THE INFLUENCE OF BASIC NEED SATISFACTION ON SEXUAL RISK BEHAVIOR

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

    THE INFLUENCE OF BASIC NEED SATISFACTION ON SEXUAL RISK BEHAVIOR

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Chapter 1

Introduction

Despite a nearly two decade long public health campaign to curb the spread of HIV/AIDS, new HIV infections continue to climb at alarming rates. Recent reports suggest that at least 40,000 new infections are being recorded a year (CDC, 2008; Copenhaver & Fisher, 2006). These statistics, along with the finding that public concern for the spread of HIV has dropped due to the availability of effective antiviral treatments, has sparked fear that another outbreak of HIV may be imminent (Brown, 2007; Copenhaver & Fisher, 2006).

In response, the public health community has renewed its call for studies that aim to understand the psychosocial risk factors underlying the sexual behavior that places one at risk for contracting HIV (CDC, 2003.; West, Corneli, Best, Kurkijian, & Cates, 2007). Many theories have attempted to explain these behaviors, but most have focused on cognitive or rational factors (Kalichman, 1998; Mustanski, 2007). For example, theories such as the Health Belief Model, the Theory of Reasoned Action, and the Theory of Planned Behavior emphasize processes such as condom negotiations or risk appraisals in the decision to engage in high-risk behavior. Critics have suggested that these approaches overlook the potential importance of non-rational emotions and cognitions on sexual behavior, and have called for a greater inclusion of these processes in investigations of high-risk sexual behavior (Crepaz & Marks, 2001; Mustanski, 2007).

This study aimed to accomplish this by using a novel theoretical perspective for investigating HIV risk-taking behavior among university and community adults: Self-Determination Theory (SDT). In particular, we utilize the tenets of SDT (Deci & Ryan, 1985, 2000) to understand how individuals suffering from acute psychological need deprivation might try to compensate by engaging in sexual risk behaviors that, though ultimately self-destructive,

may provide short-term relief from psychological distress. To address these dynamic questions, we conducted longitudinal analyses of within-subject fluctuations in our variables of interest via a weekly diary study. In the next sections, I explicate the theory behind the study hypotheses.

Self-Determination Theory.

Drawing inspiration from humanistic theories of human development and thriving, Self-Determination Theory (SDT) began as an exploration of intrinsic motivation, which was construed as the expression of peoples' active growth and mastery strivings (Deci, 1972; see Deci & Ryan, 2000, for reviews). Early experimental research revealed that *autonomy-supportive* environments maintain and enhance intrinsic motivation, while *controlling* environments inhibit intrinsic motivation (Deci & Ryan, 1985; 2000). Moreover, these differences impacted psychological well-being such that individuals in unsupportive environments reported less happiness and satisfaction than individuals in supportive contexts (Deci & Ryan, 1985; 2000). This led SDT theorists to consider what processes might influence individual pathways towards psychological well-being or psychological ill-being. The resultant 'ingredients' of psychological well-being are described through one mechanism: basic need satisfaction.

The term "basic need satisfaction" refers to the three psychological needs that SDT theorists believe must be fulfilled in order to experience optimal growth and well-being: autonomy, competence, and relatedness. Autonomy is defined as an internal endorsement of one's behavior and choices (Deci & Ryan, 1985). Competence refers to feeling that one's actions are effortful, impactful, and successful in achieving outcomes in daily life (Deci & Ryan, 1985). Finally, relatedness refers to feelings of acceptance and connectedness that an individual feels with close and important others (Deci & Ryan, 1985). Fulfillment of these basic needs is

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said to facilitate optimal well-being, and conversely, their absence additively predicts ill-being. Empirical tests of this assumption have shown basic need satisfaction to predict many global positive outcomes, including higher well-being, intrinsic motivation, and self-regulation, as well as domain-specific positive outcomes such as higher grades and achievement scores, greater job satisfaction, and more relationship fulfillment (Deci & Ryan, 1985; La Guardia et. al., 2000; Neighbors, et. al., 2007). Moreover, these effects remain regardless of participant gender, culture, or socioeconomic background, reinforcing the purported universal importance of these basic psychological needs (Chirkov et. al., 2005; Deci et. al., 2001; Sheldon et al., 2001).

Few studies have examined psychological needs as predictors of negative or maladaptive behavior (but see Deci & Ryan, 1985; Neighbors et. al, 2007; Ryan & Deci; 2002 for preliminary results). However, Ryan & Deci (2008a) recently suggested that when basic need satisfaction is thwarted or otherwise compromised, people may be vulnerable to engaging in maladaptive coping efforts. Specifically, individuals experiencing need deficits will be motivated to escape this state of deprivation by seeking short-term gratification or distraction (Neighbors et. al, 2007). In other words, individuals experiencing need deficits may seek out a quick fix to "fill the void" by engaging in activities or behaviors that provide a temporary boost rather than a long-term solution.

Sheldon & Gunz (2009) further explored the consequences of need deficits in their paper through a series of cross-sectional, longitudinal, and experimental studies. Their findings demonstrated that unmet psychological needs motivated individuals to engage in compensatory behaviors to reinstate these needs. The idea that basic psychological needs can serve as motives for behavior marks a new way to view the function of psychological needs within the SDT

literature, and provides preliminary support for our argument that individuals experiencing low basic need satisfaction may engage in risky or maladaptive behavior as a compensatory strategy.

Abad & Sheldon (in preparation) conducted a study that demonstrated preliminary support for this hypothesis. In this study, 155 undergraduate psychology students were enrolled in an online longitudinal diary study where we assessed basic need satisfaction, negative affect, and engagement in binge eating and obsessive preoccupation with food over a week's time. We discovered that deficits in each need as well as high negative affect independently predicted binge eating and food preoccupation. Additionally, the combination of negative affect and low autonomy predicted more binge behaviors.

Having demonstrated the relationship between low basic need satisfaction and binge eating tendencies, the current study looks to apply these findings to understanding sexual risk-taking. That is, we believe that individuals low in basic need satisfaction may elect to participate in risky sexual behavior because it may provide a quick and efficient method to reinstate positive feelings. However, decisions made under states of deprivation will likely be of poor quality and may serve to place individuals at risk for incurring great behavioral and emotional costs (e.g. contracting HIV).

Along with demonstrating the importance of basic need unfulfillment in understanding sexual risk-taking, our past research has revealed the importance of another factor: mood, particularly psychological distress. In the next section, we discuss the contributions of psychological distress to explain engagement in HIV-related sexual risk behavior.

Psychological Distress.

Research concerning individual differences in risk-taking has consistently revealed differences between individuals experiencing and individuals not experiencing psychological

distress. The term psychological distress refers to a state of negative emotionality defined by a variety of affective symptomatology (Mustanski, 2007; Crepaz & Marks, 2001). Many affective indices have been used to represent psychological distress, but here we will concentrate on the variables that have been shown to be especially related to sexual risk-taking tendencies: high negative affect, low positive affect, depression, and anxiety (Crepaz & Marks, 2001; Donenberg et. al., 2005; Kalichman, 2001; Lescano et al., 2007; Leith & Baumeister, 1996; Mustanski, 2007).

Research conducted in the laboratory has shown that individuals experiencing positive affect oppose taking unwarranted risks because they perceive that they have more to lose in a risky gamble (Isen & Patrick, 1983; Leith & Baumeister, 1996; Mustanski, 2007). Individuals experiencing negative mood, however, have an opposite reaction to a risk, often choosing to make risky decisions even when faced with the possibility of substantial loss (Leith & Baumeister, 1996; Mustanski, 2007). When asked to explain their decision-making processes, psychologically distressed individuals could not provide a rational reason even though they admitted to understanding the level of risk involved. Furthermore, asking participants to think carefully about their choices prevented distressed individuals from making risky decisions (Leith & Baumeister, 1996; Mustanski, 2007). This led researchers to believe that negative emotionality can render an individual incapable of engaging in rational, cognitive decision-making, causing them to instead react to impulsive and irrational tendencies. Termed a failure of self-regulation, this explanation is an often-cited reason for the link between psychological distress and engagement in risky behaviors (Leith & Baumeister, 1996; Magar et al., 2008; Mustanski, 2007).

Hundreds of studies have looked at the link between global distress indices and HIV-related sexual risk behavior, using different methodologies and subject populations (Kalichman, 2001; Mustanski, 2007). The results of these studies have produced mixed results. One prominent meta-analysis conducted by Crepaz & Marks (2001) revealed minimal effect sizes between anger (r=.10), depression (r=.04), and anxiety (r=.03) and sexual risk-taking. Some researchers have suggested that these effect sizes are small because important moderators in the relationship between distress and sexual risk-taking have not been adequately identified (Kalichman, 2001; Mustanski, 2007). We believe that one undetected moderator may be low basic need satisfaction, as this variable represents a psychological vulnerability that thwarts effective self-regulation. Indeed participants have reported decreased vitality and ability to exert self-control when their autonomy, competence, and relatedness needs were not supported, but opposite patterns when their needs were satisfied (Moller, Deci, & Ryan, 2006; Muraven, Gagne, & Rosman, 2008; Ryan & Deci, 2008b).

Further evidence for the notion that distress is related to sexual risk-taking is provided by research showing that the most successful interventions for reducing HIV risk behaviors are ones that target variables that are analogous to psychological distress (Kalichman, 2001; Scott-Sheldon et. al, 2008; UNAIDS, 1999). Indeed, some interventions have experienced success changing sexual risk behaviors through augmenting self-efficacy or self-esteem (Lescano et. al, 2007), acceptance of negative thoughts or feelings (Metzler et. al., 2000), affect regulation (Donenberg et. al, 2005), and effective partner communication skills (Raiford, Wingood, & Diclemente, 2007).

The Current Study

Assessing the effects of both psychological need deprivation and psychological distress in the same study is a strength of the current study that will enable us to more comprehensively investigate sexual risk-taking. We are encouraged by our previous research in this area, which revealed that both need dissatisfaction and high distress independently predicted engagement in maladaptive behavior (Abad & Sheldon, in preparation).

An additional strength of the current study is that it will address a series of methodological weaknesses in the distress literature previously identified by Kalichman (2001). According to Kalichman (2001), many studies linking distress to HIV risk behavior have utilized global rather than specific indices of psychological distress, and relied on one-time retrospective questionnaires to assess their variables of interest. This has obscured potential influences upon particular distress indices, as well as how these influences may manifest over time. To remedy these design flaws, Kalichman (2001) and other critics promote the use of a repeated measures diary methodology that measure specific distress indices. Though few studies have actually done this, those that have have shown promising results. For example, in Mustanski (2007)'s 30-day daily diary study of affect and HIV risk behavior among men having sex with men, low positive affect and high anxiety contributed to unprotected anal sex with risky partners. Encouraged by these findings, we intend to include multiple distress indices along with a previously overlooked moderator (need satisfaction) to investigate sexual risk-taking in a repeated measures diary study spanning several weeks.

Chapter 2

Methods

Students from an Introductory Psychology course at a large midwestern university were recruited during the spring and fall semesters of an academic year and invited to join an online

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longitudinal study. Due to the greater availability of experimental credits in the spring semester,

participants were invited to complete 8 weekly surveys. Students from the fall semester were

asked to complete 6 weekly surveys. Across both semesters, students were recruited to

participate if they were 1) currently single, 2) had had sexual intercourse with at least one person

in the past three months, and 3) used a condom between 10% and 90% of the time when they had

sex in the past three months. These criteria were chosen to increase the probability of enrolling a

sample that would be sexually active and demonstrate some variability in condom usage and

other behavioral outcomes of interest during the study period.

Study Design and Procedures

We utilized a longitudinal diary study to assess our hypotheses. Eligible participants

were sent an introductory email which advertised the study and contained a link to the first

survey (T1). If they completed the initial survey then they were sent email links to each of the

subsequent surveys (T2-T6 / T8) via follow-up emails. Participants were allowed to take a

survey even if they had missed a prior survey, with the exception of individuals who did not

complete the initial survey (T1). Each survey was open for 48 hours during which time the

participant could log on and complete it. After this 48 hour period, participants were not allowed

to access the survey. In this way, the time allotted for completion of each survey was kept

consistent across participants.

Both the introductory and follow-up emails contained a brief description of the study and

advertised the compensation to participants- up to 5 experimental credits towards their mandated

Psych 1000 total.

Sample Characteristics

58 students from the Spring semester gave 392 weekly reports while 76 participants from the Fall semester gave 377 weekly reports. The percentage of individuals who completed all assigned weekly reports was 84% for the spring and 83% for the fall. There were no differences between samples on any of the key study variables, so their weekly reports were combined into one sample. This yielded 134 participants who gave 769 weekly reports, 307 of which contained a sexual experience involving vaginal sex, anal sex (289 and 18 instances, respectively). Due to the low incidence of anal sex in our sample, anal sex and vaginal sex reports were combined. Of the 134 total participants, 109 (81%) gave at least one sex report while 80 (60%) gave two or more sex reports. On average, each participant gave 2.29 sex reports.

Table 1 reports sample characteristics for the final sample of 109 participants. The gender distribution of the sample was roughly even, but the sample was quite homogenous with respect to race/ethnicity (primarily Caucasian) and sexual orientation (primarily heterosexual). The mean participant age was 19 (SD=1.12) with a range from 18-25.

Participants reported their relationship status at every time point. At T1, 65% of participants reported being single, 5% were casually dating multiple people, 15% were casually dating one person, and 15% were in a committed relationship. 87% of the sample retained their initial relationship status throughout the duration of the survey indicating that participants' relationship status remained fairly stable. For all subsequent analyses, sex reports coming from participants who were single, casually dating multiple people, or casually dating one person were combined to denote single or casual daters while sex reports from participants who were in a serious relationship with one person were combined to denote individuals in relationships. Using this classification system, 85% of the sex reports came from individuals who were single or casually dating while 15% came from individuals in relationships.

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Measures

Each weekly survey contained the same basic inventory assessing need satisfaction, distress, and engagement in risky behavior since the last assessment. The initial questionnaire included an extended demographic and sexual history section that was not asked in subsequent follow-ups. To avoid routinization of responses or participant fatigue, we randomized the order in which questions were asked in each weekly assessment.

A. Initial Survey Only

    I. **Demographics.** Participants were asked to report their age, gender, race, income level, and sexual orientation.

    II**. Sexual History**. The sexual history inventory used in Cooper et al. (1998) was used here. This inventory asked participants to report on lifetime sexual behaviors as well as behaviors in the last 6 months (specific items listed below). Although we had no hypotheses concerning differences in participant sexual history, we controlled for certain variables in our analyses or tested for any moderator influence (see below). Tables 2 and 3 report the descriptive statistics of the sexual history of our sample.

        a. Age at first intercourse (open-ended).

        b. Number of partners (lifetime: 1= "one partner" to 8= "more than 40 partners"; 6 months: open-ended)

        c. Frequency of intercourse (lifetime: 1="one time" to 9= "more than 100 times"; 6 months: open-ended)

        d. Number of risky lifetime sexual practices: one-night stands (1="1 time in my life" to 10= "more than 30 times"), condom use during one-night stands (1="never" to 6="always"), intercourse with stranger (1="1 time in my life" to

10= "more than 30 times"), condom use during intercourse with stranger (1="never" to 6="always").

e. Negative outcomes: number of STDs ever experienced (Yes/No/), number of forced sexual intercourse experiences experienced over lifetime (1="never" to 6="more than 10 times").

B. Initial Survey and Follow-Up Assessments: Predictor Variables

1. **Need Satisfaction.** Need satisfaction was measured using an 18-item Basic Need Satisfaction scale first used in Sheldon & Gunz (2009) and also in Sheldon, Abad, & Hinsch (2011). The scale presents 6 statements (3 positively worded, 3 negatively worded) corresponding to felt autonomy, competence, and relatedness. Participants read each statement and responded with how they felt in the past week, using a 1 (not at all true) to 5 (very true) scale. Examples of these statements are: "I was free to do things my way" (positive autonomy), "I experienced some kind of failure or was unable to do something" (negative competence), and "I felt a sense of contact with people who care for me and whom I care for" (positive relatedness). Negatively worded items were reverse scored and all 6 need-specific items were averaged to create a composite score for each need. Alphas were computed for every subscale, averaging over the number of weeks in the study. The alpha for the autonomy subscale was .73, the alpha for the competence subscale was .78, and the alpha for the relatedness subscale was .76. See appendix D for full measure.

2. **Psychological Distress.** Positive and Negative Affect were measured using the Positive and Negative Affect Schedule (PANAS) which consisted of 10 positive mood items (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and 10 negative items (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous,

jittery, and afraid) (Watson, Clark, & Tellegen, 1988). Participants were asked to rate how much they felt each item in the last week using a scale from 1= very slightly to 5= extremely. Responses were averaged for positive and negative affect with higher positive affect scores indicating greater well-being and higher negative scores indicating greater distress. Alphas were computed for every subscale, averaging over the number of weeks in the study. The alpha for the positive affect subscale was .88 while the alpha for the negative affect subscale was .89.

Depression and Anxiety were measured using the 7-item anxiety subscale (e.g., nervousness or shakiness inside, trembling) and the 6-item depression subscale (e.g., feeling lonely, feeling blue) taken from the larger Brief Symptom Inventory (Derogatis, 1993). Participants were asked to rate how much they felt each item in the last week using a scale from 1=very slightly to 5=extremely). Responses were averaged for each subscale with higher scores indicating greater distress. Alphas were computed for every subscale, averaging over the number of weeks in the study. The alpha for the anxiety subscale was .87 while the alpha for the depression subscale was .89. See appendices B and C for full measures.

C. Initial Survey and Follow-Up Assessments: Outcome Variables

1. **Sexual Risk Behaviors.** A sexual risk behavior assessment that we used was adapted from a previously conducted event-level study of risky sexual behavior in a community sample of 1,946 adolescents (Barber & Cooper, in preparation; Cooper, 2010).

In the current study, participants were asked whether they participated in a sexual experience involving sexual intercourse (vaginal or anal) since the last assessment. If a participant had such an experience, he or she was routed to a section of the survey containing a number of items assessing what occurred during their most recent sexual experience (items are

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described below). If a participant did not have such an experience, he or she was sent to another part of the survey that contained non-sexual filler items

Participants who had engaged in a sexual experience since the last assessment were asked to recall their most recent sexual encounter involving vaginal or anal sexual intercourse. They were then asked a series of questions assessing what took place during the experience as well as the level of sexual risk. See appendix E for full measure.

Sexual Activity. First, participants were asked to report the details regarding what activity took place by checking items in a checklist (kissing, touching genitals, oral sex, vaginal sex, anal sex). Given that vaginal and anal sex are two of the main ways in which HIV can be transmitted, reports of vaginal and anal sex were combined to form a binary sexual activity score: (1) had vaginal or anal sex, (0) did not have sex. The decision to have sex was used as a predicted outcome in later analyses.

Condom Usage and Non-Usage. A binary variable was created to indicate whether a condom was used (1) or not used (0) during each reported sexual experience.

Cumulative Condom Usage. Participants recruited in the Fall semester were asked to report the percentage of time that a condom was used during times in which they had sexual intercourse in the past week. A continuous scale was given with the following answer choices: 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%.

Protection Usage and Non-Usage. A binary variable was created to indicate whether any protection (condoms or oral/insertive birth control) was used (1) or not used (0) during each reported sexual experience.

Pregnancy Status. Each participant was asked whether they or their partner were trying to get pregnant at every reported sexual occasion. No participant reported that they were intending to

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become pregnant, so non-usage of condoms or birth control for the purposes of becoming pregnant was ruled out.

Level of Intoxication-Self and Partner. Because some previous research has shown that alcohol use can precipitate sexual risk-taking (Cooper, 2002; Turchik, Garske, Probst, & Irvin, 2010), participants were asked to indicate how intoxicated they and their partner were during their sexual experience on two items (one for self and one for partner) fixed to a Likert scale ranging from 1 = "not at all" to 7 = "extremely."

Next, participants were asked to respond to several items regarding the nature of their relationship with their partner. The question of partner familiarity is important because certain risk-taking behaviors are associated with having sex with casual vs. serious or main sexual partners. More specifically, although condom usage tends to be higher among individuals having a casual relationship, new or first-time sex partners tend to be more intoxicated during the sexual experience and are less likely to engage in discussions concerning sexual risk, including each partner's HIV/STD status (Ciccarone, Kanouse, Collins, Miu, Chen, Morton, & Stall, 2003; Cooper, 2010; LaBrie, Earleywine, Schiffman, Pedersen, & Marriot, 2005; Lescano, Vazquez, Brown, Litvin, & Pugatch, 2006; Misovich, Fisher, & Fisher, 1997).

The answer scale associated with each item assessing partner-related risk was continuous, with the endpoints representing "not knowing one's partner well" to "knowing one's partner well." However, for some items it appeared that participants' responses tended to cluster in ways that suggested dichotomizing the continuous data. These methods are explained below.

How long you have known your partner? Participants were asked to report how long they had known their partner at the time they had sex on a 9 point scale (0 = "someone I just met" to 9 = "more than a year"). Frequencies of this variable indicated a trimodal distribution such that

nearly 27% of the sample had known their partner for one month or less, 40% knew their partner

for greater than one month to one year, and 33% had known their partner for more than a year.

Thus, the 9 possible response choices were collapsed into three values: 1 = "had just met to

known for 1 month;" 2 = "known for 1 to 12 months;" and 3 = "known for greater than a year."

How many times have you previously had sex with your partner? Participants were asked to

report how many times they previously had had sex with their partner on an 8 point scale (0 =

"never, this was the first time" to 8 = "more than 10 times"). A frequency report on this variable

indicated a bimodal distribution such that 30% of sex reports contained instances of first-time

sex, 40% of sex reports contained an instance where participants reported having sex with their

partners more than 10 times, and all other values fell evenly between these endpoints.   As

having sex with a first-time partner can be riskier than having sex with an individual with whom

you have had previous sexual experiences (Cooper, 2010), responses were dichotomized to

reflect how many times the participant had had sex with their partner previously: 0 = "never, this

was the first time" to 1 = "once or more."

How would you characterize your relationship with your partner? Participants were asked to

report how they would characterize their relationship with their partners on a 4 point scale:

1="one-time sexual partner", 2="occasional sexual partner/casually dating", 3="seriously

dating" or 4= "engaged/married." Only one respondent reported being engaged or married to

their partner, so this report was included in the third ("seriously dating") category. The

distribution of the data revealed that nearly 62% of sex reports featured sex with a one-time or

occasional sexual partner while 38% of sexual experiences were with a serious partner. This

indicates that collapsing across similar response categories yields enough variability to

dichotomize responses on this scale into two outcomes: 0="had sex with a one-time/casual sexual partner" and 1="had sex with a serious/committed sexual partner."

Previous research has shown that while individuals may be more cautious regarding their use of protection when having sex with a casual or occasional sexual partner, they may be more likely to forego protection when having sex with a serious partner in an effort to convey felt intimacy and trust (Cooper, 2010; Misovich, Fisher, & Fisher, 1997). Thus, in an effort to understand the psychological dynamics involved in variations in condom usage between casual and serious partners, we intended to test for interactions between our predictors and relationship status in predicting condom non-usage.

In addition to the general relationship items, we asked several items regarding the HIV-specific risk of a participant's sex partner. These items followed the CDC (2003) guidelines that specify particular activities that enhance an individual's likelihood of contracting and transmitting HIV: a) Has this person ever shot drugs with a needle? b) Is this person HIV-positive? c) Is this person currently infected with any other sexually transmitted disease (i.e. crabs, herpes, chlamydia)? Participants responded to these items using a 7 item Likert scale ranging from 1=not at all likely to 7=very likely. These items were highly skewed and rarely endorsed by our sample; 92% of the sample reported it was not at all likely that their partner had ever shot drugs with a needle, 90% of the sample reported it was not at all likely that their partner was HIV-positive, and 83% of the sample reported it was not at all likely that their partner was currently infected with any other sexually transmitted disease. Furthermore, 0% of the sample endorsed anything larger than a 4 (somewhat likely) for questions regarding whether their partner had shot drugs with a needle or was HIV positive, and only 1% of the sample

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reported that it was more than somewhat likely that their partner was infected with any other STD.

Control Variables

Given that little variation was observed in participants' ethnic/racial identity, sexual orientation, and age, we decided to only control for gender and relationship status in all analyses. Gender was a level 2 between-person variable (0=men; 1=women), but relationship status was a level 1 within-person variable as participants reported their status every week. As explained earlier, this variable was dichotomized (0= individuals who were single or casually dating, 1= individuals in committed relationships).

In addition, we controlled for particular sexual history variables that may be related to certain sexual activity outcomes. For instance, we controlled for number of times the participant had sex in the past six months in predicting the decision to have sex during the study period, and condom use in the past six months in predicting whether or not condoms were used during a sexual experience. Non-significant sexual history control variables were removed from the model to obtain final parameter estimates.

Overview of Analyses

Model Building

Multilevel modeling was used to capture both between- and within-person variation in our data, which was structured hierarchically (Krull & Mackinnon, 1999; Verbeke & Bolenberghs, 2000). Specifically, data from weekly reports (modeled at Level 1) were nested within individuals (modeled at Level 2) allowing us to simultaneously test how person-level variables influence temporal (i.e., weekly) fluctuations in our independent variables to predict sexual risk outcomes. Following recommendations by Nezlek (2001), preliminary analyses were

run to determine whether predictors should be estimated as random or fixed. All effects were modeled as fixed, other than the intercept.

Our hypotheses were tested utilizing the PROC MIXED and PROC GLIMMIX procedures in SAS (v.9.2). With both procedures, various sexual risk outcomes were regressed on our main independent variables: need satisfaction, mood indices, and their interactions. PROC MIXED was used when dependent variables were continuous (i.e. level of intoxication of self or partner during experience), whereas PROC GLIMMIX was used when dependent variables were dichotomous (i.e. condom usage [Yes/No]). PROC MIXED yields partial regression coefficients, whereas PROC GLIMMIX produces estimates of the log of the odds ratios, which can then be converted into odds ratios or probabilities. Odds ratios can be interpreted as the likelihood that a certain outcome will occur vs. not occur (e.g., wearing a condom vs. not wearing a condom). If the odds ratio is greater than one, it is greater than chance that the outcome is likely to occur; if the odds ratio is less than one, it is greater than chance that the outcome is less likely to happen. Importantly, the significance of odds ratios are determined by 95% confidence intervals, which are deemed statistically significant if they do not contain the value 1.

To test our hypotheses, we utilized lagged analyses. That is, we regressed a particular week's sexual risk behavior outcomes on reports of need satisfaction, distress, and their interaction from the prior week. This procedure was chosen because if we had utilized need satisfaction and mood data from the same week in which we collected sexual behavior reports, it would be impossible to detect whether need satisfaction and affect were *precursors to* or *the result of* engaging in a particular sexual experience. Lag analyses provide a convenient way to

test the hypothesized order in which we believe our independent variables would influence our dependent variables.

In accordance with our hypotheses, tested models predicted sexual risk behavior from either lagged need satisfaction (autonomy, competence, and relatedness), lagged mood (positive affect, negative affect, anxiety, depression), and the interaction between these variables. Additionally, in order to capture within-subject fluctuations between independent and dependent variables, each model also controlled for a person's mean on particular predictor variables (Bolger, Zuckerman, & Kesller, 2000; Kreft, de Leeuw, & Aiken, 1994; Raudenbush & Bryk, 2002).

Although typical lag models predict dependent variables from one week (t) from the value of the dependent variable from the prior week (t-1), we could not utilize this technique because we did not receive consistent consecutive sex reports from our participants. We instead elected to control for each person's mean on the dependent variable throughout the study period, as has been utilized in previous studies (Raudenbush & Bryk, 2002). Thus, models regressed sexual risk outcomes on lagged need satisfaction, mood, or their interaction controlling for each individual's overall mean on the independent and dependent variables.

Importantly, in all models testing need satisfaction, all three need variables were entered at the same time in order to test the unique variance that is due to each need. This practice is commonly utilized within self-determination theory research to detect distinctive need effects (La Guardia, Ryan, Couchman, & Deci, 2000; Sheldon & Gunz, 2009).

Hypotheses

Below, we have provided examples of the Level 1 and Level 2 multilevel modeling equations that correspond to each tested hypothesis:

Hypotheses I: Deficits in need satisfaction will predict greater engagement in sexual risk behavior:

Example L1 (predicting condom non-usage from autonomy, competence, relatedness):

Condom Non-Usage $_{ijt}$ = b_{0j} + b_1 (Autonomy)$_{ijt-1}$ + b_2 (Competence)$_{ijt-1}$ + b_3(Relatedness)$_{ijt-1}$ + b_4(Relationship Status)$_{ijt}$ + e_{ij}

(Eq. 1)

where i= weekly observation, j=person, and t=week, b_{0j} is the predicted value of condom non-usage for when all other variables equal zero, b_1, b_2, and b_3 are, respectively, the partial within-person regression coefficient for an individual's level of autonomy, competence, and relatedness on week t-1, and b_4 is the partial within-person regression coefficient for a person's relationship status.

L2 example:

b_{0j} = a_0 + a_1 (Autonomy Mean)$_j$ + a_2 (Competence Mean)$_j$ + a_3 (Relatedness Mean)$_j$ + a_4 (Condom Non-Usage Mean)$_j$ + a_5(Gender)$_j$

where j=person, a_0 is the predicted value of the intercept when all other variables equal zero, a_1, a_2, and a_3 are the partial regression coefficients for each person's overall mean on autonomy, competence, and relatedness, a_4 is the partial regression coefficient of each person's condom non-usage mean, and a_5 is the partial regression coefficient for gender.

Hypotheses II: Higher psychological distress will predict greater engagement in sexual risk behavior:

L1 example: (predicting condom non-usage from anxiety):

Condom Non-Usage $_{ijt}$ = b_{0j} + b_1 (Anxiety)$_{ijt-1}$ + b_2(Relationship Status t)$_{ijt}$ + e_{ij}

(Eq. 3)

where i= weekly observation, j=person, and t=week, b_{0jk} is the predicted value of condom non-usage for when all other variables equal zero, b_1 is the partial within-person regression coefficient for an individual's level of anxiety on week t-1, and b_2 is the partial within-person regression coefficient for a person's relationship status.

Example L2 (predicting condom non-usage):

L2 example:

$$b_{0j} = a_0 + a_1 \text{ (Anxiety Mean)}_j + a_2 \text{ (Condom Non-Usage Mean)}_j + a_3 \text{(Gender)}_j$$

(Eq. 4)

where j=person, a_0 is the predicted value of the intercept when all other variables equal zero, a_2 is the partial regression coefficient of each person's condom non-usage mean, and a_3 is the partial regression coefficient of gender.

Hypothesis III: Interactions between need satisfaction and distress will strength relationships to sexual risk outcomes.

L1 example: (predicting condom non-usage from the interaction between autonomy and negative affect):

$$\text{Condom Non-Usage}_{ijt} = b_{0j} + b_1 \text{ (Autonomy)}_{ijt-1} + b_2 \text{ (Negative Affect)}_{ijt-1} +$$

$$b_3 \text{(Relationship Status)}_{ijt} + b_4 \text{(Autonomy * Negative Affect t)}_{ijt-1} + e_{ij}$$

(Eq. 5)

where i= weekly observation, j=person, and t=week, b_{0j} is the predicted value of condom non-usage for when all other variables equal zero, b_1 is the partial within-person regression coefficient for an individual's level of autonomy on week t-1, b_2 is the partial regression coefficient for an individual's level of negative affect on week t-1, b_3 is the partial within-person

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regression coefficients for a person's relationship status and b_4 is the cross-product of an individual's level of autonomy and negative affect for week t-1.

L2 example:

$$b_{0j} = a_0 + a_1 (\text{Autonomy Mean})_j + a_2 (\text{Negative Affect Mean})_j + a_3(\text{Condom non-usage}$$
$$\text{Mean})_j + a_4(\text{Gender})_j$$

$$(\text{Eq. 6})$$

where j=person, a_0 is the predicted value of the intercept when all other variables equal zero, a_1 a_2 is the partial regression coefficient for each person's overall mean on autonomy, a_2 is the partial regression coefficient for each person's overall mean on negative affect, a_3 is the partial regression coefficient for condom non-usage over the study period and a_4 is the partial regression coefficient for gender.

<div align="center">Chapter 3</div>

<div align="center">Results</div>

As previously mentioned, 769 weekly reports were submitted from 134 participants throughout the study duration, and 307 of these reports (40%) contained an instance of vaginal or anal sex (289 and 18 instances, respectively).

Tables 4 and 5 contain descriptive statistics for predictor and outcome variables, respectively. All predictor variables were normally distributed (i.e., skewness and kurtosis < 2.0). With respect to sexual risk outcomes, 45% of the reported sexual experiences contained an instance of condom non-usage, 18% did not utilize any form of birth control (condoms or otherwise), 61% contained an instance of sex with a one-time or casual partner, and 25% featured sex with a partner for the first time. On average, participants reported knowing their partner between 1 and 12 months (*M=2.04, SD=.77),* were less than somewhat intoxicated

during their sexual experiences (*M*=3.01, *SD=2.12*), and also reported their partners as being less than somewhat intoxicated (*M*=2.79, *SD*=2.03). Tables 6 and 7 report the correlations among our predictor and outcome variables.

Some gender differences were observed in the data. With respect to need satisfaction, the average mean for autonomy *t*(132)= -2.62, *p*=.01 was significantly higher for women (*M*=3.76, *SD*=.55) than men (*M*=3.51, *SD*=.60). The average mean for relatedness *t*(132) =-2.55, *p*<.05 was also significantly higher for women (*M*=3.90, *SD*=.65) than men (*M*=3.64, *SD*=.52).   No gender difference was observed on competence. Additionally, no gender differences emerged for positive affect, negative affect, depression, or anxiety. With respect to sexual risk outcomes, men were marginally more likely than women to report condom usage (Odds Ratio [*OR*] = 2.17, 95% Confidence Interval [*CI*] = .20, 1.11), marginally more likely than women to report having sex with a first-time partner (*OR*=1.85, 95% *CI* = .92, 3.70), and significantly more to have sex with partners they knew for a lesser amount of time than women *t*(109) = -2.60, *p*<.05; (*M=1.64, SD=.83), (M=2.19, SD=.79*).   No other gender differences were observed on other dependent variables.

We also tested for relationship status differences in predictor and outcome variables. Single and casually dating individuals were significantly lower on relatedness (*M*=3.74, *SD*=.77) than individuals in relationships (*M*=3.88, *SD*=.75), *t*(605)= -1.94, *p*=.05. However, individuals in relationships were significantly higher in anxiety (*M*= 1.69, *SD*=.60) than single and casually dating individuals (*M*= 1.56, *SD*=.64), *t*(608)= -2.18, *p*<.05. Compared to individuals in relationships, single and casually dating individuals were significantly less likely to give sex reports than individuals in relationships (*OR*=.27, 95% *CI*= .18, .43), significantly more likely to have sex with an casual sexual partner (*OR*=46.88, 95% *CI* = 17.72, 124.01), marginally more to

have sex with partners they knew for a lesser amount of time $t(307) = -2.53$, $p<.08$; ($M=1.98$, $SD=.83$), ($M=2.12$, $SD=.69$), and significantly more likely to not have had sex with their partner before the reported occasion ($OR=8.71$, 95% $CI=3.92$, 19.37). Single and casually dating individuals were also marginally more likely to use condoms than individuals in committed relationships ($OR=.49$, 95% $CI= .23$, 1.06). Single and casually dating individuals also reported themselves as being more intoxicated at the time intercourse occurred ($M=3.68$, $SD= 2.21$) than did individuals in relationships ($M=2.23$, $SD= 1.90$), $t(301)=6.04$, $p<.01$, and likewise reported their sex partners as being more intoxicated at the time intercourse occurred ($M=3.33$, $SD=2.10$) than did individuals in relationships ($M=2.18$, $SD=1.77$) $t(298)=5.14$, $p<.01$.

Given these observed gender and relationship status differences among various predictor and outcome variables, all hypothesis tests described below controlled for gender and relationship status. We also tested for possible gender and relationship status interactions with our main predictor variables.

Main Effect of Need Satisfaction on Sexual Risk Outcomes

The relationship between lagged need satisfaction and sexual risk outcomes was tested in a series of models explicated in previous sections. All models controlled for gender, relationship status, and any sexual history variables that retained significance in accounting for variance in our measured behavioral outcomes when the full model was run. Results for the main effects of each need on each outcome are presented in Table 8; significant results are also explained here.

First, we tested possible need satisfaction main effects on the decision to have sex. The likelihood of having sex during the study on any given week was significantly predicted by higher competence the week before, but not by any other need.

We next tested possible need satisfaction main effects on sexually risky activities. Higher prior week relatedness was marginally associated with a lower probability of not wearing a condom and a lower probability of not using any protection (condom or oral/insertive birth control) during the participant's most recent sexual experience. The converse of these findings suggests that, as predicted, lower relatedness was marginally associated with a higher probability of not wearing condoms and not using any protection during the participant's most recent sexual experience.

In addition to these discrete experiences, one semester's participants were also asked to report the percentage of time that they used condoms in all their sexual experiences in the past week. High prior week autonomy was negatively associated with cumulative condom usage while high prior week relatedness was positively associated with cumulative condom usage. Thus, mirroring the findings from the discrete event reporting, lower relatedness was associated with more condom non-usage over a week's time as predicted. However, higher autonomy was also unexpectedly related to more condom non-usage over this same period.

The relationship between need satisfaction and having sex with a casual (vs. serious) sexual partner produced an interesting pattern. Higher prior-week competence significantly reduced the likelihood of having sex with a casual sexual partner (thus, low competence increased the likelihood of having sex with a casual sex partner), but higher prior-week relatedness marginally increased the likelihood of having sex with a casual partner

A series of models were run to test possible gender or relationship status differences with these findings. Only one significant interaction emerged: single or casually dating individuals who had experienced high relatedness on a given week were more likely to have sex the following week than individuals in relationships who also reported high relatedness ($b = -.70$, *SE*

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$= .48$, $t(454) = 2.17$, $p < .05$). None of these relationships were moderated by whether the participant was having sex with a casual or serious partner.

There was no main effect of any need on the level of intoxication of oneself or one's partner during a reported sexual experience, the length of time the participant had known his or her partner, or having sex with a first-time partner.

Main Effects of Distress Indices on Sexual Risk Outcomes

A series of models were run to test the hypothesis that elevated distress indices would predict engagement in sexually risky behaviors. Though few effects were detected, those that did emerge conformed to study hypotheses indicating that greater distress from the prior week would be related to increased sexual risk taking the following week. Results for the main effects of each distress predictor on each outcome are presented in Tables 9 and 10; significant results are also explained here.

High anxiety from a prior week marginally predicted the likelihood of not wearing a condom the following week, and high negative affect from the prior week significantly predicted not using any protection (oral/insertive birth control or condoms) the following week.

High prior-week negative affect significantly predicted having sex while the participant was intoxicated. High prior-week anxiety and depression each significantly predicted having sex while the participant was intoxicated as well as having sex while the participant's partner was intoxicated.

There were no main effects of mood on the decision to have sex, the length of time the participant had known his or her partner, having sex with a one-time partner, or having sex with a casual vs. serious partner. Additionally, there were no significant gender or relationship status interactions.

Effects of the Interaction between Need Satisfaction and Distress Indices on Sexual Risk

Outcomes

A series of models were run to test the hypothesis that the combination of low basic need satisfaction and high psychological distress would produce greater engagement in sexually risky behavior over the course of the study period. As shown in Equation 6, each interaction equation contained the overall mean of all predictor and outcome variables involved in the analysis, the main effect of each term, and the corresponding interaction term.   In this way, every combination of distress and need satisfaction was analyzed to predict each measured sexual risk outcome.

We chose to investigate each mood by need satisfaction interaction on its own (without the presence of other need by mood interaction terms) so as to ensure the stability and interpretability of the interaction effect. Results demonstrated that no significant mood by need interactions emerged for any of the measured outcome variables. Contrary to our hypothesis, this indicates that the combination of unmet psychological needs and high distress did not predict sexual risk-taking in our sample.

Reverse Lag Effects

In addition to testing whether fluctuations in need satisfaction would be related to increased sexual risk behavior, we also tested to see if engagement in risk behavior would affect subsequent need satisfaction. That is, we wished to determine if the decision to engage in risk behavior on one particular week would be related to enhanced need satisfaction the following week. Similar to the models described in Equations 1-6, reverse lag models regressed each need and distress index from week t on engagement in sexual risk behavior from week t-1. Results indicated that not using not using any protection one week marginally predicted higher

relatedness the following week ($b = -.23$ $SE = .13$, $t(150) = -1.86$, $p = .07$). No other reverse lag

effects of unmet psychological need satisfaction emerged for any other sexual risk measure.

Similarly, we tested whether engagement in sexual behavior one week would affect

subsequent mood or distress ratings the following week. Results indicated that not wearing

condoms one week was associated with higher positive affect the following week ($b = -.24$, $SE =$

.12, $t(131) = -2.15$, $p < .05$) and not using protection one week was associated with lower

depression the following week ($b = .23$, $SE = .11$, $t(151) = 2.04$, $p = .05$). Having sex while the

participant was intoxicated was associated with lower anxiety ($b = -.05$, $SE = .02$, $t(148) = -2.30$,

$p < .05$) and lower depression ($b = -.05$, $SE = .02$, $t(148) = -1.95$, $p = .05$) the following week.

Having sex while one's partner was intoxicated was associated with lower depression ($b = -.04$,

$SE = .02$, $t(144) = -1.94$, $p = .05$). No other reverse lag effects of mood emerged for any other

sexual risk measure, and there were no gender or relationship status interactions with these

effects.

Chapter 4

Discussion

Summary of Results

The current study utilized a repeated measures survey design to understand the influence

of intra-individual psychological factors on engagement in sexually risky behaviors that can put

one at risk for contracting HIV. In particular, we sought to determine the consequences of unmet

basic psychological needs, psychological distress, and their interaction on the decision to engage

in risky behaviors.

First, we hypothesized that deficits in autonomy, competence, and relatedness would be

related to increased engagement in sexual risk behavior. Our results, obtained via multilevel

modeling analytical techniques, partially supported this hypothesis. We found that deficits in relatedness from a particular week increased the likelihood that a participant would not use condoms (both for a discrete experience and over a week's time) or any protection during a particular sexual experience the following week. Similarly, participants low in competence were more likely to have sex with a casual (versus serious) partner.

Surprisingly, high basic need satisfaction was associated with greater engagement in some measured sexual behaviors. High competence during a particular week predicted a greater likelihood that a participant would engage in sexual intercourse the following week. Additionally, higher prior-week autonomy was associated with lesser condom usage over the following week and higher prior-week relatedness increased the likelihood of having sex with a casual sex partner.

None of our risk-specific findings were moderated by gender or relationship status indicating that, as purported by self-determination theory, the associations between basic need satisfaction and sexually risky behavior appeared to be applicable to all participants. We were unable to determine differences due to sexual orientation and ethnicity due to lack of variability in our sample.

Second, we hypothesized that heightened psychological distress would be related to greater engagement in sexual risk behavior. We found that heightened prior-week anxiety increased the likelihood that a participant would not wear condoms the following week and heightened prior-week negative affect increased the likelihood that a participant wouldn't use protection of any kind. Similarly, heightened negative affect, anxiety and depression from one week increased the likelihood that a participant would have sex while they or their partner were

intoxicated the following week. None of these effects were moderated by gender or relationship status.

Third, we hypothesized that unmet psychological needs would interact with psychological distress to produce greater engagement in risk behavior. Contrary to this hypothesis, no combination between unmet psychological needs and psychological distress predicted engagement in sexual risk-taking.

Unexpectedly, we discovered that engagement in risk behavior during a particular week was associated with increased psychological need satisfaction and positive mood the following week. These reverse lag findings found that not using condoms was associated with increased positive affect, not using any protection resulted in increased relatedness and decreased depression, having sex while intoxicated was associated with decreased depression and anxiety, and having sex while one's partner was intoxicated was related to decreased depression. The implications of these unexpected but intriguing findings are discussed below.

Implications for Theory and Research

The recent spike in new HIV infections within the US has alarmed health officials to the possibility that a new HIV epidemic may be on the horizon (CDC, 2008; Copenhaver & Fisher, 2006). The reasons behind the elevation in the incidence of HIV are not well known and have prompted greater calls for research that attempt to identify factors underlying sexual risk-taking behavior. The current study was conducted in response to better understand intra-individual psychological factors that precipitate sexual risk-taking. This study was an important addition to the existing body of research in that it explicitly focuses on non-rational reasons for engaging in risk-taking. This perspective stands in contrast to existing models of risk prevention

emphasizing cognitive or rational factors, but which have experienced limited success in modifying risk behavior (Crepaz & Marks, 2001; Kalichman, 1998; Mustanski, 2007).

Basic Need Satisfaction

One of the main issues addressed by this study was the role of basic need satisfaction in predicting engagement in sexually risky behavior. Basic need satisfaction is a construct that forms the basis of self-determination theory (Deci & Ryan, 1985). This theory states that humans need to feel autonomous, competent, and related in order to achieve optimal levels of psychological well-being (Deci & Ryan, 1985). Satisfaction of these needs have been linked to a variety of positive outcomes, including higher psychological and physical health, secure relationship attachments, positive mood, and positive sexual functioning (Filak & Sheldon, 2003; Ryan & Deci, 2000; Smith, 2007). Recent research conducted by Sheldon & Gunz (2009) demonstrated that unmet psychological needs impelled engagement in compensatory behaviors, and further research by Abad & Sheldon (in preparation) showed that some of these compensatory behaviors were maladaptive in nature. We wished to determine if the relationship between unmet psychological needs and engagement in risk behavior applied to sexual risk-taking.

First, we discovered that participants who felt more competent on a particular week were more likely to have sex the following week. This finding corroborates some previous research which has shown achievement in multiple domains (i.e. academic achievement, social acumen, feelings of self-efficacy) to be related to greater sexual initiation and occasions of sexual intercourse (House, Bates, Markah, & Lesesne, 2010; Spencer, Zimet, Aalsma, & Orr, 2002). It may be that achieving high competence through the successful completion of tasks and responsibilities boosts one's confidence to initiate sexual contact or seek out sexual experiences.

This finding is also in line with Sheldon's (in press) idea that need satisfaction may be associated with subsequent exploratory and energizing behavior, potentially as a reward for succeeding at need-relevant activities.

With respect to sexual *risk* outcomes, feelings of loneliness (lack of relatedness) on a particular week were associated with not wearing a condom or using any protection during a sexual experience the following week. Similarly, feelings of incompetence one week were associated with having sex with a casual (versus serious) partner the following week. These findings corroborate previous research demonstrating a link between loneliness and sexual risk-taking among gay men (Knox, 1997) and between low self-efficacy and sexual risk-taking among adolescents (House, Bates, Markah, & Lesesne, 2010), and lend support to our basic idea that unmet psychological needs may create a psychological void that can impel maladaptive compensatory behavior.

Unexpectedly, a surplus in some basic needs was related to increased risk behavior. Specifically, higher feelings of autonomy on a particular week were associated with less cumulative condom usage the following week and less condom usage with a casual partner. Higher feelings of relatedness were associated with having sex with a casual (versus serious) partner. It is unclear why these surplus findings emerged, but it is possible that participants feeling especially free and autonomous may have desired sexual pleasure unrestricted by condoms or other sensation-reducing devices, particularly if an individual was having a sexual relationship with a casual partner. Similarly, feelings of connectedness may have inspired participants to explore a sexual connection with a new partner rather than an established one. Another explanation may be found in findings recently described by Sheldon (in press). In this article, Sheldon (in press) discusses how the satisfaction of autonomy, competence, and

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relatedness in childhood is associated with increased exploratory behavior and an urge to explore new activities. In adulthood, individuals who report high need satisfaction are more drawn to novel activities and pleasurable activities (Sheldon, in press). Thus, it is possible that need satisfaction could be related to increased-risk taking, especially if that risk-taking is seen as a pleasurable or exciting activity. However, given that previous research has not documented many findings in this direction, and that a surplus of needs has not motivated engagement in need-relevant experiences and behaviors (Sheldon & Gunz, 2009), more research is needed to understand why a surplus in certain needs was related to increased risk-taking here.

Psychological Distress

The literature on psychological distress has produced mixed results regarding whether or not psychological distress is associated with sexual risk-taking. Although some experimental studies have demonstrated that psychologically distressed individuals engage in sexual risk-taking to a greater extent than non-psychologically distressed individuals, quantitative reviews of studies of sexually risky behavior have revealed null or minimal effects of distress on risk-taking (Crepaz & Marks, 2001; Mustanski, 2007).

Our study revealed that while the decision to have sex was unrelated to mood, psychological distress predicted engagement in some risky behavior. Individuals experiencing high anxiety on one week were more likely to not wear condoms and more likely to have sex while they and their partner were intoxicated during the following week. Individuals high in negative affect one week were more likely to not use protection the following week, and individuals high in depression one week were more likely to have sex while both they and their partner were intoxicated the following week.

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It appears that for at least some of the measured sexual risk outcomes psychological distress exerted influence such that increased distress one week resulted in increased risk-taking the following week. It is worth noting that positive affect did not exert an effect on any outcome thus negating the possibility that positive feelings may precede sexual risk-taking. However, that so few relationships between distress and sexual risk outcomes were observed suggests that the relationship between distress and sexual risk-taking is not particularly robust, as was suggested by previous research (Crepaz & Marks, 2001).

Psychological Consequences of Engagement in Risk Behavior

The current study set forth to understand the role of psychological deficits in motivating engagement in sexual risk behavior. A corollary of this question is: what psychological consequences might *arise* from engagement in risk behavior? That is, does partaking in risky behavior have negative consequences (i.e. greater need dissatisfaction), or does it engender psychological benefits, perhaps even need satisfaction or greater positive mood? Recent research by Sheldon, Abad, & Hinsch (2011) has demonstrated that while deficits in need satisfaction can motivate certain behavior, individuals may subsequently derive need satisfaction from engaging in that behavior. In this study, feelings of loneliness were found to precipitate Facebook usage and feelings of connectedness emerged from the experience. That is, even though a deficit motivated a compensatory response, that response facilitated positive feelings of need satisfaction. Does a similar pattern exist for engagement in sexual risk behavior?

In the current study, reverse lag analyses revealed instances in which participants garnered psychological benefits as a result of engaging in risky sexual behavior. Specifically, while deficits in relatedness one week appeared to impel the decision to not use protection the following week, not using protection one week resulted in heightened feelings of relatedness the

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following week. Thus, not using protection increased feelings of connectedness post-sexual experience. One explanation for this pattern could be that by refusing protection, individuals conveyed that they trusted and felt close to their partner, which may have been enough to allay any feelings of loneliness that preceded their sexual experience (Misovich, Fisher, & Fisher, 1997).

Similarly, engagement in sexually risky behavior one week appeared to enhance positive mood and affect the following week. Participants who didn't use condoms experienced greater positive affect than participants who used condoms, participants who didn't use any protection experienced less depression than participants who used protection, participants who had sex while intoxicated experienced less depression and anxiety when compared to participants who had sex while less intoxicated, and participants who had sex with intoxicated partners one week reported less depression than participants who had sex with less intoxicated partners.

Few studies in this area of research have looked at the affective or other psychological consequences that may *result* from engaging in risk behavior and fewer still have investigated whether there may be positive consequences to engaging in sexually risky behavior (Crepaz & Marks, 2001), most likely because research has focused on whether negative mood precedes engagement in risk behavior. And certainly, our proposed theory would not suggest that participants would experience positive psychological benefits following a risky experience, as the risk experience was not expected to 'fix' the underlying deficit preceding it. However, our findings demonstrate that participants engage in sexual risk behavior are deriving at least short-term benefits from engaging in risky behavior, which may, in turn, explain why individuals may engage in behaviors that ultimately put their health and well-being at risk. In line with previous research concerning rational reasons to engage in risky sexual behavior, it is possible that

participants may have anticipated gaining a boost in some need or mood index, particularly if they were feeling a deficit in it, and this may have motivated their desire to engage in ultimately risky behavior (Zuckerman, 2007).

These findings suggest that further research needs to be conducted regarding whether individuals' expectancies may override self-protective impulses in an effort to achieve positive states of being by participating in sexually risky behavior. However, that this finding was only observed for a few risk outcomes suggests that not all engagement in risk behavior will result in positive experiences. Additionally, it is not known how long these positive effects will last as we only investigated mood-behavior consequences for a period of one week. Regardless, these unhypothesized effects are interesting in that they further clarify why individuals might engage in maladaptive or destructive behavior even when it puts their health at risk.

Conclusion

Taken together, our findings suggest partial support for our hypothesis that unmet psychological needs and acute psychological distress may engender engagement in sexual risk-taking, but the paucity of significant findings suggests that these associations may be more tenuous than what was expected. In addition, that there were no interactive relationships between unmet psychological needs and psychological distress implies that autonomy, competence, and relatedness are not missing moderators in the relationship between negative affect and sexual risk-taking as was hypothesized, and that psychological needs and psychological mood exert unique, not cumulative, effects.

However, the findings we did observe suggest that some risky sexual behavior did arise from both need and mood related deficits. Programs seeking to reduce sexual risk-taking among at-risk populations may do well to identify individuals who are feeling lonely or incompetent,

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high in negative affect, anxiety, or depression and work to provide activities that may reinstate need satisfaction and positive mood. Interventions that employ cognitive-behavioral skills may be particularly helpful as they actively work to reduce feelings of distress while teaching practical HIV prevention skills (condom usage, condom negotiation) utilizing a support group format (Kelly, Murphy, Washington, & Wilson, 1994).

It will likely be of particular interest to HIV prevention program developers that in addition to deficits in needs and mood predicting engagement in sexual risk behavior, surpluses in competence, autonomy, and relatedness predicted the decision to have sex, lower condom usage, and having sex with a lesser known partner, respectively. Contrary to previous research (Sheldon & Gunz, 2009), this suggests that both deficits and a surplus in need satisfaction predict engagement in what can be considered compensatory behaviors. While further research is needed to determine under what conditions a need-deficit or a need-surplus will motivate behavior, HIV prevention programs may consider implementing modules that address how need satisfaction could motivate an individual to engage in behaviors that, while maybe being perceived as exciting or rewarding, could expose one to negative sexual health outcomes. This suggestion is bolstered by findings that participants appear to be experiencing psychological benefits from engaging in sexual risk-behavior, including enhanced psychological mood and feelings of intimacy and belongingness. To date, HIV and STD prevention researchers have not focused on the positive mental health as a precursor or an outcome to engaging in sexually risky behavior, and as such programs have not been developed to mitigate the possible influence of positive mental health on sexually risky behaviors (Crepaz & Marks, 2001; Hoff, Beam-Goulet, & Rosenheck, 1997). The results of the current study suggest that this may be an overlooked but important area of research and practice.

Limitations and Future Directions

There are some limitations to the current study that may affect the generalizibility of the results. First, although previous research has demonstrated that college students are sexually active and engage in various types of risky sexual behavior (Cooper, 1998; Cooper, 2002; Parsons, Halkitis, Bimbi, & Borkowski, 2002), participants in the current study did not provide as much data as was expected. Of the 134 individuals who enrolled in our study, only 109 provided at least one sex report, and only 80 gave 2 or more reports. Thus, although we selected participants based on criteria that should have ensured a sexually active sample, few participants were active enough to provide enough data to test our hypothesis, particularly hypotheses involving interactions. Indeed, the lack of viable data may be the true reason that so many null effects were observed in the current data.

Relatedly, participants in our sample tended to report high levels of need satisfaction and low levels of psychological distress during the study. This is not uncommon among studies that utilize college student samples, but the lack of variability on key predictor variables likely made it more difficult to detect effects in our analyses which have contributed to the number of null effects. Similarly, there was little variability in our sample due to sexual orientation or ethnicity and thus we were unable to analyze differences due to these demographics.

Finally, although the longitudinal diary study methodology enabled us to better understand the effects of need satisfaction and psychological distress on sexual risk-taking behavior, we are unable to draw causal inferences from the data. However, one strength of our analytical strategy was that we utilized lag analyses in which need satisfaction and mood on a particular week was lagged to predict engagement in sexual risk behavior. Our utilization of these lag analyses allowed for a more reliable interpretation of the direction of our effects, but

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because there was no experimental component to the study, we could not impose a causal model on our associative findings.

Future studies in this area should focus on recruiting and enrolling a diverse and sexually active sample that may demonstrate variability on both predictor and outcome variables. Indeed, we set out to recruit such a sample from local public health clinics, but due to low enrollment and low completion rates among this sample in our study, we were unable to utilize this data to test our hypotheses. It is possible that not only might additional main effects and interactions emerge if they were tested in different samples, but altogether different patterns may also emerge depending on whether a particular need or mood deficit is salient for different groups.

Future studies should also seek to understand when and under what circumstances individuals will be motivated by deficits or surplus of need satisfaction in engaging in sexually risky behavior. The results of the current study suggest that both preceded the decision to engage in risky behavior, but it is unclear why these differential outcomes occurred. What additional factors may encourage involvement in risky behavior when one doesn't get their needs met or when one does get their needs met? Are these factors solely related to intra-individual functioning, or might there be aspects of one's interpersonal functioning or social environments that may moderate the relationship between need deficits, need surpluses, and engagement in risk behavior?

In sum, this study improves upon previous research identifying factors leading to sexual risk-taking by assessing the influence of unmet basic psychological needs and multiple indices of psychological distress on the decision to engage in risky sexual behavior. One particular advantage of our study design was that we utilized a repeated measures diary methodology which allowed us to detect event-specific rather than global associations between our predictor

and outcome variables, thus increasing the precision with which we could make inferences from our data (Kalichman, 2001). We discovered that deficits in competence and relatedness, as well as negative affect, depression, and anxiety predicted engagement in sexually risky behavior, but so also did surpluses in autonomy and relatedness. In addition, ancillary analyses indicated that participants may actually be receiving psychological benefits from participating in risk behavior, but it is not clear how long-term these boosts are. Far fewer effects emerged from the data than were hypothesized, but the evidence does suggest that psychological deficits can motivate engagement in maladaptive compensatory behavior that, in this study, can place one at risk for contracting HIV and other STDs. Further research is needed to determine the strength of these findings as well as whether additional moderators or mediators exist to further clarify these associations.

REFERENCES

Abad, N. & Sheldon, K. (2008). The influence of basic need satisfaction upon binge eating behaviors. (in preparation).

Barber, L. L., & Cooper, M. L. (in preparation). Sex on rebound: Motivations for sex and sexual behaviors following a relationship breakup.

Batten, S.V., Follette, V.M., & Aban, I.B. (2001). Experiential avoidance and high-risk sexual behavior in survivors of child sexual abuse. *Journal of Child Sexual Abuse, 19,* 101-120.

Brown, D. (2001, December 1). Estimate of AIDS Cases in U.S. Rises. *Washington Post*, p.A01

Carey, M., Courty-Doniger, P., Senn, T., Vanable, P., Urban, M. (2008). Improving HIV rapid testing rates among STD clinic patients: A randomized controlled trial. *Health Psychology, 27,* 833-838.

Centers for Disease Control and Prevention (CDC). (2003). HIV and AIDS: Are you at risk? Retrieved January 20, 2005, from http://www.cdc.gov/hiv/pubs/brochure/atrisk.htm. Centers for Disease Control and Prevention (CDC). (2008). HIV and AIDS in the United States: A picture of today's epidemic. Retrieved May 29, 2008, from http://www.cdc.gov/hiv/topics/surveillance/print/united_states.htm.

Ciccarone, D.H., Kanouse, D.E., Collins, R., Miu, A., Chen, J., Morton, S., & Stall, R. (2003). Sex without disclosure of positive HIV serostatus in a US probability sample of persons receiving medical care for HIV infection. *American Journal of Public Health, 93,* 949-954.

Chirkov, V.I., Ryan, R.M., & Willness, C., (2005). Cultural context and psychological needs in Canada and Brazil: Testing a self-determination approach to the internalization of cultural practices, identity, and well-being. *Journal of Cross-Cultural Psychology, 36,*

423-443.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences.* Hillsdale, NJ:

   Erlbaum.

Cooper, M.L. (2010). Toward a person X situation model of sexual risk-taking behaviors:

   illuminating the conditional effects of traits across sexual situations and relationship

   contexts. *Journal of Personality and Social Psychology, 98,* 319-341.

Cooper, M.L., Talley, A., Sheldon, M.S., Levitt, A., & Barber, L. (2008). A dyadic perspective

   on approach and avoidance motives for sex. (pp. 615-631) In A.J. Elliot, Handbook of

   Approach and Avoidance Motivation. New York: Psychology Press.

Cooper, M.L. (1994). Motivations for alcohol use among adolescents: Development and

   validation for a four-factor model. *Psychological Assessment, 6,* 117-128.

Cooper, M.L., Shapiro, C.M., Powers, A.M. (1998). Motivations for sex and risky sexual

   behavior among adolescents and young adults: A functional perspective. *Journal of

   Personality and Social Psychology*, *75,* 1528-1558.

Copenhaver, M.M. & Fisher, J.D. (2006). Experts outline ways to decrease the decade-long

   yearly rate of 40,000 new HIV infections in the US. *AIDS and Behavior, 10,* 105-114.

Crepaz, N. & Marks, G. (2001). Are negative affective states associated with HIV sexual

   risk behaviors? A meta-analytic review. *Health Psychology, 20,* 291-299.

Curran, P. J., Bauer, D. J, & Willoughby, M. T. (2006). Testing and probing interactions in

   hierarchical linear growth models. In C. S. Bergeman & S. M. Boker (Eds.), *The Notre

   Dame Series on Quantitative Methodology, Volume 1: Methodological issues in aging

   research* (pp. 99-129). Mahwah, NJ: Lawrence Erlbaum Associates.Preacher, K. J.,

Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in

multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of*

Educational and Behavioral Statistics, *31*, 437-448.

Deci, E.L., & Ryan, R.M. (1985). The General Causality Orientations Scale: Self-determination

in personality. *Journal of Research in Personality, 19,* 109-134.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and

the

self-determination of behavior. *Psychological Inquiry*, *11*, 227-268.

Deci, E.L., Ryan, R.M., Gagne, M., Leone, D.R., Usunov, J., & Kornazheva, B.P. (2001). Need

satisfaction, motivation, and well-being in the work organizations of a former Eastern

Bloc country. *Personality and Social Psychology Bulletin, 27,* 930-942.

Derogatis, L.R. (1993). Brief symptom inventory: Administration, scoring and procedures

manual. National Computer Systems. New York.

Donnenberg, G.R. (2005). Applying a cognitive-behavioral model of HIV risk to youths in

psychiatric care. *AIDS Education and Prevention, 17,* 200-216.

Fortenberry, J.D., Orr, D., Katz, B., Brizendine, E., Blythe, M. (1997). Sex under the influence:

A diary self-report study of substance use and sexual behavior among adolescent women.

Sexually Transmitted Diseases, 24, 313-319.

Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior

engagement. *Motivation and Emotion, 27*, 199-223.

Harris, R.M., Bausell, R.B., Scott, D.E., Hetherington, S.E., & Kavanagh, K.H. (1998). An

intervention for changing high-risk HIV behaviors of African American drug-dependent

women. *Research in Nursing & Health, 21,* 239-250.

House, L.D., Bates, J., Markham, C., & Lesesne, C. (2010). Competence as a predictor of sexual and reproductive health outcomes for youth: A systematic review. *Journal of Adolescent Health, 46,* 7-22.

Hoff, R.A, Beam-Goulet J., Rosenheck R.A. (1997). Mental disorder as a risk factor for HIV infection in a sample of veterans. *Journal of Nervous and Mental Disease, 186,* 556-560.

Ickovics, J.R., Grigorenko, E.L., Beren, S.E., Druley, J.A, Morrill, A.C., Rodin, J. (1998). Long-term effects of HIV counseling and testing for women: Behavioral and psychological consequences are limited at 18 months posttest. *Health Psychology, 17,* 395-402.

Isen, A.M., & Patrick, R. (1983). The effect of positive feelings on risk taking: When the chips are down. *Organizational Behavior and Human Performance, 31*, 194-202.

Kelly, J.A., Murphy, D.A., Washington, C.D., & Wilson, T.S. (1994). Preventing HIV/AIDS among high-risk urban women: The cost-effectiveness of a behavioral group intervention. *American Journal of Public Health, 84, 12,* 1918-1922.

Kalichman, S.C. (1998). Preventing AIDS: A sourcebook for behavioral interventions. Mahwah, NJ: Erlbaum.

Kalichman, S. (2001) Negative affect and sexual risk behavior: Comment on Crepaz and Marks (2001). *Health Psychology, 20,* 300-301.

Krull, J. L. & MacKinnon, D. P. (1999). Multilevel mediation modeling in group-based intervention studies. *Evaluation Review, 23*, 418-444.

LaGuardia, J.G., Ryan, R.M., Couchman, C.E., & Deci, E.L. (2000). Within-person variation in security of attachment: A self-determination theory perspective on attachment, need fulfillment, and well-being. *Journal of Personality and Social Psychology, 79,* 367-384.

Leith, K.P., & Baumeister, R.F. (1996). Why do bad moods increase self-defeating behavior? emotion, risk taking, and self-regulation. *Journal of Personality and Social Psychology, 71,* 1250-1267.

Lescano, C.M., & Brown, L.K. (2007). Unsafe sex: Do feelings matter? *Journal of Prevention & Intervention in the Community, 33,* 51-62.

Lescano, C., Vazquez, E., Brown, L., Litvin, E., & Pugatch, M. (2006). Condom use with "casual" and "main" partners: what's in a name? *Journal of Adolescent Health, 39,* 443.e1-443.e7.

Lyubomirsky, S., Sousa, L., Casper, R. (2001). What triggers abnormal eating in bulimic and nonbulmimic women? *Psychology of Women Quarterly, 25,* 223-232.

Magar, E., Phillips, L., Hosie, J., (2008). Self-regulation and risk-taking. *Personality and Individual Differences, 45,* 153-159.

Martin, J., & Knox, J. (1997). Loneliness and sexual risk behavior in gay men. *Psychological Reports, 81,* 815-825.

Metzler, C.W., Biglan, A., Noell, J., Ary, D.V., & Ochs, L. (2000). A randomized controlled trial of a behavioral intervention to reduce high-risk sexual behavior among adolescents in STD clinics. *Behavior Therapy, 31,* 27-54.

Moller, A., Deci, E., & Ryan, R. (2006). Choice and ego-depletion: The moderating role of autonomy. *Personality and Social Psychology Bulletin, 32,* 1021-1036.

Muraven, M., Gagne, M., Rosman, H. (2008). Helpful self-control: Autonomy-support, vitality, and depletion. *Journal of Experimental Social Psychology, 44,* 573-585.

Mustanski, B. (2007). The influence of state and trait affect on HIV risk behaviors: A daily diary study of MSM. *Health Psychology, 26,* 618-626.

Muthén, L. K., & Muthén, B. O. (2002). How to use Monte Carlo study to decide on sample size

and determine power. *Structural Equation Modeling, 9,* 599-620

Nezlek, J. B. (2001). Multilevel random coefficient analyses of event and interval contingent

data in social and personality psychology research. *Personality and Social Psychology

Bulletin*, *27*, 771-785.

Neighbors, C., Lewis, M., Fossos, N., & Grossbard, J.R. (2007). Motivation and risk

behaviors: A self-determination perspective. In L.V. Brown (Eds.), *Psychology of

Motivation* (pp.99-113). Hauppauge, NY: Nova Science Publishers.

Raiford, J., Wingood, G., & DiClemente, R.   (2007). Correlates of consistent condom use

among HIV-positive African-American women. *Women & Health*, *46,* 41-58.

Raudenbush, S.W., & Bryk, A.S. (1992). *Hierarchical linear models: Applications and data

analysis methods.* Thousand Oaks, CA: Sage.

Reis, H.T., & Gable, S.L. (2000). Event-sampling and other methods for studying everyday

experience. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and

personality psychology* (pp. 190-222). New York, NY: Cambridge.

Ryan, R.M., & Deci, E.L., (2002). Self-determination theory and the facilitation of intrinsic

motivation, social development, and well-being. *American Psychologist, 55,* 68-78.

Ryan, R. M., & Deci, E. L. (2008a). Self-determination theory and the role of basic

psychological needs in personality and the organization of behavior. In O. P. John, R. W.

Robbins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 654-

678). New York: The Guilford Press.

Ryan, R., & Deci, E. (2008b). From ego depletion to vitality: Theory and findings concerning the facilitation of energy available to the self. *Journal of Experimental Social Psychology, 2,* 702-717.

Ryan, R. M., Patrick, H., Deci, E. L., & Williams, G. C. (2008). Facilitating health behavior change and its maintenance: Interventions based on self-determination theory. *The European Health Psychologist*,*10*, 2-5.

Scott-Sheldon, L., Kalichman, S., Carey, M., & Fielder, R. (2008). Stress management interventions for HIV+ adults: A meta-analysis of randomized controlled trials, 1989-2006. *Health Psychology*, *27,* 129-139.

Schroder, K.E., Carey, M.P., Vanable, P.A. (2003). Methodological challenges in research on sexual risk behavior: II. accuracy of self-reports. *Annual Behavioral Medicine, 26,* 104-123.

Sheldon, K. M., Williams, G. C., & Joiner, T. (2003). *Self-determination theory in the clinic: Motivating physical and mental health*. New Haven, CT: Yale University Press.

Sheldon, K.M., Abad, N., & Hinsch, A. (2011). A two-process view of Facebook use and relatedness need-satisfaction: Disconnection drives use, and connection rewards it. *Journal of Personality and Social Psychology,* 100, 766-775.

Sheldon, K. M. (in press). Integrating behavioral motive and experiential requirement perspectives on psychological needs: A two process perspective. *Psychological Review*.

Snijders, T.A., & Bosker, R.J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Sage, Thousand Oaks.

Spencer, J., Zimet, G., Aalsma, M., & Orr, D.P. (2002). Self-esteem as a predictor of initiation of coitus in early adolescents. *Pediatrics, 100,* 581-584.

Turchik, J, Garske, J., Probst, D., & Irvin, C. (2010). Personality, sexuality, and substance use as predictors of sexual risk taking in college students. *Journal of Sex Research, 47,* 411-419.

UNAIDS. (1999). Sexual behavioral change for HIV: Where have theories taken us? Geneva: Switzerland.

Verbeke, G., & Molenberghs, G. (2000). Linear mixed models for longitudinal data. New York: Springer.

Watson D, Clark LA, Tellegen A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063-1070.

Webb, P., Zimet, G., Fortenberry, J., Blythe, M. (1999). Comparability of a computer-assisted versus written method for collecting health behavior information from adolescent patients. *Journal of Adolescent Health, 24,* 383-388.

West, G.R., Corneli, A.L., Best, K., Kurkijian, K.M., & Cates, W. (2007). Focusing HIV prevention on those most likely to transmit the virus. *AIDS Education and Prevention, 19,* 275-288.

Williams, G. C., McGregor, H., Sharp, D., Kouides, R. W., Levesque, C. S., Ryan, R. M., & Deci, E. L. (2006). A self-determination multiple risk intervention trial to improve smokers' health. *Journal of General Internal Medicine*, *21*, 1288-1294.

Williams, G. C. (2002). Improving patients' health through supporting the autonomy of patients and providers. In E. L. Deci, & R. M. Ryan (Eds)., *Handbook of self-determination research* (pp. 233-254). Rochester, NY: University Of Rochester Press.

Zuckerman, M. (2007). *Sensation seeking and risky behavior.* Washington, DC: American Psychological Association.

Appendix A

Table 1

Final Sample Characteristics (N=109)

Variables	N	% sample
Gender		
Men	50	46%
Women	59	54%
Race		
African-American	1	1%
Hispanic	3	3%
Caucasian	102	93%
Other	3	3%
Sexual Orientation		
Exclusively heterosexual	105	96%
Most heterosexual	3	3%
Bisexual	1	1%
Mostly homosexual	0	0%
Exclusively homosexual	0	0%

Table 2

Descriptive Statistics for Sexual History: Sexual Activity

Variables	N	Minimum	Maximum	Mean	Std. Dev.
Means and Standard Deviations					
Age of First Sex	132	12	19	15.93	1.36
Frequency of Sex: Lifetime	133	1	8	6.83	1.60
Frequency of Sex: 6 months	133	1	6	4.30	1.19
Number of Sex Partners: Lifetime	133	1	8	4.02	1.66
Number of Sex Partners: 6 Months	132	1	8	3.52	1.14
Condom Usage: Lifetime	132	1	11	7.40	2.53
Condom Usage: 6 Months	132	1	10	7.17	3.07
One Night Stand: Lifetime	132	1	10	3.63	3.32
One Night Stand: Condom Usage	132	1	6	4.11	1.20
Sex with Stranger: Lifetime	133	1	10	6.07	4.12
Sex with Stranger: Condom Usage	132	1	6	2.98	2.21
Coerced into having sex	132	1	5	1.17	.48

Table 3

Descriptive Statistics for Sexual History: STD History (N=132)

Variables	N	% sample
Herpes	0	0%
Syphilis	0	0%
Gonorrhea	0	0%
Chlamydia	3	.02%
Genital Warts	1	.01%
HIV Positive	0	0%
Never had STD	100	76%
Ever been tested for HIV	49	37%

Table 4

Descriptive Statistics for Level 1 Predictors

Variables	N	Minimum	Maximum	Mean	Std. Dev.
Level 1 Predictors					
Autonomy	307	1.40	5.00	3.58	.73
Competence	307	1.00	5.00	3.42	.78
Relatedness	307	1.50	5.00	3.79	.78
Positive Affect	307	1.60	5.00	3.39	.72
Negative Affect	307	1.00	4.60	2.10	.72
Anxiety	307	1.00	3.83	1.70	.70
Depression	307	1.00	4.50	1.83	.86

Note. Mean values based on number of weekly sex reports (*N*)

Table 5

Descriptive Statistics for Level 1 Outcomes

Variables	N	Minimum	Maximum	% or *M*	
Level 1					
Sexual Intercourse	769	0	1	40%	
Condom Non-Usage	299	0	1	45%	
Protection Non-Usage	305	0	1	18%	
Sex with Casual Partner	305	0	1	61%	
Sex with First-Time Partner	303	0	1	25%	
Length of Time Partner Known	303	1	3	*M=2.05*	*SD=.77*
Level of Intoxication: Self	307	1.00	7.00	*M=3.01*	*SD=2.19*
Level of Intoxication: Partner	307	1.00	7.00	*M=2.79*	*SD=2.12*
Cumulative Condom Usage	196	1	10	*M=6.29*	*SD=2.03*

Note. Frequency and Mean values based on number of weekly sex reports (*N*)

Table 6

Correlations Between Level 1 Predictor Variables

Predictors	1	2	3	4	5	6	7	8	9
1) Autonomy	1								
2) Competence	.54**	1							
3) Relatedness	.59*	.53**	1						
4) Positive Affect	.44*	.57*	.47*	1					
5) Negative Affect	-.59*	-.52*	-.49*	-.19*	1				
6) Anxiety	-.46*	-.40*	-.41*	-.19**	.78**	1			
7) Depression	-.52*	-.61*	-.56*	-.39**	.74**	.70**	1		
8) Relationship Status	-.05	.01	.04	-.02	.10**	.11**	.09*	1	

Note. $^{*}p < .05$, $^{**}p<.01$. Based on N=307 weekly sex reports. Correlations between dichotomous variables were conducted using Spearman's Rho, other correlations were conducting using Pearson's r.

Table 7

Correlations Between Level 1 Outcome Variables

Outcomes	1	2	3	4	5	6	7	8
1) Condom Usage: Discrete	1							
2) Cumulative Condom Usage	.89*	1						
3) Protection Usage	.50**	.42**	1					
4) Sex with Casual Partner	-.18**	-.18**	-.15**	1				
5) Sex with First-Time Partner	-.20**	-.15*	-.08	.37**	1			
6) Length of Time Partner Known	-.21**	-.19**	-.19*	.19**	.46**	1		
7) Level of Intoxication: Self	.04	.11	-.03	-.35*	-.42**	-.21**	1	
8) Level of Intoxication: Partner	.05	.00	.14	-.35**	-.39**	-.23**	.87*	1

Note. $^{*}p < .05$, $^{**}p < .01$. Based on N=307 weekly sex reports (except for 'cumulative condom usage' which was only asked of one semester's participants; N=196). The decision to have sex was not included in this table because no other association could exist if a participant did not have sex. Correlations between dichotomous variables were conducted using Spearman's Rho, other correlations were conducting using Pearson's r.

Table 8

Multilevel Analysis Predicting Sexual Risk Outcomes from Autonomy, Competence, and Relatedness

Variable	Prior Week's Autonomy				Prior Week's Competence				Prior Week's Relatedness			
	b	*SE*	*OR*	*CI*	*b*	*SE*	*OR*	*CI*	*b*	*SE*	*OR*	*CI*
Decision to Have Sex	-.03	.30	.97	.54, 1.76	**.70***	**.28**	**2.03**	**1.15, 3.53**	-.01	.26	.99	.59, 1.57
Condom Non-Usage: Discrete	.71	.74	2.03	.47, 8.7	.50	.76	1.65	.37, 7.5	**-1.0†**	**.66**	**.37**	**.10, 1.4**
Cumulative Condom Usage	**-1.81***	**.64**	--	--	-.49	.61	--	--	**1.87***	**.57**	--	--
Protection Non-Usage: Discrete	1.32	1.03	3.77	.49, 28.83	1.55	1.43	4.71	.28, 78.91	**-2.45†**	**1.36**	**.09**	**.01, 1.23**
Sex with Casual Partner	-.23	1.03	.79	.10, 6.12	**-2.51**	**1.08***	**.08**	**.01, .70**	**1.70†**	**.90**	**5.47**	**.94, 31.84**
Sex with First-Time Partner	.27	.51	1.31	.48, 3.56	.41	.49	1.51	.58, 3.93	-.27	.44	.76	.32, 1.81
Length of time partner known	-.07	-.07	--	--	.07	.07	--	--	-.04	.06	--	--
Level of Intoxication: Self	-.18	.23	--	--	.06	.21	--	--	.15	.20	--	--
Level of Intoxication: Partner	-.13	.22	--	--	-.02	.20	--	--	.17	.19	--	--

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

All models controlled for each individual's mean on predictor and outcome variables, gender, relationship status, and any sexual history variable that remained significant when other predictors were added to the model.

Table 9

Multilevel Analysis Predicting Sexual Risk Outcomes from Positive Affect and Negative Affect

Prior-Week's			Positive Affect		Prior-Week's Negative Affect			
Variable	*b*	*SE*	*OR*	*CI*	*b*	*SE*	*OR*	*CI*
Decision to Have Sex	.37	.26	1.45	.86, 2.44	-.13	.46	.88	.51, 1.53
Condom Non-Usage: Discrete	.62	.75	1.85	.42, 8.2 3	.79	.77	2.21	.48, 10.12
Cumulative Condom Usage	.11	.60	--	--	-.84	.70	--	--
Protection Non-Usage: Discrete	.61	.92	1.83	.30, 11.31	**3.12***	**1.29**	**22.73**	**1.78, 289.80**
Sex with Casual Partner	.33	.93	1.40	.23, 8.7 7	.16	.93	1.17	.19, 7.34
Sex with First-Time Partner	.67	.49	1.95	.74, 5.15	.32	.45	1.37	.57, 3.30
Length of time partner known	-.06	.08	--	--	.05	.09	--	--
Level of Intoxication: Self	-.19	.19	--	--	**.62***	**.21**	**--**	**--**
Level of Intoxication: Partner	-.26	.18	--	--	.25	.21	--	--

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

All models controlled for each individual's mean on predictor and outcome variables, gender, relationship status, and any sexual history variable that remained significant when other predictors were added to the model.

Table 10

Multilevel Analysis Predicting Sexual Risk Outcomes from Anxiety and Depression

	Prior-Week's Anxiety				Prior-Week's Depression			
Variable	b	SE	OR	CI	b	SE	OR	CI
Decision to Have Sex	-.09	.28	.91	.52, 1.60	-.19	.26	.83	.50, 1.38
Condom Non-Usage: Discrete	1.19†	.71	3.29	.80, 13.46	.40	.64	1.48	.42, 5.23
Cumulative Condom Usage	-.54	.64	--	--	-.26	.55	--	--
Protection Non-Usage: Discrete	.96	1.16	2.62	.26, 26.19	.73	.99	2.08	.30, 14.67
Sex with Casual Partner	.75	.89	2.12	.36, 12.33	-.06	.79	.94	.20, 4.47
Sex with First-Time Partner	-.04	.46	.96	.39, 2.36	-.09	.42	.92	.40, 2.09
Sex with Partner known <1 month	.09	.09	--	--	-.01	.08	--	--
Level of Intoxication: Self	.73**	.21	--	--	.52**	.19	--	--
Level of Intoxication: Partner	.66**	.20	--	--	.45*	.18	--	--

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

All models controlled for each individual's mean on predictor variables, the outcome variable, gender, relationship status, and any sexual history variable that remained significant when other predictors were added to the model.

VITA

Neetu Suresh Abad was raised in Chicago, Illinois and went to Truman State University where she received a B.A. in English, Psychology, and a minor in women's studies. After college, she took a year off and studied gender psychology and post-traumatic recovery at internships at Northwestern University and at the Cook County Jail. In 2004, she began her graduate studies at the University of Missouri under the direction of Dr. Ken Sheldon. She has since studied immigrant identity, psychological well-being, and psychological predictors of risk-taking. She received her Ph.D. in July 2011 with an emphasis in social and personality psychology, a minor in quantitative psychology, and a certificate in public health. In Fall 2011, she will begin a 2 year fellowship in the Division of HIV/AIDS prevention at the Center for Disease Control.