Predicting Risky Sexual Behaviors in College Students: A Daily Diary Study

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Abstract

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Predicting Risky Sexual Behaviors in College Students: A Daily Diary Study

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The prevalence of newly diagnosed sexually transmitted infections (STIs) has created urgency in identifying risk factors for STIs and other consequences of unsafe sex, especially for college students, who comprise a significant proportion of the demographic with the highest rates of STIs and unplanned pregnancies. Previous research has highlighted a pattern of risk-taking in college students, which extends to heightened sexual risk-taking, and correlates of this risk-taking behavior. Leveraging relevant theoretical frameworks, the current study examined distal (e.g., gender, adverse childhood experiences), proximal (e.g., mental health symptoms, peer norms), and situational (e.g., substance abuse) variables as predictors of risky sexual behaviors (i.e., unprotected sex, intoxicated sex). Results from the current study provided limited support for previously robust predictors of risky sexual behaviors. The notable exception is that daily substance use and daily approach sexual motives emerged as significant predictors of daily risky sexual behaviors in multi-level regression models. Although these findings may have the potential to inform intervention programs, replication studies are needed to more firmly establish the importance of these predictors, over and above previously robust predictors of risky sexual behaviors among college students.

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Introduction

College students have demonstrated frequent engagement in risky sexual behavior (e.g., having a "one-night stand" without using protection; Stenhammar, Ehrsson, Akerud, Larsson, & Tuden, 2014), putting this demographic at heightened probability for numerous aversive sexual health outcomes. Although the rates of risky sexual behaviors have been declining since 1991, rates of risky sexual behaviors have leveled off in recent history (Centers for Disease Control and Prevention [CDC], 2017b), and more than half of sexually transmitted infections (STIs) were diagnosed in individuals 24 years of age and younger, even though this demographic makes up only one-quarter of the sexually active population (CDC, 2017a). Given the potential negative health consequences of college students' engagement in risky sexual behavior, it is important to identify factors that increase the likelihood of a wide variety of risky sexual behaviors.

Researchers have identified many distal (e.g., gender, abuse, parental support), proximal (e.g., mental health symptoms, peer norms), and situational (e.g., substance use, partner relationships) variables associated with increased engagement in risky sexual behaviors behavior among college students. That said, there are numerous concerns that limit confidence in studies underscoring these risk correlates. For example, the majority of previous research investigations have failed to (1) use theory to guide study design, (2) comprehensively examine multiple potential predictors and risky sexual behaviors in the same study, or (3) utilize modern longitudinal research designs. These limitations have contributed to inconsistent findings between studies and uncertainty about influential predictors of risky sexual behaviors. Thus, leveraging relevant theoretical frameworks, the proposed study will investigate distal, proximal, and situational predictors of risky

sexual behaviors over 30-day daily-diary assessments of college students.

College Students and Risky Sexual Behaviors

Emerging adulthood is a unique developmental period, said to occur from ages 18-25, and marked by frequent experimentation and exploration (Arnett, 2000). Two-thirds of emerging adults are enrolled in colleges or universities (Bureau of Labor Statistics, 2018). Given the period of development, it should be unsurprising to learn that college students engage in risk-taking across a wide range of domains, including financial management (e.g., Xiao, Tang, Serido, & Shim, 2011), driving behaviors (e.g., Pearson, Murphy, & Doane, 2013), substance use (Snipes & Benotsch, 2013), and sexual health (Brown & Vanable, 2007). Moreover, owing to the contextual aspects of going away to college (e.g., living apart from parents, limited occupational and relationship responsibilities), relative to staying at home or starting a career, the likelihood of college students engaging in risk taking is higher than their non-college attending peers (White, Fleming, Kim, Catalano, & McMorris, 2008).

Risky Sexual Behaviors

One of the most common and concerning risk-taking behaviors among college students is risky sexual behavior. Although a portion (14.5%) of college students refrain from any act of sexual behavior (Sprecher & Treger, 2015), the unease about the sexual health of college students is warranted given that most college students engage in sexual activity. College students who are sexually active report and demonstrate high levels of risky sexual behaviors and increasing rates of STIs (CDC, 2017a). According to the Centers for Disease Control and Prevention (CDC; 2010), risky sexual behavior involves engagement in an activity that increases the risk of contracting STIs and/or unintended

pregnancy. Broadly, risky sexual behaviors have been categorized as: (1) indiscriminate behavior (e.g., intercourse with multiple sex partners or a high-risk partner, failing to discuss sexual risk prior to intercourse, intoxicated sex) and (2) lack of protective actions (e.g., sexual intercourse without condoms or other forms of birth/STI control; Cooper, 2002; Healthwise Staff, 2016). Despite having a clear definition of risky sexual behaviors provided by the CDC, there is a lack of consistency in the way that risky sexual behaviors have been defined and examined in research studies. For the purpose of the current study, *risky sexual behavior* included the two CDC categories (i.e., indiscriminate behaviors and lack of protective actions).

Relevant Theories

Problem Behavior Theory (Jessor & Jessor, 1977) posits that problem behaviors, such as risky sexual behavior, occur in the context of multiple overlapping distal and proximal risk factors. Distal risk factors represent constructs that confer an indirect influence on the outcome variable, whereas proximal risk factors represent constructs that directly influence the outcome variable. Within this framework are antecedent-background variables (e.g., low SES or parental education), social-psychological variables (e.g., experiencing childhood maltreatment, peer deviance reinforcement), and social-behavior (e.g., substance abuse) variables. This theory has been leveraged by numerous researchers to identify risk factors for sexual behavior (e.g., Dudley, Rostosky, Korfhage, & Zimmerman, 2004; Greene, Krcmar, Walters, Rubin, & Hale, 2000). Unfortunately, researchers who have applied this theory often selected only one domain (e.g., antecedent-background variables; Dudley et al., 2004) to examine as a predictor of a chosen problem behavior, including studies that investigated risky sexual behaviors (see

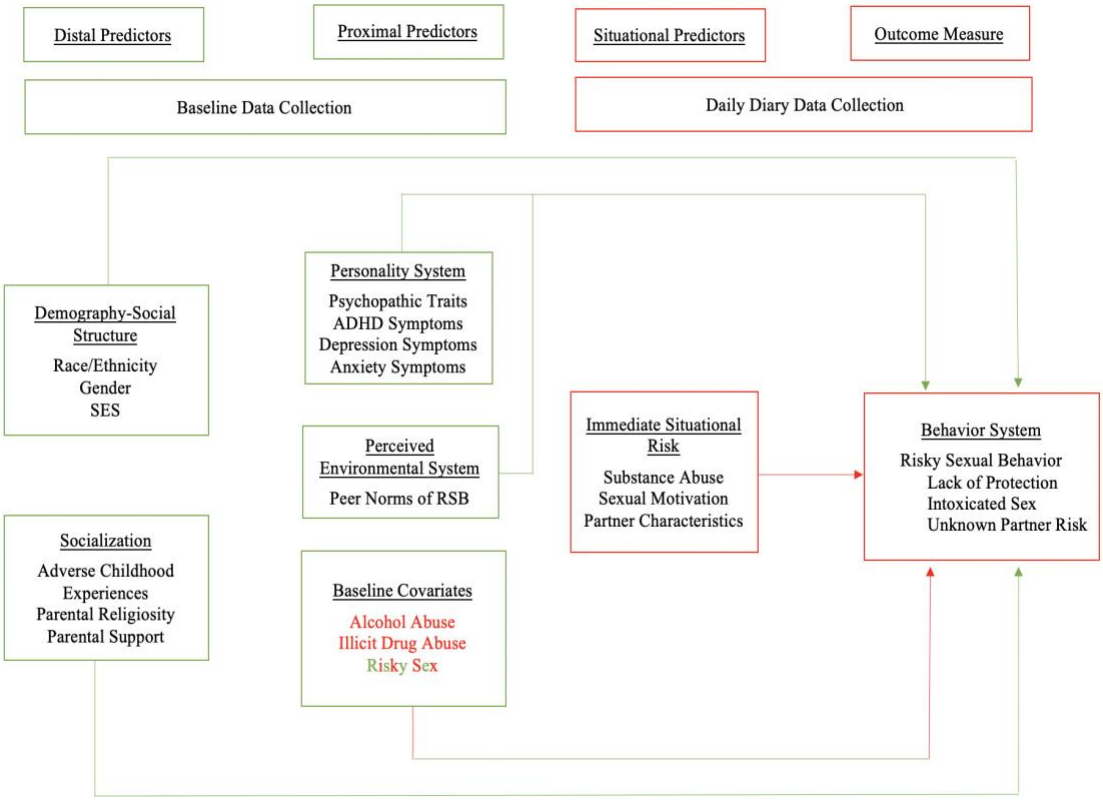
Roberts et al., 2012 for an exception). The dearth of studies leveraging Problem Behavior Theory and testing multiple variables in overlapping domains as predictors of risky sexual behavior suggests there is room to improve upon investigations of risky sexual behavior determinants in the Problem Behavior Theory framework.

Functional Perspective Theory (Cooper, Shapiro, & Powers, 1998) identifies situational motivations for sex based on intersections of positive/negative reinforcement and social/self-dimensions, leading to 4 quadrants of sexual motivations (i.e., enhancement, intimacy, coping, and approval motives). Applications of this theory have elucidated the importance of situational motives on specific risky sexual behaviors. For example, Gebhardt, Kuyper, & Greunsven (2003) found sex motives to be influential in the prediction of condom use, even in the presence of well-established predictors of risky sex (e.g., social norms). Notably, unlike other theories, Functional Perspective highlights the importance of immediate, in-the-moment situational variables in the prediction of risky sexual behaviors. Given this, there appears to be a need to examine unique immediate, daily risk factors amid more static distal and proximal risk factors.

With guidance from the Problem Behavior and Functional Perspective theories, an adapted conceptual model was developed to provide a comprehensive framework for predicting risky sexual behavior (see Figure 1). As described below, the adapted model includes distal, proximal, and situational predictors of risky sexual behaviors.

Figure 1

Proposed model examining predictors of risky sexual behavior



Distal Risk Factors

Demography-Social Structure

There is evidence to suggest that gender, race/ethnicity, and socioeconomic status (SES) are associated with college student engagement in risky sexual behaviors. However, findings indicate the direction and the strength of associations between these factors and risky sexual behaviors is mixed (e.g., Baldwin & Baldwin, 2000; Benson, Martins, & Whitaker, 2015; James, Simpson, & Chamberlain, 2008; Johnston et al., 2007; Logan et al., 2015; Patrick, Maggs, & Lefkowitz, 2015). Pending new findings, the

relevance of demographic variables as predictors of risky sexual behavior, especially relative to proximal or situational risk factors, is unclear and in need of further investigation.

Socialization

Adverse childhood experiences, parent relationships, and religion have been implicated as predictors of risky sexual behaviors in college students. There is robust evidence for strong positive associations (i.e., moderate to large effect sizes; Norman et al., 2012) between adverse childhood experiences (e.g., physical abuse, witnessing violence) and a range of risky sexual behaviors (e.g., Norman et al., 2012). Risky sexual behaviors examined by prior studies include engaging in unprotected sex, sex with a stranger, engagement in anal sex (Green et al., 2005; Rodriguez-Srednicki, 2001), sex with multiple partners (Gidycz, Hanson, & Layman, 1995), sending nude sexts (Giroux, 2011), and having a heightened risk of STIs (Hillis, Anda, Felitti, & Marchbanks, 2001). Similarly, studies have also shown repeatedly that parental factors (e.g., perceived parental presence, supportive parenting) have protected college students against engaging in risky sexual behaviors, including having intercourse with multiple partners (Padilla-Walker, Nelson, Madsen, & Barry, 2008; Rostad, Silverman, & McDonald, 2014), having intoxicated sex, being unaware of their partner's STI status (Simpson, 2015), inconsistent condom use (Simons, Burt, & Tambling, 2013), and unplanned pregnancies (Clawson & Reese-Weber, 2003). The magnitude of the association between parental factors and risky sexual behaviors is a large effect (e.g., Padilla-Walker et al., 2008). In contrast to the clear directionality of findings for adverse childhood experiences and parent relationships, previous research has revealed mixed results as to the association

between a religious upbringing and college students' risky sexual behaviors, with many studies yielding small to moderate effects (e.g., Rohrbaugh & Jessor, 2017). Some studies identified parental religiosity as being associated with lower levels of indiscriminate sexual behavior (Rohrbaugh & Jessor, 2017), intercourse with multiple partners (Baltazar, McBride, Vanderwaal, & Conopio, 2016; Burris, Smith, & Carlson, 2009), and sexual hookups (Fielder, Walsh, Carey, & Carey, 2013), while other studies have shown that parental religiosity is associated with less condom use (Zaleski & Schiaffino, 2000) and knowledge of sexual and reproductive health (Martin, Baralt, & Garrido-Ortega, 2017). Thus, though it seems that adverse childhood experiences and parental relationships are relevant predictors of college student risky sex, the degree to which religion is associated with increased or decrease risky sexual behavior, especially in context of these other distal factors, is uncertain and requires additional assessment.

Proximal Risk Factors

Personality System

Elevated externalizing (e.g., ADHD, psychopathic traits) and internalizing (e.g., anxiety, depression) symptoms have been shown to be associated with college students' engagement in more risky sexual behaviors. More specifically, ADHD symptoms are positively associated with having sex with uncommitted partners, having anal sex (Graziano et al., 2015; Marsh, Norvilitis, Ingersol, & Li, 2015), having more sexual partners (Flory, Molina, Pelham, Gnagy, & Smith, 2006), inconsistent contraceptive use (Marsh et al., 2015), unplanned pregnancies (Flory, Molina, Pelham, Gnagy, & Smith, 2006) and sexting (Reyns, Henson, & Fisher, 2014) among college students. Studies examining the association between ADHD and risky sexual behaviors have evinced

moderate effect sizes (e.g., Graziano et al., 2015). Similarly, higher rates of one-night stands, casual sex (Kastner & Sellbom, 2012), unprotected sex (Hudek-Knezevic, Kardum, & Krapic, 2008; Jones, Eaton, Livingston, & Cliette, 2018), intoxicated sex (Fulton, Marcus, & Payne, 2010) and sexting (March & Wagstaff, 2017) have been associated with higher rates of psychopathic traits in college students. Studies examining the association between psychopathic traits and risky sexual behaviors have yielded small effect sizes (e.g., Fulton, Marcus, & Payne, 2010). With respect to depressive symptoms, previous research has revealed positive associations with engagement in casual sex (Bersamin et al., 2014), having more numerous sex partners, regret after casual sex (Grello, Welsh, & Harper, 2006), inconsistent contraception use (Morrison et al., 2016), sexting coercion (i.e., sexting because of pressure from peer/partner; Drouin, Ross, & Tobin, 2015), rates of STIs (Othieno, Okoth, Peltzer, Pengpid, & Malla, 2015) and unplanned pregnancies (Story, 1999). In kind, anxiety symptoms have been associated with engagement in casual sex (Bersamin et al., 2014), having two or more sexual partners in the last 12 months, inconsistent condom use (Agardh, Cantor-Graae, & Ostergren, 2011), and sexting (Weisskirch, Drouin, & Delevi, 2017). Studies examining the association between depressive symptoms and risky sexual behaviors and anxiety symptoms and risky sexual behaviors have revealed small to moderate effect sizes (e.g., Bersamin et al., 2014). Taken together, elevated externalizing and internalizing mental health symptoms appear to be associated with more risky sexual behaviors in college students, however, the strength of unique associations between specific externalizing or internalizing behaviors and risky sexual behavior in the presence of additional externalizing or internalizing behavior has yet to be examined.

Perceived Environmental System

Peer norms have been implicated as a significant predictor of college students' engagement in a variety of risky sexual behaviors**.** For example, college students' perceptions of their peers' sexual behaviors (e.g., number of drinks prior to sex, frequency of casual sex, frequency of condom use) have been demonstrated to be positively associated with levels of intoxicated and casual sex (Lewis, Patrick, Mittmann, & Kaysen, 2014), number of oral and vaginal sex partners (Fielder & Carey, 2010; Lewis, Patrick, Mittmann, & Kaysen, 2014), and sexting (Jewell & Brown, 2013), and negatively associated with their own condom use (Scholly, Katz, Gascoigne, & Holck, 2005). Studies investigating the association between peer norms and risky sexual behaviors have yielded moderate effect sizes (e.g., Lewis, Patrick, Mittmann, & Kaysen, 2014). Researchers in this area concluded that students' perceptions that "everybody's doing it" contributes to students' own engagement in risky sexual behaviors (e.g., Fielder & Carey, 2010). Therefore, examination of the relative contribution of peer norms to engagement of risky sexual behaviors amid other risk variables is a worthwhile endeavor.

Situational Predictors

A range of situational variables have been implicated as factors that influence college students' engagement in risky sexual behaviors. First, there is a robust literature base connecting in the moment-use of alcohol and marijuana with higher rates of sex with multiple partners (Caldeira et al., 2009; Dolphin et al., 2017), sexting (Benotsch et al., 2013; Dir, Cyders, & Coskunpinar, 2013), STIs (Seth et al., 2011; Wu, Ringwalt, Patkara, Hubbard, & Blazer, 2009) and less overall use of contraceptives (Goldstein et al., 2007; Simons, Maisto, & Wray, 2010; Walsh, Fielder, Carey, & Carey, 2014). The existing

literature also suggests college students who use/abuse illicit substances endorse more overall risky sex (Reid et al., 2015), indiscriminate sexual behavior (Caldeira et al., 2009), lack of protective actions (Hamilton, Falletta, & Fishbein, 2018), sexting behaviors (Benotsch et al., 2013), and negative consequences (Parks, Frone, Muraven, & Boyd, 2017) than students not using illicit drugs. Studies investigating the association between substance abuse and risky sexual behaviors have yielded small to large effect sizes (e.g., Dolphin et al., 2017).

Second, partner factors, which may involve familiarity and intimacy, can exert influence over a range of behaviors, including college students' engagement in risky sexual behaviors. For example, one body of literature has found that college students who are in committed, romantic relationships reported engaging in more sexual behaviors (e.g., oral sex, anal sex; Shukusky, 2017), sexting (Drouin, Vogel, Surbey, & Stills, 2013) and inconsistent condom use (LaBrie, Earleywine, Schiffman, Pedersen, & Marriott, 2005) than students who had more casual partners. On the other hand, other research has shown college students in casual relationships were more likely to endorse having sex with multiple partners, to regret their sexual behavior (Wesche, Claxton, Lefkowitz, & van Dulmen, 2017), and to have unplanned pregnancies (Ashenhurst, Wilhite, Harden, & Fromme, 2017) compared to students in committed, romantic relationships (Shukusky, 2017). Studies investigating the association between partner characteristics and risky sexual behaviors have yielded small to moderate effects (e.g., Shukusky, 2017). Aligning with Problem Behavior Theory, it is expected that casual relationships will be more predictive of engagement in *risky* sexual behaviors, than committed relationships, given previous research that suggests casual sex is more strongly associated with a variety of

risk behaviors when compared to committed relationships (e.g., illicit substance abuse, alcohol consumption; Grello, Welsh, & Harper, 2005).

Finally, motivation has been implicated as an important factor to consider in the examination of risky sexual behaviors. Of note, enhancement motives (i.e., the incentive to enhance positive emotions/experience) appear to be one of the more commonly cited motives for sex (e.g., Kenney, Thadani, Ghaidarov, & LaBrie, 2013). College students who endorse enhancement motives are more likely to report being sexually experienced and to engage in riskier behavior (e.g., intercourse with someone they just met, need for pregnancy/STI test) compared to students with low enhancement motives (Ingledew & Ferguson, 2007). The remaining motives for sex (i.e., intimacy, coping, and approval motives) are also endorsed regularly by college students and have been positively associated with a range of risky sexual behaviors, including inconsistent condom use, unplanned pregnancies (Cooper, Shapiro, & Powers, 1998), anal sex (Blayney, Lewis, Kaysen, & Read, 2018), and sexting (Drouin & Tobin, 2014). Studies investigating the association between motives for sex and risky sexual behaviors have yielded small to large effects (e.g., Kenny et al., 2013). To summarize, various situational factors (e.g., substance use, partner characteristics) have been implicated as independent predictors of risky sexual behaviors, however, there remains a need to examine the influence of these risk factors simultaneously.

Methodological History and Advancement

As noted above, numerous candidate distal, proximal, and situational predictors of risky sexual behaviors have been identified. However, our understanding of the strength of association for any of these risk variables is incomplete because evidence was largely

from studies relying on single-time-point, retrospective studies. Although there is benefit to single-time-point studies, when assessing static factors, this method is susceptible to participant bias and difficulty in determining the sequence of time-variant outcomes, which can lead to limited applicability results (Cooper, 2010). In particular, without clearly establishing temporal precedence, the results from many previous studies are limited in their potential causal interpretations and have had limited implications for prevention and intervention services to disrupt connections between risk variables and risk outcomes. Given the limitations of cross-sectional studies, some researchers have turned to another method that improves upon single time point data collection: daily diary studies.

Daily diary studies are research methods used to repeatedly examine one's self-report of ongoing experiences (Bolger, Davis, & Rafaeli, 2003). Through the use of repeated, daily measures of quickly-changing variables, daily diary studies allow for a deeper understanding of the temporal sequence of events of interest, as they naturally occur. Daily diary studies have been used to study a variety of variables of interest as this method reduces participant recall bias (by shortening the length of time about which participants are asked) and provides ecologically valid data because data is being collected in the participants' daily environment near the time an outcome of interest occurs (Mays et al., 2010).

Given the strengths of daily diary studies, the current study used this methodology in concert with cross-sectional measures to identify a wide range of risk variables predicting engagement in risky sexual behaviors. Both risky sexual behaviors and situational predictors (e.g., substance abuse) fluctuate from day to day and were well

suited for examination through daily diary methods. However, distal (e.g., adverse childhood experiences) and proximal risk variables (e.g., ADHD symptoms), which are unlikely to fluctuate over time, can be effectively measured through cross-sectional methods. Most investigations of risky sexual behavior rely on one methodological approach (i.e., either cross-sectional or daily diary), however, we stood to gain a deeper understanding of sexual risk if we applied both approaches within the same study, to understand both stable and dynamic risk factors of engagement in risky sexual behaviors. Thus, the proposed conceptual model that includes distal, proximal, and situational predictors of risky sexual behaviors presented a novel opportunity to improve upon both cross-sectional and daily diary investigations of risky sexual behaviors.

Current Study

The current study set forth to investigate three aims, consistent with the proposed adapted model of predicting risky sexual behavior (see Figure 1). The first aim was to examine distal and proximal variables as unique predictors of risky sexual behaviors (i.e., intoxicated sex, lack of knowledge about partner STI risk, and lack of contraception) in college students. Based on previous research of distal predictors, it was hypothesized that males, racial/ethnic minorities, and low-SES individuals would endorse higher rates of risky sexual behaviors, compared to females, Caucasians, and high-SES individuals, respectively. It was also predicted that higher levels of adverse childhood experiences, lower levels of parental religiosity, and lower levels of parental support would independently predict higher levels of risky sexual behaviors. For proximal predictors, it was hypothesized that higher levels of psychopathic traits, ADHD symptoms, depression symptoms, and anxiety symptoms would independently predict higher levels of risky

sexual behaviors. The second aim was to examine situational variables as unique predictors of risky sexual behaviors in college students. Specifically, it was hypothesized that individuals reporting higher daily levels of substance abuse, enhancement motives for sex, and casual or hookup partners would also report higher daily levels of risky sexual behaviors in the same day. The third aim was to identify distal, proximal, and situational predictors demonstrating unique associations with risky sexual behaviors, beyond variation in sexual risk-taking explained by other risk factors, among college students. No specific hypotheses were made with respect to aim 3, due to the exploratory nature of this aim, as no studies have tested for unique predictors of risky sexual behaviors with as comprehensive a list of plausible risk factors as included in this study. Information gathered as a result of this study could inform efforts to identify college students prone to engage in risky sexual behavior, as well as to highlight potential targets of prevention and intervention programs delivered to college students prone to engage in risky sexual behavior.

Method

Participants

One hundred eighty students at Ohio University were recruited for the current study through mass email invitations and flyers posted around campus. [See Appendix S for power analysis information.] To be eligible for the current study, students needed to: (a) be 18-25 years of age, (b) have engaged in sexual activity (i.e., oral or penetrative sex) within the last 30 days, and (c) have consumed alcohol within the last 30 days. Of the 180 participants initially recruited, 7 participants did not meet the aforementioned eligibility criteria. Additionally, 7 participants were excluded for not completing consenting procedures, and 38 participants were excluded for not completing the baseline questionnaire. As such, there were 128 participants who were eligible for the current study and participated in the daily diary portion of the study. Of these participants, the mean age of participants was 20.61 (*SD* = 1.29) and the majority identified as female (75.00%), which is inconsistent with demographics of the students attending Ohio University (i.e., 52.30% female; Ohio University Office of Institutional Research and Effectiveness, 2019). The majority of participants also identified as heterosexual (74.20%). Sexual orientations reported by other participants included bisexual (16.40%), homosexual (5.50%), and pansexual (3.90%). The percentage of students identifying as non-heterosexual in the current study (i.e., 25.80%) is consistent with percentages of sexual orientation yielded from other studies (e.g., 27%; Hoburg, Konik, Williams, & Crawford, 2004). Most participants reported that they were either casually dating (28.9%), involved in a long-term exclusive relationship (26.60%), or seriously dating (24.20%). Fewer participants reported that they do not date (8.60%), live with their

partner (10.20%), are engaged (0.80%), or are married (0.80%). Participants who reported being in a relationship reported an average relationship duration of 17.77 months (*SD* = 23.48). With respect to race and ethnicity, most participants identified as white (87.50%) and non-Hispanic (94.20%). Racial identities reported by other participants included African American (4.70%), Bi-racial/Multi-racial (3.90%), Asian American (2.40%), and Native American (0.80%). The percentage of racial and ethnic identities in this sample does not appear to reflect the broader diversity of college students across the United States, where 52.90% identify as non-Hispanic White, 20.90% identify as Hispanic, 15.10% identify as African American, and 7.60% identify as Asian (United States Census Bureau, 2018). Finally, with respect to their year in school, participants were mostly seniors (38.60%) or juniors (32.30%), with fewer sophomores (13.40%), 5th year seniors (12.6%), and freshman (3.10%).

Measures

Distal Predictors

Demographics. Participants completed a brief measure (Appendix A) assessing descriptive variables of interest, such as participants' age, gender, race/ethnicity, sexual orientation, marital status, education level, socioeconomic status, parent education, and parent marital status.

Adverse Childhood Experiences. The Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003; Appendix B) is a 25-item self-report measure that screens adults for histories of childhood emotional abuse (e.g., my parents wish I was never born), physical abuse (e.g., I was hit hard enough to leave a bruise), sexual abuse (e.g., I was touched sexually), emotional neglect (e.g., I felt loved; reverse-scored), and physical

neglect (e.g., I did not have enough to eat). Response options ranged from 1 (*never true*) to 5 (*very often true*), where higher scores indicated higher levels of childhood adversity. The CTQ total scale has been found to demonstrate strong associations with therapist-rated abuse and neglect (Bernstein et al., 2003). In the current sample, the internal consistency for the CTQ total scale was $\alpha = .92$.

Religion. The Religious Commitment Inventory-10 (RCI-10; Worthington et al., 2003; Appendix C) is a 10-item measure of parental religious adherence. Participants were asked to respond to these items in the way they believed their parent(s) would, consistent with previous researchers (e.g., Stearns & McKinney, 2017). Responses were on a likert-type scale, with response options ranging from 1 (*not at all true of my parent(s)*) to 5 (*totally true of my parent(s)*). Higher scores indicated greater parental religious commitment. As evidence of construct and discriminant validity, RCI-10 scores have been shown to be positively correlated with other measures of religiosity (Worthington et al., 2003). In the current sample, the internal consistency of the RCI-10 was $\alpha = .97$.

Parent Influence. The Network of Relationships Inventory: Behavioral Systems Versions (NRI-BSV; Furman & Buhrmester, 2009; Appendix D) is a 15-item measure of support in close relationships. The version used in the present study included items assessing parental support for the respondent (e.g., “seeking out parent when you’re upset”; “parent shows support for your activities”). Response options ranged from 1 (*little or none*) to 5 (*the most*), such that higher total scores indicating greater perceived parental support. The NRI-BSV has been shown to be significantly associated with observations of parent and child interactions and NRI-BSV scores, in that perceived

parental support was positively associated to communication skills and dyadic positivity (Furman & Buhrmester, 2009). In the current sample, the internal consistency for the total NRI-BSV scale was α = .88.

Proximal Predictors

Psychopathic Traits. The Levenson Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl, & Fitzpatrick, 1995; Appendix E) is a 26-item measure assessing primary (e.g., selfishness, callousness, and manipulative behavior) and secondary symptoms of psychopathy (e.g., impulsivity, self-defeating lifestyle). The scale yielded a total psychopathy score. Response options ranged from 1 (*strongly disagree*) to 4 (*strongly agree*), with higher scores indicating greater levels of psychopathic traits. Lynam, Whiteside, and Jones (1999) found that the LSRP was moderately correlated in the expected direction with illegal drug use, alcohol use, serious antisocial behavior, and arrest history. In the current sample, the internal consistency for the total LSRP scale was α = .84.

ADHD Symptoms. The ADHD Self-Report Scale Screener (ASRS-S; Kessler et al. 2005; Appendix F) is a brief 6-item measure of inattention and hyperactivity-impulsivity symptoms that were assessed. Participants indicated how often they exhibit each symptom (0 = *Never*, 1 = *Rarely*, 2 = *Sometimes*, 3 = *Often*, and 4 = *Very Often*), whereby higher scores indicated greater levels of ADHD symptoms. The ASRS-S has shown convergence with clinical diagnoses by trained clinicians and will be used in the current study (Kessler et al., 2007). In the current sample, the internal consistency for the total ASRS-S scale was α = .78.

Depression Symptoms. The Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001; Appendix G) is a 9-item self-report measure of depressive symptoms over the last two weeks. Participants rated the severity of symptoms on a likert-type scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*), whereby higher scores reflected greater depressive symptoms. Validity for the PHQ-9 is well-established, including associations with other measures of depression and functional impairment (e.g., Kroenke, Spitzer, & Williams, 2001). In the current sample, the internal consistency for the total PHQ-9 scale was $\alpha = .86$.

Anxiety Symptoms. The Generalized Anxiety Disorder scale-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006; Appendix H) is a 7-item self-report measure of anxiety symptoms over the last two weeks. Participants rated the severity of their symptoms on a likert-type scale ranging from 0 (*Not at all*) to 3 (*Nearly every day*), in which higher scores reflected greater anxiety symptoms. Validity for the GAD-7 is also well-established, as demonstrated by associations with other measures of anxiety and functional impairment (e.g., Spitzer et al., 2006). In the current sample, the internal consistency for the total GAD-7 scale was $\alpha = .88$.

Peer Norms of Risky Sexual Behaviors. A validated measure of peer norms of risky sexual behaviors has yet to be developed and is an acknowledged gap in the literature (Martens et al., 2006). The measure developed for this study (Appendix I) is in line with previously used measures of perceived peers' health risk behavior, including sexual behavior (e.g., van de Bongardt, Reitz, Sandfort, & Dekovich, 2015). Participants responded to items assessing their perception of how many days in the last 30 days the typical college student has engaged in indiscriminate behaviors, intercourse with lack of

protective actions, behaviors that increase the risk of indiscriminate behaviors or lack of protective actions, and experience of consequences of risky sexual behaviors. Participants entered a numerical value for each item and their responses were coded (e.g., 1 = *0 times* to 7 = *11 or more times*), with higher scores indicating greater perceived peer norms of risky sexual behaviors. In the current sample, the internal consistency for the total Peer Norms scale was α = .74.

Baseline Covariates

Alcohol Use. The Alcohol Use Disorders Identification Test Hazardous Consumption Scale (AUDIT-C; Saunders et al., 1993; Appendix J) consists of 3 items assessing frequency of alcohol consumption (0 = *never*, 1 = *monthly or less*, 2 = *2-4 times a month*, 3 = *2-3 times a week*, and 4 = *4 or more times a week*), the number of alcoholic drinks consumed on a typical drinking occasion (0 = *1 or 2*, 1 = *3 or 4*, 2 = *5 or 6*, 3 = *7 to 9*, and 4 = *10 or more*), and the frequency of occasions where six or more drinks are consumed (0 = *never*, 1 = *less than monthly*, 2 = *monthly*, 3 = *weekly*, and 4 = *daily or almost daily*). The AUDIT-C has well-established psychometric properties, including a high degree of test-retest reliability (over a 3- to 4-week interval r = .98; Reinert & Allen, 2007). In the current sample, the internal consistency for the AUDIT-C scale was α = .76.

Drug Use. The Drug Use Disorders Identification Test (DUDIT; Berman, Bergman, Palmstierna, & Schlyter, 2003; Appendix K) is comprised of 14 items that measure drug use and problems. Participants responded to questions assessing a variety of domains including frequency of drug use (e.g., “How often do you use cannabis?”), guilty feelings (e.g., “How often over the past year have you had guilty feelings or a bad conscience because you used drugs?”), and harmful use (e.g., “Have you or anyone else

been hurt because you used drugs?"). Higher summary scores indicate greater drug use/abuse. The DUDIT has demonstrated a high degree of convergent validity (r = .85) with other measures of substance abuse (e.g., Drug Abuse Screening Test; Voluse et al., 2012). In the current sample, the internal consistency for the total DUDIT scale was α = .87.

Risky Sexual Behaviors. The Sexual Risk Survey (SRS; Turchik & Garske, 2009; Appendix L) consists of 23 items that measure the frequency of self-reported risky sexual behaviors in college students. Participants were asked to report the number of times they have engaged in various risky sexual behaviors over the past 6 months and throughout their life. Items were summed to a total score, with higher scores indicating greater sexual risk-taking. The mean total score of the SRS reflects the average number of instances of risky sexual behaviors (e.g., vaginal intercourse without contraception, intercourse with unfamiliar partners, regret of sexual encounter) across the participant's life. The SRS total score has been shown to be strongly associated with measures of sexual excitation, impulsive sensation seeking, sexual desire, substance use, and consequences of sexual risk taking (e.g., Turchik & Garske, 2009). In the current sample, the internal consistency for the total SRS scale was α = .85.

Because the current study utilized a broad definition of risky sexual behaviors, a single, comprehensive, validated measure of risky sexual behaviors that is in line with the current study definition does not exist. Thus, a set of questions supplemented the SRS to attempt to include a broad range of risky sexual behaviors in the baseline questionnaire (Appendix M), including consistency of contraceptive methods used (e.g., condoms, birth control, plan B), consistency of discussions of sexual risk prior to engagement in sexual

activity, quality of the relationship with their sex partner(s) *prior* to engagement in sexual behaviors (e.g., stranger, steady romantic partner), and engagement in sexting, use of smartphone dating applications, Participants also reported on their experience of negative consequences of risky sexual behaviors (i.e., contraction of STI, unplanned pregnancy) over the last six months and their lifetime sexual behaviors and consequences (e.g., age of sexual debut, number of diagnosed STIs, and number of unintended pregnancies). Answers to these items were used to create a composite score, where higher scores indicated more engagement in risky sexual behaviors. In the current sample, the internal consistency for the total supplemental risky sexual behaviors scale was .60. Given the low reliability for this measure, options to include these items were explored (e.g., eliminating poor items from this measure, combining supplemental risky sexual behaviors questions with SRS). However, none of the explored solutions yielded a scale with improved or acceptable reliability. In fact, when this measure was combined with the SRS, the reliability of the newly created measure decreased to $\alpha = .56$. The poor reliability of the expanded risky sexual behaviors measure likely contributed to the lack of association between this predictor and the outcome variable, nonetheless, this scale was not included in analyses beyond bivariate correlations.

Situational Risk Predictors

Daily Substance Use. Participants first reported the total number of standard alcoholic drinks they consumed during the previous day, with response options ranging from 0-15+ listed in one-drink increments (Appendix N).. A standard drink was defined as a 12-ounce beer, 5-ounces of wine, and 1.5 ounces of liquor (as a shot or in a mixed drink). Participants then reported on their use of any other substances (e.g., tobacco,

marijuana, cocaine, prescription pills) during the previous day. Responses from these items were summed at the daily level to create a longitudinal daily substance use variable (with up to 30 days of data for this variable). Higher scores indicated higher levels of substance abuse. In the current sample, the internal consistency for the total daily substance use scale was $\alpha = .82$.

Daily Sexual Motives. Impett, Peplau, and Gable (2005) adapted the original Sex Motives Scale (Cooper, Shapiro, & Powers, 1998) for daily diary study administration. This condensed measure yields (Appendix O) a 9-item measure consisting of approach (e.g., enhancement) vs. avoidance (e.g., coping) motives for sex. Response options ranged from 1 (*not important)* to 5 (*very important)*. Five items measured approach motives and four items measured avoidance motives. Answers to these items were summed at the daily level to create longitudinal daily approach and avoidance sexual motives variables (with up to 30 days of data for this variable). Higher scores indicated higher levels of approach/avoidance sexual motives over each day. Convergent validity was established through observation of moderate correlations between the Sex Motives Scale and other relevant measures (e.g., sensation seeking, erotophilia; Cooper, Shapiro, & Powers, 1998). In the current sample, the internal consistency for the Approach Sexual Motives Scale was $\alpha = .82$ and the internal consistency for the Avoidance Sexual Motives Scale was $\alpha = .96$.

Daily Partner Characteristics. In a measure created for this study (Appendix P), participants who endorsed engagement in sexual behavior were asked to select the answer that reflects their relationship with their sex partner (i.e., committed relationship, casual relationship, acquaintance, or stranger) and indicate if they have had previous sexual

relations with their sex partner (i.e., multiple previous sexual encounters, one previous sexual encounter, or no previous sexual encounters). Participants then selected the response that best characterized the openness of their relationship (i.e., me/my partner do not hook up with other people, me/my partner can/do hook up with other people). Answers to these items were summed at the daily level to create a daily partner characteristics variable (with up to 30 days of data for this variable). Higher scores were indicative of a riskier partner relationship. In the current sample, the internal consistency for this scale was $\alpha = .78$.

Daily Sexual Behavior Covariate. In a measure created for this study (Appendix Q), instances of sexual behaviors were measured. Participants were first asked if they engaged in any sexual activity (yes/no) on each day. They then were able to select all behaviors from a list of the following: kissing/making out, fondling over clothes, genital stimulation by hand, genital stimulation by mouth, anal stimulation by hand, anal stimulation by mouth, vaginal sex, and anal sex on each day. However, for the purpose of the covariate variable, only oral, vaginal, and anal intercourse were included, to avoid overpathologizing behaviors that confer minimal risk (e.g., kissing, fondling). If participants endorsed oral, vaginal, and anal intercourse, their response was coded as "yes" = 1 and participants who did not endorse any oral, vaginal, or anal intercourse were coded as "no" = 0 for each day. In the current sample, the internal consistency for the daily sexual behavior covariate was $\alpha = .66$.

Outcome Measure

In a measure created for this study (Appendix R), instances of risky sexual behaviors were measured. Specifically, participants were asked each day if they used any

contraception (e.g., condoms, birth control), where use of any contraception was coded as "yes" = 0 and no use of any contraception was coded as "no" = 1. Participants were also asked if they asked their partner about their STI risk ("yes at a previous/current encounter" = 0; "no" = 1). Finally, participants reported whether they consumed alcohol or drugs prior to sex ("yes" = 1; "no" = 0) and whether they believed their partner was drunk or high during sex ("yes" = 1; "no" = 0). Answers to these items were summed at the daily level to create a longitudinal daily risky sexual behaviors variable (with up to 30 days of data for this variable). Higher scores indicated more engagement in risky sexual behaviors over each day. In the current sample, the internal consistency for the total daily risky sexual behaviors scale was $\alpha = .86$.

Procedures

All study procedures were approved by the Institutional Review Board (IRB) at Ohio University. After interested students consented to study procedures online, they were then directed to an online baseline questionnaire. Completion of the baseline questionnaire took participants approximately 1 hour and served to confirm eligibility requirements and assess other study-relevant personal characteristics (i.e., distal and proximal risk factors, baseline substance use and risky sexual behavior). Data for the online baseline questionnaire was collected between May-June 2019.

For eligible students, a link to daily diary questionnaires was emailed once a day for a period of 30 days, consistent with previous studies (e.g., Stalgaitis & Glick, 2014). The daily diary questionnaires assessed situational variables (i.e., alcohol and drug use, motives for sex, and risky sexual behaviors). A link to complete the daily diary questions in Qualtrics was emailed to participants at a consistent time (12:00 am) each day. If

participants did not complete their measures by 5:00 pm, reminder emails were sent. Participants were asked to report about their behavior from the previous day (i.e., from the time they rose to the time they went to sleep). Daily diary questionnaires took approximately 10 minutes to complete. Participants received $1.25 for completion of each daily diary survey, which is consistent with compensation rates for daily diary studies of risky sexual behaviors (Stalgaitis & Glick, 2014). Data for the daily diary questionnaire was collected between May-July 2019.

Data Analytic Plan

First, bivariate correlations were conducted between study variables to determine the nature of the relationships between them. Mean scores across the 30 possible days of daily diary surveys were computed and used to examine correlations between these variables and the daily risky sexual behaviors variable. Multilevel regression analyses were then conducted using HLM7 (Raudenbush, Bryk, Cheong, Congdon, & Du Toit, 2011) to examine the influence of time-invariant predictors (i.e., distal and proximal risk factors) and time-variant predictors (i.e., situational risk factors) on the time-variant outcome (i.e., daily risky sexual behaviors). A This analytic approach allowed for simultaneous estimation of between-person effects for level 1 (i.e., situational predictors) and level 2 (i.e., distal predictors, proximal predictors, and baseline covariates) variables. Poisson distribution was used for the multilevel regression analyses, due to the non-normal distribution of data.

There was relatively minimal missing data on distal and proximal predictors from participants at the baseline survey. Missing data was determined to be less than 4% of all data points from participants in the baseline survey and did not significantly impact

values. Notably, three items (i.e., two items from peer norms subscale, one item from DUDIT scale) had the highest percentage of missing data, each with 5 missing data points corresponding to 3.9% missing data. There was also minimal missing data on situational predictors from participants in the daily diary survey portion of the study. Missing daily diary data was determined to be less than .3% of all data points from items presented to all participants (i.e., items without skip logic) and did not significantly impact values. Multilevel random coefficient modeling (MRCM) is frequently utilized for daily diary data and is flexible in that this approach does not require all individuals to be measured at all occasions (Raudenbush & Bryk, 2002). Thus, even participants with missing data were included in the analyses. Missing data was estimated according to Bayesian rules in HLM7 (e.g., Boedeker, 2017), which is consistent with similar daily diary studies examining risky sexual behaviors (e.g., Glick, Winer, & Golden, 2013).

The current study set forth to investigate three aims. The first two aims were: 1) examine distal and proximal predictors and 2) situational predictors of risky sexual behaviors among college students. These aims were accomplished by conducting two multilevel regression analyses with the daily risky sexual behavior variable as the outcome and, for Aim 1, distal and proximal variables as predictors, and, for Aim 2, situational variables as predictors. Baseline risky sexual behavior and daily sexual behaviors were entered as covariates in all analyses. Daily sexual behaviors was included as a covariate to ensure that the daily risky sexual behavior outcome variable is predicting risky components of sexual behaviors, beyond whether or not sexual behaviors occurred. Baseline illicit drug use was entered as an additional covariate in aim 2 and Aim 3. Aim 3 was to identify unique distal, proximal, and situational predictors of risky sexual

behaviors among college students. This was set to be accomplished by conducting a multilevel regression analysis to assess which of the baseline (distal and proximal) and daily (situational) predictors from Aims 1 and 2 were uniquely associated with the daily risky sexual behavior variable when accounting for all of the predictor variables found to be significant in Aims 1 and 2.

Results

Preliminary Statistics

Overall, 85.03% of daily surveys were completed, with a total of 3,266 days for analyses out of a possible 3,840 days. Out of the total days, 922 days (28.20%) involved engagement in at least one sexual behavior (e.g., kissing, oral sex, intoxicated sex) during the course of the study. With respect to specific sexual behaviors, participants engaged in vaginal sex (16.40% of daily diary days), oral sex (13.90% of daily diary days), and anal sex (0.90% of daily diary days).

With respect to correlates of sexual activity, participants reported that their partner was drunk or high during their sexual encounter (i.e., involving any sexual behavior) 23.80% of the time and their partner consumed alcohol or drugs before their sexual encounter 31.00% of the time. Almost one-third of participants reported the belief that their partner was drunk or high during sexual intercourse specifically, with 37.8% acknowledging that their partner used alcohol or illicit drugs before intercourse. Most participants who engaged in sexual intercourse had a pre-existing familiar relationship with their partner (i.e., either committed or casual relationship), leaving only 5.50% of participants who reported sexual intercourse with an acquaintance or a stranger. Although the majority of participants were familiar with their partners, 38.20% of participants failed to discuss their partner's sexual risk status (e.g., last time their partner was tested for STIs, partner's STI history, IV-drug use) at the current or a previous instance of sexual intercourse. Finally, 70.60% of participants reported use of any contraception method on days when sexual intercourse occurred. However, participants reported relatively low levels of use of specific contraception methods on days when sexual

intercourse occurred: birth control pills (42.10% of sexually active days), birth control device (31.50% of sexually active days), condoms (28.1% of sexually active days), and the pull out method (18.6% of sexually active days).

Prior to conducting analyses related to proposed aims, descriptive statistics were obtained (see Table 1). With respect to the daily risky sexual behaviors outcome variable, most participants denied engaging in any of the risky sexual behaviors (i.e., lack of protective action, intoxicated sex, lack of partner STI risk) on a daily basis, which meant the mode for this variable was a score of zero. The average score for the daily risky sexual behaviors outcome variable was .37, which means that, in general participants were *not* engaging in any of the risky sexual behaviors on a daily basis.[1] Similarly, participants endorsed relatively infrequent engagement in behaviors of interest for several other daily variables. The average score for the daily sexual behaviors covariate was .19, which means that, in general participants were *not* engaging in any of the sexual behaviors (i.e., oral, vaginal, or anal sex) on a daily basis.[2] The average score for the daily substance use variable was 1.55, which means that, in general, participants were endorsing consumption of 1-2 alcoholic beverages (maximum daily consumption of alcohol was equal to 16 standard drinks) or use of 1-2 types of illicit drugs (maximum daily use of illicit drugs was equal to 2) on a daily basis. The average score for the daily partner characteristics variable was .31, which suggests that, in general participants were *not* engaging in sexual behaviors with a risky partner (i.e., unfamiliar partner, no prior

[1] If the mean score for the daily risky sexual behaviors outcome variable was equal to 1, this would mean on average participants engaged in one risky sexual behavior (i.e., lack of protective action, intoxicated sex, lack of partner STI risk) on a daily basis.
[2] If the mean score for the daily sexual behaviors covariate was equal to 1, this would mean on average participants engaged in any of the sexual behaviors (i.e., oral, vaginal, or anal sex), on a daily basis.

sexual encounters, non-committed relationship).[3]

In addition, bivariate correlations were conducted to understand the relationships between study variables of interest for distal, proximal, and covariate variables (see Table 2) and situational and covariate variables (see Table 3) and the outcome variable (i.e., daily risky sexual behaviors). For distal predictors (Table 2), ethnicity was positively associated with daily risky sexual behaviors, such that individuals who identified as Hispanic reported increased rates of risky sexual behaviors. A positive association was found between adverse childhood experiences and daily risky sexual behaviors while negative associations were found between parental religiosity and supportive parental relationships and daily risky sexual behaviors. This suggests that greater adverse childhood experiences were reported to co-occur with greater daily risky sexual behaviors, and lower levels of parental religiosity and supportive parental relationships were related with greater daily risky sexual behaviors. Regarding proximal predictors (Table 2), psychopathic traits were positively associated with daily risky sexual behaviors, suggesting that higher levels of psychopathic traits were reported to co-occur with higher levels of daily risky sexual behaviors. A positive association also emerged between anxiety and depression symptoms and daily risky sexual behaviors, indicating that individuals who endorsed more anxious or depressive symptoms were also likely to report higher levels of daily risky sexual behaviors.

With respect to situational variables (Table 3), multiple significant associations between predictors and the outcome variable were revealed. First, there was a positive

[3] If the mean score for the daily partner characteristics variable was equal to 1, this would mean that on average participants engaged in sexual encounters with one of the identified risky partner characteristics (e.g., unfamiliar partner, no prior sexual encounters, non-committed relationship).

association between daily substance use and daily risky sexual behaviors, where, higher levels of daily substance use levels co-occurred with higher levels of daily risky sexual behaviors. There was a positive association between daily partner characteristics and daily risky sexual behaviors. Notably, individuals who reported more casual, venturesome relationships with their partners (e.g., considering their partner a stranger) were likely to endorse higher levels of engagement in daily risky sexual behaviors. A significant negative association emerged between approach sexual motives and daily risky sexual behaviors, such that participants who reported higher levels of approach sexual motives were likely to endorse lower levels of daily risky sexual behaviors. With respect to covariate variables (Table 3), there were positive associations between daily risky sexual behaviors and sexual behaviors over the previous six months, illicit substance use over the previous 12 months, and daily sexual behaviors. Of note, there was not a significant association between baseline alcohol use or the supplemental risky sexual behaviors measure and daily risky sexual behaviors. Given this, baseline alcohol use and the supplemental risky sexual behaviors measure were not included in the current study as covariates.

Table 1

Descriptive Statistics for Predictors, Covariates, and Outcome Variables

Variables	*Mean (SD)*	Min-max
Outcome Variable		
Daily Risky Sexual Behaviors	.37 (.82)	0 – 4
Distal Predictors		
Gender	-	-
Race	-	-
Ethnicity	-	-
SES Gross Income (in US Dollars)	87,039.37 (47,653.58)	0 – 175,000
Adverse Child Experiences (CTQ)	38.36 (12.10)	25 – 89
Parental Religiosity (RCI-10)	23.20 (12.94)	10 – 50
Supportive Parental Relationship (NRI-BSV)	43.84 (10.87)	23 – 73
Proximal Predictors		
Psychopathic Traits (LSRP)	50.91 (8.58)	31 – 77
Anxiety Symptoms (GAD-7)	14.55 (5.00)	7 – 28
Depression Symptoms (PHQ-9)	16.54 (5.60)	9 – 35
ADHD Symptoms (ASRS-S)	16.50 (4.61)	6 – 28
Peer Norms	28.02 (6.06)	16 – 42
Baseline Covariates		
Risky Sexual Behaviors (SRS)	156.65 (179.20)	0 – 396
Expanded Risky Sexual Behaviors	5.86 (2.73)	1 – 15
Alcohol Use (AUDIT-C)	5.37 (2.20)	1 – 11
Illicit Drug Use (DUDIT)	5.81 (6.34)	0 – 30
Situational Predictors		
Daily Sexual Behavior	.19 (.39)	0 – 1
Daily Substance Use	1.55 (2.91)	0 – 18
Partner Characteristics	.31 (.70)	0 – 3
Approach Sexual Motives	18.13 (4.65)	5 – 24
Avoidance Sexual Motives	7.07 (4.71)	3 – 20

Note: Outcome variable of daily risky sexual behaviors (daily instances of lack of contraception, lack of partner STI knowledge, and intoxicated sex). Categorical variables include gender (0 = female; 1 = male), race (0 = white; 1 = racial minority), ethnicity (0 = non-Hispanic; 1 = Hispanic). Data on gender, race and ethnicity are provided in the Participants section. Baseline covariates and situational predictors are discussed in the measures section. Situational predictors are further elaborated on in the results section above.

Table 2

Bivariate Correlations between Distal, Proximal, Covariate and Outcome Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Daily Risky Sexual Behaviors	-												
2. Gender	.03	-											
3. Ethnicity	.16***	.03	-										
4. SES	.02	.10	-.18*	-									
5. Adverse Child Experiences	.04*	.03	-.06	-.19	-								
6. Parental Religiosity	-.07***	-.04	-.01	.08	-.12	-							
7. Supportive Parental Relationship	-.12***	-.02	.07	-.06	-.59***	.15	-						
8. Psychopathic Traits	.09***	.11	-.06	.03	.05	-.10	-.24**	-					
9. Anxiety Symptoms	.10***	-.19*	-.01	-.13	.37***	-.12	-.22*	.14	-				
10. Depression Symptoms	.06**	-.07	-.07	-.16	.37***	-.05	-.22*	.33***	.69***	-			
11. ADHD Symptoms	.01	.12	.05	-.08	.37***	.02	-.20*	.29**	.31***	.43***	-		
12. Peer Norms	-.01	-.08	.13	-.14	-.04	.07	.01	-.06	-.03	-.07	.02	-	
13. Baseline Risky Sexual Behaviors	.19***	.09	.13	.10	.02	-.05	-.04	.23**	.10	.02	-.02	.11	-
14. Expanded Risky Sexual Behaviors	.02	.12	-.07	-.06	-.02	.01	.01	.41***	.07	.11	.04	-.06	.27*

Note: Variable classifications are the outcome variable (1), distal predictors (2-7), proximal predictors (8-12), and proposed covariates (13-14).
*$p < .05$, **$p < .01$, ***$p < .001$

Table 3

Bivariate Correlations between Situational, Covariate, and Outcome Variables

	1.	2.	3.	4.	5.	6.	7.	8.
1. Daily Risky Sexual Behaviors	-							
2. Baseline Alcohol Use	.02	-						
3. Baseline Drug Use	.16***	.36***	-					
4. Baseline Risky Sexual Behaviors	.19***	.25***	.27***	-				
5. Daily Sex	.55***	-.06**	.13***	.19***	-			
6. Daily Substance Use	.24***	.18***	.41***	.27***	.16***	-		
7. Partner Characteristics	.33***	.08*	.05	-.03	.04	.14***	-	
8. Approach Sexual Motives	-.22***	-.08*	.13***	.05	.17**	.08*	-.40***	-
9. Avoidance Sexual Motives	.06	.16***	.20***	-.12***	.11**	-.02	-.08*	.12**

Note: Variable classifications are the outcome variable (1), proposed covariates (2-5), situational predictors (6-9).
*$p < .05$, **$p < .01$, ***$p < .001$

Study Aim 1

The first aim was to assess for unique associations between distal and proximal predictors and daily risky sexual behaviors. Only distal and proximal predictors found to be correlated with risky sexual behaviors (see Table 1) were included in this hierarchical linear model, in addition to baseline risky sexual behavior and daily sexual behaviors, which were entered as covariates. In the HLM analysis, the overall model was not significant (B = -.17, t[1, 104] = -.74, p = .69, ICC = .01; see Table 4). Therefore, associations between predictors and the outcome variable will not be interpreted, due to the lack of significance in the overall model.

Table 4

Hierarchical Linear Model: Distal and Proximal Predictors of Risky Sexual Behaviors

Measure	Coefficient (*SE*)	*t*-ratio
For INTRCPT1, π_0		
INTRCPT2, β_{00}	-.17 (.23)	-.74
Daily Sex, β_{01}	.26 (.22)	1.14
Baseline Risky Sexual Behaviors, β_{02}	-.01 (.01)	-1.67
Ethnicity, β_{03}	.79 (.24)	3.38**
Child Trauma, β_{04}	-.01 (.01)	-.37
Parent Religiosity, β_{05}	.01 (.01)	.39
Supportive Parenting, β_{06}	.01 (.01)	1.15
Psychopathic Traits, β_{07}	.01 (.01)	.76
Depression Symptoms, β_{08}	-.01 (.02)	-.90
Anxiety Symptoms, β_{09}	.02 (.01)	1.06

Note: Variable classifications are covariate (baseline risky sexual behaviors, daily sexual behaviors), distal (ethnicity, childhood trauma, parental religiosity, supportive parental relationship), and proximal (psychopathic traits, depression symptoms, anxiety symptoms).
*$p < .05$, **$p < .01$, ***$p < .001$; $df = 104$ in all cases.

Study Aim 2

The second aim was to examine the associations between situational predictors and daily risky sexual behaviors. Only the situational predictors that were bivariately associated with risky sexual behaviors were included in this hierarchical linear analysis, in addition to baseline covariates (i.e., baseline risky sexual behavior, baseline illicit drug use, daily sexual behaviors). In the HLM analysis, the overall model was significant (B = .54, t[1, 116] = 12.14, $p < .001$, ICC = .34; see Table 5). Notably, daily substance use (B = .30, t[1, 116] = 6.60, $p < .001$, ICC = .26) and daily approach sexual motives (B = -.03, t[1, 116] = -3.52, $p < .001$, ICC = .18) were significant situational predictors of daily risky sexual behaviors. Specifically, for every one-point increase in substance use there

was a .30 point increase in daily risky sexual behaviors, which corresponds to a 30% greater chance of a risky sexual behavior (e.g., intoxicated sex, unprotected sex) occurring. For every one-point increase in daily approach sexual motives, there was a .03 point decrease in daily risky sexual behaviors, which corresponds to a 3% greater chance of a risky sexual behavior occurring. For reference, a one-point increase in daily risky sexual behaviors reflects one instance of a risky sexual behavior on a given day.

Table 5

Hierarchical Linear Model: Baseline Covariates and Situational Predictors of Risky Sexual Behaviors

Measure	Coefficient (*SE*)	*t*-ratio
For INTRCPT1, π_0		
INTRCPT2, β_{00}	.54 (.04)	12.14***
Baseline Illicit Substance Use, β_{01}	-.01 (.01)	-2.18*
Baseline Risky Sexual Behaviors, β_{02}	-.01 (.01)	-.35
Daily Sex β_{10}	-.03 (.04)	-.64
Daily Substance Use slope, β_{20}	.30 (.04)	6.60***
Daily Partner Characteristics slope, β_{30}	.04 (.04)	1.00
Daily Approach Motives, β_{40}	-.03 (.01)	-3.52***

Note: Variable classifications are covariates (baseline illicit substance use, baseline risky sexual behaviors, daily sexual behaviors) and situational predictors (daily substance use, daily partner characteristics, daily approach motives).
*$p < .05$, **$p < .01$, ***$p < .001$; $df = 116$ in all cases.

Study Aim 3

The third aim was set to assess for unique associations between distal, proximal, and situational predictors and daily risky sexual behaviors. Due to the lack of significant distal and proximal predictors from Study Aim 1, the analysis for Study Aim 3 was not

completed, as the results of this analysis would be redundant of the analysis conducted for Study Aim 2. Taken together, the analysis for completed for Study Aim 2 represents the final model for the current study.

Discussion

The purpose of this study was to advance the existing literature by conducting a comprehensive study to identify distal, proximal, and situational risk factors that are associated with college students' increased engagement in risky sexual behaviors. Overall, this study provided limited support for the proposed hypotheses that were expected to support associations between many of the previously robust distal, proximal, and situational risk variables and engagement in daily risky sexual behaviors.

The first aim of the study was to examine the associations between distal and proximal predictors and daily risky sexual behaviors among college students. Notably, many of the distal predictors evinced significant bivariate associations. Bivariate correlations revealed significant associations between ethnicity, adverse childhood experiences, parental religiosity, and supportive parental relationships and risky sexual behaviors. Individuals who identified as Hispanic were more likely than non-Hispanic individuals to report engagement in risky sexual behaviors. This is consistent with previous research that found Latino American college students to report riskier condom-related behaviors and attitudes, compared to other ethnic groups (e.g., Espinosa-Hernandez & Lefkowitz, 2009). Also in line with previous research, participants who endorsed higher levels of adverse childhood experiences reported higher levels of risky sexual behaviors (e.g., Green et al., 2005; Rodriguez-Srednicki, 2001) and inverse associations were found between risky sexual behaviors and parental religiosity and supportive parental relationships. These inverse associations are consistent with previous research that has shown parental religiosity (Rohrbaugh & Jessor, 2017) and supportive parental relationships (e.g., Simpson, 2015, Simons, Burt, & Tambling, 2013) to be

protective of individuals' engagement in risky sexual behaviors.

With respect to nonsignificant distal predictors, gender and SES were not associated with risky sexual behavior. Previous studies showed mixed associations between gender and risky sexual behaviors, with some studies showing higher rates of risky sexual behaviors among female college students (e.g., Patrick, Maggs, & Lefkowitz, 2015), others showing higher rates of risky sexual behaviors among males (e.g., Chandra, Billioux, Copen, & Sionean, 2012; Grello et al., 2006), and still others finding no gender differences (e.g., Logan et al., 2015). Previous studies also showed mixed associations between risky sexual behaviors and SES, with previous research showing higher rates of risky sexual behaviors in both low SES (e.g., Macdonald et al., 1990) and high SES (e.g., Benson, Martins, & Whitaker, 2015) college students and others finding a lack of association between SES and risky sexual behaviors (e.g., Baldwin & Baldwin, 2000). The lack of significance between risky sexual behaviors and gender and SES may be due to the absence of a strong association between these concepts, however, it is also possible that the characteristics of the sample (e.g., predominantly white female college students, high SES) may have contributed to the lack of significant findings. For example, Patrick, Maggs, & Lefkowitz (2015), who found significant gender differences in engagement in risky sexual behaviors, conducted their study with college students, as well, however, their recruitment strategy led to highly diverse sample (i.e.., varied gender, racial, and ethnic groups well-represented). Given this, the differences between the demographic characteristics of the current study and prior studies may help to explain the null findings in the current study. Nonetheless, with the exception of two demographic factors, many distal variables demonstrated significant

bivariate associations with risky sexual behavior in this sample.

For proximal predictors, bivariate correlations revealed significant associations between most predictors and risky sexual behaviors. Specifically, significant positive associations emerged between psychopathic traits and anxiety and depression symptoms and risky sexual behaviors, consistent with the existing literature. For example, previous research has shown that college students who endorsed elevated psychopathic traits also reported greater engagement in a myriad of risky sexual behaviors, including a lack of protective action during sex (Hudek-Knezevic, Kardum, & Krapic, 2008; Jones, Eaton, Livingston, & Cliette, 2018; Kastner & Sellbom, 2012), which was captured by the daily risky sexual behavior variable in the current study. Prior studies have also found that depressive and anxiety symptoms are positively associated with casual sex (Bersamin et al., 2014; Grello, Welsh, & Harper, 2006), hookups (Fielder, Walsh, Carey, & Carey, 2014; Paul et al., 2000; Weitbrecht, 2017), lack of protective action (e.g., Agardh, Cantor-Graae, & Ostergren, 2011), and number of sex partners (Grello, Welsh, & Harper, 2006). Further, the findings from the current study not only replicate, but extend the prior literature owing to the fact that psychopathic traits and anxiety and depression were found to be associated with a *pattern* of risky sexual behaviors over a 30-day study period, rather than a single-time point, as such these associations reflect more compelling evidence of these predictions than previously shown by data collected at a single time-point.

On the other hand, other proximal predictors (i.e., ADHD symptoms, peer norms), previously found to routinely predict risky sexual behavior, did not evince significant associations with risky sexual behaviors in the current study. For ADHD, it is possible

that only clinically significant symptoms and/or a diagnostic history of ADHD serve as a risk factor for recurring engagement in risky sexual behaviors (Flory, Molina, Pelham, Gnagy, & Smith, 2006). With respect to the non-significant findings for peer norms, it is possible that the lack of a validated scale of peer norms of risky sexual behaviors and reliance on a scale created for the current study contributed to the non-significant association between peer norms and risky sexual behaviors. Taken together, there are several possible explanations that could explain why predictors previously shown to robustly predict risky sexual behavior failed to do so in the current study, including the comprehensive, stringent nature of the study, as well as the lack of validated measures of some of the domains assessed.

It is important to note that bivariate correlations were conducted to identify predictors to include in hierarchical linear regression models that correspond with aims of the current study. For Aim 1, when all significant distal and proximal predictors (mentioned above) were included in a hierarchical linear model, the overall model was not significant. As such, the distal predictor hypothesis and the proximal predictor hypothesis had minimal support from the findings in the current study. It is possible that the small magnitude of the bivariate associations (i.e., all correlations <= .20) between risky sexual behaviors and distal and proximal predictors contributed to the null findings. Specifically, the relatively weak associations may have made it impossible for a predictor to evidence a unique significant effect, especially when accounting for other associated variables.

The second aim of the study was to examine the association between situational predictors and daily risky sexual behaviors among college students. Bivariate correlations

revealed significant associations between most situational predictors (i.e., partner characteristics, substance use, and approach sexual motives) and risky sexual behaviors. It is important to highlight that avoidance sexual motives were not significantly associated with risky sexual behaviors. This is in contrast to previous research that found avoidance sexual motives (e.g., Cooper, Shapiro, & Powers, 1998; Ingledew & Ferguson, 2007) to be significantly associated with various risky sexual behaviors. It is possible that the nature of the current study and characteristics of the sample may have diminished the importance of avoidance sexual motives in the prediction of risky sexual behaviors. Avoidance sexual motives have been a focus of research studies that examined non-committed sexual encounters (e.g., Schneider & Katz, 2016), and may exert significant influence in these types of encounters because of a desire to please an unfamiliar partner. Given that almost 80% of the participants in the current sample were in either casually dating or in an exclusive relationship, with an average relationship duration of approximately 1.5 years, avoidance sexual motives may have been less relevant for college students in the current study. As such, coupled participants in the current study may have been more frequently engaged in non-risky sexual behaviors, which may have contributed to the lack of significant findings for avoidance sexual motives in this study.

For Aim 2,[4] when all significant situational predictors were included in a hierarchical linear model, partner characteristics was non-significant, while daily substance use and daily approach motives were statistically significant in the presence of other predictors and covariates. As such, the situational predictor hypothesis had partial support from the findings in the current study. The positive bivariate association between

[4] It is important to note that Aim 2 represents the final model, due to the lack of significance of distal or proximal predictors from Aim 1 (eliminating the need for the Aim 3 analysis).

partner characteristics and risky sexual behaviors suggested that having a more casual sex partner was predictive of increased engagement in daily risky sexual behaviors, which is consistent with some previous research in this domain (e.g., Foubert et al., 2006; Paul, McManus, & Hayes, 2000). However, this association was not replicated in the hierarchical linear model, which suggests that partner characteristics may be a less relevant predictor of risky sexual behaviors, compared to substance use and/or approach sexual motives, perhaps due to greater importance of more proximal self-oriented factors (e.g., one's own substance use).

The positive association between substance abuse and risky sexual behaviors in both the bivariate correlation and the hierarchical linear model is consistent with previous research that has shown increases in substance abuse to be related to increases in a myriad of risky sexual behaviors (e.g., Caldeira et al., 2009; Dolphin et al., 2017; Goldstein et al., 2007; Hamilton, Falletta, & Fishbein, 2018; Reid et al., 2015; Simons, Maisto, & Wray, 2010; Walsh, Fielder, Carey, & Carey, 2014). The finding that increased substance use is predictive of increased risky sexual behavior is also consistent with the Problem Behavior Theory framework, which suggests that risky behavior begets other risky behavior. The association between substance use and risky sexual behaviors may reflect the importance of sex-related substance use expectancies. For example, George and colleagues (2000) found that, when participants believed that they consumed alcohol (despite not having consumed any), they self-reported greater sexual arousal and perceived greater sexual disinhibition in their partners. For illicit substances (e.g., marijuana), Currin, Croff, and Hubach (2017) found that participants expected their marijuana use to improve their sexual experiences and Sumnall and colleagues (2007)

found participants' use of marijuana to reduce their overall inhibition and increase their willingness to experiment. The findings from the current study replicate, extend, and increase our confidence in previously revealed positive associations between risky sexual behaviors and substance abuse, because this study showed that *patterns* of increased substance abuse were associated with a *pattern* of increased risky sexual behavior over a 30 day period.

In addition, the inverse association between approach sexual motives and risky sexual behaviors, found in the bivariate correlation and hierarchical linear model, suggests that increases in approach sexual motives is related to decreases in risky sexual behaviors. This is inconsistent with some of the existing literature, which has found a positive association between approach sexual motives and risky sexual behaviors in general (e.g., Cooper et al., 2002). Yet, when characteristics of the current sample (i.e., majority of participants in established romantic relationships) are considered, the lack of consistency in findings between the current study and previous research is less striking, as coupled participants motives for sex likely differ from single participants (e.g., Muise, Impett, & Desmarais, 2013). Moreover, the inverse association between risky sex and approach sexual motives in the current study is intuitive given the dearth of research suggesting a connection between sexual satisfaction and risky sexual behaviors (e.g., Stephenson, Arold, & Meston, 2011) and the body of research that suggests there is an association between risky sexual behaviors and regret (e.g., Eschbaugh & Gute, 2008; Fisher, Worth, Garcia, & Meredith, 2012). For this reason, approach sexual motives may be less relevant for couples, if not protective, in the engagement of risky sexual behaviors. These findings contribute to the body of research regarding the relationship

between approach sexual motives and risky sexual behaviors, by demonstrating that *patterns* of increased approach sexual motives were associated with a *pattern* of decreased risky sexual behavior over a 30 day period.

Limitations

Although this study has numerous strengths (e.g., daily diary methodology, consideration of multiple dimensions of predictors of risky sexual behavior, assessment of numerous risky sexual indicators over time), there are some notable limitations. One limitation of the current study involves issues with generalizability of the results from the current study to the broader community, due to the composition of the sample. Specifically, there are more women (i.e., 75.00%) and fewer racial/ethnic minority participants (i.e., 12.50% identified as racial minorities; 5.80% identified as non-Hispanic) in the current study than typically found in college student populations or the community, in general. To reduce concerns about limited generalizability, previous studies in this domain modified their recruitment strategy to obtain diverse samples. For example, one study utilized a stratified random sampling procedure to obtain a highly diverse sample (e.g., 30% African American, 22% Asian American, 12% Multiracial; 30% Hispanic; Vasilenko, Lefkowitz, & Maggs, 2012), to increase generalizability of the results to various college student demographic groups. However, this was beyond the capability of this dissertation study, particularly one conducted in this area of the country. Given the relatively homogenous sample in the current study, results may be less applicable to individuals who do not identify as Caucasian and/or female.

Another limitation is the relatively low number of sexual behaviors reported by participants during the daily diary portion of the current study, which limited the variance

in the data. A possible explanation for the relatively lower incidence of risky sexual behaviors in the current study may be due to the trending decline in risky sexual behaviors in the last two decades (CDC, 2017b). It is possible that the decline in risky sexual behaviors may be, in part, due to the increased reliance on technology, which has reduced the necessity for in-person contacts and subsequent opportunity for sexual contacts. However, there seems to be a lower prevalence of sexual behaviors reported in the current study, when compared to previous research. For example, in the current study, participants reported engaging in vaginal sex on 16.4% of the sampled days, whereas in another similar study, rates were 27.50% (Patrick & Maggs, 2009). It is possible that collecting data over the summer, rather than during the semesters, as was the case for many previous studies (e.g., Vasilenko, Lefkowitz, & Maggs, 2012), may have led to a lower prevalence of risky sexual behaviors in the current study. It could be the case that, during the academic year, college students have increased opportunities for engagement in sexual behaviors, due to the lack of parental supervision and increased access to same-age peers and alcohol and drugs, compared to the summer when many students return to their family residence. It is also possible that relationships that persist into the summer are more committed than relationships that are exclusive to the academic year. As such, it may be useful to complete data collection during the academic year *and* during the summer break to obtain data with increased variability and to also examine the hypothesized difference in rates of engagement in sexual behaviors.

Possible Directions for Future Research

Future research should continue to investigate predictors of daily risky sexual behaviors in college students, but do so while also improving upon limitations in the

current study. One important modification for ensuing research studies in this domain would be to revise the recruitment strategy for potential participants. Specifically, over-recruiting racial/ethnic minorities or using a stratified recruiting strategy would increase the diversity of the sample and, consequently, the generalizability of the study findings. It may also be beneficial to over-recruit college students who regularly engage in risky behaviors (e.g., risky sexual behaviors, use of illicit substances). Targeting recruitment of college students who engage in risky behaviors may be accomplished by advertising to students who participate in substance use programming (e.g., in lieu of other forms of discipline), are subject to disciplinary board reviews, are involved in Greek life (Scott-Sheldon, Carey, & Carey, 2008), and who seek STD treatment at the university clinic (Leigh, Vanslyke, Hoppe, Rainey, Morrison, & Gillmore, 2008). Consistent with the Problem Behavior Theory (Jessor & Jessor, 1977), which has received ample research support in prior studies, recruiting college students who are involved in one type of risky behavior (e.g., substance use, disruptive behavior) are more likely to be involved in other types of risky behaviors, including risky sexual behaviors. As such, future researchers may benefit from increased consideration of their recruitment strategies to improve the generalizability of their findings, when investigating daily risky sexual behaviors.

Further, future researchers may wish to modify the time-frame of the study in a variety of ways. For example, college students are significantly impacted by the academic year, leading to differences between their behaviors during the schoolyear and the summer (e.g., Miller, Merrill, Yurasek, Mastroleo, & Borsari, 2016; Van Orden et al., 2008). Even more nuanced, is the potential for differences between Fall and Spring semesters (e.g., Clapp, Johnson, Shillington, Lange, & Voas, 2008; Tremblay et al.,

2010) and varied class schedules (e.g., morning vs. afternoon classes; Wood, Sher, & Rutledge, 2007). Because of impact of the academic year and course schedule on college students, it would be beneficial for researchers to collect data at various time-points during the academic year and summer. Some previous researchers have employed this tactic, including Vasilenko, Lefkowitz, and Maggs (2012), who collected daily diary surveys on 14 days in the Fall semester and 14 days in the Spring semester, which allowed the researchers to capture a broader range of functioning from their participants. Moreover, because of the recent pandemic and the anticipated shift to hybrid college courses (e.g., portions of classes taught online and portions of classes taught in-person), it would behoove researchers to examine differences in students' behavior when they are enrolled in online vs. in-person courses. The structure afforded by enrollment in in-person classes and the abrupt termination of this structure will undoubtedly impact college students in a variety of ways, likely including their pattern of sexual behaviors. Taken together, consideration of the time-period(s) that data are collected and purposeful sampling of various time-periods may allow for researchers to capture more varied behaviors among their college student participants, including risky sexual behaviors.

Conclusion

Overall, the current study offered limited support for the proposed hypotheses that were expected to substantiate associations between many of the previously robust distal, proximal, and situational risk variables and engagement in daily risky sexual behaviors over a 30-day period. Notably, daily substance use and daily approach sexual motives were the only variables that were statistically significant predictors of college students' engagement in daily risky sexual behaviors in hierarchical linear model analyses. With

consideration of the relevance of substance use, perhaps an appropriate area for intervention is through a harm-reduction approach, which may be accomplished through brief motivational interviewing sessions focused on reducing risky substance use and sexual behavior with at-risk college students. This approach was successfully implemented by Derman and Thomas (2011), who found a reduction in college students' HIV risk behavior (e.g., fewer instances of unprotected sex) and alcohol risk behavior (e.g., less alcoholic beverages consumed), when they participated in two subject-specific motivational interviewing sessions. With consideration of the relevance of daily approach sexual motives as a potential protective factor for college students' engagement in risky sexual behaviors, it may be advantageous to reinforce consideration of approach sexual motives in interventions targeted risky sexual behaviors. For example, one study found that when young adults experienced more sexual autonomy, akin to approach sexual motives, there was an increase in sexual well-being (e.g., sexual health, sexual satisfaction), as well (Gravel, 2017). Taken together, there are opportunities to incorporate findings from the current study into interventions aimed at reducing risky sexual behaviors and/or promoting healthy sexual behaviors.

However, prior to investing in interventions to mitigate the deleterious impact of substance use and/or harness the protective power of approach sexual motives on engagement in risky sexual behaviors, it is essential for additional research to be conducted. Researchers interested in conducting future studies in this domain should strive to be more adherent to theoretical-based tests of risk factors (e.g., developing study designs guided by Problem Behavior Theory). Researchers, and the scientific community, will also benefit from the employment of more sophisticated, causal analytical models

that have the capability of examining clusters of relevant, comprehensive predictors. If researchers fail to strive toward exhaustive, theory-driven examinations of causal models, it is possible that trumpeted “robust” predictors may continue to be identified as relevant by overly-simplified studies, despite the lack of evidence from rigorous testing of the predictors.

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Appendix A: Demographics Questionnaire

1. Gender:
    a. Male
    b. Female
    c. Transgender
    d. Non-binary
    e. Other _____
2. Age: _____
3. Race:
    a. Black / African American
    b. White / Caucasian
    c. Asian / Asian American
    d. Native Hawaiian or other Pacific Islander
    e. Native American/ American Indian
    f. Bi-racial/ Multi-racial
4. Ethnicity:
    a. Hispanic/Latino
    b. Non-Hispanic/Latino
5. Predominant sexual orientation:
    a. Heterosexual
    b. Homosexual
    c. Bisexual
    d. Pansexual
    e. Asexual
    f. Other _____
6. Marital status:
    a. Single, never married
    b. Cohabitating (living together)
    c. Married
    d. Separated
    e. Divorced
    f. Widowed
7. What is your current dating status?
    a. I do not date
    b. I am casually dating (i.e. non-exclusive)
    c. I am seriously dating (i.e. exclusive)
    d. I am involved in a long-term exclusive relationship
    e. I live with my partner
    f. I am engaged
    g. I am married
8. If currently in a monogamous relationship, how long have you been in your current relationship?
    a. Years _____ Months _____
9. Year in school:

a. Freshman
b. Sophomore
c. Junior
d. Senior
e. 5th year senior

10. Parents' marital status:
    a. Married
    b. Separated
    c. Divorced
    d. Never married
11. Mother's level of education:
    a. Less than 7th grade
    b. Junior high school, including 9th grade
    c. Some high school
    d. High school graduate
    e. Some college or specialized training
    f. College degree (BA/BS)
    g. Graduate/professional training (e.g., Master's, MD, Ph.D.)
    h. Don't know
12. Father's level of education:
    a. Less than 7th grade
    b. Junior high school, including 9th grade
    c. Some high school
    d. High school graduate
    e. Some college or specialized training
    f. College degree (BA/BS)
    g. Graduate/professional training (e.g., Master's, MD, Ph.D.)
    h. Don't know
13. Socioeconomic status
    a. Unemployed or disabled
    b. $10,000 - $20,000
    c. $21,000 - $30,000
    d. $31,000 - $40,000
    e. $41,000 - $50,000
    f. $51,000 - $75,000
    g. $76,000 - $100,000
    h. $100,000 - $150,000
    i. $151,000 or more

Appendix B: Childhood Trauma Questionnaire

INSTRUCTIONS: Now we are going to ask you about some things that might have happened in your life. Please answer each question honestly and your experience **AS A CHILD (12 OR YOUNGER)**.

The rating scale is as follows:
1 = Never true
2 = Rarely true
3 = Sometimes true
4 = Often true
5 = Very often true

1. I was called names by my family
2. I was hit hard enough to see a doctor
3. I was touched sexually
4. I felt loved
5. I did not have enough to eat
6. My parents wished I was never born
7. I was hit hard enough to leave bruises
8. I was hurt if I didn't do something sexual
9. I was made to feel important
10. I got taken care of
11. I felt hated by my family
12. I was punished with hard objects
13. I was made to do sexual things
14. I was looked out for
15. My parents were drunk or high
16. My family said hurtful things
17. I was physically abused
18. I was molested
19. My family felt close
20. I wore dirty clothes
21. I was emotionally abused
22. I was hit badly enough to be noticed
23. I was sexually abused
24. My family was a source of strength
25. I got taken to the doctor

Appendix C: Religious Commitment Inventory-10

PARENT RATING INSTRUCTIONS: Please read each item carefully and answer the following questions about **YOUR PARENT(S)** beliefs and practices that you observed **AS A CHILD (12 OR YOUNGER)**.

Each item is rated as:
1 = not at all true of my parent(s)
2 = somewhat true of my parent(s)
3 = moderately true of my parent(s)
4 = mostly true of my parent(s)
5 = totally true of my parent(s)

1. My parent(s) often read books and magazines about their faith.
2. My parent(s) made financial contributions to their religious organization.
3. My parent(s) spent time trying to grow in understanding of their faith.
4. Religion was especially important to my parent(s) because it answered many questions about the meaning of life.
5. My parent(s) religious beliefs lied behind their whole approach to life.
6. My parent(s) enjoyed spending time with others of their religious affiliation.
7. Religious beliefs influenced all my parent(s) dealings in life.
8. It was important to my parent(s) to spend periods of time in private religious thought and reflection.
9. My parent(s) enjoyed working in the activities of their religious organization.
10. My parent(s) kept well informed about their local religious group and had some influence in its decisions.

Appendix D: Network of Relationships Inventory

Behavioral Systems Version

INSTRUCTIONS: Please answer the following questions regarding your relationship with your parent or parents, **AS A CHILD (12 OR YOUNGER)**.

The rating scale is as follows:

1 = little or none
2 = somewhat
3 = very much
4 = extremely much
5 = the most

1. How much did you seek out your parent(s) when you were upset?
2. How much did you turn to your parent(s) for comfort and support when you were troubled about something?
3. How much did you turn to your parent(s) when you were worried about something?
4. How much did your parent(s) encourage you to try new things that you wanted to do, but were nervous about?
5. How much did your parent(s) encourage you to pursue your goals and future plans?
6. How much did your parent(s) show support for your activities?
7. How much did your parent(s) turn to you for comfort and support when they were troubled about something?
8. How much did your parent(s) turn to you when they were worried about something?
9. How much did your parent(s) seek you out when they were upset?
10. How much did you encourage your parent(s) to try new things that they would like to do, but were nervous about?
11. How much did you encourage your parent(s) to pursue their goals and future plans?
12. How much did you show support for your parents' activities?
13. How much did you and your parent(s) spend free time together?
14. How often did you and your parent(s) go places and do enjoyable things together?
15. How much did you and your parent(s) play around and have fun?

Appendix E: Levenson Self Report Psychopathy Scale

INSTRUCTIONS: Please answer the following questions regarding your thoughts and behaviors.

The rating scale is as follows:

1 = strongly disagree
2 = disagree
3 = agree
4 = strongly agree

Primary Psychopathy

1. Success is based on survival of the fittest; I am not concerned about the losers.
2. For me, what's right is whatever I can get away with.
3. In today's world, I feel justified in doing anything I can get away with to succeed.
4. My main purpose in life is getting as many goodies as I can.
5. Making a lot of money is my most important goal.
6. I let others worry about higher values; my main concern is with the bottom line.
7. People who are stupid enough to get ripped off usually deserve it.
8. Looking out for myself is my top priority.
9. I tell other people what they want to hear so that they will do what I want them to do.
10. I would be upset if my success came at someone else's expense.
11. I often admire a really clever scam.
12. I make a point of trying not to hurt others in pursuit of my goals.
13.1 enjoy manipulating other people's feelings.
14. I feel bad if my words or actions cause someone else to feel emotional pain.
15. Even if I were trying very hard to sell something, I wouldn't lie about it.
16. Cheating is not justified because it is unfair to others

Secondary Psychopathy

1. I find myself in the same kinds of trouble, time after time.
2. I am often bored.
3. I find that I am able to pursue one goal for a long time.
4. I don't plan anything very far in advance.
5. I quickly lose interest in tasks I start.
6. Most of my problems are due to the fact that other people just don't understand me.
7. Before I do anything, I carefully consider the possible consequences.
8. I have been in a lot of shouting matches with other people.
9. When I get frustrated, I often "let off steam" by blowing my top.
10. Love is overrated.

Appendix F: ADHD Self-Report Scale Screener

INSTRUCTIONS: Please answer the questions below, rating yourself on each of the criteria shown using the scale below. Answer each question, with the response that best describes how you have felt and conducted yourself **OVER THE PAST 6 MONTHS**.

The rating scale is:

0 = Never
1 = Rarely
2 = Sometimes
3 = Often
4 = Very Often

1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?
2. How often do you have difficulty getting things in order when you have to do a task that requires organization?
3. How often do you have problems remembering appointments or obligations?
4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?
5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?
6. How often do you feel overly active and compelled to do things, like you were driven by a motor?

Appendix G: Patient Health Questionnaire-9

INSTRUCTIONS: **OVER THE LAST TWO WEEKS**, how often have you been bothered by any of the following problems? Please indicate your answer to each item using the scale below:

0 = Not at all
1 = several days
2 = more than half the days
3 = nearly every day

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Trouble falling or staying asleep, or sleeping too much
4. Feeling tired or having little energy
5. Poor appetite or overeating
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual
9. Thoughts that you would be better off dead or of hurting yourself in some way

Appendix H: Generalized Anxiety Disorder-7 Scale

INSTRUCTIONS: **OVER THE LAST TWO WEEKS**, how often have you been bothered by any of the following problems? Please indicate your answer to each item using the scale below:

0 = Not at all
1 = several days
2 = more than half the days
3 = nearly every day

1. Feeling nervous, anxious or on edge
2. Not being able to stop or control worrying
3. Worrying too much about different things
4. Trouble relaxing
5. Being so restless that it is hard to sit still
6. Becoming easily annoyed or irritable
7. Feeling afraid as if something awful might happen

Appendix I: Peer Norms of Risky Sexual Behaviors

INSTRUCTIONS: For the following questions, please indicate your perceptions on how many times a typical college student will engage in each behavior/set of behaviors over a **ONE MONTH PERIOD**, by entering a numerical value for each item.

1. How many times does the typical college student engage in sexual activity (e.g., kissing, oral sex, penetrative intercourse) with another person?
2. How many times does the typical college student regularly use protection against sexually transmitted infections/diseases (STIs/STDs) and/or pregnancy? Examples include condoms and birth control pills
3. How many times does the typical college student discuss their partner's sexual risk status (e.g., last time they got tested, STD history, IV-drug use) prior to engaging in sex?
4. How many times does the typical college student engage in sending and/or receiving sexual text or social media messages ("sexting")? Examples include requesting semi-nude/nude pictures, sending semi-nude/nude pictures, and/or talking dirty
5. How many times does the typical college student use smartphone dating applications? Examples include Tinder, OkCupid, Hinge, Badoo, Bumble, and Grindr
6. How many times does the typical college student contract or learn about their contraction of a sexually transmitted infection/disease (STI/STD)? Examples include chlamydia, HPV, herpes, gonorrhea, and HIV/AIDS.
7. How many times does the typical college student become unexpectedly pregnant or have a partner who become unexpectedly pregnant?

Appendix J: AUDIT-C

INSTRUCTIONS: Here are a few questions about alcohol. Please answer as correctly and honestly as possible by indicating which answer is right for you.

1. How often do you have a drink containing alcohol?
    (1) Never
    (2) Monthly or less
    (3) 2-4 times a month
    (4) 2-3 times a week
    (5) 4 or more times a week
2. How many drinks containing alcohol do you have on a typical day when you are drinking?
    a) 1 or 2
    b) 3 or 4
    c) 5 or 6
    d) 7, 8, or 9
    e) 10-14
    f) 15 or more
3. How often do you have six or more drinks on one occasion?
    a. Never
    b. Less than monthly
    c. Monthly
    d. Weekly
    e. Daily or almost daily

Appendix K: DUDIT

INSTRUCTIONS: The following questions ask about your use of drugs. Please select the answer that best describes you.

During the past 12 months:

1. About how often do you use cannabis (for example, hash, pot, marijuana, THC, or other)?

Never
Less than monthly
Monthly
2-3 times a month
Weekly
2 to 3 times a week
4 or more times a week

2. About how often do you use cocaine (for example, intranasal, IV, crack, freebase, "speedball," or other)?

Never
Less than monthly
Monthly
2-3 times a month
Weekly
2 to 3 times a week
4 or more times a week

3. About how often do you use hallucinogens / PCP (for example, LSD, mescaline, peyote, psilocybin, STP, mushrooms, PCP, "angel dust," Extasy, MDMA, or other)?

Never
Less than monthly
Monthly
2-3 times a month

Weekly
2 to 3 times a week
4 or more times a week

4. About how often do you use stimulants that were not prescribed for you by a doctor (for example, amphetamine, “speed,” crystal meth, dexadrine, Ritalin, “ice,” or other)?

Never
Less than monthly
Monthly
2-3 times a month
Weekly
2 to 3 times a week
4 or more times a week

5. About how often do you use sedatives, hypnotics, or anxiolytics that were not prescribed for you by a doctor (for example, Xanax, Quaaludes, Valium, Librium, barbiturates, Miltown, Ativan, Dalmane, Halcion, Restoril, Seconal, or other)?

Never
Less than monthly
Monthly
2-3 times a month
Weekly
2 to 3 times a week
4 or more times a week

6. About how often do you use opiates that were not prescribed for you by a doctor (for example, heroin, morphine, Oxycontin, Hydrocodone, opium, Methadone, codeine, Demerol, Darvon, Percodan, Dilaudid, or other)?

Never
Less than monthly
Monthly
2-3 times a month
Weekly
2 to 3 times a week
4 or more times a week

7. About how often do you use other substances, such as steroids, glue, gasoline, paint, inhalants, nitrous oxide, “laughing gas,” amyl or butyl nitrate, “poppers,” nonprescription sleep or diet pills, unknown, or other?

Never
Less than monthly
Monthly
2-3 times a month
Weekly
2 to 3 times a week
4 or more times a week

8. How often during the past 12 months have you found that you were not able to stop using drugs once you had started?

Never
Less than monthly
Monthly
Weekly
Daily or almost daily

9. How often during the past 12 months have you failed to do what was normally expected from you because of your drug use?

Never
Less than monthly
Monthly
Weekly
Daily or almost daily

10. How often during the past 12 months have you had a feeling of guilt or remorse after using drugs?

Never
Less than monthly
Monthly

Weekly
Daily or almost daily

11. How often during the past 12 months have you been unable to remember what happened the night before because you had been using drugs?

Never
Less than monthly
Monthly
Weekly
Daily or almost daily

12. How often during the past 12 months have you used drugs to keep yourself from experiencing withdrawal symptoms?

Never
Less than monthly
Monthly
Weekly
Daily or almost daily

13. In the past 12 months, have you or someone else been injured as a result of your drug use?

No
Yes, but not in the last 12 months
Yes, during the last 12 months

14. In the past 12 months, has a relative or friend, or a doctor or other health worker been concerned about your drug use or suggested you cut down or stop?

No
Yes, but not in the last 12 months
Yes, during the last 12 months

Appendix L: Sexual Risk Survey

INSTRUCTIONS: Please read the following statements and record the number that is true for you **OVER THE PAST 6 MONTHS** for each question on the blank. If you do not know for sure how many times a behavior took place, try to estimate the number as close as you can. Thinking about the average number of times the behavior happened per week or per month might make it easier to estimate an accurate number, especially if the behavior happened fairly regularly. If you've had multiple partners, try to think about how long you were with each partner, the number of sexual encounters you had with each, and try to get an accurate estimate of the total number of each behavior. If the question does not apply to you or you have never engaged in the behavior in the question, put a ''0'' on the blank. Please do not leave items blank. Remember that in the following questions ''sex'' includes oral, anal, and vaginal sex and that ''sexual behavior'' includes passionate kissing, making out, fondling, petting, oral-to-anal stimulation, and hand-to-genital stimulation. Refer to the Glossary for any words you are not sure about. Please consider only the last 6 months when answering and please be honest. In the past six months:

1. How many partners have you engaged in sexual behavior with, but not had sex with?
2. How many times have you left a social event with someone you just met?
3. How many times have you ''hooked up'' but not had sex with someone you didn't know or didn't know well?
4. How many times have you gone out to bars/parties/social events with the intent of ''hooking up'' and engaging in sexual behavior but not having sex with someone?
5. How many times have you gone out to bars/parties/ social events with the intent of ''hooking up'' and having sex with someone?
6. How many times have you had an unexpected and unanticipated sexual experience?
7. How many times have you had a sexual encounter you engaged in willingly but

later regretted?

For the next set of questions, follow the same direction as before. However, for questions 8–23, if you have never had sex (oral, anal or vaginal), please put a ‘‘0’’ on each blank.

8. How many partners have you had sex with?
9. How many times have you had vaginal intercourse without a latex or polyurethane condom? Note: Include times when you have used a lambskin or membrane condom.
10. How many times have you had vaginal intercourse without protection against pregnancy?
11. How many times have you given or received fellatio (oral sex on a man) without a condom?
12. How many times have you given or received cunnilingus (oral sex on a woman) without a dental dam or ‘‘adequate protection’’ (please see definition of dental dam for what is considered adequate protection)?
13. How many times have you had anal sex without a condom?
14. How many times have you or your partner engaged in anal penetration by a hand (‘‘fisting’’) or other object without a latex glove or condom followed by unprotected anal sex?
15. How many times have you given or received analingus (oral stimulation of the anal region, ‘‘rimming’’) without a dental dam or ‘‘adequate protection’’(please see definition of dental dam for what is considered adequate protection)?
16. How many people have you had sex with that you know but are not involved in any sort of relationship with (i.e., ‘‘friends with benefits’’, ‘‘fuck buddies’’)?
17. How many times have you had sex with someone you don’t know well or just met?
18. How many times have you or your partner used alcohol or drugs before or during sex?
19. How many times have you had sex with a new partner before discussing sexual history, IV drug use, disease status and other current sexual partners?
20. How many times (that you know of) have you had sex with someone who has had many sexual partners?
21. How many partners (that you know of) have you had sex with who had been sexually active before you were with them but had not been tested for STIs/HIV?
22. How many partners have you had sex with that you didn’t trust?
23. How many times (that you know of) have you had sex with someone who was also engaging in sex with others during the same time period?

Appendix M: Expanded Measure of Risky Sexual Behaviors

INSTRUCTIONS: Please answer the following questions about your sexual behavior

OVER THE LAST SIX MONTHS.

1. How often did you use protection against sexually transmitted infections/diseases (STIs/STDs) and/or pregnancy? Examples include condoms and birth control pills.
    a. Never (0% of the time)
    b. Sometimes (less than 50% of the time)
    c. Most of the time (more than 50% of the time)
    d. All of the time (100% of the time)
2. How would you characterize the MAJORITY of your sexual partners BEFORE you engaged in sexual relations with them?
    a. Stranger (first time meeting this person)
    b. Acquaintance (person you've met before, but you don't know them well)
    c. Casual relationship ("friends with benefits," occasional hookups; can date/hookup with other people)
    d. Committed relationship (steady, romantic partner in exclusive relationship)
3. What protection against sexually transmitted infections/diseases (STIs/STDs) and/or pregnancy did you use? Select all that apply:
    a. Condoms
    b. Other barrier methods (e.g., dental dam)
    c. Birth control (oral contraception, IUD, arm implant)
    d. Plan B (emergency contraception)
    e. Pull out method
4. Did you engage in sending and/or receiving sexual text or social media messages ("sexting")? Examples include requesting semi-nude/nude pictures, sending semi-nude/nude pictures, and/or talking dirty.
    a. Yes
    b. No
5. If yes, how often did your sexting lead to engagement in sexual behavior?
    a. Never
    b. Sometimes
    c. Most of the time
    d. All of the time
6. Did you use smartphone dating applications? Examples include Tinder, OkCupid, Hinge, Badoo, Bumble, and Grindr.
    a. Yes
    b. No
7. If yes, how often did your smartphone dating app use lead to engagement in sexual behavior?

   a. Never
   b. Sometimes
   c. Most of the time
   d. All of the time
8. Did you contract or learn about your contraction of a sexually transmitted infection/disease (STI/STD)? Examples include chlamydia, HPV, herpes, gonorrhea, and HIV/AIDS.
   a. Yes
   b. No
9. Did you (or your partner) become unexpectedly pregnant or learn about your (or your partner's) unexpected pregnancy?
   a. Yes
   b. No

These next questions are about your **LIFETIME** sexual experiences:

10. At what age did you first have sexual intercourse?
11. How many times have you been diagnosed with a sexually transmitted infection/disease (STI/STD) by a health provider?
12. How many times have you or your partner been pregnant?

Appendix N: Daily Substance Use

INSTRUCTIONS: Please answer the following questions about your sexual behavior **WITHIN THE LAST DAY**. For the purpose of this study, the last day refers to the period of time from when you woke up to when you went to sleep (e.g., 10pm, 2 am the next day).

1. How many standard alcoholic drinks did you consume yesterday? A standard alcoholic drink is a 12-ounce beer, 5-ounces of wine, and 1.5 ounces of liquor (shot; mixed drink)
    a. 0
    b. 1
    c. 2
    d. 3
    e. 4
    f. 5
    g. 6
    h. 7
    i. 8
    j. 9
    k. 10
    l. 11
    m. 12
    n. 13
    o. 14
    p. 15
    q. More than 15
2. What drugs did you use yesterday?
    a. None
    b. Tobacco (e.g., cigarettes)
    c. Marijuana (weed)
    d. MDMA (“Molly”)
    e. Prescription medication (e.g., Adderall, Xanax, pain pills)
    f. Hallucinogens (e.g., psilocybin mushrooms, PCP)
    g. Cocaine
    h. Heroin
    i. Inhalants (e.g., aerosol sprays)

Appendix O: Daily Sexual Motives

INSTRUCTIONS: Please read each item and rate the importance each item in influencing your decision to engage in sexual behavior **WITHIN THE LAST DAY**. For the purpose of this study, the last day refers to the period of time from when you woke up to when you went to sleep (e.g., 10pm, 2 am the next day).

Use the following scale to record your answers:
1 = not at all important
2 = slightly important
3 = moderately important
4 = important
5 = very important

1. To pursue my own sexual pleasure
2. To feel good about myself
3. To please my partner
4. To promote intimacy in my relationship
5. To express love for my partner
6. To avoid conflict in my relation ship
7. To prevent my partner from becoming upset
8. To prevent my partner from getting angry at me
9. To prevent my partner from losing interest in me

Appendix P: Daily Partner Characteristics

INSTRUCTIONS: Please answer the following questions about your sexual behavior **WITHIN THE LAST DAY**. For the purpose of this study, the last day refers to the period of time from when you woke up to when you went to sleep (e.g., 10pm, 2 am the next day).

1. Select the answer that best describes your relationship with your sex partner BEFORE you engaged in sexual relations with them, during the previous day:
    a. Stranger (first time meeting this person)
    b. Acquaintance (person you've met before, but you don't know them well)
    c. Casual relationship ("friends with benefits," occasional hookups; can date/hookup with other people)
    d. Committed relationship (steady, romantic partner in exclusive relationship)
2. Have you had PREVIOUS sexual relations (e.g., kissing, oral sex, penetrative sex) with your sex partner?
    a. Yes, multiple times
    b. Yes, once
    c. No, this is the first time we had sexual relations
3. Are you or your sex partner engaging in sexual relations with other people?
    a. Yes, me/my partner can/do hook up with other people
    b. No, me/my partner do not hook up with other people

Appendix Q: Daily Sexual Behaviors Covariate

INSTRUCTIONS: Please answer the following questions about your sexual behavior **WITHIN THE LAST DAY**. For the purpose of this study, the last day refers to the period of time from when you woke up to when you went to sleep (e.g., 10pm, 2 am the next day).

1. Did you engage in sexual activity (e.g., kissing, oral sex, penetrative intercourse) with another person?
    a. Yes
    b. No
2. If yes, please select what behaviors you engaged in from the following list (select all that apply):
    a. Kissing/making out
    b. Fondling over clothes
    c. Genital stimulation by hand
    d. Genital stimulation by mouth (i.e., cunnilingus/oral sex)
    e. Anal stimulation by hand
    f. Anal stimulation by mouth
    g. Vaginal sex
    h. Anal sex

Appendix R: Daily Risky Sexual Behaviors

INSTRUCTIONS: Please answer the following questions about your sexual behavior **WITHIN THE LAST DAY**. For the purpose of this study, the last day refers to the period of time from when you woke up to when you went to sleep (e.g., 10pm, 2 am the next day).

1. Did you use protection against sexually transmitted infections/diseases (STIs/STDs) and/or pregnancy? Examples include condoms and birth control pills.
    a. Yes
    b. No
2. Did you discuss your partner's sexual risk status (e.g., last time they got tested, STD history, IV-drug use) prior to engaging in sex?
    a. Yes, I asked prior to this sexual encounter
    b. Yes, I asked at a previous sexual encounter
    c. No
3. Did you use alcohol or drugs prior to engagement in any sexual activity (e.g., kissing, oral sex, penetrative sex)?
    a. Yes
    b. No
4. Do you believe your partner was drunk or high during your sexual encounter with them?
    a. Yes
    b. No

Appendix S: Power Analysis Information

The aim in recruiting a sample size of $N = 170$ was to account for attrition of participants who drop out after starting daily diary surveys (e.g., Morrison-Beedy, Carey, Feng, & Tu, 2008; Shorey, Stuart, McNulty, & Moore, 2014), while being sufficient to detect medium effects found in similar previous daily diary studies (e.g., Kiene et al., 2009). Notably, there is no standard power analysis available for daily diary methodology; a power analysis for a linear multiple regression provided the closest approximation to the analyses that were conducted. A power analysis for a linear multiple regression conducted with G*Power 3.1.3 (Faul, Lang, & Buchner, 2007), with a medium effect ($f^2 = .15$) and adequate statistical power ($\beta = .80$), revealed that a sample size of $N = 109$ would be sufficient for the current study. However, the result of this power analysis reflected estimates for single-time point data and was a conservative estimate for the current study, given the increased power that resulted from repeated measures from each participant.

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