BRINGING RISK PREVENTION INTO THE BEDROOM: SEX MOTIVES AND RISKY BEHAVIORS IN MEN WHO HAVE SEX WITH MEN

by

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ABSTRACT

We are well into the third decade of HIV disease, and unprotected anal intercourse remains the primary mode of transmission in men who have sex with men (MSM). Since 2000, evidence suggests decreased precautionary sex behaviors and increased incidences of HIV in MSM. Traditional models of risky behaviors have focused primarily on cognitive factors related to intention to use condoms. Yet, there is an often-observed gap between intentions and behaviors. This ‘gap’ has fueled calls in the literature to move beyond cognitions and explore other psychological and contextual factors that may predict condom use. In the present study, I examined a functional model of condom use in MSM not in committed, long-term relationships, given their increased risk of HIV transmission vulnerability. Sex motives were examined as predictors of condom use in single MSM as a function of partner type and HIV serostatus. Sex motives examined were having sex to enhance intimacy, gain pleasure, escape a negative affective state, enhance self-esteem, and avoid partner disapproval. For a period of two months, MSM reported condom use for anal intercourse, sex motives, and partner type on a daily basis. Hierarchical logistic regression analyses revealed that consistent with hypotheses, on occasions when participants reported higher levels, as compared to lower levels, of having sex to enhance intimacy, and to cope with a negative affective state, the likelihood of using a condom for anal intercourse was decreased. Further, consistent with hypotheses, when participants reported higher levels, compared to lower levels, of having sex to enhance sexual pleasure, to attain partner approval, and to confirm to oneself a sense of sexual esteem, the more likely they were to use a condom for anal intercourse. Results also indicated that, in general, the relationships between motives and condom use were stronger when having sex with someone considered
a regular partner as compared to casual. Finally, relationships were also stronger when
participants self-reported HIV seropositive status as compared to seronegative or serostatus
unknown. Implications for intervention approaches, at both the individual and community
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DEDICATION

To the participants of the UBC Sex Study
INTRODUCTION

We are well into the third decade of HIV disease, and risky sexual behaviors continue to be the primary mode of transmission (Centre for Disease Control and Prevention (CDC, 2006a). Within developed nations, such as Canada and the United States, men who have sex with men (MSM) remain the group accounting for the largest proportion of those already infected as well as those with new infections (CDC, 2006b; UNAIDS, 2008). The advent of more effective treatments has increased the life expectancies of those infected, and has shifted perception from the sense of inevitable doom associated with the disease to that of a manageable chronic illness. As a result, there is evidence of decreased precautionary sex behaviors in MSM (Grulich, 2000; Osmond, Pollack, Paul, & Catania, 2007; Tawk, Simpson, & Mindel, 2004) and therefore, a resurgent need to understand risky sexual behavior so that effective interventions can be designed.

Previous research on HIV prevention has focused primarily on the cognitive factors related to intentions to use condoms, with the general assumption that intentions lead to actual engagement in the behavior (Montano, Kasprzyk, von Haeften, & Fishbein, 2001; The NIMH Multisite HIV Prevention Trial Group, 2001). These cognitive components (i.e. attitudes, social norms, partner norms, beliefs) of condom use are often derived from theories of health behaviors, such as the Theory of Planned Behavior (Ajzen, 1991) and the Health Belief Model (Janz & Becker, 1984). While these models predict intentions well (Sheeran & Taylor, 1999), there is an often-observed gap between intentions and actual behavior at follow up (Abraham, Sheeram, Norman, Conner, de Vries, & Otten, 1999; Sheeran & Orbell, 1998).
The limited success of research and interventions that focus on the cognitive
determinants of precautionary and risky sexual behaviors has been attributed to the possibly
erroneous presumption that HIV and health protection are most salient in the minds of those
having sex when they are having sex. For many people, the threat of HIV transmission may
play second to the sexual and emotional motives, desires, and needs of the individual.
Increasing evidence supports this contention - that examining people’s motivations for sex
enhances the understanding of sexual risk taking (Canin, Dolcini, & Adler, 1999; Cooper,
Shapiro, & Powers, 1998; Levinson, Jaccard, & Beamer, 1995). Research that has moved
beyond traditional models of health behaviour change (Ajzen, 1991; Janz & Becker, 1984)
have consistently demonstrated that sexual motives are important to risk taking in adolescent
and young heterosexual adults (Cooper et al., 1998; Gebhardt, Kuyper, & Greunsven, 2003;
Sanderson & Cantor, 1995).

Research investigating sexual motives (Cooper et al., 1998; Gebhardt et al., 2003) is
often examined within an approach and avoidant motivation framework (Carver & White,
1994; Gray, 1990). Yet, what is clear from previous research is that relationships between
motives and sexual risk taking are more complex than originally considered, and are not
neatly captured by a model that assumes that those motivated by approach engage in healthy
behaviors and those by avoidance engage in problematic behaviors. Specifically, contextual
factors, such as the status of the relationship between partners, play significant roles in
whether specific motives are positively or negatively related to risk taking. For example,
Cooper and her colleagues (1998) demonstrated that while young adults in exclusive
relationships are more likely to decrease condom use over time, those that are single who
seek pleasure during sex maintain precautionary behaviors over time. Others have also
demonstrated similar variations in the associations between risk taking and sexual motives as a function of partner type (Gebhardt et al., 2003; Sanderson & Cantor, 1995). Thus, it is important to explore past research that examines how specific emotional states, personal, and interpersonal needs, may impact health-related and other risk taking behaviors within varying contexts. Furthermore, it may prove fruitful to examine past research that differentiates those individuals who have more difficulty in regulating such emotions and motives, and under what conditions regulating motives is more difficult.

The present study sought to investigate sex-related motives and their associations with a highly risky sexual behavior, lack of condom use for anal intercourse, within the context of the relationship between the partners. I measured risky sex at the event level in those considered most at risk for HIV transmission in developed nations—men who have sex with men who are not in stable and monogamous relationships (Ekstrand, Stall, Paul, Osmond, & Coates, 1999; Rekart, Trussler, & Barnett, 2004). I was interested in whether sexual motives, such as seeking intimacy, enhancing sexual pleasure and self-esteem, avoiding partner disapproval, or having sex to cope with a negative mood, motives previously studied as important to risk taking behaviors (Cooper et al., 1998), would independently predict condom use behaviors in MSM across several episodes. Furthermore, I considered the relevance of two important contextual factors that have previously been documented to be associated with condom use behaviors, namely partner type (Canin et al., 1999; Gillmore, et al., 2002; Moreau-Gruet, Jeannin, Dubois-Arber, & Spencer, 2001) and HIV status (Gillmore et al., 2002; Halkitis, Parsons, & Wilton, 2003). Previous studies have not differentiated between relationship status (single versus in a relationship) and partner type (regular versus casual), and often have used these terms interchangeably. However, the
reality of single people’s lives is that people who consider themselves “single” may still have regular sex partners (Solis, 2006; Rust, 2003). As a result, I consider the regular versus casual partner type as two different sexual contexts for the study’s single MSM.

The investigation of contextual factors that may potentially modify the relationships between motives and risk taking behaviors calls for examining these factors at the event level. Although motives and sexual practices are considered and measured as individual difference variables (Cooper et al., 1998; Gebhardt et al., 2003; Sanderson & Cantor, 1995), recent evidence suggests that self-directed, interpersonal, and sexual motives can fluctuate on a daily basis (Armeli, Todd, Conner, & Tennen, 2008; Impett, Gable, & Peplau, 2005; Impett, Peplau, & Gable, 2005), and that sexual behaviors and preferences can be determined by situational, not just dispositional, factors (Ariely & Loewenstein, 2006; Kiene, Tennen, & Armeli, 2008; Mustanski, 2007a,b). As a result, the present study applied an event-level recording methodology to data collection and employed a multilevel design to analysis. A further benefit of collecting data closer to real-time occurrence and over several sexual episodes for each participant includes that retrospective self-reporting does not accurately capture actual condom use (Garry, Sharman, Feldman, Marlatt, & Loftus, 2002; Horvath, Beadnell, & Bowen, 2007; Reis & Gable, 2000).

*Trends in HIV Disease in Men who Have Sex with Men*

Within developed nations, men who have sex with men remain the group accounting for the largest proportion of ever-reported cases and new incidences of infections with the Human Immunodeficiency Virus (HIV). In North America, for example, MSM constitute
greater than 50% of all cases of HIV disease reported since the early 1980’s, when reporting commenced (CDC, 2006a; Public Health Agency of Canada, 2007). In Canada, specifically, the Public Health Agency (PHAC) reported, in 2005, that of the 58,000 Canadians living with HIV disease, 29,600, or 51%, were gay, bisexual, and other MSM community members (PHAC, 2007). Furthermore, MSM, as a group, continue to comprise the largest percentage of newly reported incidences of HIV, accounting for 45% of new cases in Canada in 2005, and 53% of new cases in the United States (CDC, 2006b).

Of potentially greater importance, the decline that was observed in the 1990’s in new cases of HIV among MSM (Catania et al., 2001) reversed at the turn of the century. Trends in both Canada and the United States indicate a ten to fifteen percent relative increase in new cases from 2000 to 2005 in the MSM community (CDC, 2006b; PHAC, 2007). Similar trends have been documented in other developed nations (Dukers et al., 2002; National Centre in HIV Epidemiology and Clinical Research, 2008).

Recent statistics suggest increasing rates of risky behaviors in single gay men with multiple partners of unknown status or known HIV seropositive status (Koblin et al., 2006). Between 30% and 50% of HIV seropositive (Chen et al., 2002; Ehrenstein, Horton, & Samet, 2004; Kalichman et al., 2007; Stein et al., 2005) and between 25% and 40% of HIV seronegative (Chen et al., 2002; Kalichman et al., 2007; Mao et al., 2006) MSM report engaging in unprotected and inconsistent condom use within a 6 month to one year period. Davidovitch, de Wit, and Stroebe (2004) reported that 55% of gay men in relationships with a steady partner retrospectively reported abandoning condom use for anal intercourse within the first three months of the relationship. Of significance, in Davidovitch and colleagues’ study, close to 50% of these men did not discuss risk during the first anal intercourse
episode within which no condom was used, thus potentially placing these individuals and their partners at high risk for sexually transmitted infections (STIs), including HIV. As a result, it seems important to study why HIV seropositive and seronegative single MSM have sex, whether motives play a role in risky behaviors in these men, and to differentiate between those they consider regular and those they consider casual.

Cognitive Models of HIV Prevention

Given the increasing infection rates of HIV in MSM, there is considerable need to examine risky sex within this community. Unprotected anal intercourse (UAI), both receptive and insertive, is considered the sexual behavior that places individuals at greatest risk for HIV transmission (CDC, 2006b; Kelly & Kalichman, 1995). As such, lack of condom use for anal intercourse in MSM is the ‘critical’ measure of risky sex.

As mentioned previously, research in this area has focused primarily on the cognitive factors associated with intentions to use condoms during anal intercourse. In their meta-analysis, Sheeran and Orbell (1998) demonstrated that, across several studies, condom use intentions accounted for approximately 20% of the variance in actual use. As a result of the observed intention-behavior gap, there is increasing interest in post-intention cognitions that may relate to safer sexual practices (Abraham et al., 1999; de Visser & Smith, 2004; Sheeran & Abraham, 2003; Cooper et al., 1998). For example, Abraham and his colleagues (1999) examined young heterosexual adults’ perceptions of their ability to execute the steps required to successfully carry through their intentions to use a condom prior to or during their most recent sexual encounter. They demonstrated that self-efficacy in relation to
suggesting and negotiating condom use, and the social management of putting on condoms significantly helps intenders complete the act of using condoms. At present, there is considerable evidence supporting the importance of negotiating safety with one’s partner, and, as a result, significant emphasis is placed on acquiring the skills necessary and the confidence required to discuss condom use and HIV status with partners (Davidovich et al., 2004; Elford, Bolding, Maguire, & Sherr, 2001; Kippax, Crawford, Davis, Rodden, & Dowsett, 1993; Kippax et al., 1997).

**Motivation and Sex**

There is no doubt that HIV prevention benefits from addressing cognitions directly related to condom use. Yet, given the continued reality of HIV, the second half of the 1990’s witnessed increased calls in the literature to move beyond models of HIV prevention that target only cognitions related to condom use, towards those that capture the complexity of human sexuality and relationships (Canin et al, 1999; Cooper et al., 1998; Levinson et al., 1995; Kelly & Kalichman, 1995). Examining individuals’ ‘hot’ or ‘on-line’ cognitions and emotions that motivate people to have sex is important to understand condom use (Gold, 1993; Gold, Skinner, & Ross, 1994). Directing efforts towards understanding these motives for sex, and what functions they serve within specific contexts, can advance our understanding of problematic and risky sexual behaviors.

The idea that we could distinguish distinct patterns of sexual risk taking through understanding individuals’ ‘online’ motives for having sex (Canin et al., 1998; Cooper et al., 1998; Sanderson & Cantor, 1995), rests on work by Snyder and his colleagues (Snyder,
Snyder and Cantor (1994; Snyder, 1993; Snyder & Cantor, 1997) have argued the need to expand personality research beyond structural models or conceptualizations (i.e., delineating the Big Five Traits). They argue for a move toward functional conceptualizations of personality in which traits and dispositions are seen as predictors of motivation to enter into specific situations, and to perform specific and distinct types or constellations of behaviors. In other words, individuals move towards activities and situations that fulfill underlying personal needs and motivations (Cantor, 1994; Snyder, 1993). For example, Snyder and colleagues (Clary et al., 1998; Snyder, 1994; Snyder & Omoto, 1992) demonstrated that volunteer behavior and individuals’ experiences of volunteering (hours volunteered per week, months spent volunteering, satisfaction with volunteering) is best understood in terms of the goals or needs that volunteering serves for individuals. Snyder and Omoto (1992) postulated that regardless of how similar the manifestation of behaviors may appear, behaviors pursued for fundamentally different motives are phenomenologically distinct. Snyder and colleagues demonstrated that those individuals who volunteered for self-enhancement purposes (i.e., esteem needs) were more likely to volunteer for longer periods as compared to those who volunteered for more altruistic reasons (Omoto & Snyder, 1992; Snyder & Omoto, 1992).

Functional models of motivation have been successfully applied to a diverse range of health behaviors, including eating habits, alcohol consumption, and sexual risk taking (Cooper et al., 1998; Cooper, Agocha, & Powers, 1999; Cooper, Frone, Russell, & Mudar, 1995; Jackson, Cooper, Mintz, & Albino, 2003; Sanderson & Cantor, 1995). Cooper and colleagues (Cooper et al., 1999; Cooper, Agocha, & Sheldon, 2000; Cooper et al., 1998) have employed an approach-avoidance motivation framework, also referred to as appetitive-
aversive, (Carver & White, 1994; Gable, Reis, & Elliot, 2000; Gray, 1990), to their functional models. Briefly, approach motivation is that which directs behavior towards positive states, whereas avoidance motivation is that which directs behavior away from negative states (Carver, 2006; Elliot, 2006). For example, Cooper and colleagues (1995) distinguished between two types of motivations to drink, an approach type that directed drinking behaviors in pursuit of having fun, as opposed to the avoidant type that directed behaviors in pursuit of removing a negative affective state. They demonstrated that adolescents and adults who drank to enhance positive emotions reported increased occasions (i.e., number of times in a given time frame) of drinking compared to those less likely to drink for enhancement needs. Yet, this pattern of drinking does not lead to drinking problems, such as binge drinking, alcohol abuse, or dependence. On the other hand, those individuals motivated to drink to remove a negative state were not only likely to drink on more occasions, but also to develop problematic drinking patterns.

Cooper and her colleagues (Cooper et al., 1998; Cooper et al., 2000) have also successfully extended a function model of motivation to understanding sexual risk taking. In both retrospective and prospective designs, Cooper and her colleagues (1998) addressed the approach and avoidant nature of sex motives. They had originally conceptualized sex motives along two dimensions of motivational systems: (a) approach versus avoidance motivation, and (b) self versus other-directed motivation. Approach and avoidant motivation are considered basic biological and personality factors that underlie a wide range of human behaviors (Carver, 2006; Carver & White, 1994; Elliot, 2006; Fowles, 1994; Gray, 1990). Approach motivation directs individuals toward positive stimuli, such as possibilities, states, or events, and avoidant motivation directs people away from negative stimuli and outcomes.
The second dimension of motivation, employed by Cooper and her colleagues (1998), was the extent to which individuals were more directed to their own needs as opposed to others (self- versus other-directed), also known as agentic- versus communal- directed (Helgeson, 1994). Based on the two dimensions of motivation, Cooper and her colleagues (1998) categorized a set of motives into four distinct groups: (1) approach and self directed, (2) approach and other directed), (3) avoidant and self directed, and (4) avoidant and other directed.

Cooper and colleagues demonstrated that motives for sex were related to relationship status and risky behaviors. Cooper and her colleagues’ (1998) study expanded the motives for sex beyond traditionally studied variables, such as intimacy - approach and other directed - and pleasure seeking - approach and self directed (Brigman & Knox, 1992; Denny, Field, & Quadagno, 1984; Levinson et al., 1995; Monahan, Miller, & Rothspan, 1997; Sanderson & Cantor 1995). Their model was more comprehensive, and included other factors that proved as important, such as having sex to cope with a negative mood, to seek partner and peer approval or boost one’s self-esteem.

Cooper and colleagues’ (1998) study established a much-needed functional framework for assessing risky sexual behaviors. They showed that the reasons people have sex are significant predictors of patterns of sexual risk taking behaviors that may potentially lead to negative outcomes, such as pregnancy and sexually transmitted infections (STIs). Yet, the relationships between motives and risk taking were more complex than expected and did not neatly function along the dimensions of approach-avoidant or self-other motivations. Relationship context was a significant moderator of the associations between risk taking and sexual motives. Therefore, to better predict and understand sexual motives, it may be
important to go beyond an approach and avoidant framework, and direct attention to research that attends to how the pursuit of specific affective states, personal and interpersonal needs, in a variety of contexts, influence health behaviors.

*Seeking intimacy and sexual risk taking.*

Prior to the 1990’s, the general assumption was that intimacy-driven individuals would only have sexual contact within the context of a serious relationship, and, thus, given the nature of these relationships, implicitly engage in less risky sex (DeLamater, 1987). Research conducted by Sanderson and Cantor (1995) and Cooper and her colleagues (1998) dispelled these notions about intimacy, adding complexity and sophistication by examining the relationship between intimacy and sexual risk taking behavior within different interpersonal contexts.

While Cooper and her colleagues (1998), along with earlier findings by Sanderson and Cantor (1995), confirmed that those high in intimacy motivation were more likely to be in longer term relationships, their results suggested that intimacy was differentially related to risky behaviors as a function of the interpersonal context of the sexual encounter. When in a relationship, those motivated by affiliative needs, in a drive to enhance communication and share concerns and feelings with their partners, seem to negotiate health protective behaviors, and establish methods of contraception with their partners (Cooper et al., 1998; Moreau-Gruet et al., 2001; Sanderson & Cantor, 1995). As the relationship deepens, people become more satisfied in the relationship and trust gets established. Often, at this point in the relationship, both heterosexual and gay couples abandon the use of condoms and discuss
risk prevention should either member seek sex outside the couple (Cooper et al., 1998; Davidovich et al., 2004; Elford et al., 2001; Gebhardt et al., 2003).

A different trend emerges, though, for those not in relationships and motivated by intimacy needs. Cooper and her colleagues (1998) and Sanderson and Cantor (1995) demonstrated that single adolescents and young heterosexual adults, when driven by attachment needs during sex, are more likely to abandon protective strategies compared to those less driven by intimacy. This may be because those motivated by intimacy during sex are not well matched for having sexual partners outside an intimate relationship (Sanderson & Cantor, 1995) and do not have the skills and strategies required to negotiate adequate protection with such partners (Cooper et al., 1998).

**Pleasure seeking and sexual risk taking.**

A second motivation for sex that has been extensively studied and discussed is pleasure seeking. Satisfying sexual needs, wanting to feel good during sex, being caught up in sex, and feeling sexually aroused, have all been cited by participants in studies as reasons they’ve abandoned condom use with partners in the heat of the moment (Canin et al., 1999; Kippax et al., 2003). Often, participants suggest that condoms reduce the sensation of physical arousal during sex (Albarracín et al., 2000; Kegeles, Adler, & Irwin, 1989; Kelly & Kalichman, 1995). The pursuit of pleasure has been argued to distort judgment and override one’s ability to evaluate a situation effectively, resulting in reduced capacity to protect oneself from STIs and pregnancy (Abraham & Sheeran, 1994; Ariely & Loewenstein, 2006; Mackie & Worth, 1991; Ostrow, McKirna, Klein, & DiFranceisco, 1999). And, in a recent
laboratory study, Ariely and Loewenstein (2006) demonstrated that sexually aroused heterosexual men were more likely to report future engagement in risk-taking behaviors in hypothetical sexual situations as compared to when they were not sexually aroused.

The notion that pursuing sexual pleasure and positive mood impedes effective protective behaviors is rooted deeply in the idea that pleasure seeking and positive mood states can alter people’s judgment, and negatively impact self-regulatory processes (Salovey & Birnbuam, 1989). In a critical review of the role of positive events and mood states on self-regulatory processes, Aspinwall (1998) noted that past research has often -- yet inconsistently -- demonstrated that people in positive mood states or who are pursuing positive outcomes tend to underestimate the likelihood or frequency of negative events, such as illness or accidents (Johnson & Tversky, 1983; Salovey & Birnbuam, 1989). As a result, individuals pursuing positive states may engage in riskier behaviors than when not in or pursuing such positive states.

This idea that positive mood states and the pursuit of pleasurable events hinder appropriate information processing and place people at greater risk for negative consequences has been challenged by numerous researchers, including Aspinwall (1998; Reed & Aspinwall, 1998), Isen and colleagues (Isen, 1993; Isen & Geva, 1987; Nygren, Isen, Taylor, & Dulin, 1996) and Martin and his colleagues (Martin & Davies, 1998; Martin, Ward, Achee, & Wyer, 1993). The basic argument is that the role of positive mood on self-regulation and cognitive processing is more complex than simply altering cognitive processing in negative ways (Martin & Davies, 1998).

Isen and her colleagues demonstrated, through a series of studies, that induced positive mood can, in fact, expand creative thinking and problem solving, and enhance loss
perception, deterring behaviors that could be considered risky (Isen, 1993; Isen, Nygren, & Ashby, 1988; Nygren et al., 1996). Further, individuals directed to positive outcomes, such as optimists, are more likely to pay attention to health risks and information, especially when the health information is self-relevant (Aspinwall, 1998; Aspinwall & Brunhart, 1996). And finally, Nygren (1998) showed that in high risk situations, inducing positive affect or framing a task as having the potential to enhance gains led to more, not less, risk-aversive behaviors. On the other hand, in low risk situations, induced positive affect or directing individuals to view gains was related to more risk-seeking behaviors. As a result, individuals may be rendered risk-aversive when in or pursuing positive states, in situations considered risky, and when the information is self-relevant.

The findings by Isen and Nygren (Isen, 1993; Isen, Nygren, & Ashby, 1988; Nygren, 1998; Nygren, Isen, Taylor, & Dulin, 1996), and Aspinwall (Aspinwall, 1998; Aspinwall & Brunhart, 1996) suggest that when individuals are in positive mood states or frame their pursuits as enhancing potential gains, and consider the situation either risky or containing important health information, they are more likely, not less likely, to engage in risk averse health behaviors. Evidence supports this possibility. Individuals high in dispositional and daily positive affectivity are more likely to engage in a wide variety of health behaviors, including condom use, exercise, nutritious food intake, and drug avoidance (Griffin, Friend, Eitel, & Lobel, 1993; Mustanski, 2007a). Additionally, single young heterosexual adults maintained condom use over a one-year period when they reported higher levels of pleasure-seeking motivation during sex (Cooper et al., 1998).
Having sex to cope with a negative mood and sexual risk taking.

The role of negative affect in sexual risk taking has been extensively studied in both heterosexual and MSM and evidence is contradictory (Kalichman, 1999; Marks, Bingham, & Duval, 1998; Martin & Knox, 1997; Mustanski, 2007a). On the one hand, some studies confirm that negative affect disrupts self-regulatory processes and diminishes risk perception, especially in conditions of high arousal states or high-risk situations (Leith & Baumeister, 1996; Nygren, 1998). Further, those in negative states, in an effort to quickly overcome negative emotions, engage in indulgent and riskier behaviors that may provide more ‘bang for the buck,’ or faster relief of the negative mood (Cooper, Russell, Skinner, & Windle, 1992; Cooper et al., 1998; Isen, 1984). On the other hand, some research suggests that inducing negative affect can increase risk perception, thus leading individuals to adopt a more cautious, risk-aversive style of behavior (Johnson & Tversky, 1983; Schwarz, 1990).

In a recent meta-analysis, Crepaz and Marks (2001) sought to clarify the relationship between negative affect and sexual risk taking behaviors. Reviewing over two dozen studies, they demonstrated that negative affect did not seem to relate to increased risky sexual behaviors. Similarly, Mustanski (2007a) demonstrated that fluctuations in daily negative affect did not correspond with changes in sexual risk-taking in a sample of gay men over a 30-day period.

A reason for the mixed findings (Cooper et al., 1992; Isen, 1984) and the null findings from Crepaz and Marks’ (2001) meta-analysis may be that studies have not differentiated between people experiencing a negative affective state who have sex to escape it and people in a similar state who do not explicitly have sex to escape it. Findings suggest that this
difference is potentially key to understanding the relationships among sexual practices and negative affect. Folkman, Chesney, Pollack, and Lance (1992) demonstrated that while emotional distress was generally not related to risky sexual behaviors in nonmonogamous gay men, those who cited having sex to escape negative emotional states were more likely to engage in riskier sexual practices. The possibility exists that negative affect impacts sexual behaviors only among those who explicitly have sex to escape a negative affective state.

Self-affirmation and sexual risk taking.

Cooper and her colleagues (1998) described a fourth motive for sex: having sex to confirm one’s attractiveness and self-esteem. Crocker and Park (2004), as well as others (Baumeister & Leary, 1995; Crocker, 2002; Deci & Ryan, 2000), have argued that the pursuit of self-esteem has deleterious effects on self-regulation processes, leading to reduced mental and physical health. Similarly, Cooper and her colleagues (1998) predicted that individuals motivated by enhancing their self-esteem through sex would more likely engage in risky sex. Yet, Cooper and her colleagues’ findings (1998) did not confirm their predictions regarding risk-taking behaviors and self-affirmation, primarily because the young adults in their study who had sex to affirm their sexual esteem had less sex in general. Evidence suggests that the opposite may be true, that those with affirmed senses of sexual esteem during sex may more likely engage in precautionary sexual behaviors.

While Cooper and colleagues’ study is unique in measuring self-affirmation and its relationship to sexual risk taking, self-affirmation outside the realm of sexuality has been thoroughly studied (Armitage, Harris, Hepton, & Napper, 2008; Reed & Aspinwall, 1998;
Sherman & Cohen, 2002; Sherman, Nelson, & Steele, 2000; Steele, 1988). Steele (1988) proposed that individuals whose esteem needs are affirmed in a domain that is important to them are more likely to be open to information of personal risk in another domain and subsequently alter behaviors to match the newly learned risk information and protect themselves. For example, Sherman and colleagues (2000) demonstrated that individuals were more likely to admit risk of sexually transmittable infections during sex when their esteem needs had initially been affirmed. Similar results with the risk of caffeine (Reed & Aspinwall, 1988) and smoking (Armitage et al., 2008) confirm that when individuals feel that their esteem needs are affirmed and boosted, they are less likely to act defensively. The proposed underlying mechanism of this phenomenon is that individuals who have a strong global sense of self do not need to deflect negative and vital health information, and can in turn engage in healthy and risk-aversive behaviors. In terms of condom use, then, it could be expected that those engaging in sex to feel good about who they are and enhance their sexual self-esteem may be less likely to ignore threatening information in situations that affirm their sense of worth, and as a result, engage in more protective behaviors.

**Partner approval and sexual risk taking.**

A final motive that may prove important to understanding sexual risk taking behaviors in gay men is having sex to please one’s partner. Studies investigating the importance of partner approval as a motivation for sex and its relationship to sexual practices and sexual risk taking behaviors are scarce (Cooper et al., 1998; Gebhardt et al., 2003). Cooper and her colleagues (1998) found that single young heterosexual adults were less likely to engage in
risky sexual behaviors, whereas those partnered were neither more nor less likely to engage in risky behaviors when motivated by partner approval. Studies investigating having sex to avoid partner disapproval in MSM do not exist.

*Event-Level Recording and Sex Motives*

A thorough understanding of the risk taking behaviors of single MSM during sexual encounters with both casual and regular partners requires the assessment of encounters at the event level. Recent studies suggest that sexual behaviors and risk taking practices, and specifically condom use for anal intercourse, can change from one occasion to the next (Ariely & Loewenstein, 2006; Barta, Kiene, Tennen, Abu-Hasaballah, & Ferrer, 2007; Kiene, Tennen, & Armeli, 2008; Mustanski, 2007a; Vanable et al., 2004). Applying an event-level recording methodology is well matched to the study of condom use behaviors. Furthermore, while motives are often considered and measured as individual difference variables (Cooper et al., 1998; Gebhardt et al., 2003; Sanderson & Cantor, 1995), evidence suggests that agentic (Armeli et al., 2008), interpersonal (Impett, Gable, & Peplau, 2005), and sex motives (Impett, Peplau, & Gable, 2005) can vary on a daily basis and have significant effects on health behaviors, personal well-being, and interpersonal functioning. For example, Armeli and colleagues (2008) demonstrated that university students were more likely to commence drinking during high anxiety weeks when drinking was motivated by coping with the negative affective state. Additionally, Impett, Peplau, and Gable (2005) demonstrated that approach and avoidant sex motives can vary across days and within persons having beneficial and negative effects on personal and interpersonal well being.
These studies demonstrate the need to move beyond a dispositional or individual difference perspective of motives towards the examination of motives at the event level in order to understand how changes in motivations may influence behaviors. As a result, the present study applied an event-level process method to data collection and employs a multilevel design to analysis.

A second limitation of previous studies is that most relied solely on retrospective recall of events. However, retrospective recall of events has been criticized increasingly as systematically biased (DeLongis, Hemphill, & Lehman, 1992; DeLongis & Holtzman, 2005; Gorin & Stone, 2002; Shiffman & Stone, 1998), resulting at times with the over-reporting, and at other times with the under-reporting, of precautionary sexual behaviors when compared to daily recordings of sexual events (Coxon, 1999; Graham, Catania, Brand, Duong, & Canchola, 2003; Horvath et al., 2007). Event-sampling of sexual episodes across time, i.e. over a one-month or two-month period, captures events closer to their real-time occurrence, and thus, can more accurately represent the dynamics occurring within an episode or day (Armeli et al., 2008; Bolger, Davis, & Rafaeli, 2003; Gillmore et al., 2002; Horvath et al., 2007; McAuliffe, DiFranceisco, & Reed, 2007).

The Current Study

The review of previous research demonstrates the complexities that exist between motives and behaviors as a function of the interpersonal context within which sex occurs (Cooper et al., 1998; Sanderson & Cantor, 1995). The review highlights the scarcity of research examining motives directly, especially among those most at risk for transmitting
and contracting HIV and sexually transmitted infections, single men who have sex with men (Ekstrand et al., 1999).

The present study employed an event recording methodology to investigate the relationships among sexual motives and sexual risk-taking behaviors measured across a two-month period in single MSM. The resurgence in unprotected anal intercourse (Wolitski, Valdiserri, Denning, & Levine, 2001) and incidence rates of HIV (CDC, 2006b; PHAC, 2007) in MSM has prompted calls to move beyond cognitive models of risk-taking behaviors (Canin et al., 1999; Cooper et al., 1998; Levinson et al., 1995) – and the present study addresses those calls. An area under-explored but potentially integral to understanding sexual risk taking behaviors in MSM is the reasons they have sex and how these motives might predict patterns of risk taking and health protective behaviors (Cooper et al., 1998; Sanderson & Cantor, 1995; Sherman et al., 2000; van Kesteren, Hospers, Kok, & Van Empelen, 2005; van Kesteren, Hospers, van Empelen, van Breukelen, & Kok, 2007).

Study participants completed an initial background questionnaire package and telephone interview, including a confidential automated component that assessed self-reported HIV serostatus. Next, participants completed daily Internet questionnaires regarding their previous days’ experiences, including sexual activities, sexual motives, partner type, and the presence of discussions about condom use with partners. Previous studies demonstrate that those who discuss condom use with their partners are more likely to engage in precautionary behaviors, such as condom use, or negotiate safety concerns with their partners (Davidovich et al., 2004; Elford et al., 2001; Kippax et al., 1993; Kippax et al., 1997; Niccolai, Dorst, Myers, & Kissinger, 1999). It would thus be important to establish
that motives are important to condom use beyond a factor already established as an important predictor of condom use, such as the discussion of protective strategies.

The present study, thus, sought to investigate the associations between event-level sexual motives and condom use for anal intercourse, while employing discussions of condom use as covariates. More specifically, I examined the roles that seeking intimacy, enhancing sexual pleasure, having sex to remove a negative affective state, boosting one’s sense of self-esteem, and having sex to avoid partner disapproval independently play in condom use behavior. Previous studies have established that motives, measured as individual difference variables, retrospectively and prospectively predict precautionary sexual behaviors (Cooper et al., 1998; Sanderson & Cantor, 1995; Sherman et al., 2000; van Kesteren et al., 2005, 2007). Yet, to date, I am unaware of research examining a comprehensive functional model of sexual risk taking behaviors in MSM, nor research exploring how varying levels of sexual motives may influence behaviors across several episodes sampled within each participant.

In addition to examining the direct effects of motives on sexual risk taking and precautionary behaviors, the current study also sought to investigate the impact of participants’ HIV serostatus and the relationship with their sexual partners during each sexual occasion on the associations between sexual motives and condom use for anal intercourse. Previous studies suggest that condom use is more varied in HIV seropositive as compared to seronegative men and that those engaging in high risk behaviors are more likely to be sensitive to contextual cues (Ekstrand et al., 1999; Kalichman, Roffman, Picciano, & Bolan, 1998). Furthermore, the type of partner seems to play an important role in whether some motives enhance or prevent the likelihood of condom use (Cooper et al.,
1998; Sanderson & Cantor, 1995). This study sought to examine the roles sexual motives play in single MSM’s sex lives in different sexual situations with either regular or casual partners.

Research question 1. Do sexual motives predict condom use for anal intercourse during sexual encounters among single MSM, independent of HIV serostatus or type of partner with whom one has sex?

Sexual motives for having sex are proposed to be associated with sexual risk taking and precautionary behaviors, namely condom use for anal intercourse. Indeed, previous studies have outlined the importance of exploring the roles that sexual motives play in specific risk behaviors (Cooper et al., 1998; Levinson et al., 1995; Sanderson & Cantor, 1995). Cooper and her colleagues outlined a set of five such motives in young heterosexual adults that may be potentially relevant to the sex lives of gay men. The five motives include having sex to gain intimacy with one’s partners, pleasure seeking, boosting one’s sense of self-worth, avoiding partner disapproval, and having sex to cope with a negative mood. To date, no study has applied a comprehensive functional, motivational model to understand MSM’s condom use behaviors, though previous studies may help illuminate the potential associations.

Until recently, it was assumed that those who are motivated by intimacy are more likely to be in longer term relationships, have healthier communication with their partners, and thus, are able to effectively negotiate safer sexual practices based on the depth of the relationship (Cooper et al., 1998; DeLamater, 1988; Moreau-Gruet et al., 2001). Yet, while
this perspective of intimacy seekers is well supported in the literature for those in relationships, young heterosexuals who are single and seek intimacy during sex are less likely to use condoms for intercourse (Cooper et al., 1998; Sanderson & Cantor, 1995). The present study attempted to study these processes among single MSM.

The second motive examined in the present study is having sex to enhance one’s pleasure. The idea that pleasure seeking is related to decreased protective behaviors (Ariely & Loewenstein, 2006; Canin et al., 1999; Kalichman et al., 1994; Kegeles et al., 1989; Ostrow, et al., 2008) has been challenged by researchers who suggest that this relationship is more complex, and is a function of risk involved and relevance of information (Aspinwall, 1999; Isen, 1993; Nygren, 1998). Given the relevance of HIV to the lives of MSM, it is predicted that lack of condom use during anal intercourse, a behavior that carries high risk, would be avoided when single MSM engage in sex with partners and are motivated by enhancing pleasure and sexual satisfaction.

Third, while negative affect may not be associated with condom use (Crepaz & Marks, 2001; Mustanski, 2007a), two studies suggest that being motivated during sex to escape a negative affective state may very well be (Cooper et al., 1998; Folkman et al., 1992). Folkman and her colleagues (1992) demonstrated that nonmonogamous gay men who reported coping with negative affective states by having sex were less likely to retrospectively report using condoms for anal intercourse. It was expected, in the present study, that when men reported having sex to cope with a negative affective state, they would be less likely to use a condom for anal intercourse across several episodes.

Fourth, I examined enhancing one’s sense of self worth during sex as a predictor of condom use behaviors in our sample of single MSM. Recent work suggests that individuals
with affirmed self-esteem and sense of worth prior to or during an activity are more likely to be open to health-damaging information and less likely to engage in risky health behaviors (Armitage et al., 2008; Reed & Aspinwall, 1998; Sherman & Cohen, 2002; Sherman et al., 2000; Steele, 1988). It is possible that in sexually active MSM, those seeking to enhance their sense of worth would do so without engaging in behaviors that would directly counter this pursuit. Therefore, it was expected that being motivated to enhance one’s sense of worth and esteem would more likely be related to condom use for anal intercourse compared to lower levels of the motive.

Finally, limited research has investigated whether having sex to please one’s partner or to avoid a partner’s disapproval is related to risk taking behaviors. In the one study to investigate a similar association in heterosexual adults (Cooper et al., 1998) it was demonstrated that young adults were more likely to engage in precautionary sexual behaviors when they had sex to avoid their partner disapproval. It was expected that individuals motivated during sex to avoid the disapproval of one’s partner would be more likely to practice safer sex than those not motivated by similar reasons.

Hypothesis 1a. It was expected that higher reported levels of having sex to enhance intimacy with one’s partner would be associated with a reported decreased likelihood of condom use for anal intercourse across several episodes measured within participants. These results were expected after controlling for all other sexual motives and discussion of protection strategies on each occasion.

Hypothesis 1b. It was expected that higher reported levels of having sex to increase
pleasure would be associated with a reported increased likelihood of condom use for anal intercourse across several episodes measured within participants. These results were expected after controlling for all other sexual motives and discussion of protection strategies on each occasion.

*Hypothesis 1c.* It was expected that higher reported levels of having sex to cope with a negative affective state would be associated with a reported decreased likelihood of condom use for anal intercourse across several episodes measured within participants. These results were expected after controlling for all other sexual motives and discussion of protection strategies on each occasion.

*Hypothesis 1d.* It was expected that higher reported levels of having sex to increase one’s sense of sexual esteem would be associated with a reported increased likelihood of condom use for anal intercourse across several episodes measured within participants. These results were expected after controlling for all other sexual motives and discussion of protection strategies on each occasion.

*Hypothesis 1e.* It was expected that higher reported levels of having sex to avoid partner disapproval would be associated with a reported increased likelihood of condom use for anal intercourse across several episodes measured within participants. These results were expected after controlling for all other sexual motives and discussion of protection strategies on each occasion.
Research question 2. Do the relationships between sexual motives and the likelihood to use condoms for anal intercourse vary as a function of partner type?

Sexual motives have stronger associations with risk behaviors in single individuals than in those coupled (Cooper et al., 1998), supporting the need to investigate these links in single MSM. Further, while single men, by the nature of their relationship status, are not in exclusive relationships, they may consider partners to be regular and not only casual. Thus, it is important to differentiate the role that partner type plays in the relationships between motives and risk taking behaviors in single MSM (Ekstrand et al., 1999). Previous work suggests that single MSM vary in their behaviors more with regular sexual partners and that MSM are more likely to consistently wear condoms for anal intercourse with partners they know less or not at all (Elford et al., 2001; Moreau-Gruet et al., 2001). As familiarity and trust deepen, even in exclusively sexual relationships, the possibility exists that risk prevention is less salient than when having sex with casual partners. Self-regulation may be less important, resulting in sex motives having more significant roles in the sex lives of single gay men when having sex with regular partners as compared to casual partners.

Hypothesis 2. The relationships between sexual motives and condom use for anal intercourse would be stronger during sexual encounters involving regular partners as compared to encounters involving casual partners.

Research question 3. Do the relationships between sexual motives and the likelihood to use condoms for anal intercourse vary as a function of serostatus?
There is clear evidence that both HIV seropositive and seronegative individuals engage in risky sexual behaviors (Halkitis et al., 2003). According to Halkitis and colleagues, HIV seropositive gay men are more likely to be inconsistent in their condom use behaviors for anal intercourse and report higher rates of having sex without condoms than do HIV seronegative men. Furthermore, research demonstrates that HIV seropositive men are more sensitive to contextual cues than HIV seronegative men (Ekstrand et al., 1999). The possibility exists that HIV seropositive men’s increased reporting of inconsistent and lack of condom use is a result of an increased responsiveness to their sexual motives during sex.

Hypothesis 3. It was expected that the relationships between motives and condom use for anal intercourse would be stronger for HIV seropositive single MSM as compared to seronegative men.

Research question 4. Are there differing relationships between sex motives and condom use as a function of the interaction between partner type and HIV serostatus?

In the present study, I examined whether serostatus or partner type moderated the relationships between sexual motives and sexual risk taking behaviors in single MSM, as outlined in research questions 2 and 3. I also sought to examine whether a three-way interaction exists between partner type, HIV serostatus, and motives on condom use behaviors in single MSM. While there is a lack of evidence supporting the three-way
interaction, it was expected that if there were any significant three-way interactions, the relationships between motives and condom use would be stronger when HIV seropositive MSM have sex with regular partners as compared to casual partners or to seronegative men.
METHOD

Procedures

Participants in the present study were part of a larger study on MSM sexuality, with a focus on safer sex behaviors. Participants were recruited in Vancouver, British Columbia, via advertisements placed in community-based not-for-profit organizations and approximately two-dozen for-profit businesses that primarily serve the MSM community in the downtown Vancouver district. We also participated in the annual gay pride parade event and distributed plastic wristbands - with the word ‘Pride’ written on one side - to the crowds, and our study’s website on the other. A second phase of recruitment occurred through online click-ads on a website catering to men interested in contacting other men, as well as a second round of advertisements placed in local community-based organizations and businesses.

Interested participants visited our website where they received information about the purpose of the study, and read the eligibility criteria. Our webpage received approximately 3,000 unique visitors over the year and a half that we actively recruited participants. If interested, individuals completed an online form with their contact information. Three hundred and eighty-four people signed up for more information. No information is available on all the visitors, other than those who participated in the study. On the phone, the project manager confirmed their eligibility for the study, and elaborated further on the purpose and methodology of the study. Of the 384 interested individuals, 39 were unreachable, 94 did not meet the full eligibility criteria, and one decided to not participate once we explained the
study. Eligibility criteria during the first round of recruitment included: (1) Being a male who has sex with men; (2) having had sex at least four times with a man in the past two months (with the same person or with different people); (3) being at least 18 years of age, and (4) having access to a computer and internet on a daily basis. In order to limit participation to individuals whose condom use was more likely to vary, two more eligibility criteria were added during our second round of recruitment in the summer of 2006, adopted from Gillmore and colleagues (2002): (5) having used a condom in the past year, but not always, and (6) being single or in a relationship that is not monogamous for longer than 6 months.

The study contained three phases. First, upon oral consent, we sent each participant a booklet with a consent form and a set of questionnaires to complete. Second, upon return of the consent form, one of three trained male interviewers contacted the participant to complete a one-hour telephone interview regarding relationship status, sexual and drug history, and HIV serostatus. Each participant who expressed interest in participating in the telephone interview received $20. Participants were provided with a four-digit password to complete the final online component. For a period of eight weeks, participants completed a daily online questionnaire containing items related to mood and sexual contact in the past 24 hours or since last login. If sexual contact occurred, participants completed another set of

1 There were no significant differences between participants recruited during the first compared to the second round of recruitment on age, socio-economic status, employment status, education, any Big Five Inventory (i.e. Extroversion, Agreeableness, Openness to Experience, Conscientiousness, and Emotional Stability; Benet-Martinez & John, 1999), sexual activity, or HIV status.

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questions about sex-related motives, discussions of condom use, and a checklist of sexual behaviors that participants might have engaged in with their partner. They received daily reminders in the evening via email to complete the survey. Participants were provided with an honorarium of $15 at the start of each week of diary completion, regardless of actual participation. When a participant did not complete more than fourteen consecutive days of daily recordings in a row, they stopped receiving the daily email reminders, and were dropped from the study.

Two hundred and fifty participants received the full booklet, including the consent form and questionnaires. Participants returned 203 signed consent forms (81.2%), and of those, 183 returned completed questionnaire booklets (90.1%). 186 participated in the telephone interview and the daily study (91.6%).

Eighty-six participants were in self-described monogamous or non-monogamous relationships, whereas 100 self-described as not in relationships, and were the focus of the present study. All participants who participated in the telephone interview participated in the daily diary study.

Participants

Participants were all Canadian residents and largely Canadian-born (N=85 of 100) with the remaining born in the United States (N=3), Asia (N=5), Europe (N=5) Caribbean

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2 Participants who returned the questionnaire booklet and participated in the telephone interview (N = 165) and daily recordings portion of the study were compared to those who did not participate in the two latter components (N = 18) on the Big Five Inventory. No significant differences appeared between these participants.
(N=1), and Africa (N=1). Individuals not born in Canada were, on average, 15.23 years in the country (range = 1 to 49 years, SD = 13.54). Participants were a mean of 34.5 years of age (SD=11.93 years) and ranged from 18 to 66. A large majority of our participants in the present study were Caucasian (N=83), while the others were Asian (N=8), First Nations (N=6), South East Asian (N=1), (African Canadian=1), and Hispanic (N=1). A large majority (96%) of participants had at least a high school diploma, and of those 64.8% (N=62) had at least a bachelor’s degree or equivalent certificate. Thirty-eight participants reported income of less than $25,000 per year, 44 between $25,000 and $50,000, 16 between $50,000 and $100,000, and 1 over $150,000. Ninety-four self-labeled as gay, while 4 labeled themselves as bisexual, 1 was “questioning”, and 1 was “two-spirited”3. Twenty-five participants reported being HIV seropositive, eight reported not knowing their serostatus, and the remaining 67 reported being HIV seronegative.

Telephone Interview Measures

The present study examined motives and their relationships to condom use behavior for anal intercourse across specific sex episodes. I also examined the extent to which participants’ HIV serostatus and partner type within a specific episode altered the

3 Two-spirited refers to the term employed by First Nations individuals for queer. It captures the dynamic interaction between genders that occur within these individuals. Two-spirited individuals are believed, by aboriginal mythology, to have both the masculine and feminine spirits.
relationships between the sex motives and our outcome. Only measures included in the present analyses are presented and described here.

Demographic variables. Socio-economic status (assessed as income level), education level (level of completed education, i.e. below grade 8, elementary School (completed grade 8), some high school, high school diploma or equivalency, bachelor’s degree, master’s degree, doctorate, professional (MD, LLB, etc.), or college diploma), age (assessed as date of birth), and employment status (yes, no) were assessed at the end of the telephone interview. Demographic variables were described in the Participants section, and were examined as potential covariates in our models.

HIV Status. Near the end of the telephone interview, participants’ HIV status was self-reported and collected via automated telephone utilizing Telesage’s Interactive Voice Response (IVR) technology\textsuperscript{4}. Participants were asked, ‘What is your HIV status?’ and were prompted to select 1 for HIV seronegative, 2 for seropositive, and 3 for status unknown. Two dummy coded variables were created; the first, labeled HIV-Pos, had HIV seropositive coded 1 and seronegative and unknown coded 0. The second dummy coded variable,

\textsuperscript{4} Due to concerns about confidentiality regarding HIV status, interviewers asked participants not to reveal their serostatus during the telephone interview. Rather, each participant received a four-digit code, and was informed during the telephone interview to call an automated telephone to answer questions specific to HIV status. The file on which participants’ status was recorded was inaccessible to the interviewers.
labeled HIV-No, had HIV seronegative and serostatus unknown coded 1 and seropositive coded 0.

Daily Recording Measures

Sex motives. The Sex Motives Scale (Cooper et al., 1998) consisted of 29 items that described reasons that individuals have sex. The scale consists of six subscales: (1) Intimacy is the motive to connect and feel emotional closeness with one’s partner as a reason for engaging in sex; (2) Pleasure Seeking captures the motive of fulfilling sexual desire and appetite; (3) Self-Affirmation involves having sex to enhance self-worth; (4) Coping captures the sexual motive to cope with a negative state of mind, (5) Partner Approval is having sex in order to not lose the approval and affection from one’s partner and (6) Peer Approval is having sex in order to not lose the approval of friends. During development by Cooper and her colleagues (1998), the subscales demonstrated high internal consistency (all Cronbach’s alphas > .83) and strong confirmatory validation in community samples - Normed Fit Index

5 In the present study, HIV seropositive participants significantly differed in condom use for anal intercourse, coping motive, Pleasure Seeking motive, and avoiding partner disapproval, from HIV seronegative individuals and participants whose serostatus was unknown. On the other hand, HIV seronegative participants did not significantly differ on these variables from those whose status was unknown. As a result, HIV seronegative and serostatus unknown were grouped into one category in the present study and analyses. Liberal significance levels were employed ($p < .10$) in the comparisons in order to decrease the chances that grouping HIV serostatus unknown and seronegative occurred erroneously.
(NFI) and Comparative Fit Index (CFI) > .90. The six motives subscales also demonstrated invariant structure across race, gender, and age groups in Cooper and her colleagues’ work.

Given the burden placed on participants by the repeated measures design, a shortened version of the scale suitable for use in a daily process study was used. Brief versions of questionnaires are a standard method to reduce burden on participants in daily process and event recording studies (Bolger, DeLongis, Kessler, and Schilling, 1989; Impett, Peplau, & Gable, 2005; Story & Repetti 2006). Items removed were those that seemed to be most redundant (i.e. ‘being closer’ was kept while ‘feeling close’ was discarded). Instructions were adapted for daily reporting, and were: “The following list contains items that people sometimes evaluate as important during a sexual encounter. Please indicate the extent to which the following statements were IMPORTANT TO YOU the MOST RECENT TIME you had sex.” Intimacy items included, “being more intimate with my sexual partner,” “expressing love for my sexual partner,” “making an emotional connection with my sexual partner,” and “being closer with my sexual partner.” Pleasure Seeking items included, “satisfying my horniness,” “feeling good,” “being excited,” and “satisfying my sexual needs.” Coping items included, “forgetting upset feelings,” “feeling better because I was feeling lonely,” and “feeling better because I was feeling low.” Self-Affirmation items included, “feeling better about myself,” “my sexual partner thinking I am attractive,” “feeling sexually desirable,” and “feeling self-confident.” Partner Approval items included, “my sexual partner not wanting to be with me if I didn’t have sex,” “my sexual partner being upset with me if I didn’t have sex,” and “my sexual partner not loving me anymore if I didn’t have sex.” Finally, Peer Approval items included, “people, other than my sexual partner, talking about me if I didn’t have sex,” “people, other than my sexual partner,
thinking less of me if I didn’t have sex,” and “people, other than my sexual partner, kidding me if I didn’t have sex.”

In the present study, peer approval was not included for a few reasons. First, while seeking peer approval or avoiding peer disapproval might predict sexual behaviors in adolescents and young adults, it was assumed that adult gay men would not be motivated by seeking the approval of their peers. This was confirmed by the very low mean of 1.04 across all episodes for all participants in the present study for the peer approval motive, corresponding to ‘not at all’ for the items on this subscale. Second, the standard deviation was also the lowest of all the motives, 0.27, with most of the variance occurring at the between person level (89%), and only 11% of the variance occurring across episodes within persons. The lack of variability in the motive produced models that were unable to converge and thus, for the above reasons, having sex to avoid peer disapproval was dropped from the study.

Internal consistency coefficients (Cronbach’s alpha) were computed for the abridged Sex Motives Scale subscales, including both a between-participant coefficient, measured across all participants and sexual episodes, as well as a within-person coefficient, computed with within-person deviation scores per item. Results are presented in Table 1. In general, between-person internal consistency estimates were stronger than those of within-person estimates. However, the within person estimates confirmed acceptable to strong internal consistency. Additionally, I employed EQS 6 (Bentler, 2006) to confirm a multilevel structure to our factors using Muthén’s (1994) strategy for multilevel confirmatory factor analysis. Results indicated a satisfactory structure (CFI = .91, GFI = .87).
TABLE 1

Between- and Within-Person Internal Consistency scores for the Five Subscales of the Sex Motives Scale.

<table>
<thead>
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<th>Subscale</th>
<th>Between-Person Cronbach’s α</th>
<th>Within-Person Cronbach’s α</th>
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</thead>
<tbody>
<tr>
<td>Intimacy</td>
<td>.93</td>
<td>.88</td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>.85</td>
<td>.73</td>
</tr>
<tr>
<td>Coping</td>
<td>.91</td>
<td>.82</td>
</tr>
<tr>
<td>Self Affirmation</td>
<td>.85</td>
<td>.64</td>
</tr>
<tr>
<td>Partner Approval</td>
<td>.81</td>
<td>.71</td>
</tr>
</tbody>
</table>

Event-level partner type. Participants reported their sexual experiences, if any, on a daily basis. When participants reported any sexual activity in the previous 24 hour period or since previous entry, they were asked the type of partner from a list of 5 options (i.e. primary/regular partner, occasional but not regular, someone he knew but never had sex with before, someone he did not know and never had sex with before, and someone other than those mentioned). In the present study, all options, other than ‘regular partner’, were grouped together into a group labeled ‘casual.’ Two dummy coded variables were created.

6 Participants were told during the telephone interview that “Primary partners are, for married participants, their spouse(s). For participants in steady relationships, primary partners refer to the boyfriend(s) or girlfriend(s). A regular partner is, for single people, someone with whom you have sex with regularly.”
for the present analyses, one in which regular partner was coded 1 and casual coded 0 and labeled ‘Regular’, while in the second, scoring was reversed and labeled ‘Casual.’

*Condom use for anal intercourse.* When participants reported engaging in any sexual contact, they were asked what behaviors were performed from a list of 19 behaviors. Two of the items were whether participants anally penetrated their sexual partner (i.e., insertive) or were anally penetrated by their partners (i.e., receptive). If participants reported insertive or receptive anal intercourse in the most recent episode, they then selected whether a condom was used for either, where 1 was scored if a condom was used, and 0 if not. If the person engaged in both insertive and receptive anal intercourse in one episode, participants were scored 1 if a condom was used for both types of anal intercourse, and 0 if used for only one type of sex act or neither.

*Protection discussion.* On each occasion of sex, participants were asked whether, ‘prior to having sex the most recent time, did you talk with your sexual partner(s) about ways of preventing sexually transmitted diseases and AIDS?’ Participants had the option to choose from ‘No,’ ‘Yes, I brought it up,’ ‘Yes, my partner brought it up,’ ‘My sexual partner(s) and I have established ways to prevent STDs and AIDS in the past.’” We created a dummy variable ‘Protection Discussion’ and scored 1 if either the participant or his partner brought up protection (for prevention discussion) the last time they had sex or if there was a previous discussion in the past. We coded the lack of previous or prior discussion or not remembering as 0.
RESULTS

Adherence to Protocol

A total of 4516 days were completed of the possible 5600 (80.64%), resulting in an average of 45 days per participant (SD=12.91, range 3 to 56). Only two participants completed less than two weeks of data, and 87% participated for at least four full weeks of the possible eight. None of the demographic variables or HIV status was significantly related to number of days participants participated in the daily phase of the study.

Descriptive Data and Preliminary Analyses

Descriptive data and preliminary analyses of the sexual episodes.

During the daily recordings, participants reported 664 days (14.7% of total completed days) on which any type of sexual contact was experienced with a partner, with a mean of 6.64 sexual episode days per person (SD=5.87, range 0 to 35). Regarding anal intercourse specifically, participants reported 358 episodes out of the total number of sexual episodes (53.91%), with a mean of 3.58 anal sex episode days per person (SD=4.56, range 0 to 29). Participants reported significantly more anal sex episodes without a condom (N = 200) than with a condom (N = 158), $\chi^2 = 4.93, p < .05$ (theoretical null distribution assumed equal frequencies). Further, participants reported significantly more episodes with casual (N=220) than with regular partners (N=138), $\chi^2 = 20.67, p < .01$ (theoretical null distribution assumed equal frequencies).
Preliminary analyses examined if number of days on which participants completed daily recordings was related to number of sexual contact episodes and number of anal sex episodes. Results revealed that completed days were significantly and positively related to number of sexual episodes \( (r = .28, p < .01) \), but not to anal sex episodes \( (r = .15, p > .10) \). Number of anal episodes was significantly related to total number of recorded sexual contact episodes in general \( (r = .81, p < .001) \).

No significant relations were observed between HIV status or demographic variables and number of reported sexual episodes or anal intercourse episodes. Number of completed days, sexual contact and anal sex episodes were not related to condom use for anal intercourse, at the bivariate level nor within a multilevel framework. According to Snijders and Bosker (1999), systematic differences in outcomes should be considered and modeled into multilevel models when they predict the outcomes of interest. As such, while systematic differences existed between participants in relation to engaging in sexual contact, we did not find evidence for such a case in terms of our outcome of interest, namely condom use for anal intercourse\(^7\).

\(^7\) I also examined whether any Big Five personality factor was related to number of days participated, and there were no significant indications of such correlations. On the other hand, results revealed that openness to experience was significantly positively related to number of reported sexual episodes and to number of anal intercourse episodes, \( r = .21, p < .05 \) and \( r = .22, p < .05 \), respectively. Extraversion was significantly and positively related to number of sexual contact episodes, \( r = .24, p < .05 \). However, personality traits did not significantly predict condom use for anal intercourse, and were thus excluded from our models.
Descriptive data and preliminary analyses for covariate in study

Participants reported 153 anal sex occasions on which they discussed protection strategies either during the actual episode (N=95) or in the past (N=58), and 205 occasions when no discussion ever occurred. There were significantly more episodes on which no discussion was reported compared to episodes where the discussion of protection strategies occurred either during the episode or during the past, \( \chi^2 = 7.55, p < .01 \) (theoretical null model distribution assumed equal frequencies). Employing multilevel models, HIV seronegative participants were as likely as those who were seropositive or serostatus unknown to discuss protection strategies during the sexual episode or in the past (log odds coefficient = .53, \( t \) (98) = 1.64, \( p > .10 \)).

Descriptive data and preliminary analyses for variables of interest in study.

Table 2 presents means for all continuous variables in the present study aggregated across all episodes across all participants.\(^8\)

---

\(^8\) Avoiding partner disapproval was positively skewed in the present study (skewness greater than 3.00). Data for this motive was transformed with the inverse of each person’s score. All means, standard deviations, and variance components presented are for the original data, but multilevel analyses employed the inverse. For HIV seropositive men, a one-unit change in avoiding partner disapproval was related to a 2600% increase in the odds of using a condom. On the other hand, when the inverse was employed, avoiding partner disapproval was related to a 20% increase in the likelihood of using condoms. Relationships among all other variables to condom use remained the same.
Table 2 presents the bivariate correlations among the sex motives at two levels of analysis: (a) between participants (computed across all episodes for all individual and presented above the diagonal of the correlation matrix) and (b) within participants (centered within individuals and presented below the diagonal of the correlation matrix). Both within and between comparisons demonstrate significant positive relations among motives, with a few exceptions. At the between person level, pleasure seeking was not significantly related to partner approval, while intimacy was not significantly related to coping. At the within person level, intimacy was not significantly related to pleasure seeking and coping and pleasure seeking was significantly and negatively related to partner approval. Finally, at the within level of analysis, self-affirmation was not related to partner approval.
TABLE 3

Bivariate Correlations for the Sex Motives.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intimacy</td>
<td>-</td>
<td>.22*</td>
<td>.03</td>
<td>.44**</td>
<td>.32**</td>
</tr>
<tr>
<td>2. Pleasure Seeking</td>
<td>.04</td>
<td>-</td>
<td>.32**</td>
<td>.58**</td>
<td>.01</td>
</tr>
<tr>
<td>3. Coping</td>
<td>-.07</td>
<td>.20**</td>
<td>-</td>
<td>.47**</td>
<td>.37**</td>
</tr>
<tr>
<td>4. Self-affirmation</td>
<td>.24**</td>
<td>.40**</td>
<td>.28**</td>
<td>-</td>
<td>.28**</td>
</tr>
<tr>
<td>5. Partner approval</td>
<td>.26**</td>
<td>-.11**</td>
<td>.10*</td>
<td>.04</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. Between-person correlations are presented above the diagonal, and within-person correlations are presented below the diagonal.

* denotes significance level of $p < .05$, and ** denotes significance level of $p < .01$.

Independent t-tests comparing sex motives on occasions when condoms were used for anal sex to occasions when condoms were not used revealed that intimacy motives were significantly greater on occasions when condoms were not used than when they were used, $t (352) = -2.23, p < .05$. On the other hand, pleasure seeking and self-affirmation motives were greater on occasions when condoms were used as compared to not used, $t (352) = 3.29, p < .001$, and $t (352) = 2.67, p < .01$, respectively. I also examined whether motives differed between occasions when partners were regular versus casual. T-tests revealed that intimacy motives were greater on occasions when the partner was a regular partner as compared to a casual partner, $t (352) = 2.23, p < .05$. Additionally, I examined whether individuals who
were seronegative/status unknown, as compared to those who were seropositive, reported differing levels of motives. HIV seronegative and status unknown participants, as compared to seropositive, were more likely to engage in sex, on average, in order to cope with a negative mood ($t(92) = 4.79, p < .05$), self-affirm ($t(352) = 2.38, p < .05$), and avoid partner disapproval ($t(352) = 3.18, p < .05$).

Phi coefficients were computed to examine differences between condom use and lack of use occasions among binomial study variables, including discussions of protection strategies and whether the partner was regular or casual. Analyses revealed that condom use was significantly and positively related to having a discussion of protection strategies, $\phi = .32, p < .001$. However, analyses revealed that condom use was not significantly related to partner type at the bivariate level $\phi = .06, p > .10$.

**Multilevel Logistic Regression Analyses**

In the present study, we were interested in variation in condom use across sexual episodes. To properly model condom use, a dichotomous outcome, as a function of both within-person and between person variances, multilevel logistic regression analyses (Goldstein, Browne, & Rasbash, 2002; Snijders & Bosker, 1999) were conducted using hierarchical linear modeling (HLM) software (version 6.0; Raudenbush, Bryk, Cheong, & Congdon, 2004). A multilevel approach using HLM offers several advantages, including its ability to adequately deal with missing data and examine associations between predictors and outcomes while taking into account dependence in the data that arises from the repeated measurement of the same variables for each participant across several events. Using HLM,
within-person variation is modeled at Level 1 and between-person variation is modeled at Level 2, allowing for the simultaneous examination of both sources of variation. In the Level 1 specification of within-person variation, separate regression slopes and intercepts are estimated for each person. In the logistic regression model, however, level 1 specification estimates log-odd coefficients (i.e. rate of change in log-odds of the outcome as a function of a one-unit change in the predictor variable) and mean log-odds instead of regression slopes and intercepts. In the Level 2 specification of between-person variation, the Level 1 regression parameters are used to estimate average parameter estimates across all subjects as well as the amount of variation around this average.

In the current study, repeated measures data that were collected every day across the eight weeks of the study (i.e. sex motives and protection strategy discussions) were added at Level 1. Measures that were collected with once-only telephone interviews, such as demographic and HIV serostatus variables, were added at Level 2. A fully random model was specified for all analyses, when appropriate, whereby the intercepts and slopes of the outcomes and predictor variables were allowed to vary freely. Slopes were fixed for predictors that were dichotomous. All Level 1 and Level 2 continuous variables were grand-centered around the entire sample’s mean. Grand-centering significantly reduces multicollinearity in the data and removes the confound of the slope and intercept variance (Kreft & De Leeuw, 1998; Kreft, De Leeuw, & Aiken, 1995).
Step one: The null model.

Initially, we assessed the proportion of between- and within-person variability that occurred in the Level 1 predictors and outcome. In order to assess variation components, unconditional models were run for each variable (Raudenbush et al., 2004). According to Raudenbush and colleagues (2004), sigma-squared and tau represent within- and between-person variance components, respectively. The intraclass correlation coefficient refers to the percentage of variation occurring between-person and was computed by dividing tau by the sum of sigma-squared and tau from the unconditional model. The following is an example of an unconditional model:

Level 1: \[ Y_{ij}(\text{Intimacy}) = b_{0j} + r_{ij} \]
Level 2: \[ b_{0j} = \gamma_{00} + u_{0j} \]

The above model specifies intimacy \((Y_{ij})\) at time point \(i\) for individual \(j\) as a function of \(b_{0j}\) and \(r_{ij}\). \(b_{0j}\) is composed of the grand sample mean of intimacy across all participants and all time points \((\gamma_{00})\), plus the between-person residual parameter \((u_{0j})\); i.e., the difference between the grand sample mean and an individual’s own mean across all sexual episodes. Meanwhile, \(r_{ij}\) represents the within-person residual parameter (i.e., the difference between an individual’s own mean across all episodes and the intimacy rating during a specific sexual episode). Results of this model allow one to estimate the amount of between- and within-person variance being accounted for by subsequent models (Raudenbush et al, 2004).

For dichotomous variables, such as condom use (which is restricted to 0 and 1 in the
present analyses), a latent variable approach to variance partition component (VPC) was applied to calculate proportion of variance accounted at within- and between-person levels (Goldstein et al., 2002; Snijders & Bosker, 1998). A latent approach assumes that the true underlying variable is, in fact, continuous but that only a binary response was measured. There is evidence that condom use is one such variable, whereby individuals may potentially have sex and employ condoms part way through the experience (de Visser & Smith, 2000). In the logistic regression model, the underlying continuous variable comes from a logistic distribution, whereby the level-1 variance, i.e. sigma-squared, is a constant, $\pi^2/3$ (Snijders & Bosker, 1998). Tau and sigma-squared coefficients are presented in Table 4, along with the percentage of variation accounted for at the within-person level. Results demonstrate that between 30% and 53% of the variation in sex motives occurs within individuals. Finally, the unconditional models for our variables indicated that significant between-person variability existed in all our variables. Finally, 63% of the variance in condom use occurred within individuals.
TABLE 4

Mean, Standard Deviation, and Multilevel Variance Components for Sex Motives

<table>
<thead>
<tr>
<th></th>
<th>Between-person variance (Tau)</th>
<th>Within-person variance (sigma^2)</th>
<th>Percent within-person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intimacy motive</td>
<td>0.51</td>
<td>0.47</td>
<td>47.96%</td>
</tr>
<tr>
<td>Pleasure seeking motive</td>
<td>0.29</td>
<td>0.22</td>
<td>43.14%</td>
</tr>
<tr>
<td>Coping motive</td>
<td>0.40</td>
<td>0.31</td>
<td>43.66%</td>
</tr>
<tr>
<td>Self-affirmation motive</td>
<td>0.45</td>
<td>0.20</td>
<td>30.77%</td>
</tr>
<tr>
<td>Partner approval motive</td>
<td>0.08</td>
<td>0.09</td>
<td>52.94%</td>
</tr>
<tr>
<td>Condom use</td>
<td>1.89</td>
<td>3.29</td>
<td>63.51%</td>
</tr>
</tbody>
</table>

**Step two: Modeling Level 2 covariates.**

The next step was to model the independent effects of Level 2 demographic variables on the intercept of the outcome variable, condom use. I present here a brief summary of multilevel logistic regression for dichotomous outcomes, i.e. condom use per occasion as a binary outcome (No use = 0, Yes = 1). Logistic regression, which is more suitable than linear regression for predicting binary outcomes, tests the natural log of the odds (the logit) that data can be classified into a predetermined number of categories (Raudenbush & Bryk, 2002). The model is presented as follows:
Level 1: \[ \eta_{ij}(\text{Condom Use}) = \ln \left( \frac{(\phi_{ij})}{(1 - \phi_{ij})} \right) = b_{0j} + r_{ij} \]

Level 2: \[ b_{0j} = \gamma_{00} + \gamma_{01}(\text{SES}_{ij}) + \gamma_{02}(\text{Education}_{ij}) + \gamma_{03}(\text{Age}_{ij}) + \gamma_{04}(\text{Employment Status}_{ij}) + u_{0j} \]

\[ b_{1j} = \gamma_{10} \]

Level 1 models the log-odds (\( \eta_{ij} \)) of categorizing condom use. While the probability (\( \phi_{ij} \)) of condom use category is constrained to be either 0 or 1, \( \eta_{ij} \) can take on any real value. The log-odds of using a condom is a function of one’s average likelihood of using a condom, \( b_{0j} \), and that episode’s deviation from the average (\( r_{ij} \)). At Level 2, the Level 1 intercept (\( b_{0j} \)) for any person (i) is a function of the average intercept (mean likelihood of condom use) across persons (\( \gamma_{00} \)), socio-economic status (SES) (\( \gamma_{01} \)), education level (\( \gamma_{02} \)), age (\( \gamma_{03} \)), and employment status (yes, no) (\( \gamma_{04} \)) and a random component (\( u_{ij} \)). The four demographic variables were not significantly related to condom use and were, thus, not included in the ensuing models, as recommended by Kreft and De Leeuw (1998) and Snijders and Bosker (1999).

Next, Level 1 covariate was examined as a predictor of the log-odds of using a condom. Discussion of protection strategies was modeled in the analysis (labeled ‘ProtDisc’).
Again, the log-odds of using a condom is a function of one’s average likelihood of using a condom, \( b_{0j} \), and that episode’s deviation from the average \( (r_{ij}) \). \( b_{1j} \) is the predicted change (i.e. log-odds coefficient) in the log-odds of condom use behavior as a function of ProtDisc (i.e. discussion of protection strategies) at episode \( i \) for participant \( j \). At level 2, \( b_{0j} \) varied randomly, and was a function of all participants’ average intercept plus individual error. \( b_{1j} \), as a dichotomous variable, was not free to vary and was thus the average of all participants’ estimates on ProtDisc. Results indicated that ProtDisc significantly predicted a change in the log-odds of condom use, \( b = 0.67, t (356) = 2.53, p < .05 \). In terms of Odds Ratios (OR)\(^9\), discussion of protection strategies increases the odds of using a condom by 95% (OR = 1.95).

**Primary analyses.**

In the next step, Level 1 predictors were added to the models. The five sex motives were added to the model, together with the Level 1 covariate (i.e. discussions of protection strategy). The following sets of analyses are employed to address the research questions, as outlined in the hypotheses: (1) do sex motives predict condom use? (2) does partner type modify the relationship between motives and condom use? (3) does HIV serostatus modify the relationship between motives and condom use? and finally, (4) are there varying relationships between sex motives and condom use as a function of an interaction between

\[^9\] Increases and decreases in odds, as percentages, are calculated by adding or subtracting, respectively, the odds ratio from 1 (equal odds of using and not using a condom) and multiplying by 100.
HIV serostatus and partner type? First, I examined whether the sex motives predicted likelihood of condom use, above and beyond the covariate in the study. Second, for each question addressed above, the variable of interest representing the context of interest (i.e. partner type, HIV serostatus) was added to the model, followed by the interaction term between the dummy coded variable(s) and the sex motives.

Research question 1: Do sexual motives predict condom use for anal intercourse during sexual encounters for single MSM?

The following model was employed to examine the relations between sex motives and condom use.

Level 1: \( \eta_{ij} (\text{Condom Use}) = \ln \left( \frac{(\phi_{ij})}{(1 - \phi_{ij})} \right) = \beta_{0j} + \beta_{1j}(\text{Intimacy}_{ij}) + \beta_{2j}(\text{Pleasure Seeking}_{ij}) + \beta_{3j}(\text{Coping}_{ij}) + \beta_{4j}(\text{Self-Affirmation}_{ij}) + \beta_{5j}(\text{Partner Approval}_{ij}) + \beta_{6j}(\text{ProtDisc}_{ij}) + r_{ij} \)

Level 2: 
\( \beta_{0j} = \gamma_{00} + u_{0j} \)
\( \beta_{1j} = \gamma_{10} + u_{1j} \)
\( \beta_{2j} = \gamma_{20} + u_{2j} \)
\( \beta_{3j} = \gamma_{30} + u_{3j} \)
\( \beta_{4j} = \gamma_{40} + u_{4j} \)
\( \beta_{5j} = \gamma_{50} + u_{5j} \)
\( \beta_{6j} = \gamma_{60} \)
Level 1 models the log-odds ($\eta_{ij}$) of categorizing condom use. While the probability ($\phi_{ij}$) of condom use category is constrained to be either 0 or 1, $\eta_{ij}$ can take on any real value. The intercept, $\beta_{0j}$, is participant $j$’s predicted mean log-odds for Condom Use when all other variables are equal to 0 across all participants. $\beta_{ij}$ is the predicted change in the log-odds of condom use behavior as a function of Intimacy at episode $i$ for participant $j$, and so forth for the other motives, $\beta_{2j}$ to $\beta_{5j}$, and covariate, $\beta_{6j}$. At level 2, $\beta_{0j}$ is a function of the mean intercepts of condom use odds across all participants, $\gamma_{00}$, $\beta_{1j}$ is a function of the mean estimated slopes for intimacy, $\gamma_{10}$, across all participants, and so on. All level 1 parameters, $\beta_{0j}$ through $\beta_{5j}$ were allowed to vary randomly across participants as is illustrated at Level 2 of the analyses ($u_{0j}$ through $u_{5j}$ represent systematic unanalyzed variation across participants).

Table 5 presents the results for the log odds of condom use as a function of sex motives, including the covariate$^{10}$. Results indicate that a one unit increase in intimacy (i.e. from not at all to a little) significantly and negatively corresponded to a change in the log-odds of using a condom by -0.39 ($t(93) = -3.04, p \leq .01$), corresponding to an odds ratio of 0.68, thus decreasing the odds of using a condom by 32% (i.e. 1 - 0.68). Pleasure seeking motive was not significantly related to condom use ($b = 0.34, t(93) = 1.46, p = .15$). Further, the association between a one unit increase in self-affirmation and condom use approached significance, whereby self-affirmation was associated with a 39% increase in the odds of

$^{10}$ Each motive was first examined for its direct effects on condom use without the other motives. Intimacy ($b = -0.30, p < .05$), pleasure seeking ($b = 0.43, p = .05$), and self-affirmation ($b = 0.35, p < .05$) were significantly related to condom use. Coping and partner approval were not significantly related to condom use ($p > .10$).
using a condom ($b = 0.33, t (93) = 1.90, p = .06$). The relationship between having sex in order to cope with a negative mood and condom use also approached significance, in that coping motive was related to a 22% decrease in the odds of using a condom for anal sex ($b = -0.25, t (93) = -1.72, p = .09$). Having sex to avoid partner disapproval was not significantly related to condom use for anal intercourse in the present study ($b = 0.03, t (93) = 0.96, p = .34$).

TABLE 5

Multilevel Logistic Regression Analyses: Condom Use as a Function of Sex Motives, Including Covariate.

<table>
<thead>
<tr>
<th>Condom use</th>
<th>Log-Odds Coefficient</th>
<th>Standard Error</th>
<th>Odds Ratio</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.37</td>
<td>.25</td>
<td>0.69</td>
<td>.15</td>
</tr>
<tr>
<td>Protection Discussion</td>
<td>0.67</td>
<td>.26</td>
<td>1.96</td>
<td>.01*</td>
</tr>
<tr>
<td>Intimacy</td>
<td>-0.39</td>
<td>.13</td>
<td>0.68</td>
<td>.004*</td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>0.34</td>
<td>.23</td>
<td>1.41</td>
<td>.15</td>
</tr>
<tr>
<td>Coping</td>
<td>-0.25</td>
<td>.15</td>
<td>0.78</td>
<td>.09‡</td>
</tr>
<tr>
<td>Self-Affirmation</td>
<td>0.33</td>
<td>.17</td>
<td>1.39</td>
<td>.06‡</td>
</tr>
<tr>
<td>Partner Approval</td>
<td>0.03</td>
<td>.03</td>
<td>1.03</td>
<td>.534</td>
</tr>
</tbody>
</table>

Note. * significant level of $p < .05$; ‡ significance level of $p < .10$. 
Research question 2: Are there differing associations between sex motives and condom use as a function of partner type?

Next, direct and indirect effects of partner type on the likelihood of using condoms for anal intercourse were examined. In these sets of analyses, I initially examined whether having sex with either a casual partner, as compared to a regular partner, significantly increased the likelihood of using condoms. Results indicated that participants were as likely to use a condom when having anal intercourse with regular partners compared to casual, \( b = .30, t (355) = 0.97, p > .10 \), controlling for Protection Discussion. Next, sex motives were added to the model, and partner type was again unrelated to condom use. Associations between the sex motives and condom use were similar to the model without partner type. Next, I included the interaction terms between partner type and each sex motive. Table 6 presents the results for the direct effects of motives in both contexts of partner type\(^{11}\).

\(^{11}\) According to West, Aiken, and Krull (1996), direct effects in analyses with interactions between continuous and categorical variables represent, in the present study, the effects of motives on condom use for the referent group and whether these effects are significant. On the other hand, the interaction effects with each dummy coded variable represent the differences between the coefficients of the dummy variable coded of interest that was (coded 1) and those of the referent group (coded 0) and whether this difference is significant or not. Adding the direct and indirect effects provides the direct effects for the dummy coded variable. In order to test the significance of the direct effects for each partner type, the above is repeated with the partner type of interest as the referent group.
Results indicated that when participants had sex with a regular partner, direct effects for having sex to cope with a negative mood and self-affirmation motives existed in predicting the likelihood of using condoms. Specifically, a one unit change in having sex to cope with a negative mood was significantly and negatively related to a .59 change in the log-odds of using a condom ($t (93) = -2.42, p < .05$), corresponding to an odds ratio of 0.56, thus decreasing the odds of using a condom by 44%. Further, self-affirmation was significantly and positively related to the log-odds of using a condom, $b = 0.80, t (93) = 3.00, p < .01$, increasing the odds of using a condom by 123%. Intimacy, pleasure seeking, and partner approval were unrelated to condom use in the model for regular partners.

Regarding episodes in which participants had sex with casual partners, none of the sex motives significantly predicted the odds of using condoms, above and beyond discussing protection strategies. Though, for casual partners, Pleasure seeking approached significance, predicting increased odds of using a condom by 69% ($p < .10$). Intimacy motive also approached significance, predicting decreased odds of using a condom by 28% ($p < .10$).
TABLE 6

Multilevel Logistic Regression Analyses: Condom Use as a Function of Sex Motives, for Regular and Casual Partners, Controlling for a Discussion of Protection Strategies.

<table>
<thead>
<tr>
<th>Outcome: Log-Odds Condom Use</th>
<th>Regular Partners</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
<td>OR</td>
<td>p</td>
<td>b</td>
<td>SE</td>
<td>OR</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.69</td>
<td>0.38</td>
<td>0.50</td>
<td>.08</td>
<td>-0.24</td>
<td>0.29</td>
<td>0.78</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>ProtDisc</td>
<td>0.61</td>
<td>0.25</td>
<td>1.84</td>
<td>.01*</td>
<td>0.62</td>
<td>0.25</td>
<td>1.95</td>
<td>.01*</td>
<td></td>
</tr>
<tr>
<td>Intimacy</td>
<td>-0.26</td>
<td>0.22</td>
<td>0.77</td>
<td>.23</td>
<td>-0.33</td>
<td>0.18</td>
<td>0.72</td>
<td>.07‡</td>
<td></td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>0.37</td>
<td>0.33</td>
<td>1.44</td>
<td>.27</td>
<td>0.52</td>
<td>0.29</td>
<td>1.69</td>
<td>.08‡</td>
<td></td>
</tr>
<tr>
<td>Coping‡</td>
<td>-0.59</td>
<td>0.24</td>
<td>0.56</td>
<td>.02*</td>
<td>-0.15</td>
<td>0.16</td>
<td>0.86</td>
<td>.35</td>
<td></td>
</tr>
<tr>
<td>Self-Affirmation</td>
<td>0.80</td>
<td>0.27</td>
<td>2.23</td>
<td>.004*</td>
<td>0.05</td>
<td>0.25</td>
<td>1.06</td>
<td>.83</td>
<td></td>
</tr>
<tr>
<td>Partner Approval</td>
<td>0.04</td>
<td>0.05</td>
<td>1.04</td>
<td>.49</td>
<td>0.04</td>
<td>0.04</td>
<td>1.04</td>
<td>.32</td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < .05, ‡ p < .10. b = coefficient representing change in log-odds of anal intercourse, SE = standard error, OR = odds ratio, p = significance value. Bolded terms, Coping and Self-affirmation, denote that analyses revealed that significant differences (p < .05) exist in the relationships between each motive and condom use as a function of partner type.

Results also indicated that significant differences existed in the relationships among the motives coping and self-affirmation with the outcome condom use for anal intercourse as a function of partner type. The relationship between self-affirmation motive and log-odds of
condom use with regular partners was significantly different than with casual partners, $b = 0.83, t(340) = 2.33, p < .05$. Figure 1 presents the relationship between self-affirmation and condom use as a function of partner type. As seen in Figure 2, the difference between having sex to cope with a negative mood with a casual partner as compared to with a regular partner in predicting the log-odds of using condoms approached significance, $b = 0.46, t(341) = 1.84, p = 0.06$.

FIGURE 1

Log-Odds of Condom Use as a Function of Partner Type and Self-affirmation Motive

A statistically significant difference ($p < .05$) existed between the two types of partners in the relationship among the sex motive ‘self-affirmation’ and the odds of using a condom.
FIGURE 2

Log-Odds of Condom Use as a Function of Partner Type and Coping Motive

The difference between the two types of partners in the relationship among the sex motive ‘coping with a negative mood’ and the odds of using a condom approached significance (p < .05).

Research question 3: Are there differing relationships between sex motives and condom use as a function of HIV serostatus?

In the present set of analyses, I examined, first, whether HIV seropositive participants were less likely to use condoms compared to those HIV seronegative and status unknown, while controlling for Level 1 covariate. HIV serostatus (Positive scored ‘1’ and negative/unknown scored ‘0’) was added to the model at Level 2. HIV positive individuals, as compared to HIV seronegative and serostatus unknown individuals, were less likely to use condoms for anal intercourse in the present study, as expected, b = -1.07, t (92) = -3.08, p < .01, after controlling for discussions of condom use. Being HIV positive reduced the
odds of using a condom by 66% (OR = 0.34). Next, motives were included in the model, and again, HIV positive participants were less likely to use condoms. Finally, the interaction terms between Level 2 HIV serostatus and Level 1 sex motives were included in the model.

Table 7 presents the direct effects of sex motives as a function of HIV serostatus. Again, bolded terms represent the sex motives that differ in their relationships to condom use as a function of serostatus. Results demonstrate that distinct sex motives are differentially related to the odds of using a condom as a function of serostatus, and that these differences are statistically significant. First, intimacy motive was statistically and negatively associated with log-odds of condom use for HIV seropositive and seronegative/unknown participants, \( b = -.82, t (92) = -3.69, p < .001 \) and \( b = -.31, t (92) = -1.95, p = .05 \). Intimacy motive corresponded to odds ratios of 0.44 and 0.73, decreasing the odds of using a condom for anal intercourse by 56% and 27% for HIV seropositive and seronegative men, respectively. Results indicated that the difference between HIV seropositive and HIV seronegative/status unknown in their relationship among intimacy motive and condom use approached significance, \( b = .51, t (92) = 1.86, p < .10 \) (see Figure 3).
### TABLE 7

Multilevel Logistic Regression Analyses: Log-Odds Condom Use as a Function of the Interaction Between Sex Motives and HIV Serostatus, Controlling for Discussion of Protection Strategies.

<table>
<thead>
<tr>
<th>Outcome: Log-Odds Condom Use</th>
<th>HIV Seropositive</th>
<th>HIV negative/unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>$SE$</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.51</td>
<td>0.43</td>
</tr>
<tr>
<td>ProtDisc</td>
<td>0.76</td>
<td>0.26</td>
</tr>
<tr>
<td>Intimacy±</td>
<td>-0.82</td>
<td>0.22</td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>0.36</td>
<td>0.37</td>
</tr>
<tr>
<td>Coping</td>
<td>-0.24</td>
<td>0.32</td>
</tr>
<tr>
<td>Self-Affirmation *</td>
<td>-0.18</td>
<td>0.23</td>
</tr>
<tr>
<td>Avoiding Partner</td>
<td>0.1</td>
<td>0.07</td>
</tr>
</tbody>
</table>

**Note.** * $p < .05$, ‡ $p < .10$. $b =$ coefficient representing change in log-odds of anal intercourse, $SE =$ standard error, $OR =$ odds ratio, $p =$ significance value. Bolded terms with *, Self-affirmation and Partner Disapproval, denote that analyses revealed that significant differences ($p < .05$) existed in the relationships between each motive and condom use as a function of serostatus. Bolded term with ± denotes that the difference in relationship between intimacy motive and condom use as a function of serostatus approached significance ($p < .10$).
Note. There was no significant difference in the relationship between intimacy and the odds of using a condom between the two groups.

Results indicated that while self-affirmation motive was not significantly related to condom use in HIV seropositive men, $b = -0.18$, $t (92) = -0.78$, $p > .10$, there was a significant association in men who were either HIV negative or status unknown. Specifically, a one unit change in self-affirmation motive significantly predicted a $0.47$ increase in the log-odds of using a condom for anal intercourse ($t (92) = 2.20$, $p < .05$) in HIV seronegative or status unknown participants, corresponding to a $61\%$ increase in the likelihood of using a condom. Further, there was a statistically significant difference between seropositive and seronegative/serostatus unknown participants in the relationship between self-affirmation motive and condom use between both groups, $b = -0.65$, $t (92) = -2.07$, $p < .05$ (see Figure 4). The relationship was significantly stronger for HIV seronegative and status unknown participants than for seropositive participants.
Note. A significant difference ($p < .05$) existed in the relationship between self-affirmation and the odds of using a condom between the two groups.

Results also demonstrated that avoiding partner disapproval was a significant predictor of the likelihood of using condoms for seropositive men but not men who were seronegative or status unknown. More specifically, for seropositive men, a one unit increase in the inverse of avoiding partner disapproval was significantly related to a .18 increase in the log-odds of using a condom for anal intercourse, $t (92) = 2.55, p < .05$, increasing the odds of using a condom by 20%. The association between avoiding partner disapproval and the likelihood of using a condom was stronger for HIV seropositive men than for the other two groups, $b = -0.19, t (92) = -2.39, p < .05$ (see Figure 5).
Log-odds for condom use as a function of avoiding partner disapproval as a reason for having sex for participants who were HIV seropositive and HIV seronegative/serostatus unknown. A significant difference \((p < .05)\) existed in the relationship between avoiding partner disapproval and the odds of using a condom between the two groups.

Results also indicated that the relationship between coping motive and condom use in HIV negative and unknown participants, approached significance \(b = -0.32, t (92) = -1.84, p < .07\), decreasing the odds of using a condom by 27%. These results did not significantly differ, \(b = 0.08, t (92) = 0.20, p > .50\), from those for HIV seropositive participants, \(b = -0.24, t (92) = -0.75, p > .10\). Finally, pleasure seeking motives were unrelated to condom use for either HIV seronegative/unknown or seropositive participants.
Research question 4: Are there differing relationships between sex motives and condom use as a function of the interaction between partner type and HIV serostatus?

In the final set of analyses, log-odds of using a condom for anal intercourse was examined as a function of a 3-way interaction among motives, partner type and HIV serostatus. In order to maintain power in the present analyses, I examined the interaction between one motive at a time with partner type and serostatus. Further, the other four motives and protection strategies were included in the model as Level 1 covariates. The following represents a typical model explored:

Level 1:

\[ \eta_{ij}(\text{Condom Use}) = \ln \left( \frac{\varphi_{ij}}{1 - \varphi_{ij}} \right) = \beta_{0j} + \beta_{1j}(\text{Intimacy}_{ij}) + \beta_{2j}(\text{Partner Type}_{ij}) + \beta_{3j}(\text{Partner Type} \times \text{Intimacy}_{ij}) + \beta_{4j}(\text{Pleasure Seeking}_{ij}) + \beta_{5j}(\text{Coping}_{ij}) + \beta_{6j}(\text{Self-Affirmation}_{ij}) + \beta_{7j}(\text{Partner Approval}_{ij}) + \beta_{8j}(\text{ProtDisc}_{ij}) + r_{ij} \]

Level 2:

\[ \beta_{0j} = \gamma_{00} + \gamma_{01}(\text{HIV Status}) + u_{0j} \]
\[ \beta_{1j} = \gamma_{10} + \gamma_{11}(\text{HIV Status}) + u_{1j} \]
\[ \beta_{2j} = \gamma_{20} + \gamma_{21}(\text{HIV Status}) \]
\[ \beta_{3j} = \gamma_{30} + \gamma_{31}(\text{HIV Status}) \]
\[ \beta_{4j} = \gamma_{40} + u_{4j} \]
\[ \beta_{5j} = \gamma_{50} + u_{5j} \]
\[ \beta_{6j} = \gamma_{60} + u_{6j} \]
\[ \beta_{7j} = \gamma_{70} + u_{7j} \]
\[ \beta_{8j} = \gamma_{80} \]
Results are presented in Tables 8 through 12 and Figures 6 through 10. Each table and associated figure represents the direct effects for one sex motive under four different conditions: (1) regular partner and HIV seropositive, (2) regular partner and HIV seronegative/status unknown, (3) casual partner and HIV seropositive, and (4) casual partner and seronegative/status unknown. Descriptions of significant interactions occur in the following sections. It must be noted, first, that each model examined revealed a significant relationship between partner type and condom use as a function of HIV serostatus. In each analysis, results consistently revealed that HIV seronegative and status unknown participants were significantly more likely to use condoms with casual partners as compared to regular partners. On the other hand, HIV seropositive participants were no more likely to use condoms with a casual partner than with a regular partner.

*Intimacy*partner type*Serostatus three-way interaction*

Table 8 presents the results of the three-way interaction between partner type, serostatus, and intimacy sex motive as predictors of the log-odds of condom use for anal intercourse. Figure 6 illustrates the relationships among intimacy and the log-odds of condom use for anal sex as a function of partner type and serostatus. Results indicated that the three-way interaction was not significant, $b = 0.34$, $t (341) = 0.59$, $p > .50$. Results did reveal that a distinct two-way interaction existed. The relationship between intimacy motive and condom use was a function of serostatus and significantly differed between those seropositive versus those seronegative/unknown, $b = 0.99$, $t (92) = 3.59$, $p < .01$. Further, as indicated in Table 8, intimacy motive significantly and negatively predicted the log-odds of condom use for HIV seropositive participants, under both contexts of partner type. A one-
unit change in having sex to enhance intimacy with a regular or casual partner decreased the odds of using a condom by 65% and 71%, respectively, in HIV seropositive participants. However, for HIV seronegative or status unknown participants, intimacy motive did not significantly predict condom use.

Table 8
Multilevel Logistic Regression Analyses: Log-Odds of Condom Use as a Function of a Three-Way Interaction Between Intimacy Motive, Partner Type, and HIV.

<table>
<thead>
<tr>
<th>Outcome: Log-Odds Condom Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV seropositive</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Regular Partner</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>Intimacy</td>
</tr>
<tr>
<td>Casual Partner</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>Intimacy</td>
</tr>
</tbody>
</table>

Note. * p < .05. Presented in table are direct effects for intimacy under four different conditions: (1) regular partner and HIV seropositive, (2) regular partner and HIV seronegative/status unknown, (3) casual partner and HIV seropositive, and (4) casual partner and seronegative/status unknown. All analyses included the interaction between intimacy, each partner type, and each serostatus group and included, as covariates, the other motives and discussion of protection strategies.
FIGURE 6

Log-Odds Condom use as a Function of Intimacy, Partner Type, and HIV Serostatus.

Table 9 and Figure 7 present the results of the three-way interaction between partner type, serostatus, and pleasure seeking sex motive as predictors of the log-odds of condom use for anal intercourse. Results indicated that the three-way interaction was not significant, \( b = 0.36, t (340) = 0.83, p > .10 \). Yet, results did reveal that the relationship between pleasure seeking motive and condom use was a function of partner type, regardless of serostatus, \( b = 0.81, t (341) = 2.72, p < .01 \). Specifically, having sex for pleasure significantly increased the odds of using a condom for those having sex with regular
partners, as compared to having sex with casual partners. When having sex with a regular partner, pleasure seeking significantly increased the odds of using a condom for anal intercourse by 91% in HIV seropositive participants ($p < .05$), yet not for HIV seronegative/serostatus unknown participants (even though the three-way interaction was not significant).

TABLE 9
Multilevel Logistic Regression Analyses: Log-Odds of Condom Use as a Function of a Three-Way Interaction Between Pleasure Seeking Motive, Partner Type, and HIV Serostatus.

<table>
<thead>
<tr>
<th></th>
<th>Outcome: Log-Odds Condom Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HIV seropositive</td>
</tr>
<tr>
<td></td>
<td>$b$</td>
</tr>
<tr>
<td>Regular Partner</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.17</td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>0.65</td>
</tr>
<tr>
<td>Casual Partner</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.33</td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>-0.08</td>
</tr>
</tbody>
</table>

Note: * $p < .05$. Presented in table are direct effects for pleasure seeking under four different conditions: (1) regular partner and HIV seropositive, (2) regular partner and HIV seronegative/status unknown, (3) casual partner and HIV seropositive, and (4) casual partner
and seronegative/status unknown. All analyses included the interaction between pleasure seeking, each partner type, and each serostatus group and included, as covariates, the other motives and discussion of protection strategies.

FIGURE 7
Log-Odds Condom Use as a Function of Pleasure Seeking, Partner Type, and HIV Serostatus.

Coping with a negative mood*partner type*serostatus three-way interaction

Table 10 and Figure 8 present the results of log-odds of condom use as a function of a three-way interaction between partner type, serostatus, and having sex to cope with a negative mood. Results indicated that the three-way interaction was significant, $b = 1.76$, $t$
Specifically, coping with a negative mood decreased the odds of using a condom for anal intercourse in HIV seropositive participants during occasions in which the partner was considered regular by 78%, $b = -1.52$, $t (92) = -3.26$, $p < .001$. For HIV seronegative or status unknown participants, in situations where the partner was casual, coping motive approached significance, predicting a 28% decrease in the likelihood of using a condom, $b = -0.33$, $t (92) = -1.90$, $p < .10$.

**TABLE 10**

Multilevel Logistic Regression Analyses: Log-Odds of Condom Use as a Function of a Three-Way Interaction Between Coping with a Negative Mood, Partner Type, and HIV Serostatus.

<table>
<thead>
<tr>
<th></th>
<th>HIV seropositive</th>
<th>HIV negative/unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>SE</td>
</tr>
<tr>
<td>Regular Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.61</td>
<td>0.42</td>
</tr>
<tr>
<td>Coping</td>
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<td>0.47</td>
</tr>
<tr>
<td>Casual Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.15</td>
<td>0.34</td>
</tr>
<tr>
<td>Coping</td>
<td>-0.16</td>
<td>0.33</td>
</tr>
</tbody>
</table>

*Note. * $p < .05$, ‡ $p < .10$. Presented in table are direct effects for having sex to cope with a negative mood (i.e. Coping) under four different conditions: (1) regular partner and HIV
seropositive, (2) regular partner and HIV seronegative/status unknown, (3) casual partner and HIV seropositive, and (4) casual partner and seronegative/status unknown. All analyses included the interaction between coping with a negative mood, each partner type, and each serostatus group and included, as covariates, the other motives and discussion of protection strategies. The three-way interaction was statistically significant (p < .05).

FIGURE 8
Log-Odds Condom Use as a Function of Coping with a Negative Mood, Partner Type, and HIV Serostatus.
Table 11 and Figure 9 present the results of the three-way interaction between partner type, serostatus, and self-affirmation sex motive as predictors of the log-odds of condom use for anal intercourse. Results indicated that the three-way interaction was not significant, \( b = .03, t(341) = 0.08, p > .50 \). Results did reveal that the relationship between self-affirmation motive and condom use was a function of partner type, regardless of serostatus, \( b = -.84, t(340) = -2.62, p < .01 \). Specifically, having sex to affirm one’s self significantly increased the odds of using a condom for those having sex with regular partners, as compared to having sex with casual partners. When having sex with a regular partner, self-affirmation significantly increased the odds of using a condom for anal intercourse by 140% in HIV seronegative participants, \( b = .87, t(92) = -2.62, p < .05 \). For HIV seropositive participants, the odds of using a condom was increased by 76% for a one unit increase in self-affirmation, \( b = -57, t(92) = -2.62, p < .05 \).
TABLE 11
Multilevel Logistic Regression Analyses: Log-Odds of Condom Use as a Function of a Three-Way Interaction Between Self-Affirmation, Partner Type, and HIV Serostatus.

<table>
<thead>
<tr>
<th>Outcome: Log-Odds Condom Use</th>
<th>HIV seropositive</th>
<th>HIV negative/unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>SE</td>
</tr>
<tr>
<td>Regular Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.34</td>
<td>0.40</td>
</tr>
<tr>
<td>Self-Affirmation</td>
<td>0.57</td>
<td>0.23</td>
</tr>
<tr>
<td>Casual Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.32</td>
<td>0.35</td>
</tr>
<tr>
<td>Self-Affirmation</td>
<td>-0.06</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Note. * p < .05. Presented in table are direct effects for having sex to affirm oneself under four different conditions: (1) regular partner and HIV seropositive, (2) regular partner and HIV seronegative/status unknown, (3) casual partner and HIV seropositive, and (4) casual partner and seronegative/status unknown. All analyses included the interaction between self-affirmation, each partner type, and each serostatus group as well as covariates (i.e. the other motives and discussion of protection strategies).
FIGURE 9
Log-Odds Condom Use as a Function of Self-Affirmation, Partner Type, and HIV Serostatus

Table 12 presents the results of the three-way interaction between partner type, serostatus, and avoiding partner disapproval during sex as predictors of the log-odds of condom use for anal intercourse. Figure 10 illustrates the relationships among avoiding partner disapproval and the log-odds of condom use for anal sex as a function of partner type and serostatus. Results indicated that the three-way interaction was not significant, \( b = - \)
Results did reveal that avoiding partner disapproval predicted increased odds among HIV seropositive participants but not seronegative or status unknown participants, and that this difference was statistically significant, $b = 0.19$, $t(92) = 2.63$, $p < .01$. For regular ($b = 0.24$, $t(92) = 2.60$, $p < .01$) and casual ($b = 0.19$, $t(92) = 2.82$, $p < .01$) partners, HIV seropositive participants were 27\% and 21\% more likely to use condoms for anal intercourse for a one unit change in having sex to avoid partner disapproval.

**TABLE 12**  
Multilevel Logistic Regression Analyses: Log-Odds of Condom Use as a Function of a Three-Way Interaction Between Avoiding Partner Disapproval, Partner Type, and HIV Serostatus.

<table>
<thead>
<tr>
<th>Outcome: Log-Odds Condom Use</th>
<th>HIV seropositive</th>
<th>HIV negative/unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$b$</td>
<td>SE</td>
</tr>
<tr>
<td>Regular Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.58</td>
<td>0.66</td>
</tr>
<tr>
<td>Avoiding Partner</td>
<td>0.24</td>
<td>0.09</td>
</tr>
<tr>
<td>Casual Partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.29</td>
<td>0.44</td>
</tr>
<tr>
<td>Avoiding Partner</td>
<td>0.19</td>
<td>0.07</td>
</tr>
</tbody>
</table>
Note. * p < .05. Presented in table are direct effects for having sex to avoid partner disapproval under four different conditions: (1) regular partner and HIV seropositive, (2) regular partner and HIV seronegative/status unknown, (3) casual partner and HIV seropositive, and (4) casual partner and seronegative/status unknown. All analyses included the interaction between avoiding partner disapproval, each partner type, and each serostatus group as well as covariates (i.e. the other motives and discussion of protection strategies).

FIGURE 10
Log-Odds Condom Use as a Function of Avoiding Partner Disapproval, Partner Type, and HIV Serostatus.
DISCUSSION

The current study examined the relationships between single MSM’s reported motives for sex and their reported use of condoms for anal intercourse across several episodes. The study investigated changes in reported motive levels as predictors of reported condom use for anal intercourse across several episodes measured over a two-month period. In the present study, while reported discussion of protection strategies predicted use, reported sex motives added to the understanding of individuals’ condom use across time. The findings indicate the benefit in extending outside of approach and avoidant motivation theories to better understand condom use. Importantly, the present study supports a more complex model that examines how specific emotional states, personal, and interpersonal needs, in a variety of contexts, may impact risk-taking behaviors. Specifically, the findings supported the hypotheses – that on occasions when participants reported higher levels, compared to lower levels, of having sex to enhance intimacy and to cope with a negative affective state, the likelihood of using a condom for anal intercourse was decreased. Further, consistent with hypotheses, on occasions when participants reported higher levels, compared to lower levels, of having sex to enhance sexual pleasure, to attain partner approval, and to confirm to oneself a sense of sexual esteem, the more likely they were to use a condom for anal intercourse. The results indicated, though, that for each motive, the likelihood of condom use was either enhanced or diminished in more complex ways, as a function of context. More specifically, the reasons single MSM reported having sex were differentially related to condom use as a function of both their HIV serostatus and type of partner, in the directions predicted (see Table 13 for summary of results).
TABLE 13
Summary of Findings for Three-Way Interactions

<table>
<thead>
<tr>
<th></th>
<th>HIV negative/status unknown</th>
<th>HIV positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regular</td>
<td>Casual</td>
</tr>
<tr>
<td>Intimacy</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Pleasure Seeking</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Coping</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Self-Affirmation</td>
<td>increase</td>
<td>n.s.</td>
</tr>
<tr>
<td>Av. Partner Disapproval</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Motives and Condom Use

Having sex to enhance intimacy and condom use.

As expected, and similar to other studies (Cooper et al., 1998; Sanderson & Cantor, 1995), when participants reported higher levels of having sex to enhance intimacy with their last sexual partner, as compared to episodes when lower levels were reported, the odds of using a condom for anal intercourse were decreased. Importantly, findings indicate that HIV seropositive men were significantly more likely to report engaging in risky sexual practices when motivated by intimacy needs during sex as compared to HIV seronegative men, regardless of the type of partner. Intimacy needs were not significantly related to condom use in HIV seronegative men.
Previous studies have established that individuals more motivated by intimacy needs are more likely to be in committed, long-term relationships (Cooper et al., 1998; Sanderson & Cantor, 1995), and that they are more likely to continually negotiate and renegotiate condom use throughout the course of the relationship (Boulton, McLean, Fitzpatrick, & Hart, 1995; Davidovich et al., 2004; Elford et al., 2001; McLean et al., 1994; Moreau-Gruet et al., 2001). As intimate relationships deepen and trust is secured, individuals often abandon condoms for intercourse as a symbol of such trust (Kippax et al., 2003; Remien, Carballo-Dieguez, & Wagner, 1995). While the development of an intimate relationship is an ideal situation for those motivated by intimacy to discuss and share feelings about prevention, when single, these same individuals are potentially mismatched and unprepared to deal with condom use without an intimate discussion (Sanderson & Cantor, 1995). Furthermore, those motivated by intimacy needs during sex may potentially search for implicit signs or explicit reassurances that the other person is trustworthy and caring, thus creating a ‘momentary affective experience’ with a sex partner (Canin et al., 1999). Recent work by Sanderson and Evans (2001) suggests that women with high intimacy needs perceive relationship partners to have similarly high intimacy needs, even though each partner’s self-reports of intimacy goals were not related to one another. This heuristic of trust and intimacy may extend to others as well, including single individuals and MSM. While this may lead to increased satisfaction and trust in the sexual relationship, individuals may develop ‘intimacy-colored glasses’ (Sanderson & Evans, 2001), which counters the desire or sense of urgency for condom use (Albarracín et al., 2001; Canin et al., 1999; Shidlo, Yi, & Dalit, 2005).

The question remains why intimacy was a significant predictor of decreased condom use in seropositive men. Of concern, specifically, is that HIV seropositive men are those at
risk for transmitting the infection to others, as well as compromising their own health and immune systems by increasing the likelihood of re-infection and acquiring other STIs (Blackard, Cohen, & Mayer, 2002; Blower, Aschenbach, Gershengorn, & Kahn, 2001; Kalichman, 1999; Kelly, Hoffman, Rompa, & Gray, 1998; Ostrow et al., 1999). In a recent survey of HIV seropositive MSM, Remien, Halkitis, O’Leary, Wolitski, and Goméz (2005) found that nearly 25% of HIV seropositive MSM had not used condoms for anal intercourse with partners. Others have found that a sizable minority of HIV seropositive men does not disclose their status (Ekstrand et al., 1999; Kalichman et al., 1998).

Understandably, disclosure of HIV serostatus is a sensitive issue and difficult for many HIV seropositive men, and often takes time in new relationships. In a qualitative review of semi-structured interviews with 30 HIV seropositive MSM, van Kesteren and her colleagues (2005) found that while single HIV seropositive MSM desire the intimacy and security of steady relationships, they often avoid them out of fear of rejection and the deleterious effects the infection might have on potentially intimate and close partners. Furthermore, a number of the MSM in van Kesteren’s study claimed that they prefer the security of being single, and the sex that occurs with casual partners. While these findings are certainly not conclusive, given their qualitative nature, they do point to the need to explore the links between disclosure, the need for intimacy, and condom use among HIV seropositive MSM. Along with the findings from the present study, it is possible that single HIV seropositive MSM, motivated to be emotionally close to a sexual partner, may experience moments of affection with their partner. The resulting lack of condom use may have the benefit of enhancing a sense of closeness in single individuals, but runs high risk of transmission of HIV and other STIs for himself and his partner.
Having sex to enhance pleasure and condom use

The relationship between having sex to enhance pleasure and condom use was revealed to be more complex than expected, in that the relationship was only significant for HIV seropositive men having sex with a regular partner. On occasions that HIV seropositive men reported higher, as compared to lower, levels of having sex with a regular partner to enhance pleasure, the odds of using a condom for anal intercourse were increased. Under other conditions (HIV seronegative or casual partners), varying levels of pleasure seeking were unrelated to condom use. The significant findings are supported by previous studies that individuals directed to positive outcomes or experience positive states are more likely to pay attention to risk information, and engage in precautionary behaviors, sexual and otherwise (Aspinwall, 1998; Mustanski, 2007a; Nygren, 1998). For example, Mustanski (2007a) demonstrated that higher levels of positive affect across days were related to condom use at the event level, thus providing support to the findings from the current study.

These findings contrast previous studies on HIV seropositive and seronegative MSM’s sexual risk taking behaviors and sexual sensation seeking. Ostrow et al. (2008) and Kalichman and Rompa (1995) have previously documented that HIV seropositive and seronegative MSM are more likely to engage in unprotected anal intercourse with new and repeated partners when they report higher levels of sexual sensation seeking.

The possibility exists that there are differences in the relationship between pleasure-seeking and condom use when examining pleasure seeking as a between-person factor versus an event-level factor. The notion that between- and within-person associations among
variables can differ is not new (DeLongis & Holtzman, 2005; Snijders & Bosker, 1999; Tennen, Affleck, Armeli, & Carney, 2000). For example, Mustanski (2007b) demonstrated that MSM who, on average, are more likely to use the Internet to find sexual partners are also less likely to use condoms for anal intercourse compared to those that are less likely to seek partners on the Internet. On the other hand, he found that at the event level, using a condom for anal intercourse was more likely to occur when partners met online than through other avenues. The possibility exists that while high sensation seeking MSM may be less likely to use condoms, when individuals are explicitly having sex to have fun and feel good at the event-level, there is either no relationship or a positive one with condom use (as a function of serostatus and partner type). Mustanski (2007a) also found that increases in positive affect predicted condom use in MSM at the event-level. The present study was not designed to differentiate between higher and lower sensation seekers versus higher and lower pleasure seeking during sex. Future studies are required to investigate these possible differences. These studies could help health educators in specifying the persons at increased need of intervention and psycho-education while at the same time identifying and promoting an important motive that enhances condom use.

_Having sex to cope with a negative affective state and condom use_

In the present study, having sex to cope with a negative mood was predictive of unprotected anal intercourse as expected, supporting previous work by Folkman and her colleagues (1992) and Cooper and colleagues (1998). Yet, again, this relationship was a function of the interaction between partner type and serostatus. In the present study, when HIV seropositive MSM reported increasing levels of having sex with a regular partner to
cope with a negative affective state, they were more likely to have unprotected anal intercourse.

These findings suggest that when single HIV seropositive MSM have sex to cope with a negative affective state, they are less likely to use condoms for anal intercourse when they consider their partner to be regular. These findings can be understood in the context of risk-orientation as examined by Nygren (1998). Nygren’s research experimentally manipulated the framing of task and the perception of risk for four randomly assigned groups. He found that when a situation or task was explicitly framed negatively (i.e., individuals were asked to explicitly think about negative outcomes when engaging in a possible risky behavior), and the situation was high risk, individuals became more risk-prone. Explicitly framing situations as having negative outcomes introduces overt aversive emotional states from which individuals try to escape. In these pursuits, they are more likely to engage in behaviors that contain considerable risk but have the bilateral effect of faster, greater relief (Clark & Isen, 1982; Isen, 1993; Nygren, 1998). By extension, the present study may reflect a real-world example of Isen and Nygren’s work (Clark & Isen, 1982; Isen, 1993; Isen et al., 1988; Nygren, 1998; Nygren et al., 1996). That is, our findings suggests that when explicitly framing sex as a function of wanting to remove a negative state, HIV seropositive MSM pursue behaviors that provide greater sexual release, but carry increased risk.

Having sex to affirm one’s self and condom use

In the present study, HIV seronegative, seropositive and status unknown MSM were more likely to use condoms during episodes in which they reported higher levels of having
sex to enhance their sense of self with regular partners, compared to when they reported lower levels of the motive. On the other hand, being motivated by enhancing one’s sense of self was unrelated to condom use with casual partners. The present study confirms previous experimental work by Steele and colleagues (Sherman et al., 2000; Steele, 1998), Armitage and colleagues (2008), and Reed and Aspinwall (1998). The pursuit of self-esteem can carry considerable physical and mental health costs (Crocker & Park, 2004). However, those at risk for health problems (i.e., high caffeine drinkers, sexually active young adults, smokers) are more likely to accept sensitive health risk information about their behavior, intend to reduce the risky behaviors, and prospectively decrease these behaviors when their esteem needs are affirmed (Armitage et al., 2008; Reed & Aspinwall, 1998; Sherman et al., 2000). Sherman and colleagues (2000) suggested that individuals with strong global senses of self do not need to deflect threatening information that can potentially lower these healthy self-perceptions, and can incorporate new threatening information into their knowledge without damaging their self-esteem. The likelihood is that the sexual encounter with a regular partner contains numerous implicit and explicit cues that confirm one’s sense of attractiveness beyond the necessary threshold whereby threatening information can be healthily incorporated and assessed.

_Having sex to avoid partner disapproval and condom use_

Having sex to avoid partner disapproval was related to condom use, as expected, but only for HIV seropositive MSM. Increasing levels of this motive predicted increased likelihood of condom use in these men. These findings are consistent with Cooper and
colleagues’ (1998) cross-sectional findings for single young heterosexual adults. The present study does not address why avoiding partner approval would impact HIV seropositive MSM’s risk-taking behaviors. Cooper and colleagues suggested that without information about one’s partner preferences it is difficult to understand the dynamics underlying how avoiding partner approval is related to condom use. Recent work (van Kesteren et al., 2005, 2007) suggests that HIV seropositive men who are more directed to their partners’ concerns are more likely to take precautions than those less other-oriented. They suggest that concern for their partners’ well being, both psychological and physical, is a form of prosocial behavior. Avoiding partner disapproval may be one such concern, along with those measured by van Kesteren and colleagues that include care for partners’ psychological and physical health. Future studies could examine how being other-oriented versus self-directed is related to avoiding partner disapproval and other forms of considering one’s partner needs during sex in HIV seropositive MSM.

Understanding the Context

The present study confirms that it is important to consider the context of the sexual encounter when evaluating the relationships among motives and condom use. In general, motives were associated more strongly with abandoning or increasing condom use when single men had sex with those they knew and considered to be regular partners. For single individuals, regular partners may be sex buddies – partners with whom one has an ongoing sexual relationship with no emotional commitment (Rust, 2003; Solis, 2006). On the other hand, these regular partners may also be individuals with whom a person is starting to
establish a committed romantic relationship, while still considering oneself single. Given the consistently significant findings for regular partners in the present study, it is important for future studies to delineate the varied types of sexual relationships single individuals establish with regular partners, beyond the regular and casual categories. In so doing, it is possible to further our understanding of the types of contexts motives may relate to risk behaviors. As a result, we can inform individuals and communities about the types of relationships that place individuals at risk for HIV and other STIs.

It is important to understand why, for single people, regular partners provide a unique and significant context for condom use to vary as a function of motives. Previous work (Davidovich et al., 2004; Fernandez-Davila, 2007) suggests that, when dating new partners or in sex buddy relationships, condom use is often abandoned or used intermittently as time into the relationship elapses. In new relationships, nearly a third abandon condom use within a month of the relationship while more than half do so by three months. Furthermore, abandoning condom use occurs in nearly half of all new relationships with limited discussion of HIV serostatus or STI prevention or testing (Davidovich et al, 2004). The possibility exists that condom use is more variable when having sex with dating partners due to the establishment of familiarity and trust, resulting in reduced perceptions of threat. In sex buddy relationships, where intimacy is not the primary objective, familiarity and trust are also likely to be established, thus also resulting in reduced threat perception (Fernandez-Davila, 2007). Decreased risk perception is documented to predict lower levels of intentions to use condoms and actual condom use (Ellen, Adler, Gurvey, Dunlop, Millstein, & Tschann, 2002; Ellen, Adler, Gurvey, Millstein, & Tschann, 2002; van Kesteren et al., 2007). As trust increases and the influence of cognitive factors, such as risk and intention,
decrease, the possibility exists that motives play more significant roles in condom use as individuals establish sexual and/or emotional relationships with new partners. Future research should investigate how motives are influenced by and also influence risk perception, intention, and trust as new relationships, whether strictly sexual or not, develop over time.

The present study also highlights those individuals that are potential targets for future study and interventions for HIV prevention. Findings from the present study suggest that HIV seropositive individuals may be more responsive to sexual motives than those who are seronegative or status unknown. Previous research suggests that a history of poor health behaviors, including sexual risk taking and substance abuse, predicts seroconversion (Chesney, Barrett, & Stall, 1998). Additionally, sexual risk taking is considered one of many significant predictors of HIV disease progression in those already infected. Psychosocial factors, including stress, depression, and loneliness, and health behaviors, such as medication adherence, exercise, sexual risk taking, and substance abuse, are important mediators in the progression of HIV disease (Cole, 2008; Gore-Felton & Koopman, 2008; Halkitis et al., 2005; Kalichman, 2008; Leserman, 2008; Parsons, Halkitis, Wolitski, & Gómez, 2003). Future studies should examine the roles motives, sexual and other, play in risk taking behaviors in MSM over a longer period of time. These studies would help clarify whether the relationships between motives and risky health behaviors occur prior to seroconversion, or result from biological, emotional, and cognitive disruptions occurring post-infection. As such, prevention efforts that address motives can be directed towards post-infection HIV seropositive individuals, or towards the larger MSM population as a whole.
Individuals’ vulnerability to their sexual motives may also point to difficulty in emotion and cognitive regulation. Poor cognitive and emotional regulation has been linked to several health behaviors, including condom use (Svenson, Östergren, Merlo, & Råstam, 2002), as well as exercise, dietary food intake, and problematic alcohol consumption (Magar, Philips, & Hosie, 2008; Schwarzer, 2001; Scholz, Schüz, Ziegelmann, Lippke, & Schwarzer, 2008). Future longitudinal studies should investigate whether emotional and cognitive regulation, either as a personality trait or daily process variable, play significant roles in directly predicting condom use for anal intercourse, as well as other health behaviors. Furthermore, regulatory processes may act as significant predictors of motives and moderators of the relationships between motives and health behaviors in at-risk HIV seronegative and seropositive MSM.

Using Motives for Prevention Efforts

Studies on message framing in health promotion and disease prevention strategies are increasingly focusing on motivation and on matching the message to the target individuals (Rothman & Salovey, 1997; Sherman, Mann, & Updegraff, 2006; Sanderson & Cantor, 1995). Message framing consists of whether a health message is framed as a gain (i.e., condom use promotes a healthy life) or a loss (lack of condom use can cause disease transmission; Rothman & Salovey, 1997; Rothman, Salovey, Antone, Keough, & Martin, 1993). Recent evidence suggests that message framing is more likely successful when the framing matches an individual’s motivational orientation or mood. For example, Mann and colleagues (Mann, Sherman, & Updegraff, 2004; Sherman et al., 2006) provided students with either a message that dental flossing promotes great breath and healthy gums versus
helps avoid bad breath and gum disease. They also provided students with 7 pieces of floss for the following week and, one week later, asked how many of the pieces were used. Results indicated that gain-framed messages increased self-reported flossing in those more approach-oriented than avoidant-oriented whereas loss-framed messages increased flossing in those more avoidant-oriented. Similar results were found on healthy dietary practices (Cesario, Grant, & Higgins, 2004).

Affective states have also been linked to the success of message framing. Wegener, Petty, and Klein (1994) demonstrated that randomly assigned participants, whose moods were manipulated to be more positive, were more easily persuaded by gain-framed messages, whereas those exposed to sad stimuli were more easily persuaded by loss-framed messages. Related, Rothman, Salovey and their colleagues (Latimer, Salovey, & Rothman, 2007; Rothman, Bartels, Wlaschin, & Salovey, 2006; Rothman & Salovey, 1997) have encouraged health promoters to match messages for disease prevention as either gain- or loss-framed as a function of whether individuals are motivated to either pursue positive outcomes and affective states or avoid negative outcomes and affective states. Future studies should attempt to address the benefits or deleterious effects of the motives examined in the present study while employing a gain- or a loss-framed message based on the approach or avoidant nature of each motive. For example, while intimacy needs are approach-directed in nature (Cooper et al., 1998; Elliot, Gable, & Mapes, 2006; Impett, Peplau, & Gable, 2005), their resulting impact on condom use in single MSM, and specifically HIV seropositive men, is negative. It is possible to address intimacy needs and communication strategies for those more prone towards intimacy, as did Sanderson and Cantor (1995), while framing the approach as a way to enhance condom use and health as opposed to prevent disease.
Cooper and colleagues’ (1998) model initially conceptualized sexual motives as a function of two sets of motives, approach-avoidant and self-other directed. Their findings, along with those of the present study, demonstrated that the relationships between sexual motives and behaviors are more complex and that contextual factors are key to understanding these relationships. Yet, these dispositions (i.e. approach-versus-avoidant or self-versus-other oriented) may have an impact on the expression of the sex motives and on the relationship between motives and behavior.

While there is a lack of research examining the influence of personality dispositions on the expression of sex motives, recent work suggests that these questions may be important to understand the personality of those at greater risk. For example, the behavioral activation and inhibition systems (BAS and BIS, respectively) have been linked to the experience of positive and negative events, as well as the impact of these events on affect (Gable et al., 2000). Individuals higher in BAS sensitivity, as seen in Gable and colleagues’ study (2000), tend to experience more positive events and affect in general while those higher in BIS sensitivity tend to be more reactive to negative affect when they experience negative events. Similar findings were demonstrated for those high in neuroticism in terms of the experience and impact of negative events (Bolger & Schilling, 1991). In terms of condom use, high BAS, as compared to low BAS, individuals may be more motivated towards positive outcomes, such as pleasure during sex or intimacy with one’s partner. It is possible that being self- versus other-directed helps to differentiate whether high BAS
individuals are motivated to enhance pleasure versus intimacy during sex, and thus use or not use condoms. Additionally, high BIS individuals might be more inclined to have sex in order to cope with a negative mood, placing them at greater risk for transmittable diseases as compared to lower BIS individuals. Future studies should examine these possibilities.

Situational factors other than partner type may also influence condom use in MSM. For example, while participants’ HIV serostatus was considered in the present study, equally as important is the serostatus of the partner, which was not examined. Serosorting, the practice of having unprotected intercourse with individuals believed to be of similar serostatus, has increased in practice as a ‘safer’ sex strategy among seropositive and seronegative men (Cox, Beauchemin, & Allard, 2004; Osmond et al., 2007; Suarez et al., 2001; see Elford, Bolding, Sherr, & Hart, 2007 for a study that demonstrated no significant increase in serosorting since the year 2000 for seronegative men living in London, England). Serosorting is of particular concern since one’s assumed HIV serostatus may not correspond to actual status given seroconversion may have taken place since the last HIV test (Mao et al., 2006). Mackellar and colleagues (2006) found that among young MSM who reported being HIV seronegative, six percent seroconverted in the previous six months without their knowledge, placing individuals who serosort based on self-reported HIV serostatus at greater risk for infection. Sex motives may play significant roles in the decisions of those who serosort and abandon condom use based on assumed or discussed HIV serostatus of their partners. Related, while discussions of protection strategies were employed as a covariate in the present study, it is possible that sex motives predict whether individuals have these discussions or not. As a result, discussions of condom use and HIV status may play significant mediating roles in the relationship between sex motives and condom use.
While the motives addressed in the current study are diverse, the model is not comprehensive. A recent study by Meston and Buss (2007) investigated the reasons individuals have sex and outlined 237 unique reasons that factored into 4 scales (physical, goal attainment, emotional, and insecurity) and 13 subscales. Two of the reasons individuals have sex, highlighted by Meston and Buss but not investigated here, were revenge and physical desirability. These may play significant roles in the sex lives of MSM, as indicated by previous studies suggesting that the sexual attractiveness of a partner decreases intentions to use condoms (Agocha & Cooper, 1999; Dijkstra, Buunk, & Blanton, 2000; Shuper & Fisher, 2008). Shuper and Fisher’s study (2008) experimentally manipulated the sexual attractiveness of hypothetical partners, and demonstrated that the attractiveness of partners was related to decreased intentions to use condoms for anal intercourse in HIV seropositive MSM. Future studies should expand the motives addressed here to incorporate other motives highlighted by Meston and Buss (2007).

It is important to note that the results of the present study are based on an average of four anal sex episodes per person across a two-month period. Unbalanced designs (i.e. varying numbers of events recorded per individual) are adequately handled in multilevel analyses using HLM (Raudenbush et al., 2004; Affleck, Zautra, Tennen, & Armeli, 1999). Furthermore, daily event recording over a 2-month period is a more reliable methodology than retrospective recall reports (Horvath et al., 2007). Yet, to date no study has evaluated the extent to which a two-month time frame nor a limited number of episodes, such as four in the present study, adequately represent sex behaviors of specific target groups, such as HIV seropositive, status unknown, and seronegative MSM. Repeated measurement of behaviors is considered a satisfactory representation of individuals’ patterns of behaviors.
(Fleeson, 2001; Fournier, Moskowitz, & Zuroff, 2008), but specific research on the number of episodes required to effectively capture the sex life of individuals has not been conducted. In unrelated research, Fournier and colleagues, based on Shoda, Mischel, and Wright’s work (1994), required participants to provide at least seven records for interpersonal events to adequately estimate each person’s typical behavior patterns. The present study successfully employed similar design conditions and accumulated similar numbers of events from each participant as other studies (Garry et al., 2002; Gillmore, et al., 2002; Mustanski, 2007a,b). The present study was primarily designed to capture event-level relationships among our variables of interest, specifically among sex motives, condom use, and partner type, and therefore similar results would be expected if more events were recorded per participant. It was not designed to look at the patterning of behaviors among participants. More events could potentially better capture the spectrum of sexual experiences that single HIV seropositive, serostatus unknown, and seronegative individuals have, thus providing even further understanding of their behaviors and motives. Increased number of episodes would further help us understand the nature of the relationships between motives and condom use, as either a function of the person, the situation, or a combination of both.

The recruitment method employed in the current study precluded a comparison of those who visited the website only, versus those who additionally signed up for more information, and participated in the study. Furthermore, recruitment occurred across several different venues (i.e., internet dating/sex sites, pride festival, community organizations and local restaurants and bars) in an attempt to sample across various demographics and MSM communities. Yet, data on where each participant heard about the study is unavailable and thus statistical computations are not possible. Also, our sample included primarily
Caucasian, young, urban, and well-educated men. Of concern then, is whether sampling employed in the current study accurately represents the diversity witnessed in MSM populations. Others (Schwarcz, Spindler, Scheer, Valleroy, & Lansky, 2007) have found differences in demographics as a function of sampling method. Yet, in the present study preliminary analyses revealed that no significant differences existed in income, age, education, HIV status, condom use consistency, or personality (see footnote 1) between those who were recruited during the first phase of the study in local for-profit and not-for-profit community establishments and the gay pride parade and those recruited during the second phase in similar establishments and Internet dating/sex sites. Thus, sampling variance seems unlikely to have influenced our results. The question still remains whether the findings extend beyond Caucasian, young, urban, and well-educated MSM. Future studies should attempt to examine the relationships between motives and risky behaviors in a more diverse group of MSM.

Another limitation in the present study is the reliance on self-report data, often plagued by retrospective bias (Coxon, 1999; Schroder, Carey, & Vanable, 2003; Smyth & Stone, 2001). In the present study, participants were asked to repeatedly report on sexual encounters within a 24-hour period and accumulating evidence confirms that this method of data collection significantly diminishes retrospective bias (Horvath et al., 2007; McAuliffe et al., 2007). Event-recordings of sexual activities are not without problems though. They have been criticized for burdening participants (DeLongis et al., 1992; Bolger et al., 2003), difficulties in documenting compliance (Broderick, Schwartz, Shiffman, Hufford, & Stone, 2003), and having reactivity effects (Horvath et al., 2007). In the present study, great effort was taken to make participants feel involved in the research, as suggested by DeLongis,
Capreol, Holtzman, O’Brien, and Campbell (2004), Green, Rafaeli, Bolger, Shrout, and Reis (2006) and Tennen and his colleagues (2006). Participants were described the importance of the research for understanding gay men’s sexual health, and were extensively prepared for daily reporting. Furthermore, daily participation was very limited if sex did not happen in the previous 24 hours, having a dual effect of decreasing burden every day and keeping participants engaged in the study across a two-month period. The employment of electronic event recording via the Internet has been demonstrated to enhance compliance (Garry et al., 2002; Miller et al., 2002; Tourangeau & Smith, 1998).

A recent two-month event recording Internet study by Horvath and colleagues (2007) demonstrated a reactivity effect among gay men, in that they reported less insertive anal intercourse and less unprotected receptive anal intercourse over the course of the study. Others have also used self-monitoring, as a prevention tool, to lower HIV risk behavior (Horn & Brigham, 1996). In the present study, a reactivity effect did not appear to occur. Analyses revealed that over the two-month period, participants reported more anal sex, but similar condom use over time\textsuperscript{12}. The increase in reported anal intercourse could reflect real-life increases in the activity in the present study’s participants, or could potentially reflect an increase in authentic reporting over time.

\textsuperscript{12} Two multilevel models were conducted to test for reactivity effects. In the first, number of anal sex episodes was the outcome variable. In the second, condom use for anal intercourse (yes/no) was the outcome. In both models, Time (day of study) was the predictor variable. Results indicated increases in reported anal sex episodes ($p < .05$) and no significant differences in condom use across the two-months of reporting ($p > .05$).
Finally, the recordings of motives and behaviors occurred concurrently. Consequently, it is not possible to conclude whether the reasons participants had sex caused preventive or risky sexual behaviors or whether behaviors preceded participants’ perceptions of their motives. While the adopted framework was based on a functional approach to motivation and behavior (Cooper et al., 1998; Snyder, 1993; Snyder & Cantor, 1997), the possibility exists that those who engage in specific behaviors maintain long-held beliefs or heuristics about what having unprotected or protected sex means to their motivation (similar to the argument posed by Nisbett & Wilson, 1977). For example, it is possible that individuals’ belief that condoms interfere with intimacy (Albarracín et al., 2001; Canin et al., 1999) is strongly embedded in people’s minds. Consequently, when in situations that they do not use a condom, individuals may interpret it as wanting to be closer and more intimate with their partner. However, condoms are also believed to interfere with pleasure (Albarracín et al., 2001; Canin et al., 1999), and thus it would be expected that if such a heuristic were operating, and functioning post-UAI, then pleasure seeking during sex would be negatively related to protecting oneself and others during anal intercourse. Yet, the reverse was true in the present study. Future laboratory experiments though are required to clarify the direction of the relationships between motives and risky sexual behaviors.

CONCLUSION

The results of the present study revealed that sexual motives predict risky sexual behavior in single MSM, especially within the context of regular partners and among HIV seropositive men. The findings suggest an area for future research, whether a motivational
model of condom use behavior can augment the effectiveness of prevention strategies and interventions, similarly espoused by others (Canin et al., 1999; Cooper et al., 1998; Levinson et al., 1995). The study points to specific motives that can be addressed in research evaluating health promotion campaigns directed at MSM, and in individual- and group-based therapy approaches such as Coping Effectiveness Training (Chesney, Chambers, Taylor, Johnson, & Folkman, 2003; DeLongis & Puterman, 2007). Furthermore, the study directs attention to the possible roles of emotion and cognitive regulation in the relationships between motives and condom use. In light of the recommendations by Salovey and colleagues (Rothman & Salovey, 1997; Rothman et al., 2006), future studies can test framing condom use as either promoting physical well being (a gain) or preventing disease (a loss) as a function of the basic approach or avoidant nature of a motive while addressing the harmful or health-enhancing effects of that motive. Findings from the present and future studies can be employed in psycho-educational approaches, where communities and individuals explain how motives affect their condom use and within which contexts they are most likely to do so. These nuances may strengthen the successes of health promotion and disease prevention strategies, both at the community and individual levels. The current study is not without its limitations, as discussed, yet highlights the pivotal role motives may play in protective and risky sexual behaviors.
REFERENCES


Armeli, S., Todd, M., Conner, T. S., & Tennen, H. (2008). Drinking to cope with
negative moods and the immediacy of drinking with the weekly cycle among college students. *Journal of Studies on Alcohol and Drugs, 69*, 313-322.


Psychology, 30, 1738–1755.


*Motivation and Emotion, 30, 111-116.*


relationships and motives for sex as determinants of adolescent condom use. *Journal of Adolescents Health, 33*, 154-164.


Horvath, K. J., Beadnell, B., & Bowen, A. M. (2007). A daily web diary of the sexual experiences of men who have sex with men: Comparisons with a retrospective recall
survey. *AIDS and Behavior, 11, 537-548.*


Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports


representativeness of sampling methods for reaching men who have sex with men: A
direct comparison of results obtained from convenience and probability samples.

*AIDS & Behavior, 11,* 596-602.

Schwarz, N. (1990). Feelings as information: Informational and motivational functions of
affective states. In E. T. Higgins & R. Sorrentino (Eds.), *Handbook of motivation
and cognition: Foundations of social behavior* (Vol. 2, pp. 527-561). New York:
Guilford.


*Current Directions in Psychological Science, 10,* 47-51.

intention and the intention-behavior relation. *Personality and Social Psychology

examination of six moderator variables. *British Journal of Social Psychology, 37,*
231 - 250.

and comparison of the theories of reasoned action and planned behavior. *Journal of

affirmation and the reduction of defensive biases. *Current Directions in
Psychological Science, 11,* 119–123.

message framing, and health behavior: Understanding the congruency effect.


van Kesteren, N. M. C., Hopers, H. J., van Empelen, P., van Breukelen, G., & Kok, G.


