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The Role of Impulsivity in the Relation Between Negative Affect and Risky Sexual Behaviors

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Abstract

While risky sexual behavior associates with negative affect, and impulsivity often increases during negative affective states, little is known about the interrelations of these factors. This study examined whether impulsivity explained the relation between negative affect and risky sex among college students. Negative affect exhibited an indirect effect via impulsivity on number of sexual partners for both males and females, and on inconsistent condom use for females, but not males. Results suggest risky sex may serve to regulate negative affect, proposing the importance of negative affect in future strategies to reduce risky sex among young adults.

INTRODUCTION

In the United States, the incidence of human immunodeficiency virus (HIV) and sexually transmitted infections (STIs) is increasing fastest among young adults, who account for approximately 20% of new HIV infections and half of all new STIs (Satterwhite et al., 2013). Contributing to the increased risk for HIV and STI among this age group is the high rate of risky sexual behavior (RSB). For example, among college students, 16.3% report having three or more sexual partners in the past 12 months, while 66.3% of those who are sexually active report inconsistent condom use during vaginal intercourse and 20.4% report unprotected sex while drinking alcohol (American College Health Association, 2014).

Negative affect is one risk candidate for engaging in RSB. Trait negative affect is defined as the degree to which an individual typically experiences distressing and aversive emotions (Costa & McCrae, 1992; Whiteside & Lynam, 2001). Previous research has reported mixed

findings regarding the association of trait negative affect with RSBs (Brody, Chen, & Kogan, 2010; Crepaz & Marks, 2001; Littleton, Grills, & Drum, 2014). One reason for these inconsistencies may be that previous research designs have not modeled data separately for males and females. In fact, theory and empirical data routinely suggest that males and females often differ in their proneness for negative affect (Gater et al., 1998; Yonkers & Gurguis, 1995) and that there are often distinct etiological influences as a function of sex (Stewart, Taylor, & Baker, 1997; Zvolensky, Eifert, & Lejuez, 2001) for negative mood propensity. Mixed findings concerning RSBs may be related to the research designs and analyses used in previous studies (Kalichman & Weinhardt, 2001). For instance, intensive longitudinal designs show that state negative affect (the experience of negative affect in the moment) is reduced following sexual intercourse (Fortenberry et al., 2005; Shrier, Koren, Aneja, & de Moor, 2010) and RSBs (Barta, Tennen, & Kiene, 2010; Blood & Shrier, 2013). For example, state negative affect increases prior to intercourse with a casual sex partner (Blood & Shrier, 2013). Additionally, among males, laboratory-induced negative affect is related to riskier decision making on a laboratory task (Lighthall, Mather, & Gorlick, 2009; van den Bos, Harteveld, & Stoop, 2009), and present-day stress demonstrates similar relations (Galván & McGlennen, 2012). Specific to RSBs, greater psychophysiologic response (e.g., skin conductance reactivity) to pleasant and unpleasant pictures associates with a greater likelihood of having had sex with a stranger (Derefinko et al., 2014). Overall, these data suggest a relation between negative affect and RSBs, but the mechanisms underlying these associations are as of yet largely unclear.

Impulsivity is a personality trait that denotes the tendency to engage in behavior without planning or consideration of potential consequences (Cyders & Smith, 2008; Whiteside & Lynam, 2001). Impulsivity is associated with a variety of risk behaviors in young adults, including problematic alcohol use (Coskunpinar & Cyders, 2012; Cyders & Coskunpinar, 2011), substance use (Beaton, Abdi, & Filbey, 2014; Quinn & Harden, 2013), problematic gambling (MacLaren, Fugelsang, Harrigan, & Dixon, 2011; Wong, Zane, Saw, & Chan, 2013), and RSBs (Dir, Coskunpinar, Steiner, & Cyders, 2013; Fulton, Marcus, & Zeigler-Hill, 2014). Impulsivity is related to sexting (i.e., sending sexual pictures via text messages; Dir et al., 2013; Temple et al., 2014), sex with casual partners (Black, McMahon, Potenza, Fiellin, & Rosen, 2015; Dir et al., 2013), number of sexual partners (Donohew et al., 2000), and inconsistent condom use (Derefinko et al., 2014). Moreover, impulsivity mediates the relation of drug use to an index of RSBs (Winters, Botzet, Fahnhorst, Baumel, & Lee, 2008) and moderates the relation of drug use to nonuse of condoms (Nydegger, Ames, Stacy, & Grenard, 2014). On task-based measures of risk taking, greater impulsivity relates to riskier decision making (Buelow & Suhr, 2013; Franken, van Strien, Nijs, & Muris, 2008), particularly in the presence of sexually arousing stimuli (Laier, Pawlikowski, & Brand, 2014; Macapagal & Janssen, 2011).

The relation between negative affect and impulsivity is well documented (Fetterman, Robinson, Ode, & Gordon, 2010; Tice, Bratslavsky, & Baumeister, 2001). In psychometric studies of the Big Five Inventory of personality traits and facets, the impulsivity facet loads onto the neuroticism personality factor (Costa & McCrae, 1992; Whiteside & Lynam, 2001), which is typified by high levels of negative affect. This connection suggests a strong relation between trait-based negative affect and impulsivity. The relation of impulsivity with negative

affect is especially apparent in the study of risk behavior. Impulsivity mediates the relation of depression symptoms with problematic alcohol use (Cyders & Coskunpinar, 2011; Gonzalez, Reynolds, & Skewes, 2011) and the relation of stress with both problematic alcohol use (Hamilton, Ansell, Reynolds, Potenza, & Sinha, 2013) and smoking status (Ansell, Gu, Tuit, & Sinha, 2012). Negative urgency, the tendency toward impulsive behavior in response to negative affect, also predicts RSBs (Deckman & DeWall, 2011), such as nonuse of condoms (Derefinko et al., 2014; Simons, Maisto, & Wray, 2010), and sexual “hookups” (Dir et al., 2013). However, to date, no studies have examined whether impulsivity mediates the relation of negative affect with RSBs.

The present study tested an empirically driven model in which the relation between trait negative affect and RSBs was explained by trait impulsivity (see >Figure 1). Separate analytical models were tested for two RSBs frequently associated with contracting HIV and STIs (Gewirtzman, Bobrick, Conner, & Tying, 2011): number of sex partners over the past six months and inconsistent condom use, both during the past six months. Since the factors that influence RSBs may be different for males and females (Black et al., 2015; Brodbeck, Vilén, Bachmann, Znoj, & Alsaker, 2010), each analytical model was examined for males and females separately. The proposed model included theoretically relevant covariates known to influence RSBs: age (Pflieger, Cook, Niccolai, & Connell, 2013), race/ethnicity (Pflieger et al., 2013), relationship status (Cooper, Barber, Zhaoyang, & Talley, 2011), trait positive affect (Houck et al., 2014), sexual trauma history (Littleton et al., 2014), and peak alcohol use (Fielder & Carey, 2010). It was hypothesized that, for males and females, trait negative affect would exert an indirect effect, through trait impulsivity, on both the number of sexual partners and inconsistent condom use. If supported, the proposed model would suggest impulsivity as a target for efforts to reduce RSBs among young adults with high levels of chronic negative affect.

METHOD

Participants

Between August 2013 and December 2014, college students ($N = 1,349$; 83.3% female) were recruited from an ethnically diverse university in the southwestern United States; they received extra credit toward psychology coursework as compensation. Recruitment occurred via flyers and posting on the extra credit website. Inclusion criteria required being 18 years of age or older and proficient in English. Participants were excluded for inconsistent ($n = 290$) or incomplete responding to study measures ($n = 211$). Participants reporting only same-sex sexual activities ($n = 37$) were too few for statistical analyses and were also excluded. The final sample consisted of 811 college students (84.5% female; $M_{age} = 22.98$; $SD = 5.10$; age range: 18–57 years). Ethnically, the sample was 32.2% Caucasian (non-Hispanic), 12.3% African American (non-Hispanic), 31.8% Hispanic, 14.7% Asian, and 9.0% other or mixed ethnicities.

Procedures

Study protocol complied with the Institutional Review Board at the university in which the study was conducted. Participants completed online informed consent before proceeding to

an Internet-based self-report survey. All study measures were completed online. No identifying information was retained linking participants to survey responses.

Materials

Demographics—Sex, age, race/ethnicity (coded: Caucasian = 0; non-Caucasian = 1), and relationship status (coded: single/nonexclusive dating = 0; exclusive relationship = 1) were collected and included in analyses as covariates.

Sexual HIV-risk behavior—A modified, 14-item version of the Sexual Behavior Questionnaire (SBQ; Durant & Carey, 2000) was used to assess RSBs over the previous six months. Participants reported the number of male and the number of female partners with whom they had penetrative sex (e.g., “How many female partners have you had sex with (i.e., vaginal, anal, or oral sex) in the past month?”). For both male and female partners, participants then reported the frequency of vaginal, anal, and oral sex with (e.g., “How many times have you had vaginal sex with a condom?”) and without (e.g., “How many times have you had vaginal sex without a condom?”) a condom, respectively. The SBQ has shown excellent test-retest reliability among females ($\rho = .84$ to $.96$; $M\rho = .92$; Durant & Carey, 2000). In the present study, the dependent variable was restricted to vaginal sexual intercourse with an opposite-sex partner (henceforth referred to as “sex partners”). Number of sex partners and inconsistent condom use served as outcome variables. Inconsistent condom use was operationalized as the proportion of vaginal sexual intercourse events in which a condom was not used and was calculated as the frequency of vaginal sexual intercourse without a condom divided by the total frequency of vaginal sexual intercourse (DiClemente, Brown, Sales, & Rose, 2013).

Trait negative affect—The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a self-report measure that assesses the degree with which participants typically experience 20 different positive (e.g., excited, proud) or negative affective states (e.g., afraid, distressed). Participants were instructed as follows: “Indicate to what extent you generally feel this way, that is, how you feel on the average.” Responses span a Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The PANAS produces two subscales, Positive Affect (PA) and Negative Affect (NA), which have shown good internal reliability (PA: $\alpha = .86$; NA: $\alpha = .87$) and validity (Watson et al., 1988). In the present study, the internal reliabilities of both subscales (PA: $\alpha = .92$; NA: $\alpha = .90$) were excellent; the PA subscale served as a covariate, while the NA subscale served as the predictor in the theorized model.

Trait impulsivity—The Personality Inventory for the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012) was used to assess trait impulsivity. The PID-5 is a 220-item measure that was developed using item response theory and produces five domains and 25 facets of maladaptive personality (Krueger et al., 2012). In a representative sample, the PID-5 showed good internal reliability ($\alpha = .72$ to $.96$; $M\alpha = .86$), with the impulsivity facet exhibiting acceptable internal reliability ($\alpha = .77$; Krueger et al., 2012). The PID-5 has also shown good test-retest reliability and criterion validity (Wright et al., 2015). In the present study,

the internal reliability of the PID-5 Impulsivity facet was acceptable ($\alpha = .79$); impulsivity served as the mediator in the proposed model.

Alcohol use—Alcohol use during the past month was measured using the Drinking Patterns Questionnaire (DPQ; Collins, Parks, & Marlatt, 1985; Matthews & Miller, 1979). The DPQ has shown good reliability and convergent validity with other measures of drinking behavior (Collins et al., 1985). The present study included the maximum number of drinks consumed on one occasion (henceforth “peak alcohol use”) as a covariate.

Sexual trauma history—The Posttraumatic Distress Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997) was used to code for having experienced a sexual trauma. The PDS has shown good internal consistency ($\alpha = .73$ to $.94$) and convergent validity (Foa et al., 1997). For the purpose of this study, endorsement of any item regarding sexual assault by family member, sexual assault by stranger, or child sexual abuse (items 5, 6, and 8) was coded as having a sexual trauma history. Sexual trauma history served as a covariate.

Data Analytic Strategy

The proposed mediation model was tested in SPSS 22.0 using the PROCESS Macro, a publicly available syntax package designed for mediation analyses (Hayes, 2013). The PROCESS Macro utilizes a regression framework with bootstrapping to examine the indirect effect of a predictor variable on an outcome through a proposed mediator. Indirect effects are calculated as the product ($a \times b$) of the beta coefficients from two linear models: the first predicting the mediator from the proposed independent variable (path a); and the second predicting the proposed outcome variable from the proposed mediator (path b ; see Figure 1). Bootstrapping is a resampling method that generates, with replacement, thousands of “samples” from a sample of observed scores. The size of each bootstrapped sample is equal to the sample size of observed scores (Hayes, 2013). Unlike traditional regression theory, bootstrapping does not assume normality of observed data (Hayes, 2013). Within the PROCESS Macro, the sampling distribution of the indirect effect is estimated from the indirect effect calculated within each bootstrapped sample (Hayes, 2013). The present study utilized 10,000 bootstrapped samples. Bias corrected 95% confidence intervals (BC 95% CI) were calculated, and an indirect effect was determined to be significant if the confidence interval did not include zero (Preacher & Hayes, 2008).

All variables were standardized to yield completely standardized indirect effects (Preacher & Kelley, 2011). Separate models were estimated for sex partners and condom use outcomes. Bootstrapped analyses accommodated for the nonnormality of both outcome variables. Since the present study utilized cross-sectional data, two comparison models were tested to verify the direction of effects among the model variables (Preacher & Hayes, 2008). The predictor and mediator variables were switched in comparison model 1. In the comparison model 2, the mediator and outcome variables were switched.

RESULTS

Descriptive statistics and bivariate correlations of study variables are presented in Table 1. The average number of sexual partners in the past six months for males was 1.84 (range: 0–

30) and 1.32 for females (range: 0–24). Among reporters of vaginal intercourse, the average male did not use a condom in 43% of sexual events, while the average female did not use a condom in 57% of sexual events.

Model parameters are presented in Table 2. All direct, indirect, and total effects are presented in Table 3. Total effects present the effect of negative affect on each outcome variable without including impulsivity in the model (Hayes, 2013). For the proposed model with number of sexual partners as the dependent measure, there was a significant positive indirect effect for both males (standardized point estimate = .190, BC 95% CI: .074 to .381; direct effect of negative affect controlling for Impulsivity = $-.027$, $SE = .208$, $p = .896$; total effect of negative affect = .163, $SE = .193$, $p = .402$) and females (standardized point estimate = .019, BC 95% CI: .002 to .040; direct effect of negative affect controlling for Impulsivity = $-.011$, $SE = .042$, $p = .784$; total effect of negative affect = .007, $SE = .040$, $p = .857$). The comparison models for males (model 1: standardized point estimate = $-.014$, BC 95% CI: $-.168$ to .220; model 2: standardized point estimate = .011, BC 95% CI: $-.023$ to .033) and females (model 1: standardized point estimate = $-.003$, BC 95% CI: $-.029$ to .021; model 2: standardized point estimate = .001, BC 95% CI: $-.004$ to .009) did not yield significant indirect effects, which supported the direction of effects within the proposed model.

As condom use is only beneficial in the context of sexual intercourse, and the present study limited analyses to vaginal sexual intercourse, analyses for inconsistent condom use were restricted to those participants who reported vaginal sexual intercourse in the previous six months (males = 102; females = 572). A significant positive indirect effect was observed for females (standardized point estimate = .022, BC 95% CI: .001 to .048; direct effect of negative affect controlling for Impulsivity = $-.012$, $SE = .043$, $p = .778$; total effect of negative affect = .010, $SE = .042$, $p = .818$), but not for males (standardized point estimate = $-.008$, BC 95% CI: $-.103$ to .077; direct effect of negative affect controlling for Impulsivity = $-.032$, $SE = .100$, $p = .754$; total effect of negative affect = $-.040$, $SE = .090$, $p = .662$). The comparison models for females (model 1: standardized point estimate = $-.003$, BC 95% CI: $-.025$ to .018; model 2: standardized point estimate = .001, BC 95% CI: $-.006$ to .010) did not yield significant indirect effects, which supported the direction of effects observed in the proposed model.

DISCUSSION

The present study examined whether trait impulsivity explains the relation of trait negative affect with specific RSBs. For both males and females, the hypothesized indirect effect of trait negative affect on number of sexual partners via impulsivity was supported. However, the hypothesized indirect effect of trait negative affect on inconsistent condom use via impulsivity was supported only for females. The observed direct and indirect effects suggest that, while negative affect does not directly influence RSBs, the propensity to experience negative affect is associated with increased impulsivity that, in turn, increases engagement in RSBs. These findings extend previous work (Barta et al., 2010; Blood & Shrier, 2013; Derefinko et al., 2014; Dir et al., 2013; Simons et al., 2010) by suggesting the relation of negative affect to RSBs is qualified by its relation with impulsivity. Specifically, this study

extends previous research as the first to report that trait impulsivity explains the relation of trait negative affect with number of sexual partners among males and females, and with condom use among females.

The significant indirect effect of trait negative affect on number of sexual partners (among both males and females) and inconsistent condom use (females only) via trait impulsivity was observed in the context of theoretically relevant factors known to influence RSBs, including age, race/ethnicity, relationship status, trait positive affect, sexual trauma history, and peak alcohol use. The indirect effect of negative affect accounted for unique variance over and above these factors. Testing two alternative models, in which either negative affect or RSBs served as the mediating variable, did not yield significant indirect effects. These alternative models increased confidence in the inference that trait impulsivity explained the direction of relations in the proposed model (Preacher & Hayes, 2008).

The nature of these results also suggested gender differences in the indirect effect of negative affect on RSBs via impulsivity. First, the standardized indirect effect of negative affect on number of sexual partners for males ($\beta = .190$) was 10 times that of females ($\beta = .019$). Upon examining the *a*- and *b*-paths in the model, impulsivity exerted a significant direct effect on number of sexual partners among males, but not among females (see Table 2). Together, these data would suggest that, in efforts to reduce number of sexual partners, addressing negative affect-related impulsivity may be a higher priority among males than among females. Secondly, the indirect effect of negative affect on inconsistent condom use via impulsivity among males was not significant. Further examination showed that neither of the direct effects of negative affect nor impulsivity associated with inconsistent condom use among males. For males, only demographic variables (i.e., race and relationship status) were significantly related to inconsistent condom use. This finding suggests that, among males, inconsistent condom use may be better explained by situational factors.

The effect size of the indirect effects among females was relatively small for both number of sexual partners and inconsistent condom use. Although negative affect was significantly related to impulsivity, impulsivity was not associated with either RSB outcome, which likely reduced the indirect effect. Whereas early (traditional) statistical recommendations would have precluded the examination of mediation effects under these circumstances (e.g., Baron & Kenny, 1986), contemporary work demonstrates that significant bivariate relations are not mathematically necessary to test indirect effects (Hayes, 2013; Rucker, Preacher, Tormala, & Petty, 2011). Specific inference tests for the indirect effect have the advantage of increased statistical power and better account for potential suppression effects between covariates (measured and unmeasured) with the hypothesized predictor and mediator variables (Fritz & MacKinnon, 2007; Hayes, 2013; MacKinnon, 2008; Rucker et al., 2011). However, given the small indirect effect sizes observed among females, it is important to consider additional factors influencing RSBs among female young adults. Examining study covariates suggests that, alongside the indirect effects of negative affect, factors such as alcohol use, race, and being single (not in a committed relationship) may be important predictors of number of sexual partners, while older age, having experienced a sexual trauma, and being in a committed relationship may heavily influence condom use.

Detecting the mechanism by which trait negative affect relates to RSBs is important for the development of prevention and intervention efforts to reduce RSBs among adolescents and young adults. The present results suggest that impulsivity may be part of the mechanism connecting trait negative affect with RSBs. Given that young adults report more positive than negative consequences following sexual behavior (Vasilenko, Lefkowitz, & Maggs, 2012), including pleasure and increases in positive affect (Bourdeau, Grube, Bersamin, & Fisher, 2011; Shrier et al., 2010), it may be that sexual behavior serves as a method to increase positive affect and reduce negative affect. That impulsivity explained the relation of trait negative affect to RSBs in the present study supports previous work that suggests impulsive behavior may reflect difficulties with affect regulation in response to distress (Gratz & Roemer, 2004; Weiss, Tull, Viana, Anestis, & Gratz, 2012). As such, these findings support previous research that suggests RSBs may function as a strategy to regulate negative affect (Littleton et al., 2014; Shrier et al., 2010). Therefore, negative affect and affect-related impulsivity may be important targets for programs aimed at increasing safe sex practices and reducing the transmission of HIV and other STIs among young people. In particular, the present results are particularly relevant to youth who are predisposed to chronically high levels of negative affect, such as sexually victimized (Littleton et al., 2014; Messman-Moore, Ward, Zerubavel, Chandley, & Barton, 2015) and depressed or anxious (Brody et al., 2010; Fielder & Carey, 2010; Littleton et al., 2014) youth.

Limitations

Several limitations of the present study should be noted. First, the cross-sectional nature of this study prevents conclusions about causation based on the proposed model. Second, because all assessments were based on self-report, results of the present study may have been influenced by measurement effects. Future work should incorporate multiple assessment methods (e.g., task measures of impulsivity; physiological measures of affective arousal) to mitigate measurement effects. Third, the sample of males was much smaller than the sample of females, which may have limited statistical power to detect indirect effects among the subsample of sexually experienced males and made gender comparisons infeasible. Fourth, the study sample included college students only and may not generalize to other populations. However, given the racial and ethnic diversity of the sample, study findings may be applicable across a wide range of college students. Future research is needed to examine whether impulsivity explains the relation of negative affect with sexual behaviors among other populations. Finally, given the small number of participants who identified as sexual minorities, analyses were limited to self-identified heterosexual college students. Additional research is needed to determine whether the present study's proposed model generalizes to sexual-minority populations.

Conclusions

Overall, the present study was an initial investigation of the mechanisms relating negative affect to numbers of sexual partners and inconsistent condom use. The significant indirect effect via impulsivity observed in this study may help to clarify why previous research on the relation of trait negative affect with RSBs has been inconclusive. Results suggest that prospective research on the relation of negative affect and RSBs is needed to confirm whether impulsivity indeed mediates this relation, to determine other possible mediators,

and to examine other potential mechanisms linking negative affect with RSBs other than number of sexual partners and inconsistent condom use.

References

- American College Health Association. American College Health Association-National College Health Assessment II: Reference Group Report Spring 2014. Hanover, MD: American College Health Association; 2014.
- Ansell EB, Gu P, Tuit K, Sinha R. Effects of cumulative stress and impulsivity on smoking status. *Human Psychopharmacology: Clinical and Experimental*. 2012; 27(2):200–208. [PubMed: 22389084]
- Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*. 1986; 51(6):1173–1182. DOI: 10.1037/0022-3514.51.6.1173 [PubMed: 3806354]
- Barta WD, Tennen H, Kiene SM. Alcohol-involved sexual risk behavior among heavy drinkers living with HIV/AIDS: Negative affect, self-efficacy, and sexual craving. *Psychology of Addictive Behaviors*. 2010; 24(4):563–570. [PubMed: 21198219]
- Beaton D, Abdi H, Filbey FM. Unique aspects of impulsive traits in substance use and overeating: Specific contributions of common assessments of impulsivity. *The American Journal of Drug and Alcohol Abuse*. 2014; 40(6):463–475. DOI: 10.3109/00952990.2014.937490 [PubMed: 25115831]
- Black AC, McMahon TJ, Potenza MN, Fiellin LE, Rosen MI. Gender moderates the relationship between impulsivity and sexual risk-taking in a cocaine-using psychiatric outpatient population. *Personality and Individual Differences*. 2015; 75:190–194. DOI: 10.1016/j.paid.2014.11.035 [PubMed: 25554716]
- Blood EA, Shrier LA. The temporal relationship between momentary affective states and condom use in depressed adolescents. *Archives of Sexual Behavior*. 2013; 42(7):1209–1216. [PubMed: 23297149]
- Bourdeau B, Grube JW, Bersamin MM, Fisher DA. The role of beliefs in sexual behavior of adolescents: Development and validation of an adolescent sexual expectancies scale. *Journal of Research on Adolescence*. 2011; 21(3):639–648. DOI: 10.1111/j.1532-7795.2010.00697.x
- Brodbeck J, Vilén UL, Bachmann M, Znoj H, Alsaker FD. Sexual risk behavior in emerging adults: Gender-specific effects of hedonism, psychosocial distress, and sociocognitive variables in a 5-year longitudinal study. *AIDS Education and Prevention*. 2010; 22(2):148–159. DOI: 10.1521/aeap.2010.22.2.148 [PubMed: 20387985]
- Brody GH, Chen YF, Kogan SM. A cascade model connecting life stress to risk behavior among rural African American emerging adults. *Development and Psychopathology*. 2010; 22(3):667–678. [PubMed: 20576186]
- Buelow MT, Suhr JA. Personality characteristics and state mood influence individual deck selections on the Iowa Gambling Task. *Personality and Individual Differences*. 2013; 54(5):593–597. DOI: 10.1016/j.paid.2012.11.019
- Collins RL, Parks GA, Marlatt GA. Social determinants of alcohol consumption: The effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*. 1985; 53(2):189–200. DOI: 10.1037/0022-006X.53.2.189 [PubMed: 3998247]
- Cooper ML, Barber LL, Zhaoyang R, Talley AE. Motivational pursuits in the context of human sexual relationships. *Journal of Personality*. 2011; 79(6):1031–1066. DOI: 10.1111/j.1467-6494.2010.00713.x
- Coskunpinar A, Cyders MA. Mediation–moderation analysis of problematic alcohol use: The roles of urgency, drinking motives, and risk/benefit perception. *Addictive Behaviors*. 2012; 37(7):880–883. [PubMed: 22475583]
- Costa PT, McCrae RR. Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment*. 1992; 4(1):5–13. DOI: 10.1037/1040-3590.4.1.5

- Crepaz N, Marks G. Are negative affective states associated with HIV sexual risk behaviors? A meta-analytic review. *Health Psychology*. 2001; 20(4):291–299. DOI: 10.1037/0278-6133.20.4.291 [PubMed: 11515741]
- Cyders MA, Coskunpinar A. Depression, impulsivity and health-related disability: A moderated mediation analysis. *Journal of Research in Personality*. 2011; 45(6):679–682.
- Cyders MA, Smith GT. Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin*. 2008; 134(6):807–828. [PubMed: 18954158]
- Deckman T, DeWall CN. Negative urgency and risky sexual behaviors: A clarification of the relationship between impulsivity and risky sexual behavior. *Personality and Individual Differences*. 2011; 51(5):674–678.
- Derefinko KJ, Peters JR, Eisenlohr-Moul TA, Walsh EC, Adams ZW, Lynam DR. Relations between trait impulsivity, behavioral impulsivity, physiological arousal, and risky sexual behavior among young men. *Archives of Sexual Behavior*. 2014; 43(6):1149–1158. [PubMed: 24958252]
- DiClemente RJ, Brown JL, Sales JM, Rose ES. Rate of decay in proportion of condom-protected sex acts among adolescents after participation in an HIV risk-reduction intervention. *JAIDS: Journal of Acquired Immune Deficiency Syndromes*. 2013; 63(Suppl. 1):S85–S89. DOI: 10.1097/QAI.0b013e3182920173 [PubMed: 23673893]
- Dir AL, Coskunpinar A, Steiner JL, Cyders MA. Understanding differences in sexting behaviors across gender, relationship status, and sexual identity, and the role of expectancies in sexting. *Cyberpsychology, Behavior, and Social Networking*. 2013; 16(8):568–574.
- Donohew L, Zimmerman R, Cupp PS, Novak S, Colon S, Abell R. Sensation seeking, impulsive decision-making, and risky sex: Implications for risk-taking and design of interventions. *Personality and Individual Differences*. 2000; 28(6):1079–1091. DOI: 10.1016/S0191-8869(99)00158-0
- Durant LE, Carey MP. Self-administered questionnaires versus face-to-face interviews in assessing sexual behavior in young women. *Archives of Sexual Behavior*. 2000; 29(4):309–322. DOI: 10.1023/A:1001930202526 [PubMed: 10948721]
- Fetterman AK, Robinson MD, Ode S, Gordon KH. Neuroticism as a risk factor for behavioral dysregulation: A mindfulness-mediation perspective. *Journal of Social and Clinical Psychology*. 2010; 29(3):301–321.
- Fielder RL, Carey MP. Predictors and consequences of sexual “hookups” among college students: A short-term prospective study. *Archives of Sexual Behavior*. 2010; 39(5):1105–1119. [PubMed: 19130207]
- Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*. 1997; 9(4):445–451. DOI: 10.1037/1040-3590.9.4.445
- Fortenberry JD, Temkit MH, Tu W, Graham CA, Katz BP, Orr DP. Daily mood, partner support, sexual interest, and sexual activity among adolescent women. *Health Psychology*. 2005; 24(3):252–257. [PubMed: 15898860]
- Franken IHA, van Strien JW, Nijs I, Muris P. Impulsivity is associated with behavioral decision-making deficits. *Psychiatry Research*. 2008; 158(2):155–163. DOI: 10.1016/j.psychres.2007.06.002 [PubMed: 18215765]
- Fritz MS, MacKinnon DP. Required sample size to detect the mediated effect. *Psychological Science*. 2007; 18(3):233–239. [PubMed: 17444920]
- Fulton JJ, Marcus DK, Zeigler-Hill V. Psychopathic personality traits, risky sexual behavior, and psychological adjustment among college-age women. *Journal of Social and Clinical Psychology*. 2014; 33(2):143–168.
- Galván A, McGlennen KM. Daily stress increases risky decision-making in adolescents: A preliminary study. *Developmental Psychobiology*. 2012; 54(4):433–440. [PubMed: 22012864]
- Gater R, Tansella M, Korten A, Tiemens BG, Mavreas VG, Olatawura MO. Sex differences in the prevalence and detection of depressive and anxiety disorders in general health care settings: Report from the World Health Organization collaborative study on psychological problems in general health care. *Archives of General Psychiatry*. 1998; 55(5):405–413. DOI: 10.1001/archpsyc.55.5.405 [PubMed: 9596043]

- Gewirtzman, A., Bobrick, L., Conner, K., Tyring, S. Epidemiology of sexually transmitted infections. In: Gross, GE., Tyring, SK., editors. Sexually transmitted infections and sexually transmitted diseases. Heidelberg, Germany: Springer; 2011. p. 13-34.
- Gonzalez VM, Reynolds B, Skewes MC. Role of impulsivity in the relationship between depression and alcohol problems among emerging adult college drinkers. *Experimental and Clinical Psychopharmacology*. 2011; 19(4):303–313. [PubMed: 21480733]
- Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*. 2004; 26(1):41–54.
- Hamilton KR, Ansell EB, Reynolds B, Potenza MN, Sinha R. Self-reported impulsivity, but not behavioral choice or response impulsivity, partially mediates the effect of stress on drinking behavior. *Stress: The International Journal on the Biology of Stress*. 2013; 16(1):3–15.
- Hayes, AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: Guilford Press; 2013.
- Houck C, Swenson R, Donenberg G, Papino A, Emerson E, Brown LK. Adolescents' emotions prior to sexual activity and associations with sexual risk factors. *AIDS and Behavior*. 2014; 18(8):1615–1623. [PubMed: 24558097]
- Kalichman SC, Weinhardt L. Negative affect and sexual risk behavior: Comment on Crepez and Marks (2001). *Health Psychology*. 2001; 20(4):300–301. [PubMed: 11515742]
- Krueger RF, Derringer J, Markon KE, Watson D, Skodol AE. Initial construction of a maladaptive personality trait model and inventory for DSM-5. *Psychological Medicine*. 2012; 42(9):1879–1890. [PubMed: 22153017]
- Laier C, Pawlikowski M, Brand M. Sexual picture processing interferes with decision-making under ambiguity. *Archives of Sexual Behavior*. 2014; 43(3):473–482. [PubMed: 23733155]
- Lighthall NR, Mather M, Gorlick MA. Acute stress increases sex differences in risk seeking in the balloon analogue risk task. *PLoS One*. 2009; 4(7):e6002.doi: 10.1371/journal.pone.0006002 [PubMed: 19568417]
- Littleton HL, Grills AE, Drum KB. Predicting risky sexual behavior in emerging adulthood: Examination of a moderated mediation model among child sexual abuse and adult sexual assault victims. *Violence and Victims*. 2014; 29(6):981–998. [PubMed: 25905140]
- Macapagal KR, Janssen E. The valence of sex: Automatic affective associations in erotophilia and eroto-phobia. *Personality and Individual Differences*. 2011; 51(6):699–703. [PubMed: 21869852]
- MacKinnon, DP. Introduction to statistical mediation analysis. New York, NY: Taylor & Francis Group/Lawrence Erlbaum Associates; 2008.
- MacLaren VV, Fugelsang JA, Harrigan KA, Dixon MJ. The personality of pathological gamblers: A meta-analysis. *Clinical Psychology Review*. 2011; 31(6):1057–1067. DOI: 10.1016/j.cpr.2011.02.002 [PubMed: 21802620]
- Matthews DB, Miller WR. Estimating blood alcohol concentration: Two computer programs and their applications in therapy and research. *Addictive Behaviors*. 1979; 4(1):55–60. DOI: 10.1016/0306-4603(79)90021-2 [PubMed: 420046]
- Messman-Moore T, Ward RM, Zerubavel N, Chandley RB, Barton SN. Emotion dysregulation and drinking to cope as predictors and consequences of alcohol-involved sexual assault: Examination of short-term and long-term risk. *Journal of Interpersonal Violence*. 2015; 30(4):601–621. DOI: 10.1177/0886260514535259 [PubMed: 24919992]
- Nydegger LA, Ames SL, Stacy AW, Grenard JL. Response inhibition moderates the association between drug use and risky sexual behavior. *Substance Use & Misuse*. 2014; 49(11):1457–1464. DOI: 10.3109/10826084.2014.912230 [PubMed: 24827870]
- Pflieger JC, Cook EC, Niccolai LM, Connell CM. Racial/ethnic differences in patterns of sexual risk behavior and rates of sexually transmitted infections among female young adults. *American Journal of Public Health*. 2013; 103(5):903–909. DOI: 10.2105/AJPH.2012.301005 [PubMed: 23488501]
- Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*. 2008; 40(3):879–891. [PubMed: 18697684]

- Preacher KJ, Kelley K. Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods*. 2011; 16(2):93–115. (Supplemental). DOI: 10.1037/a0022658.supp [PubMed: 21500915]
- Quinn PD, Harden KP. Differential changes in impulsivity and sensation seeking and the escalation of substance use from adolescence to early adulthood. *Development and Psychopathology*. 2013; 25(1):223–239. DOI: 10.1017/S0954579412000284 [PubMed: 22824055]
- Rucker DD, Preacher KJ, Tormala ZL, Petty RE. Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*. 2011; 5(6): 359–371. DOI: 10.1111/j.1751-9004.2011.00355.x
- Satterwhite CL, Torrone E, Meites E, Dunne EF, Mahajan R, Ocfemia MCB, Weinstock H. Sexually transmitted infections among US women and men: Prevalence and incidence estimates, 2008. *Sexually Transmitted Diseases*. 2013; 40(3):187–193. DOI: 10.1097/OLQ.0b013e318286bb53 [PubMed: 23403598]
- Shrier LA, Koren S, Aneja P, de Moor C. Affect regulation, social context, and sexual intercourse in adolescents. *Archives of Sexual Behavior*. 2010; 39(3):695–705. [PubMed: 18818996]
- Simons JS, Maisto SA, Wray TB. Sexual risk taking among young adult dual alcohol and marijuana users. *Addictive Behaviors*. 2010; 35(5):533–536. [PubMed: 20071102]
- Stewart SH, Taylor S, Baker JM. Gender differences in dimensions of anxiety sensitivity. *Journal of Anxiety Disorders*. 1997; 11(2):179–200. DOI: 10.1016/S0887-6185(97)00005-4 [PubMed: 9168341]
- Temple JR, Le VD, van den Berg P, Ling Y, Paul JA, Temple BW. Brief report: Teen sexting and psychosocial health. *Journal of Adolescence*. 2014; 37(1):33–36. DOI: 10.1016/j.adolescence.2013.10.008 [PubMed: 24331302]
- Tice DM, Bratslavsky E, Baumeister RF. Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology*. 2001; 80(1):53–67. DOI: 10.1037/0022-3514.80.1.53 [PubMed: 11195891]
- van den Bos R, Harteveld M, Stoop H. Stress and decision-making in humans: Performance is related to cortisol reactivity, albeit differently in men and women. *Psychoneuroendocrinology*. 2009; 34(10):1449–1458. DOI: 10.1016/j.psyneuen.2009.04.016 [PubMed: 19497677]
- Vasilenko SA, Lefkowitz ES, Maggs JL. Short-term positive and negative consequences of sex based on daily reports among college students. *Journal of Sex Research*. 2012; 49(6):558–569. [PubMed: 21707408]
- Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*. 1988; 54(6): 1063–1070. [PubMed: 3397865]
- Weiss NH, Tull MT, Viana AG, Anestis MD, Gratz KL. Impulsive behaviors as an emotion regulation strategy: Examining associations between PTSD, emotion dysregulation, and impulsive behaviors among substance dependent inpatients. *Journal of Anxiety Disorders*. 2012; 26(3):453–458. [PubMed: 22366447]
- Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*. 2001; 30(4):669–689.
- Winters KC, Botzet AM, Fahnhorst T, Baumel L, Lee S. Impulsivity and its relationship to risky sexual behaviors and drug abuse. *Journal of Child & Adolescent Substance Abuse*. 2008; 18(1):43–56.
- Wong G, Zane N, Saw A, Chan AKK. Examining gender differences for gambling engagement and gambling problems among emerging adults. *Journal of Gambling Studies*. 2013; 29(2):171–189. [PubMed: 22585283]
- Wright AGC, Calabrese WR, Rudick MM, Yam WH, Zelazny K, Williams TF, Simms LJ. Stability of the DSM-5 Section III pathological personality traits and their longitudinal associations with psychosocial functioning in personality disordered individuals. *Journal of Abnormal Psychology*. 2015; 124(1):199–207. (Supplemental). DOI: 10.1037/abn0000018.supp [PubMed: 25384070]
- Yonkers, KA., Gurguis, G. Gender differences in the prevalence and expression of anxiety disorders. In: Seeman, MV., editor. *Gender and psychopathology*. Arlington, VA: American Psychiatric Association; 1995. p. 113-130.

Zvolensky MJ, Eifert GH, Lejuez CW. Offset control during recurrent 20% carbon dioxide-enriched air induction: Relation to individual difference variables. *Emotion*. 2001; 1(2):148–165. DOI: 10.1037/1528-3542.1.2.148 [PubMed: 12899194]

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FIGURE 1.

Proposed model examining whether impulsivity explained the relation of negative affect with number of sexual partners and inconsistent condom use in the past six months.

TABLE 1

Zero-Order Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Age (years) ^a	—	-.151	.193 [†]	-.038	-.019	.261*	.052	.245 [†]	-.010	-.047
2. Race/Ethnicity ^a	-.033	—	-.019	-.077	.028	.077	-.005	-.244 [†]	-.012	-.004
3. Relationship Status ^a	.159**	-.041	—	.012	.059	.159	-.123	.355**	-.013	-.134
4. Positive Affect ^a	.092 [†]	-.050	-.013	—	.061	.168	-.028	-.043	-.084	-.038
5. Peak Alcohol Use ^a	-.069	-.081 [†]	-.124*	.021	—	.003	-.015	-.105	.013	.189 [†]
6. Sexual Trauma History ^a	.135**	-.104*	.008	-.009	.038	—	-.057	.117	.061	.176 [†]
7. Sexual Partners ^d	.009	-.093 [†]	-.124*	.012	.219**	.030	—	.074	.074	.201 [†]
8. Inconsistent Condom Use ^d	.198**	-.079	.186**	-.043	.002	.125*	-.090 [†]	—	-.074	-.141
9. Negative Affect ^b	-.138**	.072	-.092 [†]	-.156**	.036	.115*	.014	-.009	—	.414*
10. Impulsivity ^c	-.090 [†]	.071	-.134**	-.098 [†]	.181**	.135**	.099*	.053	.325**	—
Males (<i>n</i> = 126)	Mean (<i>n</i>)	23.17	89	70	33.37	5.87	19	1.84	0.43	20.79
	<i>SD</i> (%)	5.26	70.63	55.55	9.02	11.48	15.1	3.14	0.42	7.97
Females (<i>n</i> = 685)	Mean (<i>n</i>)	22.94	461	252	33.90	3.70	207	1.32	0.57	20.84
	<i>SD</i> (%)	5.07	67.30	36.79	8.35	3.80	30.2	1.55	0.42	7.46

Notes. Data for males is presented above, while data for females is presented below. Age = age in years; Race/Ethnicity = racial and ethnic background, coded as Caucasian = 0 and non-Caucasian = 1, with descriptive statistics for number and percentage non-Caucasian; Relationship Status = romantic relationship status, coded as single/non-exclusive dating = 0 and exclusive relationship = 1, with descriptive statistics for number and percentage single/non-exclusive dating; Positive Affect = trait positive affect, the total score for the Positive and Negative Affect Scale; Peak Alcohol Use = the most drinks consumed on one occasion in the past month, as reported on the Drinking Patterns Questionnaire; Sexual Trauma History = endorsement of sexual assault or child sexual abuse items on the Post-traumatic Distress Scale; Sexual Partners = number of opposite-sex sexual partners in the previous six months according to the Sexual Behaviors Questionnaire; Inconsistent Condom Use = proportion of vaginal sexual intercourse events in which a condom was NOT used during the previous six months according to the Sexual Behaviors Questionnaire; Negative Affect = trait negative affect, reported as the total score for the Positive and Negative Affect Scale–Negative Affect subscale; Impulsivity = trait impulsivity, the total score for the Impulsivity subscale of the Personality Inventory for the DSM-5. a Covariates. b Predictor. c Mediator. d Outcome Variables.

[†] *p* < .05.

* *p* < .01.

** *p* < .001.

TABLE 2

Model parameters for all examined outcome variables

	<i>Outcome Variable</i>	<i>R² (p-value)</i>	<i>Predictors</i>	<i>β</i>	<i>t</i>	<i>p-value</i>
Males	Number of sexual partners	.070 (<i>p</i> = .373)	Constant	.813	3.507	<.001
			Age	.245	1.181	.240
			Race	.050	0.241	.810
			Relationship	-.205	-1.000	.320
			Pos. Affect	.019	0.097	.923
			Peak Alcohol	-.056	-0.555	.580
			Sex Trauma	-.319	-1.162	.248
			Neg. Affect	-.027	-0.132	.896
			Impulsivity	.589	2.212	.029
			Inconsistent Condom use	-.190	-1.762	.081
		.230 (<i>p</i> = .002)	Constant	.134	1.522	.131
			Age	-.222	-2.371	.020
			Race	.314	3.358	.001
			Relationship	-.058	-0.683	.497
			Pos. Affect	-.051	-1.176	.242
			Peak Alcohol	.037	0.295	.769
			Sex Trauma	-.032	-0.314	.754
			Neg. Affect	-.024	-0.192	.849
			Impulsivity	.150	3.893	<.001
			Constant	.043	1.061	.289
Females	Number of sexual partners	.069 (<i>p</i> < .001)	Age	-.087	-2.232	.026
			Race	-.109	-2.711	.007
			Relationship	.003	0.078	.938
			Pos. Affect	.295	4.999	<.001
			Peak Alcohol	.002	0.055	.957
			Sex Trauma	-.011	-0.274	.784
			Neg. Affect	.065	1.569	.117
			Impulsivity	.017	0.405	.686
			Inconsistent Condom use			
			Constant			

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<i>Outcome Variable</i>	<i>R² (p-value)</i>	<i>Predictors</i>	<i>β</i>	<i>t</i>	<i>p-value</i>
		Age	.167	4.056	<.001
		Race	-.066	-1.656	.098
		Relationship	.184	4.077	<.001
		Pos. Affect	-.047	-1.135	.257
		Peak Alcohol	.039	0.622	.534
		Sex Trauma	.081	2.017	.044
		Neg. Affect	-.012	-0.283	.778
		Impulsivity	.083	1.935	.054

TABLE 3

Direct, Indirect, and Total Effects of Negative Affect on Risky Sexual Behaviors, Separately for Males and Females

DV	Effect of IV on M (a)	Effect of M on DV (b)	Direct effect (c')	Indirect effect		Total effect (c)
				(a × b)	95% CI	
Males	Partners .322**	.589 [†]	-.027	.190	[.074, .381]	.163
	Condoms .337**	-.024	-.032	-.008	[-.103, .077]	-.040
Females	Partners .289**	.065	-.011	.019	[.002, .040]	.008
	Condoms .263**	.083	-.012	.022	[.001, .048]	.010

Notes. IV = Independent Variable, M = Statistical Mediator, DV = Dependent Variable.

[†] $p < .05$.

** $p < .001$.