 items, factor loadings [*FL*] = .57 to .86), *Intimacy* (5 items, *FL* = .79 to .93), *Coping* (5 items, *FL* = -.54 to -.87), *Values* (3 items, *FL* = .75 to .96), *Health* (3 items, *FL* = .50 to .87), and *Not Ready* (3 items, *FL* = .59 to .83) motivations. Cross-loadings were all low (absolute value range = 0 to .33). Sub-scales for each factor were created by taking the mean of items loading highly in each domain. Internal consistency of these scales was high, ranging from .76 to .91.

Confirmatory Factor Analysis

Based on the results of the EFA, a CFA was conducted on the full sample. The hypothesized 6-factor structure was tested for replication across gender and ethnicity (i.e., four groups: European American women, European American men, Asian American women, and Asian American men) using AMOS 7 (Amos, 2006). Simple structure was modeled, such that each item loaded only on the hypothesized factor and errors were independent. All factors were allowed to be intercorrelated.

A multi-group CFA tested whether measurement across groups was identical. Fit statistics including Normed Fit Index (NFI, Bentler & Bonett, 1980), Comparative Fit Index (CFI, Bentler, 1990), and Root Mean Square Error of Approximation (RMSEA, Browne & Cudeck, 1992) are reported in Table 2-3. The unconstrained model fit well, indicated by NFI, CFI, and RMSEA. NFI and CFI values of .90 indicate that 90% of the covariance among the variables was accounted for by the model (Bentler & Bonett, 1980). The structure of the scale remained the same for each group (i.e., items loaded on the same factors), providing evidence for *configural* factor invariance (see Horn & McArdle, 1992). The patterns of standardized regression weights for the six factors were similar across groups (see Table 2-4). The CFA model presented supports the theoretically-driven hypothesis that there are 6 distinct factors in each of the subgroups, without post-hoc modifications that may capitalize on chance and reduce the replicability of the findings (MacCallum, Roznowski, & Necowitz, 1992).

The four-group model allowed measurement weights (factor loadings), measurement intercepts (mean values), structural covariances, and measurement residuals (errors) to be estimated separately for European American women, European American

men, Asian American women, and Asian American men. Chi-square difference tests were conducted to compare models that constrained additional parameters to be equal across groups, and all were significant at $p < .001$. The model constraining measurement weights to be identical had a worse fit than the unconstrained model, $\Delta\chi^2 (54, N = 1653) = 116, p < .001$. However, the significant chi-square differences were likely a result of the large sample size ($N=1653$) and resulting statistical power to detect any variance in model fit (Bentler & Bonett, 1980). The model constraining measurement weights to be equal was nearly or exactly the same as the unconstrained model on other indices of model fit. Therefore, there was evidence that the measurement weights may have been very similar across groups. In addition, it may not be reasonable to document *metric* factor invariance across the four groups (Horn & McArdle, 1992), particularly when mean differences on motivations are anticipated (e.g., by gender).

Reliability of the Sub-Scales

After the factor structure was identified, scales were computed as the means of items loading highly on each factor (see Table 2-5 for descriptives). Cronbach's alpha reliabilities for the total sample are reported in Table 2-5. Reliability was fairly consistent across the 4 groups; Enhancement $\alpha = .90 - .91$, Intimacy $\alpha = .93 - .94$, Coping $\alpha = .87 - .88$; Values $\alpha = .88 - .91$; Health $\alpha = .78 - .81$; and Not Ready $\alpha = .70-.72$. Motivations for sex (Enhancement, Intimacy, and Coping) were moderately positively correlated with each other and negatively correlated with Values, Health, and Not Ready motivations against sex. The three motivations against sex (Values, Health, and Not Ready) were moderately positively correlated with each other.

Validity: Mean level differences by gender and ethnicity

Demonstrating configural invariance allows for meaningful cross-group comparisons (Horn & McArdle, 1992). Mean differences by gender and ethnicity were tested using MANOVA. Multivariate results are reported in Table 2-6. Effects with $p < .05$ were probed with follow-up tests at protected alpha levels (i.e., Tukey) to describe fully the associations in the data. Mean endorsement by gender and ethnicity are shown for each of the 6 subscales in Figure 2-1. Significant mean differences on motivations scales were found based on gender and ethnicity. Follow-up ANOVAs showed that men rated Enhancement ($M = 2.99, SD = 1.11$) and Coping ($M = 1.62, SD = 0.75$) motivations for sex as more important than did women (Enhancement $M = 2.45, SD = 1.06$; Coping $M = 1.35, SD = 0.61$). Women rated Health ($M = 4.19, SD = 0.99$), Values ($M = 3.07, SD = 1.45$), and Not Ready ($M = 3.42, SD = 1.19$) motivations against sex as more important than did men (Health $M = 3.76, SD = 1.13$; Values $M = 2.46, SD = 1.40$; Not Ready $M = 2.57, SD = 1.13$). There was no gender difference for the importance of Intimacy ($M = 3.67, SD = 1.19$). Asian American participants reported that Coping motivations for sex ($M = 1.57, SD = 0.75$) and all motivations against sex (Health $M = 4.27, SD = 0.97$, Values $M = 3.22, SD = 1.39$, Not Ready $M = 3.45, SD = 1.23$) were more important than did European American participants (Health $M = 3.92, SD = 1.09$, Values $M = 2.68, SD = 1.47$, Not Ready $M = 2.93, SD = 1.21$). There were no significant differences for Intimacy or Enhancement based on ethnicity. The two-way Gender \times Ethnicity interaction was also significant. Asian American males reported especially high levels of Coping motivations ($M = 1.85, SD = 0.81$) for sex and Asian American females reported especially high levels of Not Ready motivations against sex ($M = 3.85, SD = 1.08$).

Validity: Correlations and Regressions with Behavior

Initial predictive validity was assessed by computing the correlations of subscales with measures of oral and penetrative sex behaviors (shown in Table 2-5). Motivations for sex were hypothesized to be associated with greater likelihood of reporting sexual behaviors. Intimacy motives were expected to be associated with more contraception use and lower condom use (Bankole, Darroch, & Singh, 1999; Misovich, Fisher, & Fisher, 1997) According to Cooper et al. (1998), enhancement and coping were associated with more risky sexual behavior. Motivations against sex were hypothesized to predict lower likelihood of reporting sexual behaviors. As anticipated, Enhancement and Intimacy motivations for sex were positively associated with previous sexual behaviors. Coping motivations were not significantly associated with behaviors. Motivations against sex were negatively correlated with previous sexual behaviors, with the exception of the non-significant association of Health motivations and penetrative sex.

Logistic regression analyses were used to predict lifetime oral and penetrative sexual behavior based on age, gender, and ethnicity (Step 1) and the six motivational subscales (Step 2; see Table 2-7). Although the age range was restricted to incoming first-year college students, older students were more likely to report lifetime experience with sexual behaviors. Asian Americans were less likely to report having engaged in both oral and penetrative sex than European American students and women were more likely to report lifetime penetrative sex than men, as anticipated (Mosher et al., 2005; Neumark-Sztainer et al., 1996).

Significant χ^2 values reflect the importance of motivations as predictors of sexual behavior. Students with greater Enhancement and Intimacy motives for sex and greater

Health motives against sex were more likely to have had oral and penetrative sex, similar to Cooper et al. (1998). Students who reported greater Coping motives for sex and greater Values, and Not Ready motives against sex were less likely to report these two sexual experiences.

Multiple linear regressions among individuals who reported penetrative sex in the previous 12 weeks ($N = 601$) predicted protective (i.e., contraceptive and condom use) and risk (i.e., alcohol use before sex) behaviors. Men and Asian American students reported using contraception less frequently than women and European American students. As a step, motivations for and against sex predicted a significant amount of variance for all behavioral outcomes except for condom use. As hypothesized, higher Enhancement motives were uniquely predictive of more frequent contraceptive use and more frequent alcohol use before sex, and marginally significantly associated with less frequent condom use. This combination of risk and protective behaviors from the same motivation is consistent with a pattern of pleasure. Intimacy motives were associated with more frequent contraception and less frequent alcohol use before sex, suggesting a pattern of sex within the context of relationships. Greater Coping motives were associated with less frequent contraception use, as anticipated. Greater importance attached to Values was marginally predictive of less frequent contraception, while Health motives were predictive of more frequent contraception. Contrary to expectations, Health motivations were not associated with frequency of condom use. As anticipated, higher Not Ready motives were predictive of less alcohol use before sex.

Discussion

A multi-dimensional measure addressing distinct motivations for and against sex was shown to be reliable, valid, and configurally invariant across gender and ethnicity. The six factors of motivations for and against sex describe motivations regarding oneself (e.g., Not Ready), one's partner (e.g., Intimacy), and the larger context of sexual behavior (e.g., Values).

In addition, motivations were associated with lifetime sexual behaviors and past 12 week risk and protective behaviors. Greater enhancement and intimacy motivations for sex and greater health motivations against sex were associated with a greater likelihood of having lifetime experience with oral and penetrative sexual behaviors, consistent with Cooper et al. (1998). Greater coping motivations for sex and greater values and not ready motivations against sex were associated with a lower likelihood of lifetime oral and penetrative sexual experience.

In total, these results suggest that different aspects of motivation are differentially associated with risk and protective behaviors. Among college students who had been sexually active in the previous 12 weeks, more importance placed on enhancement and intimacy motives and less importance placed on coping motives was associated with more frequent contraceptive use. In other words, contraception other than condoms may be most likely in the context of a pleasurable and intimate relationship, rather than when sex is used to regulate affect or when one or both partners feel that they have few opportunities for sex. Previous research has supported this, documenting that as relationships become more serious couples tend to switch from using condoms to other contraceptive (e.g., hormonal) methods (Bankole et al., 1999; Misovich et al., 1997).

Using alcohol before or during sexual encounters was uniquely predicted by greater enhancement motives and lower intimacy and not ready motives. Cooper et al. (1998) similarly found that enhancement and coping were associated with more risky sexual behavior and intimacy was associated with less risky sexual behavior, although they used an index of total risk and did not differentiate specific risk behaviors. Alcohol use may co-occur more often with sexual relationships focused largely on pleasure, but not as often when sex is seen as relationship-building (e.g., a partner is already identified) or when one or both people feel less ready for sex. For example, sex with a new or casual partner is more likely to involve alcohol (Corbin & Fromme, 2002). Based on alcohol expectancy theory (Cooper, 2002; Dermen & Cooper, 2000), one of the reasons some college students use alcohol is the belief that alcohol facilitates social interactions with the opposite sex, both physiologically and socially.

Strengths and Limitations

The current study developed a reliable and valid assessment tool for motivations against sex and adapted an existing scale of motivations for sex in a large sample of incoming college students with varying levels of sexual experience. Motivations not to have sex have been particularly understudied, so this measure addresses an important gap in research on adolescent and emerging adult development, motivations, and sexuality. These measures were shown to be configurally invariant for men and women, as well as European American and Asian American students. Notable limitations include the single university sample of incoming students. Data were cross-sectional, so how motivations

affected behavior or behavior affected motivations (or, more likely, their reciprocal relations) is unclear.

Implications

Motivations for having and for not having sex were distinguishable from one another and can be measured with the developed scales. In other words, enhancement is one motivation incoming college students report for having sex but the lack of this motivation or the reverse (i.e., finding sex unpleasurable) is not the only type of motivation against sex. In fact, if motivations against sex were actually just low scores on motivations for sex, the hypothesized distinct factors for motivations against sex would not have been confirmed. There are distinct reasons some incoming students report for choosing not to have sex that are measurable and associated with actual sexual behavior. Motivations against sex, or reasons to abstain from sexual behavior at least some of the time, are also important to understand for sexually active individuals. Consistent with the theory of reasoned action (Ajzen, 2001; Fishbein & Ajzen, 1975), both perceived benefits and perceived risks are identified. Then, over time and on certain occasions, individuals may weigh their motivations for and against a behavior (Goldberg, Halpern-Felsher, & Millstein, 2002). Understanding how these motivations for and against sex are balanced to predict risk is particularly important for interventions designed to promote sexual health.

Future Research

Future research using the motivation against sex scales should investigate invariance across additional ethnic and racial groups (e.g., African Americans, Latino Americans), demographic groups (e.g., high school students, non-college young adults), and individuals in various relationship types (e.g., single, casually dating, serious). The impact of biological sexual maturity and sexual desire should be considered, in addition to other motivations, as important components of a healthy sexual self-concept (Diamond, 2006). Person-centered approaches to data analysis that investigate how motivations cluster together within individuals would advance our understanding of how motivations are associated with one another and how individuals with multiple motivations reconcile their decisions to have sex or not to have sex. Motivational profiles of individuals at greatest risk for STD infection and unwanted pregnancy would inform sexual health promotion programs. In addition, situation-level investigation of why college students choose to have sex or not on a given occasion may provide insight into the most proximal effects of motivations. Finally, the ways in which sexual motivations change across time, from adolescence to adulthood, deserve exploration.

Table 2-1

Item Descriptives and Rotated Pattern Matrix

Items	M	SD	Rotated Factor Loadings					
			E	I	C	V	H	R
It feels good	3.24	1.32	.57	.25	-.01	-.15	-.04	.06
You feel horny	2.59	1.26	.72	.11	.01	-.12	-.00	.01
Just for the excitement of it	2.38	1.22	.86	-.02	-.01	.04	.00	-.02
Just for the thrill of it	2.15	1.54	.84	-.09	-.02	.02	-.03	-.05
To satisfy your sexual needs	2.68	1.28	.68	.15	-.07	-.06	.02	-.03
More intimate w/ partner	3.70	1.36	.06	.79	-.05	-.03	-.07	.06
Express love for partner	4.00	1.25	.03	.80	.04	.00	.01	.00
Emotional connection w/ partner	3.69	1.31	.00	.88	.01	.01	.00	.02
Become closer to partner	3.73	1.28	.02	.93	-.01	.04	.01	-.06
Feel emotionally close to partner	3.67	1.33	-.01	.90	-.06	.02	.01	-.05
To cope with upset feelings	1.36	0.69	-.10	.04	-.78	-.02	.01	-.02
Feel better when you're lonely	1.50	0.90	.09	.01	-.72	.02	.04	.01
Feel better when you're feeling low	1.48	0.78	.13	.01	-.77	.01	-.03	-.01
Help deal with disappointment	1.29	0.66	-.12	.01	-.87	-.01	-.01	.03
To cheer yourself up	1.62	0.90	.33	-.04	-.54	-.01	.01	-.01
It's against my beliefs	2.72	1.66	-.03	-.01	-.01	.89	-.02	-.04
Moral/religious values	3.05	1.63	.01	.03	.02	.96	.00	-.01
Ethical principles	3.17	1.52	-.01	.06	.00	.75	.04	.10
A desire to avoid pregnancy	4.34	1.11	-.02	.05	.07	.00	.50	.04
Fear of STDs	3.86	1.27	.02	-.08	-.07	.03	.85	-.03
To avoid exposure to HIV/AIDS	4.02	1.30	.01	-.02	-.04	-.02	.87	.00
I am not in love with anyone	3.74	1.45	-.07	.17	.04	-.06	.06	.59
I don't feel old enough	2.58	1.52	-.07	-.10	-.03	.07	-.01	.70
Not ready for the commitment	3.25	1.55	.10	-.12	-.01	.08	.01	.83
Eigenvalue			5.26	4.81	3.81	3.71	2.38	1.81
% Variance			28.82	12.08	4.68	5.91	12.14	3.21

Note. N = 432. E = Enhancement, I = Intimacy, C = Coping, V = Values, H = Health, R = Not Ready

Table 2-2

Reliabilities and Factor Correlation Matrix

Factor	α	E	I	C	V	H
Enhancement	.90	-				
Intimacy	.94	0.38	-			
Coping	.87	-0.44	-0.13	-		
Values	.91	-0.37	-0.24	0.12	-	
Health	.79	-0.13	-0.08	-0.04	0.25	-
Not Ready	.76	-0.32	-0.02	0.11	0.39	0.44

Note. $N = 432$. E = Enhancement, I = Intimacy, C = Coping, V = Values, H = Health, R = Not Ready

Table 2-3

Confirmatory Factor Analysis Fit Statistics

	Measurement	Measurement	Structural	Measurement	
	<u>Unconstrained</u>	<u>Weights</u>	<u>Intercepts</u>	<u>Covariances</u>	<u>Residuals</u>
χ^2	2782.00	2898.96	3418.82	3581.67	4080.24
df	948	1002	1074	1137	1209
NFI	.898	.894	.874	.868	.850
CFI	.930	.927	.910	.906	.890
RMSEA	.034	.034	.036	.036	.038

Note. $N = 1653$. The models shown from left to right move from unconstrained parameters for the four groups (i.e., European American women, Asian American women, European American men, Asian American men), to constraining only measurement weights to be equal, to additionally constraining measurement intercepts, to adding constraints on covariances, to constraining all parameters including measurement residuals. The Unconstrained model, allowing measurement parameters and covariances to vary across the four groups, was chosen as the best fit to the data.

Table 2-4

Confirmatory Factor Analysis Unconstrained Model: Range of Standardized Factor Loadings by Gender and Ethnic Group

	<u>European American</u>		<u>Asian American</u>	
	<u>Females</u>	<u>Males</u>	<u>Females</u>	<u>Males</u>
Enhancement	.79-.83	.77-.84	.77-.83	.78-.86
Intimacy	.80-.86	.79-.94	.78-.94	.78-.94
Coping	.75-.85	.65-.88	.69-.84	.71-.83
Values	.80-.97	.77-.96	.81-.89	.76-.95
Health	.56-.88	.47-.94	.54-.88	.45-.93
Not Ready	.52-.85	.51-.80	.50-.81	.49-.82

Note. N = 1653.

Table 2-5

Sub-scale Descriptives, Reliabilities, and Correlations

<u>Sub-Scales</u>	<u>Descriptives</u>		<u>Reliability</u>	<u>Inter-Correlations</u>					<u>Correlations with Behavior</u>	
	<u>M</u>	<u>SD</u>	<u>α</u>	<u>Enhancement</u>	<u>Intimacy</u>	<u>Coping</u>	<u>Values</u>	<u>Health</u>	<u>Oral</u>	<u>Penetrative</u>
Enhancement	2.67	1.11	.91						.34***	.37***
Intimacy	3.67	1.19	.94	.36***					.25***	.24***
Coping	1.46	0.68	.88	.48***	.19***				.02	.04
Values	2.82	1.46	.91	-.44***	-.21***	-.14***			-.30***	-.32***
Health	4.01	1.07	.80	-.10**	.01	-.02	.22***		-.06*	-.04
Not Ready	3.06	1.23	.75	-.37***	-.01	-.15***	.44***	.39***	-.29***	-.28***

Note. $N = 1653$. *** $p < .001$, ** $p < .01$

Table 2-6

Motivations by Gender and Ethnicity: Multivariate Tests

<u>Effects</u>	<u>F</u>	<u>p</u>
Intercept	7563.24	.000
Gender	42.78	.000
Ethnicity	17.87	.000
Gender × Ethnicity	2.60	.019

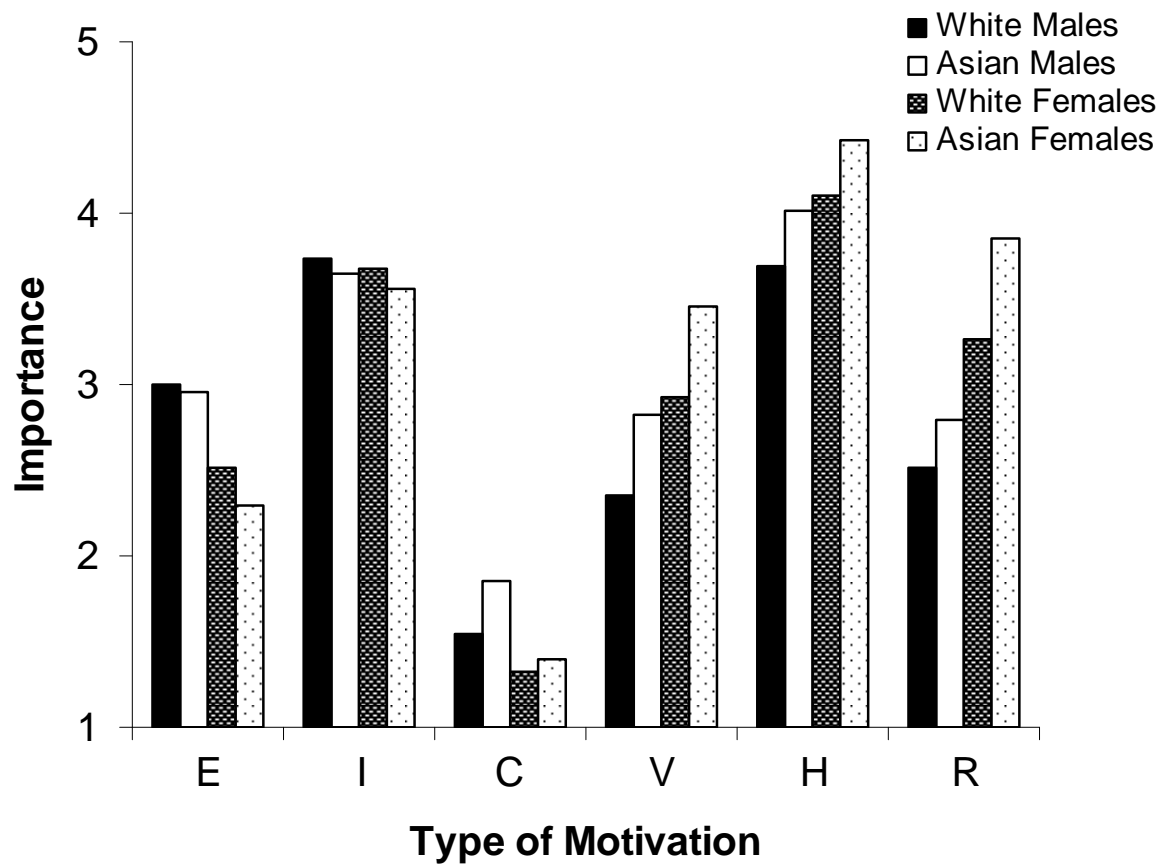
Note. Hypothesis $df = 6$, Error $df = 1644$.

Table 2-7

Multiple and Logistic Regressions Predicting Behavior from Gender, Ethnicity, and Motivations

	<u>Oral Sex</u>		<u>Penetrative Sex</u>		<u>Contraception</u>	<u>Condoms</u>	<u>Alcohol</u>
	<u>B (SE)</u>	<u>OR</u>	<u>B (SE)</u>	<u>OR</u>	<u>β (SE)</u>	<u>β (SE)</u>	<u>β (SE)</u>
<u>Step 1: Demographics</u>	$\chi^2 = 77.86^{***}$		$\chi^2 = 53.19^{***}$		$R^2 = .03^{**}$	$R^2 = .00$	$R^2 = .01$
Age	0.28 (.13)	1.33*	0.39 (.14)	1.48**	0.04 (0.23)	-0.01 (.22)	-0.00 (.12)
Male Gender	-0.11 (.10)	0.90	-0.33 (.11)	0.72**	-0.12 (.16)**	0.05 (.16)	0.04 (.08)
Asian Ethnicity	-1.00 (.14)	0.37***	-0.76 (.13)	0.47***	-0.12 (.20)**	-0.01 (.19)	-0.08 (.10)†
<u>Step 2: Motivations</u>	$\chi^2 = 400.51^{***}$		$\chi^2 = 470.40^{***}$		$R^2 = .06^{***}$	$R^2 = .02$	$R^2 = .09^{***}$
Enhancement	0.67 (.07)	1.95***	0.79 (.08)	2.20***	0.11 (.09)*	-0.08 (.09)†	0.20 (.05)***
Intimacy	0.37 (.06)	1.44***	0.39 (.06)	1.47***	0.13 (.08)**	-0.05 (.11)	-0.11 (.04)**
Coping	-0.58 (.10)	0.56***	-0.43 (.10)	0.65***	-0.12 (.11)**	0.01 (.07)	-0.01 (.06)
Values	-0.16 (.05)	0.85***	-0.28 (.05)	0.76***	-0.08 (.07)†	0.01 (.07)	-0.03 (.04)
Health	0.15 (.06)	1.16*	0.18 (.06)	1.20**	0.08 (.08)†	0.03 (.08)	0.02 (.04)
Not Ready	-0.46 (.06)	0.63***	-0.42 (.07)	0.66***	-0.03 (.08)	-0.03 (.08)	-0.11 (.04)*

Note. Lifetime Sex ($N = 1646$), Risk and Protective Frequencies for those with lifetime penetrative experience ($n = 601$), *** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$.



Note. E = Enhancement, I = Intimacy, C = Coping, V = Values, H = Health, R = Not Ready

Figure 2-1. Mean motivation importance rating by gender and ethnicity.

Chapter 3

Profiles of Motivations for Alcohol Use and Sexual Behavior

According to the functional perspective, outwardly similar behaviors may meet very different needs and identifying these functions could be a key factor in understanding behavior (Cooper et al., 1999). As Cooper et al. (1995) argued, engagement in a single behavior, alcohol use, actually “represents multiple *psychologically distinct* behaviors defined by the distinct underlying functions they serve” (p. 990) for different individuals. One theory that reflects the importance of conscious perceptions of costs and benefits associated with behavior is the theory of reasoned action (Ajzen, 2001; Fishbein & Ajzen, 1975), which asserts that individuals behave in ways that are consistent with their evaluation of expected consequences and their understanding of social norms. Based on the theory of reasoned action approach, interventions should be designed to target cost-benefit assumptions and motivations for behavior (Petraitis et al., 1995). Therefore, the evaluations of consequences and motivations for behavior must be well understood in order to explain behavior and to implement programs to promote behavior change. For alcohol use and risky sex, we must first investigate motivations for behaviors in populations at risk, such as college students (Cooper, 2002). Investigating the functions these behaviors serve and how motivations for the two behaviors are associated with one another and with behavior will inform developmental models of behavior and intervention efforts to promote public health.

Engagement in risk behaviors, such as alcohol use and risky sexual activity, is a widely acknowledged cause of negative health-related consequences for adolescents and

young adults (Centers for Disease Control and Prevention (CDC), 2000). Despite the negative consequences experienced from heavy drinking (e.g., hangovers, accidents) and risky sexual behavior (e.g., sexually transmitted diseases [STDs], unwanted pregnancy), many college students engage in both behaviors throughout their university years (Cooper, 2002; Johnston et al., 2005; Lefkowitz & Gillen, 2005; Mallett et al., 2006; NIAAA, 2006). One explanation for engagement in behaviors that pose such serious risks to personal health is that these behaviors may meet a variety of needs (Cooper & Shapiro, 1997). Indeed, adolescents and college students may be making rational choices to engage in these behaviors based on their perceptions of the importance of potential risks and benefits (Goldberg et al., 2002). For example, some “negative” effects of heavy drinking, such as doing or saying something embarrassing, may be reinforcing for individuals who would choose to use alcohol again in order to behave in ways that allow them to receive a similar amount of attention from peers as they did during and after a previous drinking occasion (Leigh, 1989a). Therefore, it is important to understand the motivations that individuals have for engaging in and not engaging in risk behaviors. Motivations, or the functions a behavior serves and the needs that it meets, are understood as the most proximal antecedents to behavioral engagement (Cooper, 1994; Cox & Klinger, 1988; Kuntsche et al., 2005).

Motivations for Alcohol Use

Research on individual factors predicting alcohol use has supported the role of alcohol motivations in predicting alcohol use cross-sectionally and longitudinally over months and years (Baer, 2002; Goldman et al., 1999; Komro et al., 2001; Leigh, 1989a).

Past work has shown that adolescents and young adults typically drink to get social rewards, to enhance positive mood, to reduce negative mood, or to avoid social alienation (Cox & Klinger, 1988; Kuntsche et al., 2005). Drinking for social motives appears to be the most common, along with enhancement motives, while only a minority of college students drinks to cope (Kuntsche et al., 2005). Furthermore, drinking motivations have been associated with particular patterns of alcohol use. In general, some evidence suggests that social drinkers tend to exhibit more moderate alcohol use, enhancement drinkers tend to engage in heavy alcohol use, and individuals with coping motivations tend to manifest drinking problems and addictions (Cooper et al., 1995; Cox & Klinger, 1988; Kuntsche et al., 2005).

In addition to the impact of prior motivations on behavior, experiences with alcohol may affect individual's subsequent motivations and actions. Recent research suggests that experiencing consequences of alcohol use may affect reported motivation to drink (Blume, Schmalzing, & Marlatt, 2006), although there is some evidence that the heaviest drinkers fail to change their behavior in response to negative alcohol effects (Mallett et al., 2006; McCarthy, Pedersen, & Leuty, 2005). Therefore, motivations may affect and be affected by behavior over time. This body of research provides a foundation for the current study by establishing that different motives for drinking exist and that they may be important in explaining the etiology of alcohol use as well as its short- and long-term consequences.

Motivations for Sexual Behavior

Whereas public health research documents the *prevalence* and *health consequences* of sexual behaviors across demographic groups, the presence and importance of underlying sexual *motivations* and the meaning such experiences hold for individuals have received less attention (Brooks-Gunn & Paikoff, 1993; Diamond et al., 1999). Hill's (2002; Hill & Preston, 1996) sexual motivation model describes the perceived availability and likelihood of experiencing rewarding interpersonal incentives as a result of sexual behavior. Among college students, the most salient rewards were experiencing pleasure, needing to be valued, providing and receiving comfort, and feeling and expressing affection. Similarly, Cooper and colleagues (1998) distinguished self-focused from other-focused sexual motivations, where the former were motivated by agentic or identity needs (e.g., affirming attractiveness) and the latter were motivated by the desire for intimacy. Surveys of adolescents (Hill & Preston, 1996; Leigh, 1989b) have empirically identified practical reasons for sex (e.g., to reproduce) as well as emotional reasons (e.g., to express closeness). A core set of reasons adolescents have sex includes loving the partner, believing that the "time is right," and, for men, sexual opportunism (Eyre & Millstein, 1999; Leigh, 1989b). Among college students, then, it is likely important to study the domains of pleasure, comfort, and affection as motivations for engagement in sexual behaviors.

Reasons *not* to have sex are especially understudied, despite their clear relevance for behavioral prediction and for public health. Sprecher and Regan's (1996) study of sexually abstaining college students found that the reason rated as most important in deciding not to have sex was that students had not found the right person and were not in

love. Personal beliefs, fear of rejection, and avoiding pregnancy and disease have also been reported (Leigh, 1989b; Sprecher & Regan, 1996). Therefore, readiness for sex, concerns over STDs, and ethical beliefs are important domains to consider when assessing motivations not to have sex among college students.

Associations Between Domains of Behaviors

Studies have documented a global overlap of alcohol use and sexual behavior, with evidence that individuals who drink also have sex (for reviews see Cooper, 2002; Leigh & Stall, 1993). In particular, individuals who engage in heavy episodic drinking tend to also engage in risky sexual behaviors, including multiple partners. A positive relationship between the two behaviors is clear, although the level at which the association exists is less so (Cooper & Orcutt, 2000; Leigh & Stall, 1993). The ways in which these behaviors, and especially the motivations for these behaviors, may be intricately linked within individuals are not yet fully understood. For example, people who drink in order to facilitate having sex may also have sex in order to feel better about themselves. Understanding these cross-behavior motivations helps explain and predict each individual behavior, but it also gives insight into appropriate avenues for programs designed to promote health across these behavioral domains. The general associations between alcohol use and sexual behavior may obscure more specific associations for groups of individuals with distinct motivational profiles.

In general, people are strongly motivated by attaining pleasure and avoiding pain (Higgins, 1997; Solomon, 1980). However, whether individuals who have particularly strong hedonistic motivations in one domain are also more hedonistically motivated in

another domain, for example for both alcohol use and sexual behavior, is yet to be documented. Furthermore, whether or not individuals who use alcohol to avoid negative emotions (e.g., to cope) also have sex in order to avoid negative emotions (e.g., to relax) is unknown. The current study therefore investigated person-centered associations, that is, whether people whose motivations indicate that they drink to have a good time also have motivations for having sex that include having a good time. Potential associations of motivations for alcohol use (e.g., fun, relaxation) and motivations for sexual behavior (e.g., enhancement, coping) within persons were explored.

Significance

Identifying the profiles of motivations most salient to individuals with the greatest risk (e.g., multiple sexual partners, evidence of alcohol problems) is necessary in order to design applicable intervention programs. Assessing motivations for and against alcohol use and sexual behavior in the same people, and for individuals with varying levels of drinking and sexual experience, provides new and needed information about motivations for behavioral engagement. As further information regarding the profiles of motivations that are most associated with risk for negative consequences emerges, intervention programs designed to promote health will be able to better target particular audiences.

Information regarding how individuals are motivated will inform interventions by addressing what types of motivations are influential, in general, and the profiles of motivations that indicate individuals at the greatest risk for negative consequences, in particular. According to Cooper and Shapiro (1997), in order to change health behaviors, “we must gain some understanding of the multiple needs or functions these behaviors

serve and attempt to devise alternative ways to meet these same needs” (p. 25). For example, effective strategies for promoting condom use for individuals who have sex to achieve different goals may differ (Cooper et al., 1999; Cooper & Orcutt, 1999). Accordingly, interventions can target specific group profiles of motivations (Kuntsche et al., 2005), based on theoretical estimations of the underlying causes of behavior (Cooper, 2002). Individuals who have some positive and some negative motivations may be different intervention targets than individuals who have largely positive or largely negative motivations. The current study was designed to improve understanding of the potential associations of positive and negative motivations, behaviors, and consequences of alcohol use and sexual behavior to inform the development of motivational interventions to reduce alcohol use and risky sexual behavior for emerging adult college students.

The Current Study

Latent profile analysis (LPA) (Gibson, 1959; Lazarsfeld & Henry, 1968) was used to assess similarities and differences between college students based on motivations. This person-centered approach focused on finding patterns, or profiles, in the data that describe groups of people who had different levels of the various types of motivations. Groups of people with distinct profiles of similarly high or low values on each of the motivation sub-scales were identified. Demographic and behavioral differences between these profiles of people, then, were assessed to determine if there were some motivated groups who were particularly likely to engage in high risk behaviors.

The current study was designed to address three broad aims: (1) to identify groups

of individuals with distinct profiles of positive and negative motivations for alcohol use and sexual behavior; (2) to describe the associations between profiles of motivations for alcohol use and for sex; and (3) to determine if group membership was associated with gender, alcohol use, sexual behavior, and alcohol problems.

The first phase of analysis was description of the endorsement of motivation subscales with means, standard deviations, and ranges. In addition, alcohol and sexual behaviors and consequences were described. To address Aim 1, sub-scale mean values were used in a LPA to distinguish profiles of individuals who have specific types of motivations to use alcohol and to have sex based on overall fit criteria. Analyses were conducted for all respondents regardless of alcohol use and sexual behavior histories. Continuous indicators were used to identify categorical profiles, with a probability given to each individual of being a member of each profile group. The highest probability group was then selected. The motivations surrounding alcohol and sex were each entered separately into a latent profile analysis using MPLUS version 4.21 (Muthén & Muthén, 1998-2007), and a Drinking Motivational Profile and a Sex Motivational Profile were identified for each individual.

Aim 2 was addressed by conducting a Chi-Square test of the contingency table of Drinking Motivational Profile by Sex Motivational Profile. In addition, cross-behavior associations were assessed by testing for mean differences in alcohol use behaviors by sex motivations and vice versa in Aim 3. Aim 3 was to explore differences in profile membership by gender and behavior. Drinking and sex profile groups were used as between-subjects independent variables in multivariate analysis of variance (MANOVA) (e.g., Neter, Kutner, Nachtsheim, & Wasserman, 1996). Dependent variables were gender

composition, frequency of alcohol and sexual risk behaviors (i.e., frequency of alcohol use, frequency of binge drinking, number of sexual partners, frequency of condom use), and a measure of problem consequences of alcohol (i.e., Rutgers' Alcohol Problem Index [RAPI] scores). These analyses were designed to yield information relative to which people with particular profiles of motivations may be most at-risk for engaging in risky behaviors (e.g., multiple sexual partners) and experiencing negative consequences (i.e., problematic drinking consequences).

Method

Participants

Participants ($N = 227$, 51.1% male) were recruited as part of a study designed to examine links between alcohol use and sexual behavior across days and years among traditionally-aged college students. To be eligible for the study, participants were required to be first-year college students, at least 18 years of age, and U.S. citizens or permanent residents. Recruitment letters were sent to 336 students with a pen and \$5 in cash enclosed. Email invitations followed, with a secure link to the survey which was administered via the world wide web. On campus residence was reported by 96.8% of the students. Individuals from racial and ethnic minorities were over-sampled to achieve diversity in the sample. Hispanic or Latino ethnicity was reported by 32.7% of the sample. A separate question asked participants to self-report their race by checking all that applied. Of the total sample, 24.7% identified as African American, 23.8% identified as Asian American, 56.4% identified as European American, 5.5% identified as

American Indian, and 1.3% identified as Other. Mean age was 18.85 years ($SD = 0.38$, range 18.12 – 20.74). Incentives for participation were the \$5 pre-incentive and a \$25 survey incentive. Recruitment rate (i.e., percent of eligible individuals who provided data) was 69.3% ($N = 233$). Data on sexual and alcohol use motivations for the current analyses were available for 67.6% of eligible individuals, 97.4% of those who participated in the study.

Participants were required to provide an electronic signature on an online consent form in order to participate. This study was approved by the Institutional Review Board and protected by a Certificate of Confidentiality from the federal government. Data collection was confidential and linked to randomly-generated personal ID numbers for study purposes. Tracking information was stored in separate and secured files.

Measures

Motivations. Three subscales from the Importance of Consequences of Drinking (ICOD) short form (Maggs, 1993) assessed the importance of achieving positive alcohol consequences on a scale of 0 = *not important* to 1 = *very important*. Motivations for Drinking included: Fun/Social motivations (4 items, e.g., having a good time, $\alpha = .94$), Relaxation/Coping motivations (5 items, e.g., helping you unwind, $\alpha = .90$), and Image motivations (4 items, e.g., maintain your reputation; $\alpha = .83$). In addition, Sex motivations for drinking questions were designed for the current study (2 items, i.e., having a sexual experience, enjoying a sexual experience more). Also, two ICOD subscales assessing Motivations Against Drinking included avoiding Physical alcohol consequences (4 items, e.g., passing out; $\alpha = .89$) and Behavioral alcohol consequences

(3 items, e.g., doing something embarrassing; $\alpha = .73$). The ICOD has shown good convergent and predictive validity in college student populations (Maggs, Vesterdal, & Galambos, in review).

Cooper et al.'s (1998) adapted sex motives sub-scales (described in Chapter 2) assessed Intimacy (5 items, e.g., to express love; $\alpha = .92$), Enhancement (5 items, e.g., it feels good; $\alpha = .91$), and Coping (5 items, e.g., to cheer up; $\alpha = .88$) motivations for sex. To assess motivations against sex, scales assessing Health (3 items, e.g., fear of STDs, $\alpha = .80$), Not Ready (3 items, e.g., do not feel old enough; $\alpha = .67$), and Values (3 items, e.g., against your beliefs; $\alpha = .87$) motivations were used (see Chapter 2 for scale development).

Alcohol Use and Problems. Standard summary measures adapted from the Monitoring the Future study assessed the frequency of alcohol use in the past 3 months (Johnston et al., 2005). Respondents were asked, "On how many occasions have you had alcoholic beverages to drink – more than just a few sips, during the last 3 months?" on a scale of 0 = 0 occasions, 1 = 1-2 occasions, 2 = 3-5 occasions, 3 = 6-9 occasions, 4 = 10-19 occasions, 5 = 20-39 occasions, 6 = 40 or more occasions. Individuals who reported never drinking in their lifetime were given a 0.

The frequency of binge drinking (4+/5+ drinks) was assessed by two questions that read, "Think back over the last two weeks. How many times have you had four [five] or more drinks in a row?" The binge drinking measure is an assessment of combined quantity and frequency which reflects the level of heavy episodic drinking among respondents. Based on work demonstrating the need for gender-specific frequency of binge drinking, because of differences in ability to metabolize alcohol and typical body

weight by gender (Wechsler, Dowdall, Davenport, & Rimm, 1995), binge drinking was computed separately for men and women. For women, the response to the 4+ drinks question was used; for men, the response to the 5+ drinks question was used. Responses were on a scale of 0 = *None*, 1 = *Once*, 2 = *Twice*, 3 = *3-5 times*, 4 = *6-9 times*, and 5 = *10 or more times*. Individuals who reported never drinking in their lifetime were coded as 0.

Alcohol problems were assessed by the Rutgers Alcohol Problem Index (RAPI) (White & Labouvie, 1989). The RAPI screens for problem drinking, with high internal consistency ($\alpha = .92$ in this sample) and good convergent validity with other measures of alcohol use and abuse (White & Labouvie, 1989). Respondents reported how often they have ever experienced 23 negative consequences as a result of alcohol use (e.g., not able to study, got into fights) on a scale of 0 = *none*, 1 = *1-2 times*, 2 = *3-5 times*, and 3 = *More than 5 times*. The mean of the 23 items was used.

Sexual Behavior and Health. Participants were asked whether they had ever performed oral sex, ever received oral sex, and how many oral sex partners they had in their lifetime. Number of lifetime oral sex partners was coded as the number of partners reported or as 0 if participants reported never engaging in either type of oral sex. A separate set of questions asked whether participants had engaged in penetrative sex during the past 12 weeks and how many penetrative sexual partners they had in the past 12 weeks. Number of penetrative sex partners in the past 12 weeks was coded as 0 for persons who reported not having penetrative sex in the past 12 weeks.

In addition, self-reported lifetime diagnosis of at least one of six sexually transmitted diseases (STDs) was investigated. The first question asked, "In your lifetime,

have you ever been told by a doctor or nurse that you had any of the following sexually transmitted diseases?” Respondents indicated whether or not they had been diagnosed with chlamydia, gonorrhea, trichomoniasis, genital herpes, and human papillomavirus (HPV). A second question, asked only to those individuals who were ever tested for HIV, asked, “Were the [HIV test] results positive?” Four people (1.7%) reported a known STD diagnosis. Due to lack of variance, this variable was not included in analyses.

Results

Descriptive Information

Means, standard deviations, and ranges for the motivations sub-scales are shown in Table 3-1. Table 3-2 shows descriptive information for the alcohol use, alcohol problems, and sexual behavior variables. The mean frequency of alcohol use in the past three months was about 6 occasions (i.e., a mean of 2.7, where 2 = 3-5 occasions and 3 = 6-9 occasions) and the mean of binge drinking the past two weeks was approximately one time (i.e., a mean of 1.23, where 1 = 1-2 times and 2 = 3-5 times). On average, participants reported experiencing few of the alcohol problems as measured by the RAPI ($M = 0.30$, $SD = .40$; where 0 = never and 1 = 1-2 times). However, only 27.4% ($n = 62$) reported never experiencing any of the RAPI consequences. One-third of the sample ($n = 76$) reported never having experienced oral sex in their lifetime (0 partners); 21.4% ($n = 49$) reported 1, 18.3% ($n = 42$) reported 2, 12.7% ($n = 29$) reported 3, and 14.3% ($n = 33$) reported 4 or more lifetime oral sex partners. For penetrative sex partners in the past 12

weeks, 56.0% ($n = 130$) reported 0 partners; 34.1% ($n = 79$) reported 1 partner; 8.2% ($n = 19$) reported 2 partners; and 1.7% ($n = 4$) reported 3 to 5 partners.

Latent Profile Analysis

Aim 1 was to identify profiles of motivations for alcohol use and sexual behavior. LPA was used to distinguish profiles of motivations for alcohol use and for sexual behavior (separately) based on responses to the scales shown in Table 3-1. LPA assumes that the associations between the sub-scales can be appropriately explained by a categorical profile variable (Waller & Meehl, 1998). Profiles with two to five classes were compared for each behavior. Solutions were chosen based on fit statistics, interpretability of profiles, and the criterion of avoiding very small cell sizes (e.g., Bauer & Shanahan, 2007). Fit statistics are shown in Table 3-3. With the addition of classes, the absolute fit statistics all decreased indicating better fit, but the incremental drop in AIC, BIC, and Adjusted BIC decreased with each additional class. The asymptote of incrementally better fit, therefore, is acknowledged as important to consider. For alcohol motivations, the asymptote of change in fit statistics (i.e., incremental improvement) indicated either a three- or four-class solution would be most appropriate. When the results for each of these solutions were compared, it was clear that these solutions shared the same first three classes, with the four-class solution separating out an additional class with particularly high motivations for drinking in order to have sex. Due to the paper's primary focus on links between motivations for alcohol and sex as well as the relative similarity of fit between the three- and four-class profiles, the four-class solution for alcohol motivations was chosen (see Bauer & Shanahan, 2007).

For sex motivations, the three-class model was chosen because it fit the data better than the two-class model. The four- and five-class solutions for sex motivations were rejected because they included profiles with only 11 or 13 people (4.7 – 5.6% of participants). Entropy (shown in Table 3-3) indicates the level of classification accuracy with values closer to 1 reflecting better classification; these indicators should always be used in conjunction with other measures of model fit (Herman, Ostrander, Walkup, Silva, & March, 2007). Average latent class probabilities for most likely class membership showed good discrimination (.89 to .97 for alcohol motivations and .91 to .96 for sex motivations). A value of .92 indicates a 92% probability of being in a specific profile. Individuals were then assigned to their highest probability class for subsequent analyses.

Four profiles were identified for alcohol use motivations (see Figure 3-1). The first profile, labeled Anti Drinking Motivations, described the motivations of 31.4% of participants ($n = 72$) who reported lower than average Fun/Social, Relaxation, and Image motivations for drinking and higher than average Physical and Behavioral motivations against drinking. The second profile, Average Drinking Motivations, described 39.6% of participants ($n = 91$). Mean endorsement of all motivation sub-scales were within 0.5 of the sample mean (on a scale of 0 – 4). The third profile, Pro Drinking Motivations were endorsed by 15.7% of participants ($n = 36$) who reported higher than average Fun/Social, Relaxation, and Image motivations for drinking, but not higher Drinking for Sex motivations. Finally, Pro Drinking for Sex Motivations, included 13.1% of participants ($n = 30$) who reported high motivations for drinking, and especially Drinking for Sex.

Three profiles of motivations for sex were identified and are shown in Figure 3-2. The first profile, Anti Sex Motivations, captured the motivations of 35.3% of participants

($n = 82$) who reported lower than average Enhancement, Intimacy, and Coping motivations for sex and greater than average Not Ready, Health, and Values motivations against sex. The second profile, Pro Sex Motivations, described 41.8% of the sample ($n = 97$) who reported higher than average motivations for sex including Intimacy and Enhancement, but not Coping. This group also reported lower than average Not Ready, Health, and Values motivations against sex. A third profile, Pro Sex for Coping Motivations, described 22.8% of participants ($n = 53$) who reported higher than average Enhancement and Intimacy motivations for sex and who had particularly high endorsement of having sex in order to Cope. These individuals also reported lower than average Not Ready, Health, and Values motivations against sex.

Comparing Profiles for Drinking and Sex

To address Aim 2, a Pearson Chi-Square test was conducted to determine whether motivational profiles for alcohol use were associated with motivational profiles for sexual behavior, that is, whether people with particular motivations for drinking also showed a differential likelihood of having particular motivations for sex. Results indicated motivational profiles were significantly associated, $\chi^2(6, N = 227) = 55.0, p < .001$. Table 3-4 shows the percentages and numbers of participants in each drinking motivation profile who were also in each sex motivation profile. The majority of individuals whose motivational profiles were Anti Drinking also had motivational profiles that were Anti Sex. Students in the Average Drinking group were most often also in the Pro Sex group. People who were classified as Pro Drinking were divided between the Pro Sex and the

Pro Sex for Coping groups. Individuals with the Pro Drinking for Sex profile were also most likely to have the Pro Sex for Coping profile.

Gender Differences in Profiles

To address Aim 3, gender and behavioral differences between the profiles were examined. First, two ANOVA models with between subjects factors of Drinking Profile and Sex Profile, respectively, tested for mean differences in profile categorization by gender (dependent variable). Percentages of women and men in each profile type are shown in Figure 3-3. The first ANOVA indicated that there were significant differences in gender composition by Drinking Motivational Profile, $F(3, 225) = 3.26, p < .05$. Post-hoc comparisons revealed that the Anti Drinking Motivations profile was comprised of more women than men and the Pro Drinking for Sex Motivations profile was comprised of more men than women. All other comparisons by gender were not significantly different.

A second ANOVA revealed differences in gender composition by Sex Motivational Profile, $F(2, 229) = 17.30, p < .001$. Post-hoc comparisons showed that all three profiles had significantly different gender compositions (Figure 3-4). The Anti Sex Motivations profile was comprised of more women than men. The Pro Sex Motivations profile and the Pro Sex for Coping Motivations groups contained more men than women. In addition, the Pro Sex for Coping Motivations group had a significantly greater proportion of men than the Pro Sex Motivations group.

Differences in Behavior and Consequences by Profile Membership

Two MANOVA analyses were conducted to explore whether alcohol use and problems and sexual behaviors differed by motivational profiles for drinking and sex. The five dependent variables were frequency of alcohol use in the past 3 months, frequency of binge drinking in the past 2 weeks, RAPI scores, lifetime number of oral sex partners, and number of penetrative sex partners in the past 12 weeks. Multivariate results are shown in Table 3-5. Drinking Motivational Profile was associated with multivariate differences in behavior. The significant effects were explored using Tukey's post-hoc comparisons, as described below.

Between-subjects differences by Drinking Motivational Profiles were observed for frequency of alcohol use, $F = 12.32, p < .001$, frequency of binge drinking, $F = 6.20, p < .001$, and RAPI scores, $F = 9.21, p < .001$, but not for lifetime oral or 12-week penetrative sexual behavior. Individuals in the Anti Drinking Motivations profile had lower reported frequency of drinking and frequency of binge drinking than all other profiles. The Anti Drinking Motivations group had lower RAPI scores compared to the Pro Drinking Motivations and the Pro Drinking for Sex Motivations groups, but not to the Average Drinking Motivations Group. For all three alcohol-related variables, individuals with profiles of Average Drinking Motivations, Pro Drinking Motivations, and Pro Drinking for Sex Motivations did not significantly differ. Mean levels of the dependent variables by Drinking Motivational Profile are shown in Figure 3-5.

Sex Motivational Profile was also significantly associated with multivariate differences in behavior. In the model with Sex Motivational Profile, gender and the Gender \times Profile Interaction were also significant multivariate predictors. Between-

subjects effects for Sex Motivational Profile were found for frequency of alcohol use, $F = 8.37, p < .001$, number of oral sex partners, $F = 6.26, p < .01$, and number of penetrative sex partners, $F = 15.01, p < .001$. No between-subjects differences by Sex Motivational Profile were found for frequency of binge drinking or RAPI. Post-hoc comparisons indicated that frequency of alcohol use was significantly lower among individuals in the profile of Anti Sex Motivations. The other two profiles, Pro Sex Motivations and Pro Sex for Coping Motivations, did not significantly differ. A similar pattern was replicated for number of oral sex partners and number of penetrative sex partners. Individuals in the Anti Sex Motivations profile reported significantly fewer sexual partners compared to the two other motivational profiles. Results are shown in Figure 3-6.

The significant multivariate effect of gender in the model with Sex Motivational Profile was probed further. The between-subjects effect of gender was significant only for the number of penetrative sex partners in the past 12 weeks, $F = 8.40, p < .01$ (Women $M = 0.66, SD = 0.81$; Men $M = 0.50, SD = 0.70$).

Finally, the Gender \times Profile interaction for Sex Motivational Profile was significant for the RAPI only, $F = 8.19, p < .001$. Men in the Pro Sex for Coping Motivations group reported more alcohol consequences on the RAPI compared to men in the other motivational groups (see Figure 3-7). Women in the Pro Sex Motivations group reported more alcohol consequences on the RAPI compared to women in the other motivational groups.

Discussion

Based on the theory of reasoned action (Ajzen, 2001; Fishbein & Ajzen, 1975), individuals' perceptions of the costs and benefits of a behavior are its most proximal antecedents. In addition, the functional perspective suggests that identical behaviors (e.g., frequent alcohol use, multiple sexual partners) may serve different purposes for different individuals and therefore represent psychologically distinct actions (Cooper et al., 1999; Cooper et al., 1995). This underlines the importance of understanding motivations in order to understand behavior and approaches to intervene to promote healthier behavior among college students. In the current study, motivations for behavior were examined using a person-centered design that can capture the profiles of motivations for and against behavior for given individuals who have similar beliefs and perceptions of alcohol use and sexual behaviors.

Motivational Profiles and Associations with Gender and Behavior

The study addressed three main aims. First, groups of individuals with unique profiles of positive and negative motivations for alcohol use and sexual behavior were identified. Four profiles of drinking motivations were profiles of motivations against drinking (high on physical and behavioral motivations), average motivations, pro drinking motivations (high on fun/social and image motivations), and pro drinking motivations including drinking to have sex. Three profiles of sexual behavior motivations were motivations against sex (high on values, health, and not ready motivations), pro sex motivations (high on intimacy and enhancement motivations), and pro sex motivations

including having sex for coping reasons. Previous studies focused on drinking motivations have used variable-centered approaches and primarily focused on positive motivations for alcohol use. Therefore, the current study advances the literature by including (a) drinking motivations and sexual behavior motivations in the same study; and (b) negative motivations, or, motivations not to use alcohol and have sex. This broader focus facilitated a more complete and nuanced picture of the complexity of patterns of motivations held by first-year college students.

The second aim was to describe the associations between motivations for alcohol use and sex among college students. Although a positive relationship between drinking and sexual behaviors has been documented between people, the meaning of the association has not been specified (Cooper & Orcutt, 1999; Leigh & Stall, 1993). The authors are aware of no previous research linking motivations for alcohol use and for sexual behavior using person-centered analyses. In this study, cross-motivation associations were found, such that individuals who had motivational profiles with motivation against drinking also tended to hold particular motivational profiles with motivations against sex. Individuals who had motivational profiles including endorsing alcohol use in order to have sex also tended to have profiles including having sex as a coping mechanism. These latter two profiles may be conceptually considered to be the most risky, given the possible effects of alcohol use on risky sexual behavior (Cooper, 2002; Kaly et al., 2002; Leigh, 1999) and the evidence that individuals who engage in risk behaviors to cope may be at risk for clinical abuse and dependence (Cox & Klinger, 1988).

The third study aim was to examine profile membership by gender, alcohol use and problems, and sexual behavior. The gender composition of the motivational profile differed, such that there were more women in groups with higher motivations against drinking and sex and more men in groups characterized by drinking for sex motivations and sex for coping motivations. Motivational profiles were also associated with behavior. Drinking motivational profile predicted frequency of alcohol use, frequency of binge drinking, and alcohol problems. Sex motivational profile predicted number of lifetime oral sex partners and number of penetrative sex partners in the past 12 weeks. In addition, men with motivations for sex including coping also exhibited more problems with alcohol, suggesting some cross-behavior links between drinking and sex.

While these associations show validity of the motivational profiles and provide evidence for the utility of person-centered approaches, it is important to note that the majority of the differences identified a uniquely low risk for the motivations against drinking and sex groups rather than a uniquely high risk for any other specific group. In other words, anti drinking and anti sex motivational groups engaged in significantly less behavior than all other groups, but groups with profiles of different motivations *for* a behavior (e.g., pro drinking and pro drinking for sex) did not significantly differ in their retrospective reports of behavior. Therefore, there is evidence that having motivations against drinking including worry regarding physical or behavioral consequences and motivations against sex including concern over health consequences, holding values against sex, or not feeling ready is associated with engaging in less drinking and sexual behavior.

However, the hypothesized highest risk profiles (Pro Drinking Motivations for Sex and Pro Sex Motivations for Coping) did not evidence significantly different risk behaviors overall compared to other groups with pro drinking and sex motives. Previous research using variable-centered analyses has noted the increased risk of individuals with coping motivations (Cooper et al., 1995; Cox & Klinger, 1988; Hussong, Hicks, Levy, & Curran, 2001; Kuntsche et al., 2005). In the current study, these results were not replicated, possibly due to the developmental stage (i.e., behavioral variability during the exploratory first year of college), lack of power to detect these differences, or the use of retrospective behavioral reports (i.e., motivations were measured concurrently). Future research should address the possibility that the increased risk for greater health consequences manifests itself longitudinally, such that the motivational profile may be a prospective predictor of alcohol- and sex-related health outcomes.

Intervention Implications

The existence of distinct profiles of motivations for alcohol use and sexual behavior implies the need for intervention programs targeted to individuals with different reasons for engaging in risk behaviors. For example, for individuals who have a profile of motivations for drinking including drinking for fun/social reasons, relaxation reasons, and image reasons, an intervention could address potential strategies for enjoying themselves while exercising harm reduction (e.g., spacing drinks). A profile of motivations for sex that includes coping reasons, or using sexual intimacy to escape from stressful situations, might require an intervention focus on managing anxiety in healthier ways (e.g., exercise,

meditation). These two profiles, therefore, suggest vastly different intervention approaches.

Strengths and Limitations

The current study has two main strengths. First, both positive and negative motivations for two separate behaviors were measured in order to assess the motivational links between alcohol use and sexual behavior. These data expand what has been established in the literature by focusing on potential motivations for and against behavior within the same individuals. Therefore, profiles apply to people with or without experience with these behaviors making assessment of developmental change across adolescence and young adulthood without selection for prior experience possible. Second, a person-centered approach allowed for an analysis of how motivations are configured within people, or which motivations tend to occur together, to give insight to how college students are motivated as individuals. Rather than focusing on each subscale independently, person-centered approaches allow for complex higher-order interactions in associations to be uncovered (Bauer & Shanahan, 2007). Limitations for the study include its cross-sectional design and the single college sample. However, strengths of the data, including its racial and ethnic diversity, high response rate, and quality of measures mitigate these limitations.

Future Directions

There is evidence that distinct profiles of motivations for alcohol use and sexual behavior exist and are related to the behaviors themselves cross-sectionally. Future studies should address whether person-centered motivational types predict the development of these behaviors over time and across behavioral domains (i.e., whether having motivations to drink for sex is predictive of riskier sexual behavior). Developmentally, motivational profiles may change over time as adolescents and young adults mature, during life transitions (e.g., the transition to college, marriage), and in response to specific experiences (i.e., a new relationship). Understanding the composition and development of motivational profiles may prove to be a fruitful field of investigation. Evidence regarding how the same individuals experience and weigh both positive and negative motivations for a behavior will be foundational for designing intervention programs that can appropriately address the whole individual.

Table 3-1.

Descriptive Information

	<u>Mean (SD)</u>	<u>Items</u>	<u>α</u>
Alcohol Motivations			
Fun/Social	1.73 (1.19)	5	.91
Relaxation	1.00 (0.99)	4	.88
Image	0.62 (0.80)	4	.83
Sex	0.47 (0.88)	2	.91
Physical	2.95 (1.09)	4	.89
Behavioral	3.30 (0.87)	3	.73
Sex Motivations			
Enhancement	1.82 (1.12)	5	.91
Intimacy	2.31 (1.11)	5	.92
Coping	0.69 (0.85)	5	.88
Not Ready	1.91 (1.21)	3	.67
Health	3.22 (0.91)	3	.73
Values	1.59 (1.34)	3	.87

Note. All scales ranged from 0 (not important) to 4 (very important).

Table 3-2.

Drinking and Sexual Behaviors: Descriptive Statistics

	<u>Mean (SD)</u>	<u>Range</u>
Frequency of Alcohol Use (Past 3 months)	2.70 (1.91)	0-6
Frequency of Binge Drinking (Past 2 weeks)	1.23 (1.37)	0-5
Alcohol Problems (RAPI)	0.30 (0.40)	0-1.78
Number of Oral Sex Partners (Lifetime)	1.88 (2.76)	0-30
Number of Penetrative Sex Partners (Past 12 weeks)	0.56 (0.76)	0-5

Note. $N = 227$.

Table 3-3.

Fit Statistics for Alcohol and Sexual Motivation Latent Profile Analyses

Alcohol					
	<u>LL (H0)</u>	<u>AIC</u>	<u>BIC</u>	<u>Adj BIC</u>	<u>Entropy</u>
Two Classes	-1669.96	3377.92	3443.17	3382.95	0.88
Three Classes	-1547.37	3146.73	3453.61	3153.61	0.92
Four Classes	-1498.93	3063.87	3177.18	3072.59	0.89
Five Classes	-1452.73	2985.46	3122.81	2996.04	0.92
Sex					
	<u>LL (H0)</u>	<u>AIC</u>	<u>BIC</u>	<u>Adj BIC</u>	<u>Entropy</u>
Two Classes	-1965.29	3968.58	4034.07	3973.85	0.78
Three Classes	-1901.28	3854.56	3944.17	3861.76	0.83
Four Classes	-1868.87	3803.73	3917.47	3812.88	0.87
Five Classes	-1839.54	3759.09	3896.96	3770.18	0.86

Note. LL (H0) = Loglikelihood H0 value; AIC = Akaike information criteria; BIC = Bayesian information criteria; Adj BIC = Sample-size Adjusted Bayesian information criteria.

Table 3-4.

Cross-tabs of Drinking Profiles by Sex Profiles

<u>Drinking Profile</u>	<u>Sex Profile</u>		
	<u>Against Sex</u>	<u>Pro Sex</u>	<u>Pro Sex For Coping</u>
	<u>% of Drk Grp (n)</u>	<u>% of Drk Grp (n)</u>	<u>% of Drk Grp (n)</u>
Against Drinking	57.1% (40)	32.9% (23)	10.0% (7)
Average Drinking	35.2% (32)	49.5% (45)	15.4% (14)
Pro Drinking	11.1% (4)	47.2% (17)	41.7% (15)
Pro Drinking for Sex	3.3% (1)	40.0% (12)	56.7% (17)

Note. N = 227.

Table 3-5.

Multivariate Results: Differences in Frequency of Alcohol Use, Alcohol Consequences, and Number of Sex Partners by Motivational Profile

<u>Drinking Motivations</u>	<u>F</u>	<u>Hyp df</u>	<u>Error df</u>	<u>Sig</u>
Gender	1.43	6	89	.214
Drinking Profile	2.99	18	273	.000
Gender × Drinking Profile	1.16	18	273	.299
<u>Sex Motivations</u>	<u>F</u>	<u>Hyp df</u>	<u>Error df</u>	<u>Sig</u>
Gender	3.35	5	217	.006
Sex Profile	4.62	10	436	.000
Gender × Sex Profile	2.43	10	436	.008

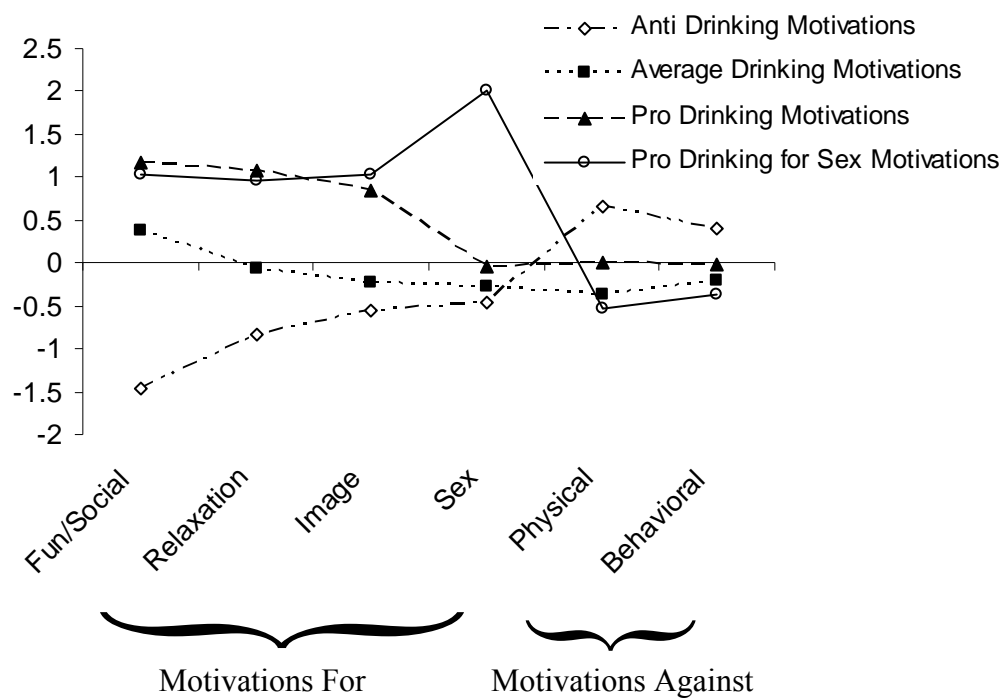


Figure 3-1.

Profiles of Drinking Motivations

Note. Profile group means are sample-mean centered.

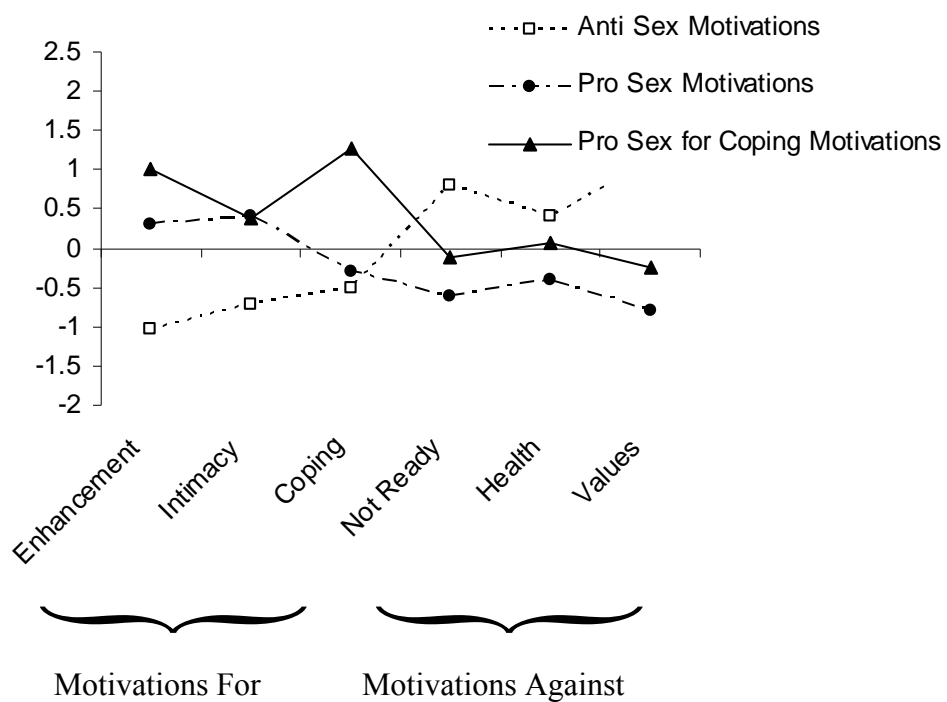


Figure 3-2.

Profiles of Sex Motivations

Note. Profile group means are sample-mean centered.

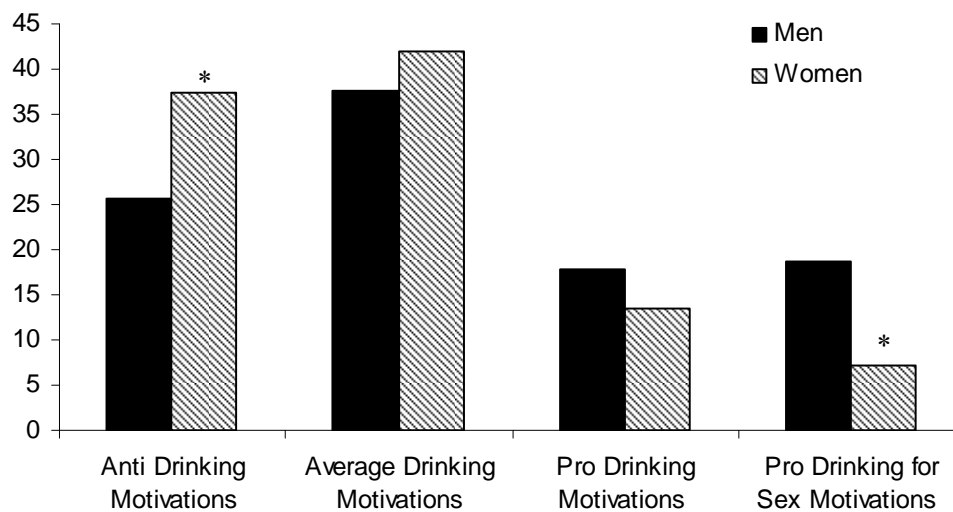


Figure 3-3.

Percentage of Men and Women in Each Drinking Motivational Profile

Note. * $p < .05$.

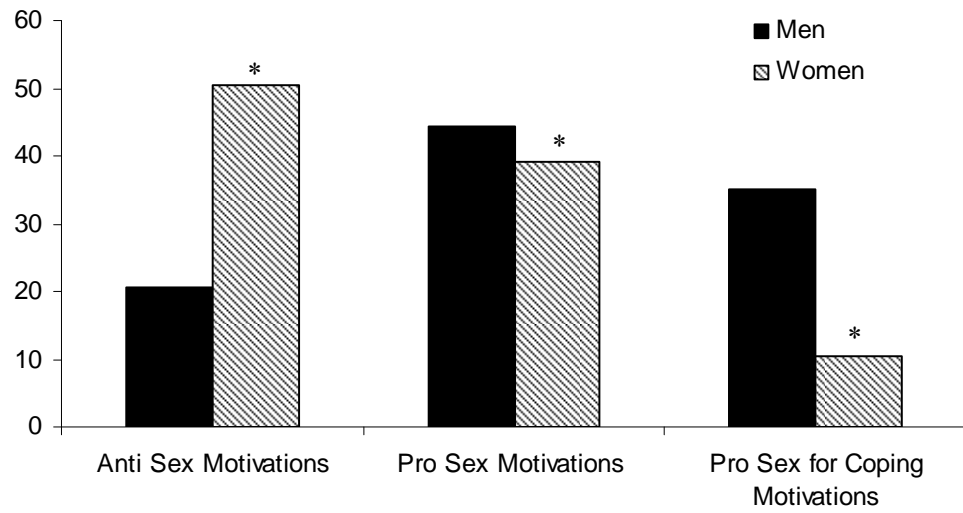


Figure 3-4.

Percentage of Men and Women in Each Sex Motivational Profile

Note. * $p < .05$.

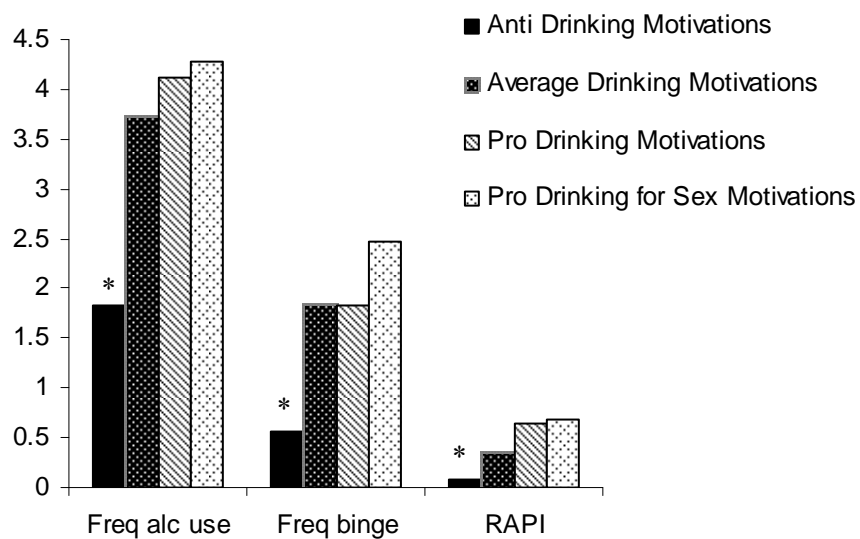


Figure 3-5.

Differences in Alcohol Use and Consequences by Drinking Motivational Profile

Note. * $p < .05$.

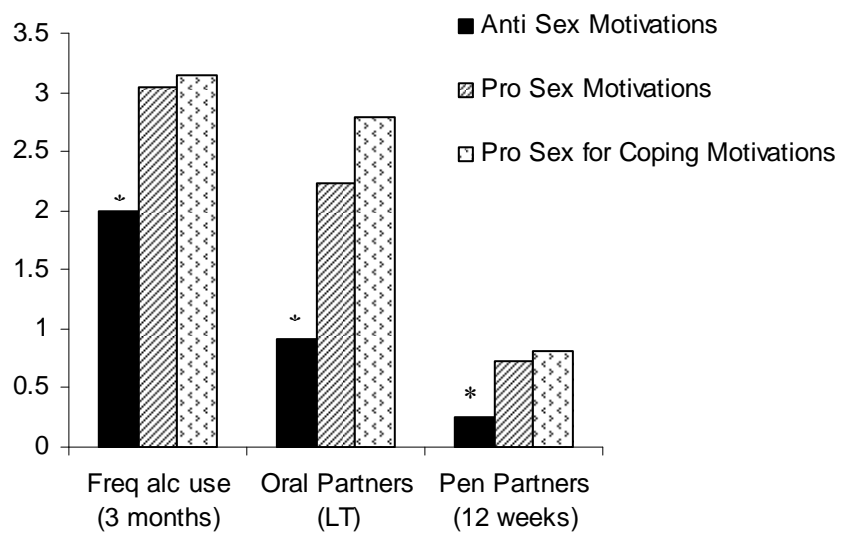


Figure 3-6.

Differences in Behavior by Sex Motivational Profile

Note. * $p < .05$.

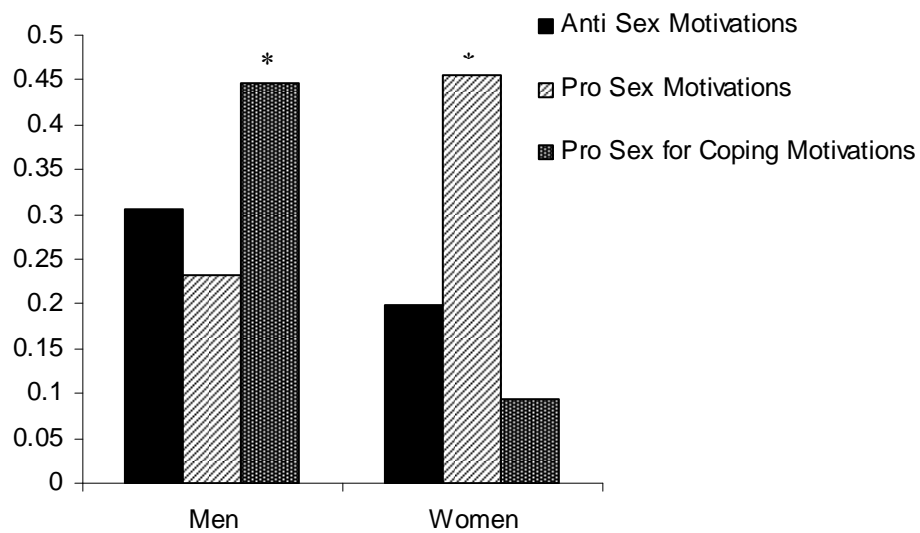


Figure 3-7.

Gender by Sex Motivational Profile Interaction Predicting Number of Penetrative Sex Partners

Chapter 4

Does Drinking Lead to Sex? Daily Alcohol-Sex Behaviors and Expectancies

Alcohol use is widely understood as a common part of the collegiate experience in North America and Western Europe (Schulenberg & Maggs, 2002; Straus & Bacon, 1953). There is a strong cultural expectation of college student drinking that encourages alcohol use in order to experience fully the mythically carefree college years (Maggs, 1997). In addition, despite evidence of alcohol's pharmacological impairment on sexual performance, there is a strongly held cultural belief that drinking may lead to pleasurable sexual experiences (Goldman & Roehrich, 1991; Leigh & Stall, 1993). In fact, even warnings for students that alcohol use leads to risky sexual encounters may actually strengthen sex-related alcohol expectancies and thus promote risky behavior by serving to create a self-fulfilling prophecy or an "excuse-in-a-bottle" (p. 75, Dermen, Cooper, & Agocha, 1998). For example, students who report failing to use condoms because they were drinking may be interpreting the cause of their non-use of condoms based on their beliefs or expectancies about alcohol's effects. In other words, individuals who were drunk may mistakenly attribute their risky behavior to drunkenness, even in the absence of any causal disinhibitory effect of alcohol use on behaviors, because of an expectancy bias (Cooper, 2002). The current work examines event-level associations between alcohol use and sexual behaviors, and tests whether this within-person link may be stronger for those students who had expectancies that alcohol would enhance their sexual affect and sexual drive (Abbey et al., 1999).

Alcohol Use and Sexual Behavior

Over 600 studies have investigated the association between using alcohol and having sex over the past two decades (Cooper, 2006). The majority of studies have found a positive association (Cooper, 2002, 2006; Leigh & Stall, 1993), although most have used purely cross-sectional, between-subjects, and correlational designs (Cooper, 2006; Cooper & Orcutt, 2000; Leigh & Stall, 1993). Intricacies of the associations between these behaviors within-persons and across occasions are relatively unstudied. In addition, questions about for whom alcohol use and sexual behavior are associated on an occasion level are yet unanswered.

The relationship between alcohol use and sexual behavior is complex (Leigh & Stall, 1993) and likely involves bidirectional influences. Alcohol and other substance use are commonly understood as contributors to risky sexual behavior, defined as behavior that increases the probability of negative outcomes (e.g., unwanted pregnancy, STDs). On average, heavy drinkers tend to have more sexual partners than non-heavy drinkers over time (Santelli, Brener, Lowry, Bhatt, & Zabin, 1998; Wechsler et al., 1994). Possible explanations of the associations between alcohol and sex are third variables (e.g., lifestyle, values), causal effects of alcohol (e.g., alcohol's disinhibitory effects lead to sex when drinking), and reverse causal effects of alcohol (e.g., intentions to have sex cause drinking) (Cooper, 2006). Third variable explanations, including personality (Caspi et al., 1997), sensation seeking (Zuckerman, 1979), ethical values (Regenerus, 2007), and social group norms (Borsari & Carey, 2003; Lewis, Lee, Patrick, & Fossos, 2007), may at least partially explain the correlation between alcohol use and sexual behavior. However, it is also possible that there are causal or reverse causal associations between behaviors.

Based on the causal view, one particular danger of alcohol use among college students is the reported increase in risky sexual behavior following drinking (Cooper, 2002; Kaly et al., 2002; Leigh, 1999). For example, Hingson et al. (2005) estimated that 8% of college students aged 18 to 24 (474,000 people) had unprotected sexual intercourse annually resulting from alcohol use. College students tend to overestimate the number of drinks they could consume without experiencing negative consequences, such as unwanted sex (Mallett et al., 2006), and may be more likely to have sex with a new partner after drinking (Cooper, 2002; Leigh & Stall, 1993; Testa & Collins, 1997). Furthermore, drinking prior to sex may be associated with decreased condom use, particularly with casual partners (LaBrie et al., 2005).

Conversely, according to the reverse causal explanation, the desire to engage in sexual behavior may lead to heavier drinking because drinkers hold strong beliefs about the influence of alcohol on sexuality (Abbey et al., 1999; Goldman & Roehrich, 1991). For example, based on alcohol expectancy theory (Cooper, 2002; Dermen & Cooper, 2000), one of the reasons some college students use alcohol is their belief that alcohol facilitates social interactions with the opposite sex, both socially and physiologically. Abbey et al. (1999), for example, described the perceived positive effects of alcohol on sexual drive and sexual affect. Many drinking settings provide opportunities to interact with potential partners (Abbey et al., 2005; Cooper, 2002; Dermen & Cooper, 2000) and alcohol decreases sexual inhibitions (Kotchick et al., 2001a). Emerging adults commonly consume alcohol before having sex (Cooper, Peirce, & Huselid, 1994); estimates range from $\frac{1}{4}$ to more than $\frac{1}{2}$ of people at the most recent sexual occasion (Desiderato & Crawford, 1995; MacNair-Semands & Simono, 1996).

To elucidate such complex and reciprocal influences, such that the desire for sex may lead to drinking and drinking may lead to sexual risk taking, requires models that track goal-directed expectancies and consequences of behavior on a short-term, within-person basis and which allow for natural controls for between-person differences (e.g., personality) when comparing occasions. However, studies of the event-level and within-person associations of alcohol use and sexual behavior and related consequences (e.g., regret) have been rare and inconclusive (Cooper, 2006). In one study in which participants retrospectively reported on their sober and intoxicated behavior, individuals engaged in less unprotected sex and oral sex after consuming alcohol (Bon, Hittner, & Lawandales, 2001). After drinking, individuals may have felt sick, become less attractive to potential partners, or even passed out which would diminish their opportunities to engage in sexual behaviors. In addition, participants may not have been with potential partners or misremembered their drunken behavior. Clearly, further empirical data addressing the associations between these two health risk behaviors is needed. Therefore, the current paper focuses on the daily covariation of alcohol use and sexual behavior, as well as the ways in which the association may differ based on alcohol-related sex expectancies.

The Importance of Positive Expectancies

Alcohol expectancies are beliefs about the probability of experiencing positive and negative effects of alcohol (Baer, 2002; Cooper, 1994; Kuntsche et al., 2005; Leigh, 1989a) and they include anticipated consequences of alcohol on sex (Goldman & Roehrich, 1991). The way in which alcohol use and sexual experiences are related is

likely some sort of reciprocal or feedback association between expectancies and experiences (Cooper et al., 1995). Given the centrality of positive expectancies in influencing behavior, the current study will investigate college students' expectancies for how alcohol relates to sex and how these are associated with sexual behaviors and experienced short-term positive and negative consequences of sex.

The large body of available research regarding alcohol expectancies and the smaller body of available research regarding alcohol-sex expectancies both suggest the importance of positive anticipated consequences as predictors of behavior. Experiencing pleasure is consistently associated with continued behavior (Higgins, 1997). Having positive alcohol expectancies, or anticipating rewarding consequences as a result of drinking, is consistently associated with higher rates of alcohol use (Baer, 2002; Leigh & Stacy, 2004) and with experiencing positive alcohol consequences among college students (Park & Grant, 2005). Patrick and Maggs (in press) found that experiencing more positive consequences from alcohol use in the prior week was associated with plans to drink more the following week and with short-term increases in the importance of experiencing potential positive alcohol consequences. In other words, positive consequences appeared to reinforce drinking (Patrick & Maggs, in press). Although little research has addressed positive and negative expectancies for sexual behavior, it is similarly likely that some individuals focus on positive expected consequences of sex (e.g., pleasure) rather than negative expected consequences of sex (e.g., regret). Based on alcohol myopia theory, this focus on potential positive consequences may be especially likely while drinking (MacDonald, MacDonald, Zanna, & Fong, 2000; Steele & Josephs, 1990).

Some data suggest that it is important both to have *positive expectancies* that alcohol leads to having sex and to *consume alcohol* in order to exhibit riskier sexual behavior on a given drinking occasion (Dermen et al., 1998; MacDonald, MacDonald et al., 2000). In other words, alcohol-related sex expectancies for positive consequences may be activated by drinking alcohol. In the present study, expectancies will be tested as a moderator of within-person associations of alcohol use and sexual behavior (Dermen & Cooper, 2000).

Having Sex after Drinking: Methodological Issues

As noted previously, the majority of studies regarding alcohol use and sexual behavior have employed correlational, cross-sectional designs (Cooper, 2006; Cooper & Orcutt, 2000; Leigh & Stall, 1993). Predictors of alcohol use and sexual behaviors and their associated consequences are most commonly assessed on a global or macro level (e.g., family history, personality), which can distinguish people who may be, on average, more likely to engage in the behaviors. However, heavy episodic alcohol use and sexual behavior each occur on an event level, or a given night. Therefore, global predictors measured cross-sectionally can provide very little information regarding why an individual chooses to binge drink on one night and to abstain on another. Studies providing greater specificity in behaviors are therefore needed to understand the phenomenon. Such information will provide critical information to inform interventions designed to prevent negative outcomes and promote health in certain contexts (e.g., bars) and during special events (e.g., Spring Break) (Neighbors, Oster-Aaland, Bergstrom, & Lewis, 2006).

In addition, both alcohol use and sexual behavior and intentions to engage in the behaviors may vary more within people than across people, and therefore within-person analyses may be most appropriate. For example, there is greater variation in the desirability of anticipated outcomes of drinking within people than there is between people over 21 days (Armeli et al., 2005). Therefore, interventions that seek to reduce the harm associated with a given night's behavior must be based on information regarding what influences behavior at that time, in that context, and for those people. Until we understand how behaviors fluctuate, and for whom drinking and sex are most strongly linked, we will be ill-equipped to intervene to promote healthy and safer behaviors. For these reasons, a within-person and event-level approach is utilized in the current paper in order to identify whether alcohol use predicts sexual behavior on a day-to-day basis, and for whom the behaviors are more strongly associated (i.e., based on alcohol expectancies) across days.

Daily diary methodology has been increasingly applied in developmental and alcohol studies in order to capture variation in behaviors over time, and this technology needs to be utilized more effectively in basic research (Cooper, 2002, 2006). For example, intra-individual variation in the use of alcohol and other drugs is captured by repeated daily reports of substance use over time. These measures have been found to be accurate (e.g., Hoppe et al., 2000) and informative for understanding behavioral variation in substance use (e.g., Del Boca et al., 2004). Diary methods “capture the particulars of experience in a way that is not possible using traditional designs” (p. 579, Bolger, Davis, & Rafaeli, 2003). Such diary studies on specific occasions of alcohol and/or sex behaviors are needed to understand their potential co-variation (Morrison, Gillmore,

Hoppe, Leigh, & Rainey, 2003). Particularly for sex research, there is virtually no data across time or on multiple occasions (Lefkowitz & Gillen, 2005), which limits understanding of behavior, behavioral continuity, and associated antecedents.

It is likely that alcohol can have various effects on sexual behavior, by promoting or inhibiting sexual behavior, depending on the characteristics of the people (i.e., expectancies), relationships, and situations (Cooper, 2006). For people in consistent sexual relationships, drinking may not affect protective choices and therefore not be a cause of sexual risk-taking (Morrison et al., 2003); and for individuals in stable, monogamous partnerships using other methods of pregnancy protection, lack of condom use may be much less risky (Dermen et al., 1998). Both drinking and condom use are more common with casual partners, but after controlling for partner type, greater alcohol use has been shown to be associated with less condom use (Cooper & Orcutt, 2000). Therefore, it is important to acknowledge the relationship context and account for the variance associated with partner type in these analyses.

The Current Study

Despite interest in bidirectional influences between heavy alcohol use and risky sexual behavior, little research has examined either the co-occurrence of these behaviors at the event level or specified the cross-domain links between individual cognitions, behavior, and consequences related to alcohol use and sex (Cooper, 2002). This requires research that elucidates the day-to-day variation in behaviors and addresses the within-person associations linking alcohol use and sexual behavior, studies of which are currently both rare and inconclusive.

Among first-year college students who completed a baseline survey and 14 consecutive days of surveys, the within-person associations of daily behaviors were investigated to shed light on whether alcohol use leads to sexual behaviors and consequences on an event level. Research questions were: (1) Are people more likely to engage in sexual behaviors on days they drink more alcohol? And, (2) Is this within-person daily association stronger for those with more positive alcohol-related sex expectancies? Based on motivational models previously described (Abbey et al., 1999; Cooper, 2002; Cooper et al., 1995; Cooper et al., 1998), it was hypothesized that alcohol use and sexual behaviors would evidence stronger positive within-person associations among individuals who expected alcohol to enhance their sexual affect and sexual drive (Abbey et al., 1999). For example, people who endorsed sex-enhancing alcohol expectancies were expected to be especially likely to have sex on days they consumed alcohol.

Method

Participants

Participants in the present analyses ($N = 218$, 51.4% male) were recruited as part a study to examine daily alcohol use and sexual behavior among traditionally-aged college students (see Table 4-1). To be eligible for the study, participants were required to be first-year students at a large state university in the Northeastern US, at least 18 years of age, and U.S. citizens or permanent residents. Recruitment letters were sent to 336 students with a pen and \$5 in cash enclosed. Email invitations followed, with a secure

link to the baseline survey which was administered via the world wide web. On campus residence was reported by 96.8% of the students. Individuals from racial and ethnic minorities were over-sampled to achieve diversity in the sample. Hispanic or Latino ethnicity was reported by 32.3% of the sample. A separate question asked participants to self-report their race by checking all that applied. Of the total sample, 56.0% identified as European American, 25.2% identified as Asian American, 24.3% identified as African American, 5.5% identified as American Indian, and 1.4% identified as Other. Mean age was 18.85 years ($SD = 0.38$, range 18.12 – 20.74).

Students were asked to complete a baseline web-based survey and then 14 consecutive daily web-based surveys. Each day, an invitation with a secure link was sent to participants to sign into an online survey. Incentives for participation were the \$5 pre-incentive, a \$25 baseline survey incentive, and \$3 per daily survey with an \$8 completion bonus (maximum \$80 total for all surveys).

Recruitment rate (i.e., percent of eligible individuals who provided data) was 69.3% ($N = 233$) and retention rate (i.e., percent of participants providing baseline data who were included in the daily analyses presented here) was 93.6% ($N = 218$). All 14 days were completed by 74.7% ($n = 174$), with an additional 10.7% ($n = 25$) completing 13 days. Data on 12 or more days were available for 88.4% ($n = 206$) of the total baseline sample. Of the possible 3262 days ($233 \text{ people} \times 14 \text{ days}$), data on 3004 days (92.1%) were collected and data on 2879 (88.3% of possible) days are used in the present analysis.

Participants were required to provide an electronic signature on an online consent form in order to participate. This study was approved by The Institutional Review Board

and protected by a Certificate of Confidentiality from the federal government. Data collection was confidential and linked to randomly-generated personal ID numbers for study purposes. Tracking information was stored in separate and secured files.

Measures

Baseline Survey. Relationship Status was reported by the question, “Which of the following best describes you right now?” coded as 0 = *not dating anyone right now*, 1 = *casually dating someone*, and 2 = *in a serious and committed relationship/living with my partner*.

Alcohol Expectancies Regarding Sex were assessed by two subscales from Abbey et al.’s (1999) 25-item AESASVQ (Alcohol Expectancies Regarding Sex, Aggression, and Sexual Vulnerability Questionnaire), which included assessments of beliefs about *Sexual Affect* (6 items; e.g., when drinking alcohol, I am romantic, $\alpha = .89$) and *Sexual Drive* (6 items; e.g., when drinking, I am likely to initiate sex, $\alpha = .96$). Responses ranged from 0 = *not at all* to 4 = *very much*. The AESASVQ has demonstrated convergent validity with other measures of alcohol expectancies; discriminant validity by being uncorrelated with measures of social desirability, aggression, and sexuality; and predictive validity with actual alcohol use (Abbey et al., 1999). Sexual Affect and Sexual Drive expectancies were correlated $r = .73$ in the present sample, and therefore entered as predictors separately into analytical models.

Daily Survey (14 Days). Alcohol Use was measured by reports of the number of standard drinks consumed in the prior day. The definition of “a drink” provided to respondents was “half an ounce of absolute alcohol, for example: 12 ounce can or glass

of beer or cooler, 5 ounce glass of wine, drink containing 1 shot of liquor.” Respondents were asked, “How many drinks of alcohol did you drink yesterday?” A drop down menu allowed responses from 0 drinks to 25 or more drinks. Actual responses ranged from 0 to 20 in the present sample.

Sexual Behavior. Each day, participants were asked whether they had had oral sex (2 questions: “Did you perform oral sex on a partner yesterday?” and “Did a partner perform oral sex on you yesterday?”), vaginal sex (“Did you have vaginal sex yesterday?”), and anal sex (“Did you have anal sex yesterday?”). For each day, sexual behavior was coded in three ways to explain different aspects of behavioral variation. First, whether or not oral sex behavior was reported was coded (0 = no, 1 = yes). Second, whether or not penetrative (vaginal or anal) sex was reported was coded (0 = no, 1 = yes). Finally, a sum of the four potential sex behaviors (i.e., receiving oral, performing oral, vaginal, anal) was created to reflect the extent of the sexual behavior.

Sexual behaviors were predicted individually (i.e., predicting oral sex, predicting penetrative sex) and when summed (i.e., predicting total number of sexual behaviors) to reflect the entire phenomenon of variation in sexual behaviors. The summed variable reflects increasing physical intimacy and health risk resulting from multiple forms of sexual contact. This decision was predicated on four main reasons. First, participating in oral sex, vaginal sex, or anal sex each involve specific risks of oral and genital STD contraction (CDC, 2000; Chambers, 2007), and participating in multiple sexual behaviors therefore indicates an increased cumulative health risk. Second, all of these behaviors hold meaning for the individual, with more sexual behaviors likely representing both more intimate encounters (Chambers, 2007). The variation in level of sexual intimacy

and sexual risk associated with daily alcohol use are of primary interest. Third, differentiating oral sex behaviors is especially important in this normative college sample. Developmentally, oral sex holds particular importance for the 38% of the current sample who have never engaged in penetrative sex because individuals often engage in oral sexual behaviors preceding their first penetrative sexual encounter (Prinstein et al., 2004; Schwartz, 1999). Finally, summing types of contact is inclusive of variation in both heterosexual and homosexual behaviors.

On days participants reported engaging in any of the sexual behaviors, a series of follow-up questions were asked. Participants reported if they used any method of contraception or disease protection. If yes, they were asked to check all forms of protection that applied. In the present analyses, Condom Use was coded only for days with penetrative sex as 0 = *no* and 1 = *yes*. Finally, experienced short-term Positive and Negative Consequences of Sex were assessed. The stem question read, “As a result of your sexual experiences yesterday, did you...” with a yes or no response for 19 different consequences. Positive consequences (7 items, $\alpha = .67$; e.g., feel attractive, feel closer to your partner) and negative consequences (12 items, $\alpha = .73$; e.g., feel like things moved too fast, worried about pregnancy) were summed separately.

Plan of Analysis

The extent to which there are event-level associations between alcohol use and sexual behaviors, and the extent to which these vary as a function of between-person differences in alcohol-sex expectancies, was the focus of the current work. Multilevel models (MLMs) (Raudenbush & Bryk, 2002; Singer & Willett, 2003; Snijders & Bosker,

1999) were used to model up to 14 days of data for each person. HLM 6.04 software was used (Raudenbush & Bryk, 2002). These MLMs modeled occasions (Level 1) nested within people (Level 2) to test for both within-person and between-person associations (example equations shown below). Six daily dependent variables were modeled: oral sex, penetrative sex, a sum of sexual behaviors, condom use with penetrative sex, and short-term positive and negative consequences of sexual behavior.

Between-person (Level 2) effects were gender, relationship status, person means of alcohol (aggregated across days), and alcohol expectancies regarding sex (sexual affect and sexual drive, tested separately). These between-person effects are used as controls in the analyses in order to interpret the within-person effects. For example, person means of alcohol use across days control for the average level of an individual's drinking so that reports of drinking on a given day can isolate the effects of a given day's drinking. Within-person (Level 1) effects for all models were the number of drinks of alcohol consumed on a given day and the interaction between daily alcohol use and alcohol expectancies regarding sex. The following equations describe the within-person and between-person portions of the MLM:

Level 1:

$$\text{Sexual Behavior}_{it} = \beta_{0i} + \beta_{1i} * \text{Daily Alcohol Use} + r_{it}$$

Level 2:

$$\beta_{0i} = \gamma_{00} + \gamma_{01} * \text{Gender} + \gamma_{02} * \text{Alcohol-Sex Exps} + \gamma_{03} * \text{Mean Alcohol Use} +$$

$$\gamma_{03} * \text{Relationship Status} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} * \text{Alcohol-Sex Exps}$$

As described in the Level 1 equation, sexual behavior for a given person on a given day was modeled as a function of an intercept indicating the individual's predicted sexual behavior on days with no reported alcohol use (β_{0i}), a slope indicating the predicted incremental change in sexual behavior for every additional drink consumed (β_{1i}), and a within-person error term (r_{it}). At Level 2, the sexual behavior intercept (β_{0i}) was modeled as the grand mean of sexual behavior (γ_{00}) for women (Gender=0) with average alcohol expectancies (grand mean-centered Alcohol-Sex Expectancies=0) who were abstainers from alcohol during the 14 days (Mean Alcohol Use=0) and were not dating anyone (Relationship Status = 0); the effect of being male (γ_{01}); the effect of between-person differences in alcohol-sex expectancies (γ_{02}); the effect of between-person differences in average alcohol use across the measured days (γ_{03}); the effect of being in a more committed relationship (γ_{04}); and between-person residuals or prediction errors (u_{0i}). Finally, the within-person alcohol-sexual behavior slopes (β_{1i}) were modeled as the average association of daily alcohol use and sexual behavior across all individuals in the sample (γ_{10}); and the effect of between-person differences in alcohol-sex expectancies on this association (γ_{11}).

The equations above are linear. However, the six daily dependent variables had different distributional properties requiring different types of MLMs. Oral sex, penetrative sex, and condom use were dichotomous outcomes so a logistic Bernoulli distribution was used for these three outcomes (Raudenbush & Bryk, 2002). The sum of sexual behaviors was skewed with a large number of zeroes, so a Poisson distribution was used for this outcome (Snijders & Bosker, 1999). Finally, the number of positive and negative sexual consequences approximated a normal distribution, so a linear model was

used for these two outcomes. Results with trend level significance ($p < .10$) are reported and interpreted in the current study. Behaviors of interest are relatively rare (e.g., penetrative sex is reported on 4.6% of days) are therefore there is relatively low power to detect effects.

Results

Daily Behaviors

Data were available for 2879 days. The number of days that participants reported drinking and engaging in sexual behavior are shown in Table 4-2. The majority of days were both non-drinking and non-sex days (81.2 %; see also Table 4-3). Table 4-4 reports the descriptive statistics for variables used in the MLMs. Participants reported consuming five or more drinks on 236 days (59.0% of drinking days).

Daily Drinking Predicting Daily Sexual Behaviors Across Days

Oral sex and penetrative sex. Logistic MLMs were computed predicting the likelihood of engaging in oral sex and penetrative sex on a given day. Between-person predictors were gender, alcohol-sex expectancies, average alcohol use across days, and relationship status. Within-person predictors were alcohol use and the Expectancies \times Alcohol Use interaction. Results with sexual affect expectancies are shown in Table 4-5. Similar models were tested substituting sexual drive expectancies for sexual affect expectancies. Results were similar, except as noted in the text. Between-persons, the

likelihood of engaging in oral and penetrative sex on average across the two weeks did not differ between men and women (β_{01}) or as a function of the average level of alcohol consumption (β_{03}). On average, participants in more committed relationships, β_{02} , were more likely to report oral sex and penetrative sex. On average, holding stronger sexual drive expectancies (not tabled) was associated with a greater likelihood of reporting oral sex (Odds Ratio [OR] = 1.755, Confidence Interval = [1.111, 1.84], $p < .01$) and penetrative sex (OR = 1.755 [1.341, 2.298], $p < .001$), but sexual affect expectancies were not, β_{04} .

Examining the within-person associations (Research Question 1), the number of drinks consumed predicted a greater likelihood of oral sex. Specifically, for every additional drink participants reported consuming, they had 17% greater odds of having oral sex on that day. Number of drinks consumed did not significantly predict the likelihood of penetrative sex. In addition, there was a significant Sexual Affect Expectancies \times Alcohol Use interaction effect (and a trend level interaction of Sexual Drive Expectancies \times Alcohol Use interaction, OR = 1.076 [0.991, 1.167], $p = .081$), such that the effect of every drink on the likelihood of having oral sex increased with more positive expectancies (Research Question 2).

Condom use. On average, participants in more committed relationships were less likely to report using condoms with penetrative sex. No other between-person variables uniquely predicted condom use (i.e., no differences by gender [β_{01}], person mean drinks [β_{03}], or alcohol expectancies [β_{04}]). Daily fluctuations of alcohol use were not predictive of condom use with penetrative sex (Research Question 1). The interactions of Daily

Drinking \times Sexual Affect (or Sexual Drive) Expectancies (β_{11}) were not significantly associated with condom use (Research Question 2).

Daily sum of sexual behaviors: All days. Results for the sum of sexual behaviors outcome variable using MLM with a Poisson distribution are shown in Table 4-6. Between-persons, gender (β_{01}) and a person's mean drinks across the 14 days (β_{03}) were not predictive of the average number of sexual behaviors reported. On average, individuals in more committed relationships (β_{02}) reported a greater number of sexual behaviors. In addition, people with higher sexual drive expectancies reported higher average sexual behavior sums ($p < .001$) and sexual affect expectancies (β_{04}) had a trend level of significance ($p < .10$).

Within-person, on days individuals consumed a greater number of drinks (β_{10}) they reported greater sum of number of sexual behaviors, providing evidence for Research Question 1. In addition, there was a Sexual Affect Expectancies \times Alcohol Use interaction effect (β_{11}) supporting Research Question 2. The same interaction with sexual drive expectancies had a trend level of significance (coefficient = 0.052, $SE = 0.030$, $p = .082$). In other words, the effect of alcohol use was greater for participants who had strong sexual affect expectancies.

Positive and negative sex consequences. Daily fluctuations in short-term positive and negative consequences of sex were modeled using linear MLM equations. Results with sexual drive expectancies are shown in Table 4-7. Similar analyses with sexual affect expectancies were also conducted and differences in results are noted in the text. On average, sexual drive expectancies (γ_{04}) were associated with more positive (but not more negative) sexual consequences on average across days ($p < .05$). There were no

other between-person predictors. On average, gender (γ_{01}), relationship status (γ_{02}), and person mean drinks (γ_{03}) were not uniquely predictive of reporting consequences of sex.

Within-person, daily reports of drinking (γ_{10}) were significantly associated with daily positive (but not negative) consequences of sex in the models with sexual drive expectancies (Research Question 1). The same interaction was not significant in models with sexual affect expectancies in place of sexual drive. There was a Sexual Drive Expectancies \times Alcohol Use interaction (γ_{11}) with trend level significance ($p < .10$) predicting negative sexual consequences (Research Question 2). The shape of the interaction suggests that for people with stronger sexual drive expectancies, consuming more drinks was associated with experiencing more negative consequences. For people with weaker sexual drive expectancies, consuming more drinks was associated with experiencing fewer negative consequences.

Discussion

Consistent with previous research (Desiderato & Crawford, 1995; MacNair-Semands & Simono, 1996), sexual behavior was preceded by alcohol use at least one time in 14 days by 40% of college students in this sample, and on 21% of penetrative sex days. It is important to note, however, that although drinking does predict sexual behavior on a given day, on the majority of days during which sex is reported there is no alcohol use reported and vice versa. In fact, on the majority of all days among all people, participants report neither drinking nor sexual behaviors. However, on days individuals report drinking they consume more than 5 drinks over half of the time, and on days college students have penetrative sex they do not use condoms half of the time.

Therefore, although students drink and/or have sex on the minority of days, when they do engage in these behaviors they are vulnerable to acute health risks including alcohol poisoning and STD contraction. These risks warrant further research into the individual behaviors and their cross-behavior associations.

After controlling for average alcohol use, daily number of drinks was associated with daily sexual behavior. Days with more drinking were more likely to also be days with oral sex and days with a greater number of total sexual behaviors. In addition, on days when participants consumed more drinks, they reported experiencing more short-term positive consequences of sex such as feeling more attractive or feeling closer to their partner. Fluctuations in alcohol consumption were not associated with changes in the likelihood of having penetrative sex, using condoms, or experiencing negative sex-related consequences.

Alcohol Expectancies

This study provided some evidence for the importance of alcohol-related sex expectancies in predicting behavioral co-variation. Having stronger sexual drive expectancies was associated with having an average greater likelihood of reporting oral sex, penetrative sex, a larger number of sexual behaviors, and more positive consequences of sex. Consuming a greater number of drinks was predictive of reporting a greater number of positive sex consequences. This is particularly interesting given that evidence for the hypothesized expectancies moderation effect on behavior was found only for oral sex and the total number of sexual behaviors. Therefore, there is limited support for the expectancies effect.

Alcohol expectancy theory states that drinking alcohol may lead to sexual risk-taking because of the self-fulfilling prophecy that alcohol is believed to lead to sexual behavior (Cooper, 2002; Dermen & Cooper, 2000; Goldman & Roehrich, 1991). Evidence for this perspective is mixed, however. People who were randomly assigned to consume alcohol in dyads of unacquainted men and women perceived their partners as acting more sexually than did people who consumed placebo drinks (Abbey, Zawacki, & McAuslan, 2000). However, expectancies did not affect perceptions of sexuality. In other words, Abbey et al. found that alcohol affected perceptions when expectancies did not, therefore lending greater support to the theory of alcohol myopia rather than to alcohol expectancy theory. Research on individuals with varying levels of executive function (i.e., working memory) ability has shown that explicit alcohol expectancies may be most predictive of behavior for individuals with good working memory capacity (Thush et al., 2008).

Alcohol Myopia Theory

Cooper (2002) called for the integration of alcohol expectancy theory and alcohol myopia theory in describing the effects of alcohol consumption on sexual behavior. According to alcohol myopia theory, the acute disinhibitory effects of alcohol reduce ability to process complex information (such as long-term goals and consequences), thus allowing immediate and salient goals (such as sexual arousal) to influence behavior more strongly (Cooper, 2002; Dermen & Cooper, 2000). Steele and Josephs (1990) articulated a model of alcohol myopia, such that consuming alcohol impairs perception and cognitive processing, causes short-sightedness in information processing, restricts the

range and meaning of environmental cues individuals can understand, and causes priority to go to the most immediate cues.

While drinking alcohol, the impelling cues for sexual behavior (e.g., arousal) are often more immediate than inhibiting cues (e.g., fear of STDs). This discrepancy may lead to riskier sexual behavior when alcohol is consumed (MacDonald, MacDonald et al., 2000). However, consistent with alcohol myopia theory, whether or not an individual engages in risky sexual behavior will depend on the most salient cues in the environment. If the strongest and most salient cues encourage sex (e.g., arousal) then an individual may be more likely to have risky sex. Intoxicated individuals may also be more likely to make *less* risky decisions in some circumstances. When the environmental cues suggest high behavioral risks (e.g., strong prevention message “AIDS Kills” stamped on bar patrons hands), intoxicated individuals have been found to be more likely to have safe sex intentions than sober individuals (MacDonald, Fong, Zanna, & Martineau, 2000; Steele & Josephs, 1990) because they may be more easily swayed by the environmental cues in their alcohol-induced state of myopia. Future studies with innovative measures of environmental cues supporting or inhibiting sexual intentions (e.g., laboratory manipulations) will be especially helpful in elucidating how drinking affects sexual decisions. In addition, alcohol myopia theory does not consider the contextual characteristics, including the type of relationship between potential sexual partners (Cooper & Orcutt, 2000) or an individual’s expectancies regarding alcohol. Future research integrating the alcohol myopia and alcohol expectancies theories will provide deeper understanding of their relative and synergistic effects.

Strengths, Limitations, and Future Directions

The current study addressed an important gap in the research literature. Despite the hundreds of research studies focusing on the behaviors of alcohol use and sexual behavior (Cooper, 2006), there is very little empirical data linking the behaviors on a day-to-day basis. Strengths of the present study include the within-person analysis of daily data on alcohol use and sexual behavior across 14 consecutive days. In addition, cross-behavior expectancies were assessed to provide an indicator of persons for whom drinking may be more likely to lead to sex. Level of relationship commitment was also considered and was a consistent predictor of sexual behavior and consequences. The larger context of the behaviors, including where individuals are drinking and whether they are drinking with potential sexual partners, will be important to consider in future research.

Limitations include a sample limited to first-year college students in a single academic institution and a sample of only a two-week period that may or may not generalize to other times in the students' academic and calendar years. Another limitation of the current study is that the desirability of alcohol's effect on sexual affect and sexual drive was not measured. For example, some individuals may view an enhancing effect of alcohol on sexual drive as positive and highly sought after, whereas others may see this as frightening and a reason to avoid drinking. Furthermore, the extent to which sex after drinking is a desired goal (e.g., drank alcohol expressly to affiliate with potential romantic partners) or a mistake (e.g., judgment was impaired and led to an unintentional risk) is not known. Finally, the salience of experienced consequences of sex was not clear, despite the fact that the perceived severity of a consequence may be an important

variable in the equation. Future research should incorporate measures of the goals and the desirability of the behaviors and consequences in question.

Research should incorporate additional sexual behaviors (e.g., kissing, touching) to more fully understand how alcohol use is associated with behaviors that have personal, relational, and developmental significance (Gulledge, Stahmann, & Wilson, 2004; Welsh, T., Widman, Darling, & Grello, 2005). In addition, as the present models were poor predictors of condom use, additional types of expectancies should be investigated to predict protective behaviors more accurately including, for example, expectancies for one's ability to use condoms when intoxicated (Gebhardt, Kuyper, & Gruensven, 2003). These condom expectancies should be investigated as moderators of daily drinking to predict sexual risk and protective behaviors. Finally, the ways in which behavioral links between drinking and sex may change over time developmentally and within a given relationship are important to investigate. As knowledge regarding the ways alcohol use may contribute to sexual behaviors is gained, more differentiated and effective interventions should be developed to reduce health risks associated with these behaviors and to promote relational and sexual health.

Understanding the processes linking alcohol use and sexual behavior is necessary to inform interventions to promote health. For instance, the expanding market for brief, motivation-based approaches to intervention demands specific knowledge of the role of expectancies in producing behavior and behavioral consequences (Burke et al., 2003; Tevyaw & Monti, 2004). Whether or not the short-term positive and negative consequences of drinking alcohol and having sex are experienced simultaneously will inform the potential utility of designing interventions to address the co-occurring

behaviors. As expectancies for drinking and sex are better understood, it will become clearer whether these behaviors could be targeted together in motivation-based interventions designed to promote public health by reducing the harm associated with alcohol use (e.g., alcohol poisoning) and sexual behavior (e.g., STDs).

Table 4-1

Participant Characteristics

	<i>n</i>	<i>%</i>
Gender		
Men	112	51.4
Women	106	48.6
Relationship Status		
Not Dating	115	52.8
Casually Dating	36	16.5
Serious, Committed, Cohabiting	67	30.7

Note. *N* = 218.

Table 4-2.

Daily Alcohol Use and Sexual Behavior

	<u>Drinking</u>	<u>Oral Sex</u>	<u>Penetrative Sex</u>	<u>Any Sex</u>	<u>No Condom[†]</u>	<u>Drinking and Sex[‡]</u>
Number of People (%)	132 (60.6)	58 (26.6)	60 (27.5)	72 (33.0)	33 (55.0)	29 (40.3)
Number of Days (%)	400 (13.9)	120 (4.2)	133 (4.6)	177 (6.1)	68 (51.1)	37 (20.9)

Note. Total People $N = 218$, Total Days $N = 2879$. [†]No Condom use with penetrative sex days only; percentages are out of 60 people and 133 days with penetrative sex reported. [‡]Drinking and Sex percentages are out of 72 people and 177 days with any sex reported.

Table 4-3.

Days of Drinking by Days of Sexual Behavior

	<u>No Drinks</u>	<u>Any Drinks</u>
No Sex	2339	363
Any Sex	140	37

Note. $N = 2879$ days.

Table 4-4.

Hierarchical Model Descriptive Statistics

	<i>M</i>	<i>SD</i>	Range
Level 1 Constructs			
Daily Drinks (All Days)	0.85	2.59	0-20
Daily Drinks (Drink Days)	6.15	4.00	1-20
Oral Sex	0.04	0.20	0-1
Penetrative Sex	0.05	0.21	0-1
Condom Use†	0.51	0.50	0-1
Daily Number of Sex Behaviors	0.10	0.43	0-3
Positive Sex Consequences	4.14	1.48	0-7
Negative Sex Consequences	0.67	1.21	0-6
Level 2 Constructs			
Male Gender	0.51	0.50	0-1
Mean Drinks	0.89	1.23	0-6
Relationship Status	0.78	0.89	0-2
Sexual Drive Expectancies	1.47	1.20	0-4
Sexual Affect Expectancies	1.68	1.01	0-4

Note. Level 1 $N = 2879$ person days, Level 2 $N = 218$ people.

†Condom Use is measured only on days with penetrative sex.

Table 4-5.

Predicting Daily Sexual Behavior with Sexual Affect Alcohol Expectancies and Daily Drinking

	Oral Sex OR [CI]	Penetrative Sex OR [CI]	Condom Use with Penetrative Sex OR [CI]
Average Outcome over 14 Days, P_0			
Intercept, B_{00}	0.002 [0.001, 0.004]***	0.003 [0.002, 0.006]***	23.752 [1.214, 464.621]*
Male Gender, B_{01}	1.512 [0.752, 3.040]	1.288 [0.643, 2.583]	2.736 [0.319, 23.494]
Relationship Status, B_{02}	3.857 [2.639, 5.639]***	3.725 [2.568, 5.403]**	0.126 [0.028, 0.568]**
Person Mean Drinks, B_{03}	0.849 [0.610, 1.182]	1.033 [0.711, 1.500]	1.006 [0.377, 2.689]
Sexual Affect Expectancies, B_{04}	1.239 [0.876, 1.751]	1.380 [0.951, 2.004]	0.442 [0.153, 1.275]
Average Fluctuations in Daily Alcohol Use, P_1			
Intercept, B_{10}	1.173 [1.073, 1.283]**	1.061 [0.974, 1.156]	0.687 [0.376, 1.254]
Sexual Affect Expectancies, B_{11}	1.105 [1.012, 1.206]*	1.069 [0.952, 1.200]	1.171 [0.821, 1.671]

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Note. OR = odds ratio; CI = confidence interval. Level 1 $N = 2879$ person days, Level 2 $N = 218$ people. β coefficients (Level 1) are estimated for each person. γ coefficients (Level 2) are aggregate estimates across the sample and are presented in the table.

Level-1: $\text{Prob}(Y=1|B) = P$; $\log[P/(1-P)] = P_0 + P_1*(\text{Daily Alcohol Use})$

Level2: $P_0 = B_{00} + B_{01}*(\text{Gender}) + B_{02}*(\text{Relp Status}) + B_{03}*(\text{Mean Alcohol Use}) + B_{04}*(\text{Alcohol-Sex Exp}) + R_0$; $P_1 = B_{10} + B_{11}*(\text{Alcohol-Sex Exp})$

Table 4-6.

Predicting Sum of Daily Sexual Behavior

	<u>Sexual Behavior Sum</u>	
	Coefficient (SE)	Event Rate Ratio
Average Outcome over 14 Days, P_0		
Intercept, B_{00}	-5.085 (0.305)***	0.006
Male Gender, B_{01}	0.407 (0.298)	1.501
Relationship Status, B_{02}	1.328 (0.165)***	3.772
Person Mean Drinks, B_{03}	-0.024 (0.151)	0.976
Sexual Affect Expectancies, B_{04}	0.299 (0.155) [†]	1.349
Average Fluctuations in Daily Alcohol Use, P_1		
Intercept, B_{10}	0.091 (0.030)**	1.096
Sexual Affect Expectancies, B_{11}	0.095 (0.039)*	1.100

* $p \leq .05$, ** $p < .01$, *** $p \leq .001$.

Level 1: $E(Y|B) = L$

$V(Y|B) = L$

$\log[L] = P_0 + P_1*(\text{Daily Alcohol Use})$

Level 2:

$P_0 = B_{00} + B_{01}*(\text{Gender}) + B_{02}*(\text{Relationship Status}) + B_{03}*(\text{Mean Alcohol Use}) + B_{04}*(\text{Alcohol-Sex Expectancies}) + R_0$

$P_1 = B_{10} + B_{11}*(\text{Alcohol-Sex Expectancies})$

Table 4-7.

Predicting Daily Sexual Behavior Consequences

	Positive Consequences	Negative Consequences
	Coefficient (SE)	Coefficient (SE)
Average Outcome over 14 Days, β_0		
Intercept, γ_{00}	4.226 (0.396)***	1.460 (0.524)**
Male Gender, γ_{01}	0.088 (0.292)	-0.116 (0.307)
Relationship Status, γ_{02}	-0.127 (0.196)	-0.381 (0.248)
Person Mean Drinks, γ_{03}	0.086 (0.139)	-0.107 (0.104)
Sexual Drive Expectancies, γ_{04}	0.251 (0.116)*	-0.142 (0.109)
Average Fluctuations in Daily Alcohol Use, β_1		
Intercept, γ_{10}	0.161 (0.075)*	-0.114 (0.074)
Sexual Drive Expectancies, γ_{11}	-0.125 (0.078)	0.133 (0.077) [†]

[†] $p < .10$, * $p \leq .05$, ** $p < .01$, *** $p \leq .001$. Equations tested were: Level 1: Sexual Consequences_{it} = β_{0i} + β_{1i} *Daily Alcohol Use + r_{it} ; Level 2: β_{0i} = γ_{00} + γ_{01} *(Gender) + γ_{02} *(Relationship Status) + γ_{03} *(Mean Alcohol Use) + γ_{04} *(Alcohol-Sex Expectancies) + u_{0i} ; β_{1i} = γ_{10} + γ_{11} *(Alcohol-Sex Expectancies)

Chapter 5

General Discussion

Understanding adolescent engagement in health risk behaviors, including alcohol use and risky sexual behavior, is important for both developmental science and for public health (e.g., Hawkins, Catalano, & Miller, 1992). Adolescent risk behaviors receive a great deal of attention in the research community, as well as in popular culture. Although most adolescents weather this period with positive adjustment outcomes and emerge without the development of serious social, emotional, or behavioral problems in adulthood (Lerner & Galambos, 1998; Steinberg & Morris, 2001), involvement in health risk behaviors escalates during adolescence and the transition to adulthood (Johnston et al., 2006). Such “social morbidities” (p. 237, Blum, 2002) are now the leading cause of death and injury among adolescents. As such, engagement in health risk behaviors is of public health concern (e.g., Hawkins et al., 1992; Wechsler et al., 1994).

In order to understand this behavior, it is necessary to understand why people do what they do. Behavior tends to be goal-directed (Furby & Beyth-Marom, 1992; Maggs, 1997), which makes understanding the goals, expectancies, and motivations for behavior especially critical for explaining behavior and its development and for promoting health. From the tradition of experimental psychology, the theory of reasoned action (TRA) is a widely acknowledged model for understanding behavioral intentions (Madden et al., 1992). TRA asserts that intentions, expected consequences, and perceived social norms fully explain engagement in risk behavior (Fishbein & Ajzen, 1975; Petraitis et al., 1995). TRA has been extended into the theory of planned behavior (TPB) by Ajzen to include

perceptions of control over the behavior (Ajzen, 2001; Madden et al., 1992). In other words, it is beliefs about the behaviors and their consequences that determine involvement. This framework underlines the importance of the decisional component of risk behaviors, that individuals make choices based on their perceptions of the likely consequences of engaging or not engaging in the behavior. The three aims of the current work were designed to provide understanding of the motivations for sexual behavior and alcohol use and their behavioral associations in order to inform prevention science.

The first aim was to develop a scale to assess motivations for and against sexual behavior (Chapter 2). A critical research component is measurement, and this tool was designed to enable scientists to describe motivations surrounding sexual behavior in adolescence and early adulthood among individuals with varying levels of sexual experience. These scales demonstrated sound measurement properties and validity which support the promise of its utility for this purpose.

Second, profiles of motivations surrounding sexual behavior and alcohol use were identified (Chapter 3). There were distinct motivational profiles for each behavior that described sub-groups of individuals. In addition, drinking motivation profiles were associated with sexual motivation profiles in predictable way, giving evidence for cross-behavioral associations on a motivational level. In addition, these profiles were significantly associated with both sex and drinking behaviors. Such differentiation of people is important for intervention approaches. Sub-groups of college students, for example, who are motivated by a different set of factors, may require different strategies for health promotion and behavior change.

A third aim focused on the occasion-level association between behaviors (Chapter 4). Consuming alcohol on a given day was predictive of engaging in sexual behaviors on that day, especially for individuals who endorsed more positive expectancies about the effects of drinking on sex (e.g., drinking makes me romantic). This study highlights the importance of understanding alcohol-related sex expectancies to accurately describe the day-to-day covariation between drinking and sex.

Strengths and Limitations

There are at least four particular strengths of these studies. First, they address innovative questions that address gaps in the literature by assessing two behaviors simultaneously, including motivations against the behaviors, and modeling temporal associations and fluctuations. Second, the focus on college students was appropriate for the particular research questions. The first year of college is a period of development with particular importance for both alcohol use and sexual behavior, so understanding motivations, expectancies, and behavior during this time is critical. Third, samples with ethnic and racial diversity were used in all cases. This broadens the generalizability of findings and increases the applicability of the results (e.g., the motivational scale developed in Chapter 2 can appropriately be used among Asian and European American traditionally-aged college students based on those results). Finally, appropriate advanced methodological techniques were used to address the aims. Confirmatory factor analysis, latent profile analysis, and multi-level modeling were utilized to address specific research questions that called for different methods.

Limitations for these studies are threefold. First, students from a single university are described in each case, somewhat limiting generalizability. Second, motivations and expectancies are measured at a single time point, despite the fact that they are likely not static constructs. Change over the course of development, and possibly in response to experiences and situations, is expected. Finally, the context of drinking and sexual behavior is not included in the models presented, although it is important to understand. Influences including seasonal variations (e.g., holidays), peer behaviors, and physical environment may all contribute to perceptions of behavioral consequences and to behavioral prediction in meaningful ways.

Future Research

A number of research avenues are recommended to build upon the current work. Although this research has documented the associations between motivations and expectancies with behavior retrospectively and across a period of 14 days, there is need for longitudinal investigation. The manner in which motivations for sexual behavior and alcohol use may change across development from adolescence to adulthood deserves exploration in a variety of ways. Mean-level endorsement of particular types of motivations may evidence developmental trends across populations. For example, people may become increasingly physically and emotionally ready for adult sexual relationships and therefore motivations involving a lack of readiness may decline with maturity. Profiles of motivations may also change, such that some sub-groups diminish and others become increasingly prevalent. For example, the group of individuals with motivations to

drink in order to have sex may become less normative as more people gain experience with sex, and more people may instead have pro drinking motivations including for fun and social reasons. Particular motivational sub-groups may also evidence long-term negative consequences. Individuals who have profiles of motivations for sex to cope may be more likely to continue maladaptive coping patterns and therefore be at greater risk for contracting STDs, unwanted pregnancy, and/or substance abuse in adulthood.

In addition, the associations between motivations or expectancies and behavior may change. For example, drinking may be especially likely to lead to sexual behavior or riskier sexual behavior during exploratory years and less likely to be associated for individuals as they enter into more adult roles including more stable and committed romantic relationships. Furthermore, there may be specific events or occasions (e.g., Spring Break, 21st birthday) that pose particular health risks and are accompanied by event-specific cognitions (Neighbors et al., 2007). These events provide an opportunity for maximum health impact with short-term intervention techniques.

Research addressing each of these questions may provide additional explanations regarding why individuals are involved in health risk behaviors and how these behaviors change over time. There is ample room for multiple data collection and analytic methods to address these questions. Indeed, person-centered and within-person variation approaches are essential for understanding the process of motivated behavior (Molenaar, 2008; Nesselroade, 2001). Long-term longitudinal data is necessary to investigate the adult consequences of adolescent behaviors. In addition, qualitative analysis of motivations and expectancies will also be important, to insure that established scales capture the salient aspects of behavioral cognitions.

Implications for Intervention

The greater goal of research on adolescent and college student engagement in risk behaviors is to inform strategies to promote health. Transition periods, such as the first year of college, offer viable intervention opportunities during which individuals may evaluate their current and future goals (Turrisi et al., 2001). The early years of college, for example, may be a particularly opportune time to intervene as adolescents are moving toward young adulthood and making independent choices in a variety of domains for the first time. However, despite the potential importance of the entrance to college for the reduction of alcohol problems and alcohol-related harm and despite the development of numerous efficacious interventions for drinking in college populations, fewer effective programs have targeted high school students or students transitioning to university (Spath, Greenberg, & Turrisi, 2006). Furthermore, very little is known about the motivations for safer sex behaviors and the prevention of negative sex-related consequences among emerging adults (Kotchick et al., 2001b; Lefkowitz & Gillen, 2005). Given the theories of the import of expectancies and motivations, innovative intervention approaches acknowledging positive consequences and strategies to meet the needs of students by replacing the benefits they perceive from alcohol (e.g., fun) with safer alternatives are needed (Morritz, Seehafer, & Maatz-Majestic, 1993). Effective intervention approaches should meet a person where he or she currently is by focusing on existing motivational factors for behavior (Stewart et al., 2005).

Motivational enhancement interventions, such as adapted motivational interviewing, are becoming increasingly popular. The four principles of motivational

interviewing (MI), founded by W. R. Miller, establish that interventionists should be empathic, support an individual's development of discrepancy between goals and actions, roll with resistance, and support the development of self-efficacy (Burke et al., 2003). The key goal of these approaches is to increase an individual's motivation for healthy behavior (Tevyaw & Monti, 2004). In a meta-analysis of adapted motivational interviewing (AMI) approaches, Burke, Arkowitz, and Menchola (2003) identified that in addition to adherence to the four MI principles, AMI approaches also incorporate feedback about behavior and behavioral norms. Among alcohol programs, motivational enhancement approaches have reported some of the highest effect sizes (Larimer & Cronce, 2002; Tevyaw & Monti, 2004; Walters & Neighbors, 2005; White et al., 2006) and are therefore recommended by NIAAA as a focus for the prevention of youth alcohol use and HIV-related risks (DEPR, 2006). Impressively, when reductions in alcohol use have been produced by motivational interventions, they have been maintained over time. In a meta-analysis of studies from which effect sizes were available at multiple time points, effect sizes at 20 weeks post-treatment were sustained until an average of 67 weeks post-treatment (Burke et al., 2003). For example, a brief motivational intervention by Baer and colleagues (2001) was implemented with 508 college students exhibiting high risk alcohol use behavior (averaging over 10 drinks per week on fewer than two occasions) and a normative comparison sample (averaging 5.5 drinks per week on one occasion). The intervention consisted of a single individualized feedback session during the winter of participants' first year of college, followed by mailed feedback results one year later. The primary effect of the intervention was seen during the first year, with stable effects for the following three years (Baer et al., 2001). Specifically, negative

consequences experienced continued to be reduced 3 ½ years after the single MI session. Although drinking frequency and quantity responded to the initial intervention, these effects were non-significant by the four-year follow-up. Still, such long-lasting effects on negative alcohol-related consequences from a brief intervention approach were unprecedented in prevention efforts among college students.

According to the meta-analysis cited previously, motivational approaches have shown significant effects reducing drinking, but not yet with reducing sexual risk behaviors (Burke et al., 2003). However, preliminary evidence for the promise of these approaches for interventions focused on sexual behavior is available (Chernoff & Davison, 2005). The key goal of AMI techniques for intervention is to enhance an individual's motivation for healthy behavior (Miller & Rollnick, 1991). Therefore, a primary need to improve these promising approaches is a better understanding of an individual's existing motivation for behavior and the types of intervention that would be most salient to him or her. Researchers comment on the lack of understanding of the mechanisms of the effects of motivational enhancement interventions to explain the promising effects (Baer et al., 2001; Tevyaw & Monti, 2004). Therefore, further research on the motivations and expectancies for sexual behavior and alcohol use is needed to understand how these approaches can more effectively target sexual behavior.

One of the principal advantages of these motivational approaches is the brevity with which interventions can be delivered. MI approaches are among the most popular and influential of brief intervention programs (Tevyaw & Monti, 2004). In addition, adaptations of MI have potential utility as primes to increase participant receptivity and the effects of other programs (Burke et al., 2003; Tevyaw & Monti, 2004). Motivational

approaches are currently being integrated and adapted. New directions include peer-enhanced MI (with mixed results), group-based MI (e.g., by fraternity house), and using mailed feedback (with promising results) (see Tevyaw & Monti, 2004). One of the most exciting adaptations, however, is utilizing the internet and computer-generated feedback to disseminate motivational interventions to alter subjective norms and attitudes.

According to Skinner and colleagues (2001), 90% of adolescents are willing to use the internet to get information regarding drugs. Therefore, adaptations of empirically-based interventions need to address the potential for using this far-reaching media for the reduction of risk behaviors. Internet-based AMI interventions have potential to be cost-effective and widely disseminated approaches with relevance for today's computer-savvy adolescents and young adults. College students, in particular, have access to computer technology widely available on campuses. Given the promise of these approaches for altering motivated behavior, understanding cross-behavior motivational profiles and day-to-day fluctuations in alcohol and sex behaviors are first steps toward designing and improving approaches targeting these co-occurring behaviors.

References

- Abbey, A., McAuslan, P., Ross, L. T., & Zawacki, T. (1999). Alcohol expectancies regarding sex, aggression, and sexual vulnerability: Reliability and validity assessment. *Psychology of Addictive Behaviors, 13*, 174-182.
- Abbey, A., Saenz, C., & Buck, P. (2005). The cumulative effects of acute alcohol consumption, individual differences and situational perceptions on sexual decision making. *Journal of Studies on Alcohol, 66*, 82-90.
- Abbey, A., Zawacki, T., & McAuslan, P. (2000). Alcohol's effects on sexual perception. *Journal of Studies on Alcohol, 61*, 688-697.
- Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology, 50*, 179-211.
- Amos. (2006). *Amos 7.0.0*. Spring House, PA: Amos Development Corporation.
- Armeli, S., Mohr, C., Todd, M., Maltby, N., Tennen, H., Carney, M. A., & Affleck, G. (2005). Daily evaluation of anticipated outcomes from alcohol use among college students. *Journal of Social and Clinical Psychology, 24*, 767-792.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist, 55*, 469-480.
- Arnett, J. J. (2006). Emerging adulthood: Understanding the new way of coming of age. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 3-20). Washington, DC: American Psychological Association.
- Baer, J. S. (2002). Student factors: Understanding individual variation in college drinking. *Journal of Studies on Alcohol, Supplement No. 14*, 40-53.

- Baer, J. S., Kivlahan, D. R., Blume, A. W., McKnight, P., & Marlatt, G. A. (2001). Brief intervention for heavy-drinking college students: 4 year follow-up and natural history. *American Journal of Public Health, 91*, 1310-1316.
- Bandura, A. (1977). *Social Learning Theory*. Oxford: Prentice Hall.
- Bankole, A., Darroch, J. E., & Singh, S. (1999). Determinants of trends in condom use in the United States, 1988-1995. *Family Planning Perspectives, 31*, 264-271.
- Bauer, D. J., & Shanahan, M. J. (2007). Modeling complex interactions: Person-centered and variable-centered approaches. In T. D. Little, J. A. Bovaird & N. A. Card (Eds.), *Modeling contextual effects in longitudinal studies*. Mahwah, NJ: Lawrence Erlbaum
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238-246.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.
- Blum, R. W. (2002). Positive youth development: A strategy for improving adolescent health. In F. Jacobs, D. Wertlieb & R. M. Lerner (Eds.), *Handbook of applied developmental science: Promoting positive child, adolescent, and family development through research, policies, and programs* (Vol. 2, pp. 237-252). Thousand Oaks, CA: SAGE Publications.
- Blum, R. W., Beuhring, T., Shew, M. L., Bearinger, L. H., Sieving, R. E., & Resnick, M. D. (2000). The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. *American Journal of Public Health, 90*, 1879-1884.

- Blume, A. W., Schmalings, K. B., & Marlatt, G. A. (2006). Recent drinking consequences, motivation to change, and changes in alcohol consumption over a three month period. *Addictive Behaviors, 31*, 331-338.
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology, 54*, 579-616.
- Bon, S. R., Hittner, J. B., & Lawandales, J. P. (2001). Normative perceptions in relation to substance use and HIV-risky sexual behaviors of college students. *The Journal of Psychology, 135*, 165-178.
- Borsari, B., & Carey, K. B. (2003). Descriptive and injunctive norms in college drinking: A meta-analytic integration. *Journal of Studies on Alcohol, 64*, 331-341.
- Brooks-Gunn, J., & Paikoff, R. L. (1993). "Sex is a gamble, kissing is a game": Adolescent sexuality and health promotion. In S. G. Millstein, A. C. Peterson & E. O. Nightingale (Eds.), *Promoting the health of adolescents: New directions for the twenty-first century* (pp. 180-208). New York: Oxford University Press.
- Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods and Research, 21*, 230-258.
- Burke, A. L., Arkowitz, J., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology, 71*, 843-861.
- Caspi, A., Begg, D., Dickson, N., Harrington, H., Langley, J., Moffitt, T. E., & Silva, P. A. (1997). Personality differences predict health-risk behaviors in young adulthood: Evidence from a longitudinal study. *Journal of Personality and Social Psychology, 73*, 1052-1063.

- Centers for Disease Control and Prevention (CDC). (2000). *Health, United States*. Hyattsville, MD: National Center for Health Statistics.
- Chassin, L., Hussong, A., Barrera, M., Molina, B. S. G., Trim, R., & Ritter, J. (2004). Adolescent substance use. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2 ed., pp. 665-696). New York: Wiley.
- Chernoff, R. A., & Davison, G. C. (2005). An evaluation of brief HIV/AIDS prevention intervention for college students using normative feedback and goal setting. *AIDS Education and Review, 17*, 91-104.
- Civic, D. (1999). The association between characteristics of dating relationships and condom use among heterosexual young adults. *AIDS Education and Prevention, 11*, 343-352.
- Comrey, A. L. (1978). Common methodological problems in factor analytic studies. *Journal of Consulting and Clinical Psychology, 46*, 648-659.
- Conway, J. M., & Huffcutt, A. I. (2003). A review and evaluation of exploratory factor analysis practices in organizational research. *Organizational Research Methods, 6*, 147-168.
- Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment, 6*, 117-128.
- Cooper, M. L. (2002). Alcohol use and risky sexual behavior among college students and youth: Evaluating the evidence. *Journal of Studies on Alcohol, Supplement No. 14*, 101-117.
- Cooper, M. L. (2006). Does drinking promote risky sexual behavior?: A complex answer to a simple question. *Association for Psychological Science, 15*, 19-23.

- Cooper, M. L., Agocha, V. B., & Powers, A. M. (1999). Motivations for condom use: Do pregnancy prevention goals undermine disease prevention among heterosexual young adults? *Health Psychology, 18*, 464-474.
- Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P. (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology, 69*, 990-1005.
- Cooper, M. L., & Orcutt, H. K. (1999). Alcohol use, condom use, and partner type among heterosexual adolescents and young adults. *Journal of Studies on Alcohol, May*, 413-419.
- Cooper, M. L., & Orcutt, H. K. (2000). Alcohol use, condom use and partner type among heterosexual adolescents and young adults *Journal of Studies on Alcohol, 61*, 413-419.
- Cooper, M. L., Peirce, R. S., & Huselid, R. F. (1994). Substance use and sexual risk taking among black adolescents and white adolescents. *Health Psychology, 3*, 251-262.
- Cooper, M. L., & Shapiro, C. M. (1997). Motivations for health behaviors among adolescents. In J. A. McNamara, Jr. & C. Trotman (Eds.), *Creating the compliant patient* (Vol. 33, pp. 25-46). Ann arbor, MI.
- Cooper, M. L., Shapiro, C. M., & Powers, A. M. (1998). Motivations for sex and risky sexual behavior among adolescents and young adults: A functional perspective. *Journal of Personality and Social Psychology, 75*, 1528-1558.
- Corbin, W. R., & Fromme, K. (2002). Alcohol use and serial monogamy as risks for sexually transmitted diseases in young adults. *Health Psychology, 21*, 229-236.

- Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology, 92*, 168-180.
- Del Boca, F. K., Darkes, J., Greenbaum, P. E., & Goldman, M. S. (2004). Up close and personal: Temporal variability in the drinking of individual college students during their first year. *Journal of Consulting and Clinical Psychology, 72*, 155-164.
- DEPR. (2006). Strategic planning review: Division of Epidemiology and Prevention Research: National Institute on Alcohol Abuse and Alcoholism. Retrieved 9 November 2006, from <http://www.niaaa.nih.gov/NR/rdonlyres/802A4ECB-D680-4E8B-BF36-319D06412167/0/BriefingBook2.pdf>
- Dermen, K. H., & Cooper, M. L. (2000). Inhibition conflict and alcohol expectancy as moderators of alcohol's relationship to condom use. *Experimental and Clinical Psychopharmacology, 8*, 198-206.
- Dermen, K. H., Cooper, M. L., & Agocha, V. B. (1998). Sex-related alcohol expectancies as moderators of the relationship between alcohol use and risky sex in adolescents. *Journal of Studies on Alcohol, 59*, 71-77.
- Desiderato, L. L., & Crawford, H. J. (1995). Risky sexual behavior in college students: Relationships between number of sexual partners, disclosure of previous risky behavior, and alcohol use. *Journal of Youth and Adolescence, 24*, 55-68.
- Diamond, L. M. (2006). Introduction: In search of good sexual-developmental pathways for adolescent girls. *New Directions for Child and Adolescent Development, 112*, 1-7.

- Diamond, L. M., Savin-Williams, R. C., & Dube, E. M. (1999). Sex, dating, passionate friendships, and romance: Intimate peer relations among lesbian, gay, and bisexual adolescents. In W. Furman, B. B. Brown & C. Feiring (Eds.), *The development of romantic relationships in adolescence: Cambridge studies in social and emotional development* (pp. 175-210). New York, NY: Cambridge University Press.
- Else-Quest, N. M., Hyde, J. S., & DeLamater, J. D. (2005). Context counts: Long-term sequelae of premarital intercourse or abstinence. *The Journal of Sex Research, 42*, 102-112.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: W. W. Norton & Co.
- Eyre, S. L., & Millstein, S. G. (1999). What leads to sex? Adolescent preferred partners and reasons for sex. *Journal of Research on Adolescence, 9*, 277-307.
- Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*, 272-299.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley Publishing Company.
- Furby, L., & Beyth-Marom, R. (1992). Risk-taking in adolescence: A decision-making perspective. *Developmental Review, 12*, 1-44.
- Gebhardt, W. A., Kuyper, L., & Gruensven, G. (2003). Need for intimacy in relationships and motives for sex as determinants of adolescent condom use. *Journal of Adolescent Health, 33*, 154-164.

- Geisner, I. M., Larimer, M. E., & Neighbors, C. (2004). The relationship among alcohol use, related problems, and symptoms of psychological distress: Gender as a moderator in a college sample. *Addictive Behaviors, 29*, 843-848.
- Gibson, W. A. (1959). Three multivariate models: Factor analysis, latent structure analysis, and latent profile analysis. *Psychometrika, 24*, 229-252.
- Goldberg, J. H., Halpern-Felsher, B. L., & Millstein, S. G. (2002). Beyond invulnerability: The importance of benefits in adolescents' decision to drink alcohol. *Health Psychology, 21*, 477-484.
- Goldman, M. S., Del Boca, F. K., & Darkes, J. (1999). Alcohol expectancy theory: The application of cognitive neuroscience. In H. T. Blane & K. E. Leonard (Eds.), *Psychological theories of drinking and alcoholism* (pp. 203-246). New York, NY: Guilford Press.
- Goldman, M. S., & Roehrich, L. (1991). Alcohol expectancies and sexuality. *Alcohol, Health, & Research World, 15*, 126-132.
- Grunbaum, J. A., Kann, L., Kinchen, S. A., Williams, B., Ross, J. G., Lowry, R., & Kolbe, L. (2002). *Youth risk behavior surveillance--United States, 2001*. Atlanta, GA: Centers for Disease Control.
- Gulledge, A. K., Stahmann, R. F., & Wilson, C. M. (2004). Seven types of nonsexual romantic physical affection among Brigham Young University students. *Psychological Reports, 95*, 609-614.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin, 112*, 64-105.

- Hays, R. (1985). An integrated value-expectancy theory of alcohol and other drug use. *British Journal of Addiction, 80*, 379-384.
- Herman, K. C., Ostrander, R., Walkup, J. T., Silva, S. G., & March, J. S. (2007). Empirically derived subtypes of adolescent depression: Latent profile analysis of co-occurring symptoms in the treatment for adolescents with depression study (TADS). *Journal of Consulting and Clinical Psychology, 75*, 716-728.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*, 1280-1300.
- Hill, C. A. (2002). Gender, relationship stage, and sexual behavior: The importance of partner emotional investment within specific situations. *The Journal of Sex Research, 39*, 228-240.
- Hill, C. A., & Preston, L. K. (1996). Individual differences in the experience of sexual motivation: Theory and measurement of dispositional sexual motives. *The Journal of Sex Research, 33*, 27-43.
- Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: Changes from 1998 to 2001. *Annual Review of Public Health, 26*, 259-279.
- Hoppe, M. J., Gillmore, M. R., Valadez, D. L., Civic, D., Hartway, J., & Morrison, D. M. (2000). The relative costs and benefits of telephone interviews versus self-administered diaries for daily data collection. *Evaluation Review, 24*, 102-116.
- Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research, 18*, 117-144.

- Hulse, G. K., Robertson, S. I., & Tait, R. J. (2001). Adolescent emergency department presentations with alcohol- and other drug-related problems in Perth, Western Australia. *Addiction, 96*, 1059-1067.
- Hussong, A. M., Hicks, R. E., Levy, S. A., & Curran, P. J. (2001). Specifying the relations between affect and heavy alcohol use among young adults. *Journal of Abnormal Psychology, 110*, 449-461.
- Jackson, K. M., Sher, K. J., & Park, A. (2006). Drinking among college students: Consumption and consequences. *Alcohol Problems in Adolescents and Young Adults, 85-117*.
- Jemmott, J. B., Jemmott, L. S., & Fong, G. T. (1992). Reductions in HIV risk-associated sexual behaviors among black male adolescents: Effects of an AIDS prevention intervention. *American Journal of Public Health, 82*, 372-377.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York, NY: Academic Press.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2005). *Monitoring the Future national survey results on drug use, 1975-2004. Volume II: College students and adults ages 19-45* (No. NIH Publication No. 05-5728). Bethesda, MD: National Institute on Drug Abuse.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2006). *Monitoring the Future national survey results on drug use, 1975-2005. Volume II: College students and adults ages 19-45* (No. NIH Publication No. 06-5884). Bethesda, MD: National Institute on Drug Abuse.

- Kaly, P. W., Heesacker, M., & Frost, H. M. (2002). Collegiate alcohol use and high-risk sexual behavior: A literature review. *Journal of College Student Development, 43*, 838-850.
- Komro, K. A., Perry, C. L., Williams, C. L., Stigler, M. H., Farbaksh, K., & Veblen-Mortenson, S. (2001). How did Project Northland reduce alcohol use among adolescents? Analysis of mediating variables. *Health Education Research, 16*, 59-70.
- Kotchick, B. A., Shaffer, A., Forehand, R., & Miller, K. S. (2001a). Adolescent sexual risk behavior: A multi-system perspective. *Clinical Psychology Review, 21*, 493-519.
- Kotchick, B. A., Shaffer, A., Forehand, R., & Miller, K. S. (2001b). Adolescent sexual risk behavior: A multi-system perspective. *Clinical Psychology Review, 21*, 493-519.
- Kuntsche, E., Knibbe, R., Gmel, G., & Engels, R. (2005). Why do young people drink? A review of drinking motives. *Clinical Psychology Review, 25*, 841-861.
- LaBrie, J., Earleywine, M., Schiffman, J., Pedersen, E., & Marriot, C. (2005). Effects of alcohol, expectancies, and partner type on condom use in college males: Event-level analyses. *The Journal of Sex Research, 42*, 259-266.
- Larimer, M. E., & Cronce, J. M. (2002). Identification, prevention, and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students. *Journal of Studies on Alcohol, Supplement 14*, 148-163.

- Larimer, M. E., Kilmer, J. R., & Lee, C. M. (2005). College student drug prevention: A review of individually-oriented prevention strategies. *Journal of Drug Issues, 35*, 431-456.
- Lazarsfeld, P. F., & Henry, N. W. (1968). *Latent structure analysis*. Boston: Houghton Mifflin.
- Lee, C. M., Neighbors, C., Kilmer, J., & Larimer, M. E. (2008). A brief, web-based personalized feedback selective intervention for college student marijuana use: A randomized clinical trial. Manuscript submitted for publication.
- Lefkowitz, E. S., & Gillen, M. M. (2005). "Sex is just a normal part of life": Sexuality in emerging adulthood. In J. J. Arnett & J. L. Tanner (Eds.), *Emerging adults in America: Coming of age in the 21st century* (pp. 235-255). Washington, DC: American Psychological Association.
- Leigh, B. C. (1989a). In search of the seven dwarves: Issues of measurement and meaning in alcohol expectancy research. *Psychological Bulletin, 105*, 361-373.
- Leigh, B. C. (1989b). Reasons for having and avoiding sex: Gender, sexual orientation, and relationship to sexual behavior. *The Journal of Sex Research, 26*, 199-209.
- Leigh, B. C. (1999). Peril, chance, adventure: Concepts of risk, alcohol use and risky sexual behavior in young adults. *Addiction, 94*, 371-383.
- Leigh, B. C., & Stacy, A. W. (2004). Alcohol expectancies and drinking in different age groups. *Addiction, 99*, 215-227.
- Leigh, B. C., & Stall, R. (1993). Substance use and risky sexual behavior for exposure to HIV: Issues in methodology, interpretation, and prevention. *American Psychologist, 48*, 1035-1045.

- Lerner, R. M., & Galambos, N. L. (1998). Adolescent development: Challenges and opportunities for research, programs, and policies. *Annual Review of Psychology*, *49*, 413-446.
- Lewis, M. A., Lee, C. M., Patrick, M. E., & Fossos, N. (2007). Gender-specific normative misperceptions of risky sexual behavior and alcohol-related risky sexual behavior *Sex Roles*, *57*, 81-90.
- MacCallum, R. C., Roznowski, M., & Necowitz, L. G. (1992). Model modifications in covariance structure analysis: The problem of capitalization on chance. *Psychological Bulletin*, *111*, 490-504.
- MacDonald, T. K., Fong, G. T., Zanna, M. P., & Martineau, A. M. (2000). Alcohol myopia and condom use: Can alcohol intoxication be associated with more prudent behavior? *Journal of Personality and Social Psychology*, *78*, 605-619.
- MacDonald, T. K., MacDonald, G., Zanna, M. P., & Fong, G. T. (2000). Alcohol, sexual arousal, and intentions to use condoms in young men: Applying alcohol myopia theory to risky sexual behavior. *Health Psychology*, *19*, 290-298.
- MacNair-Semands, R. R., & Simono, R. B. (1996). College student risk behaviors: Implications for the HIV-AIDS pandemic. *Journal of College Student Development*, *37*, 574-583.
- Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and Social Psychology Bulletin*, *18*, 3-9.
- Maggs, J. L. (1993). *Adolescent alcohol use as a goal-directed behavior*. Unpublished Doctoral dissertation, University of Victoria, British Columbia.

- Maggs, J. L. (1997). Alcohol use and binge drinking as goal-directed action during the transition to postsecondary education. In J. E. Schulenberg, J. L. Maggs & K. Hurrelmann (Eds.), *Health risks and developmental transitions during adolescence* (pp. 289-304). New York: Cambridge University Press.
- Maggs, J. L., Vesterdal, W. J., & Galambos, N. L. (in review). The Importance of Consequences of Drinking (ICOD) measure: Motivations for alcohol use in college students.
- Mallett, K. A., Lee, C. M., Neighbors, C., Larimer, M. E., & Turrisi, R. (2006). Do we learn from our mistakes? an examination of the impact of negative alcohol-related consequences on college students' drinking patterns and perceptions. *Journal of Studies on Alcohol, 67*, 269-276.
- McCarthy, D. M., Pedersen, S. L., & Leuty, M. E. (2005). Negative consequences and cognitions about drinking and driving. *Journal of Studies on Alcohol, 66*, 567-570.
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York, NY: Guilford Press.
- Misovich, S. J., Fisher, J. D., & Fisher, W. A. (1997). Close relationships and elevated HIV risk behavior: Evidence and possible underlying psychological processes. *Review of General Psychology, 1*, 72-107.
- Molenaar, P. C. M. (2008). On the implications of the classical ergodic theorems: Analysis of developmental processes has to focus on intra-individual variation. *Developmental Psychobiology, 50*, 60-69.

- Moore, S., & Gullone, E. (1996). Predicting adolescent risk behavior using a personalized cost-benefit analysis. *Journal of Youth and Adolescence, 25*, 343-359.
- Morrison, D. M., Gillmore, M. R., Hoppe, M. J., Leigh, B. C., & Rainey, D. (2003). Adolescent drinking and sex: Findings from a daily diary study. *Perspectives on Sexual and Reproductive Health, 35*, 162-168.
- Morritz, T., Seehafer, R. W., & Maatz-Majestic, E. (1993). A student competition to develop an innovative alcohol education strategy. *Journal of American College Health, 41*, 283-286.
- Mosher, W. D., Chandra, A., & Jones, J. (2005). *Sexual behavior and selected health measures: Men and women 15-44 years of age, United States, 2002*: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.
- Muthén, L. K., & Muthén, B. O. (1998-2007). Mplus 4.21.
- Neighbors, C., Oster-Aaland, L., Bergstrom, R. W., & Lewis, M. A. (2006). Event- and context- specific normative misperceptions and high risk drinking: 21st birthday celebrations and football tailgating. *Journal of Studies on Alcohol, 67*, 282-289.
- Neighbors, C., Walters, S. T., Lee, C. M., Vader, A. M., Vehige, T., Szigethy, T., & DeJong, W. (2007). Event-specific prevention: Addressing college student drinking during known windows of risk. *Addictive Behaviors, 32*, 2667-2680.
- Nesselroade, J. R. (2001). Intraindividual variability in development within and between individuals. *European Psychologist, 6*, 187-193.
- Neter, J., Kutner, M. H., Nachtsheim, C. J., & Wasserman, W. (1996). *Applied linear statistical models*. New York, NY: McGraw Hill.

- Neumark-Sztainer, D., Story, M., French, S., Cassuto, N., Jacobs, D. R., & Resnick, M. D. (1996). Patterns of health-compromising behaviors among Minnesota adolescents: Sociodemographic variations. *American Journal of Public Health, 86*, 1599-1606.
- NIAAA. (2002). A call to action: Changing the culture of drinking at U.S. colleges. Retrieved 10 November 2006, from <http://www.collegedrinkingprevention.gov/media/TaskForceReport.pdf>
- NIAAA. (2006). Initiative on underage drinking. Retrieved 9 November 2006, from <http://www.niaaa.nih.gov/AboutNIAAA/NIAAASponsoredPrograms/underage.htm>
- O'Callaghan, F. V., Chant, D. C., Callan, V. J., & Baglioni, A. (1997). Models of alcohol use by young adults: An examination of various attitude-behavior theories. *Journal of Studies on Alcohol, 58*, 502-507.
- O'Hare, T. (1995). Differences in Asian and White drinking: Consumption level, drinking contexts, and expectancies. *Addictive Behaviors, 20*, 261-266.
- O'Malley, P. M., & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol, Supplement No. 14*, 23-39.
- Ozer, E. J., Dolcini, M. M., & Harper, G. W. (2003). Adolescents' reasons for having sex: Gender differences. *Journal of Adolescent Health, 35*, 317-319.
- Paradise, J. E., Cote, J., Minsky, S., Lourenco, A., & Howland, J. (2001). Personal values and sexual decision-making among virginal and sexually experienced urban adolescent girls. *Journal of Adolescent Health, 28*, 404-409.

- Park, C. L., & Grant, C. (2005). Determinants of positive and negative consequences of alcohol consumption in college students: Alcohol use, gender, and psychological characteristics. *Addictive Behaviors, 30*, 755-765.
- Patrick, M. E., & Maggs, J. L. (in press). Short-term changes in plans to drink and importance of positive and negative alcohol consequences: Between- and within-person predictors. *Journal of Adolescence*.
- Patrick, M. E., Maggs, J. L., & Abar, C. C. (2007). Reasons to have sex, personal goals, and sexual behavior during the transition to college. *Journal of Sex Research, 44*, 240-249.
- Perkins, H. W. (2002). Social norms and the prevention of alcohol misuse in collegiate contexts. *Journal of Studies on Alcohol, Supplement No. 14*, 164-172.
- Petraitis, J., Flay, B. R., & Miller, T. Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin, 117*, 67-86.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2 ed.). Thousand Oaks, CA: Sage Publications.
- Regenerus, M. D. (2007). *Forbidden fruit: Sex and religion in the lives of American teenagers*. New York: Oxford University Press.
- Roisman, G. I., Masten, A. S., Coatsworth, J. D., & Tellegen, A. (2004). Salient and emerging developmental tasks in the transition to adulthood. *Child Development, 75*, 123-133.

- Sanderson, C. A., & Cantor, N. (1995). Social dating goals in late adolescence: Implications for safer sexual activity. *Journal of Personality and Social Psychology, 68*, 1121-1134.
- Santelli, J. S., Brener, N. D., Lowry, R., Bhatt, A., & Zabin, L. S. (1998). Multiple sexual partners among US adolescents and young adults. *Family Planning Perspectives, 30*, 271-275.
- Santelli, J. S., Lowry, R., Brener, N. D., & Robin, L. (2000). The association of sexual behaviors with socioeconomic status, family structure, and race/ethnicity among US adolescents. *American Journal of Public Health, 90*, 1582-1588.
- Schulenberg, J. E. (2006). Understanding the multiple contexts of adolescent risky behavior and positive development: Advances and future directions. *Applied Developmental Science, 10*, 107-113.
- Schulenberg, J. E., & Maggs, J. L. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol, Supplement No. 14*, 54-70.
- Siegel, D. M., Klein, D. I., & Roughmann, K. J. (1999). Sexual behavior, contraception, and risk among college students. *Journal of Adolescent Health, 25*, 336-343.
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York, NY: Oxford University Press.
- Skinner, H., Maley, O., Smith, L., Chirrey, S., & Morrison, M. (2001). New frontiers: Using the Internet to engage teens in substance abuse prevention and treatment. In P. M. Monti, S. M. Colby & T. A. O'Leary (Eds.), *Adolescents, alcohol, and*

- substance abuse: Reaching teens through brief interventions* (pp. 297-318). New York: Guilford Press.
- Smith, E. A., & Udry, J. R. (1985). Coital and non-coital sexual behaviors of white and black adolescents. *American Journal of Public Health, 75*, 1200-1203.
- Snijders, T., & Bosker, R. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, CA: Sage Publications.
- Solomon, R. L. (1980). The opponent-processes theory of acquired motivation: The costs of pleasure and the benefits of pain. *American Psychologist, 35*, 691-712.
- Spear, L. (2000). Modeling adolescent development and alcohol use in animals. *Alcohol Research and Health, 24*, 115-123.
- Spoth, R., Greenberg, M. T., & Turrisi, R. (2006). *Preventive interventions addressing underage drinking: State of the evidence and steps toward public health impact*.
- Sprecher, S., & Regan, P. C. (1996). College virgins: How men and women perceive their sexual status. *The Journal of Sex Research, 33*, 3-15.
- SPSS. (2006). *SPSS for Windows, version 15.0*. Chicago: SPSS, Inc.
- Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist, 45*, 921-933.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology, 52*, 83-110.
- Stewart, S. H., Conrod, P. J., Marlatt, G. A., Corneau, M. N., Thush, C., & Krank, M. (2005). New developments in prevention and early intervention for alcohol abuse in youths. *Alcoholism: Clinical and Experimental Research, 29*, 278-286.

- Straus, R., & Bacon, S. D. (1953). *Drinking in college*. New Haven, CT: Yale University Press.
- Testa, M., & Collins, R. L. (1997). Alcohol and risky sexual behavior: Event-based analyses among a sample of high-risk women. *Psychology of Addictive Behaviors, 11*, 190-201.
- Tevyaw, O. T., & Monti, P. M. (2004). Motivational enhancement and other brief interventions for adolescent substance abuse: Foundations, applications, evaluations. *Addiction, 99* (Supplement 2), 63-75.
- Thush, C., Wiers, R. W., Ames, S. L., Grenard, J. L., Sussman, S., & Stacy, A. W. (2008). Interactions between implicit and explicit cognition and working memory capacity in the prediction of alcohol use in at-risk adolescents. *Drug and Alcohol Dependence, 94*, 116-124.
- Turrisi, R., Jaccard, J., Taki, R., Dunnam, H., & Grimes, J. (2001). Examination of the short-term efficacy of a parent intervention to reduce college student drinking tendencies. *Psychology of Addictive Behaviors, 15*, 366-372.
- US Department of Transportation. (2002). Traffic safety facts 2002: Young drivers. Retrieved 20 May 2006, from <http://www=nrd.nhtsa.dot.gov/pdf/nrd-20/NCSA/TSF2002/2002ydrfacts.pdf>
- Waller, N. G., & Meehl, P. E. (1998). *Multivariate taxometric procedures: Distinguishing types from continua*. Thousand Oaks: Sage Publications.
- Walters, S. T., & Neighbors, C. (2005). Feedback interventions for college alcohol misuse: What, why, and for whom? *Addictive Behaviors, 30*, 1168-1182.

- Wechsler, H., Davenport, A., Dowdall, G., Moeykens, B., & Castillo, S. (1994). Health and behavioral consequences of binge drinking in college: A national survey of students at 140 campuses. *Journal of the American Medical Association, 272*, 1672-1677.
- Wechsler, H., Dowdall, G. W., Davenport, A., & Rimm, E. B. (1995). A gender-specific measure of binge drinking among college students. *American Journal of Public Health, 85*, 982-985.
- Weinhardt, L. S., Carey, M. P., Johnson, B. T., & Bickham, N. L. (1999). Effects of HIV counseling and testing on sexual risk behavior: A meta-analytic review of published research. *American Journal of Public Health, 89*, 1397-1405.
- Weinstock, H., Berman, S., & Cates, W. J. (2004). Sexually transmitted diseases in American youth: Incidence and prevalence estimates, 2000. *Perspectives on Sexual and Reproductive Health, 36*, 6-10.
- Welsh, D. P., T., H. P., Widman, L., Darling, N., & Grello, C. M. (2005). Kissing is good: A developmental investigation of sexuality in adolescent romantic couples. *Sexuality Research & Social Policy: A Journal of NSRC, 2*, 32-41.
- White, H. R., & Jackson, K. M. (2004/2005). Social and psychological influences on emerging adult drinking behavior. *Alcohol Research & Health, 28*, 182-190.
- White, H. R., & Labouvie, E. W. (1989). Toward the assessment of adolescent problem drinking. *Journal of Studies on Alcohol, 50*, 30-37.
- White, H. R., Morgan, T. J., Pugh, L. A., Celinska, K., Labouvie, E. W., & Pandina, R. J. (2006). Evaluating two brief substance-use interventions for mandated college students. *Journal of Studies on Alcohol, 67*, 309-317.

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation.

Contemporary Educational Psychology, 25, 68-81.

Zuckerman, M. (1979). Sensation seeking and risk taking. In C. E. Izard (Ed.), *Emotions*

in personality and psychopathology (pp. 163-197). New York: Plenum Press.

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PUBLICATIONS

- Patrick**, M. E., Collins, L., Smith, E., Caldwell, L., Flisher, A., & Wegner, L. (in press). A prospective longitudinal model of substance use onset among South African adolescents. *Substance Use & Misuse*.
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- Patrick**, M. E., Abar, C., & Maggs, J. L. (in press). Adolescent drinking. *Encyclopedia of the life course and human development*. Gale: Farmington Hills, MI.
- Patrick**, M. E., & Maggs, J. L. (2008). Short-term changes in plans to drink and importance of positive and negative alcohol consequences: Between- and within-person predictors. *Journal of Adolescence*, *31*, 307-321.
- Maggs, J. L., **Patrick**, M. E., & Feinstein, L. (2008). Childhood and adolescent predictors of alcohol use and problems in the National Child Development Study. *Addiction*, *103* (Suppl. 1), 7-22.
- Patrick**, M. E., Blair, C., & Maggs, J. L. (2008). Executive function, behavioral approach and risk behavior among female college students. *Journal of Clinical and Experimental Neuropsychology*, *30*, 449-462.
- Patrick**, M. E., Rhoades, B. L., Small, M., & Coatsworth, J. D. (2008). Faith-placed parenting intervention. *Journal of Community Psychology*, *36*, 74-80.
- Lewis, M. A., Lee, C. M., **Patrick**, M. E., & Fossos, N. (2007). Gender-specific normative misperceptions of risky sexual behavior and alcohol-related risky sexual behavior. *Sex Roles*, *57*, 81-90.
- Coffman, D., **Patrick**, M. E., Palen, L., Rhoades, B. L., & Ventura, A. (2007). Why do high school seniors drink? Implications for a targeted approach. *Prevention Science*, *8*, 241-248.
- Patrick**, M. E., Maggs, J. L., & Abar, C. C. (2007). Reasons to have sex, personal goals, and sexual behavior during the transition to college. *Journal of Sex Research*, *44*, 240-249.
- Blair, C., & **Patrick**, M. E. (2006). Fluid cognitive abilities: Neglected aspects of cognition in research on mental retardation. *International Review of Research in Mental Retardation*, *32*, 134-158.