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Risk Factors in the Relationship between Gender and Crack/ Cocaine

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Abstract

Female inner-city substance users evidence greater crack/cocaine use and are more likely to be dependent on this drug than any other drug. Additionally females inner-city substance users evidence greater crack/cocaine use and are more likely to be dependent on this drug than their male counterparts, despite no consistent difference demonstrated in use and dependence across other drugs. Because no published work has examined empirically the factors underlying this link between females and crack/cocaine, the current study examined the role of theoretically relevant personality and environmental variables. Among 152 (37% female) individuals in a residential substance use treatment program, females evidenced greater use of crack/cocaine (current and lifetime heaviest) and were significantly more likely to evidence crack/cocaine dependence than their male counterparts. In contrast, no gender differences were found for any other substance across alcohol, cannabis, and hallucinogens (including PCP). Surprisingly, females were more impulsive than their male counterparts, with impulsivity serving as a risk factor in the relationship between gender and crack/cocaine dependence and lifetime heaviest use. Females also evidenced higher levels of negative emotionality and childhood abuse, but neither variable served as a risk factor in the relationship between gender and crack/cocaine dependence or use. Limitations and future directions are discussed including the need for further exploration of impulsivity across its various dimensions, as well as the inclusion of additional variables such as social context variables, to account more fully for this complex link between gender and crack/cocaine.

Keywords

Gender; Crack/Cocaine; Drug Choice; Impulsivity; Childhood Abuse; Negative Affect

An emerging body of literature suggests that inner-city drug using females are overwhelmingly more likely to use and/or be dependent upon crack/cocaine than any other illicit drug (Bornovalova, Lejuez, Daughters, Rosenthal, & Lynch, 2005; Lejuez, Bornovalova, & Daughters, 2005; Peters, Strozier, Murrin, & Kearns, 1997; Sterk, Theall, & Elifson, 2003). Further, in contrast to epidemiological data among community samples indicating that females evidence less frequent use and dependence across illicit substances including cocaine (SAMHSA, 2004), data indicate that this gravitation of inner-city females

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towards crack/cocaine is more evident than in their male counterparts. For example, evidence indicates that 74% of female substance using inmates reported crack/cocaine as their drug of choice, compared to only 49% of male substance users (Peters et al., 1997). Additionally, in a sample of inner-city treatment-seeking substance users, a considerably larger percentage of females reported at least weekly use of crack/cocaine compared to heroin (84.5% vs. 37.0%, with 21.7% reported at least weekly use of both drugs), whereas an almost equivalent percentage of males reported weekly use of crack/cocaine as did weekly use of heroin: 63.6% vs. 66.2%, with 29.9% of these individuals dependent on both drugs (Lejuez et al., 2005). Despite efforts to understand the link between females and crack/cocaine (Evans, Forsyth, Gauthier, 2002; Henderson, Boyd, Mieczkowski, 1994; Lam, Wechsberg, & Zule, 2004), no published work has directly compared males and females with the goal of empirically examining risk factors that may underlie this gender difference in relation to crack/cocaine. This gap in the literature is noteworthy and unfortunate as crack/cocaine, more so than any other drug, has been associated with health-compromising situations and behaviors including homelessness, condom non-use, exchange of sex for money and/or drugs, and contraction of HIV (Evans et al., 2002; Henderson et al., 1994; Hoffman, Klein, Eber, & Crosby, 2000; Lam et al., 2004; Lejuez et al., 2005; Wechsberg, Lam, Zule, Hall, Middlesteadt & Edwards, 2003).

In attempting to identify variables that may underlie the relationship between gender and crack/cocaine, it becomes useful to consider variables that are linked to drug choice in general, and then consider the extent to which these variables may present a unique vulnerability for inner-city females. One such variable is impulsivity. Considered in terms of substance use more generally across drug classes, impulsivity has been linked to substance use vulnerability, frequency, severity (including social and emotional consequences), and dependence (Fishbein, Lozovsky, & Jaffe, 1989; King, Curtis, & Knoblich, 1991; Allen, Moeller, Rhoades & Cherek, 1998; Moeller & Dougherty, 2002; Moeller, Dougherty, Barratt, Schmitz, Swann & Grabowski, 2001; Monterosso, Ehrman, Napier, O'Brien, & Childress, 2001; Petry, 2001; Patton, 1995), and has been considered as part of a larger externalizing spectrum that shows a clear relationship to substance use and related psychopathology including antisocial behavior (Krueger et al., 2002). Further, researchers have identified that impulsivity may be a key variable in understanding drug choice, such that crack/cocaine users are significantly higher in impulsivity than heroin users (Bornovalova et al., 2005; Donovan, Soldz, Kelley, & Penk, 1998; Lejuez et al., 2005). While numerous studies indicate greater impulsivity in males compared to females across community adolescents and adults (e.g., Krueger et al., 2002; Lejuez et al., 2002); clear evidence of greater impulsivity for males compared to females in inner-city settings is lacking, with some studies indicating higher levels of impulsivity in females compared to males (Lejuez et al., 2005). Although no studies have formally explored impulsivity as a risk factor in the relationship between gender and crack/cocaine, available evidence suggests the importance of further exploring this variable.

A second potentially relevant risk factor is childhood trauma. Specifically, several studies suggest that childhood sexual, emotional, and physical abuse is strongly related to severity of substance abuse problems (Bensley, Spieker, Van Eenwyk & Schoder, 1999; Brems, Johnson, Neal, & Freemon, 2004; Easton, Swan, & Sinha, 2000; Roy, 2002). For instance, Brems and colleagues (2004) found that in a large sample of treatment-seeking substance users, those individuals who reported experiences of childhood abuse had more problems associated with substance use (i.e., legal problems, interpersonal dysfunction), as well as a greater likelihood of presenting with an additional psychiatric disorder. Specific to crack/cocaine use, several studies have found that abuse was related to crack/cocaine use among females (Boyd, 1993; Boyd, Guthrie, Pohl & Whitmarsh, 1994; El-Bassel, Gilbert & Rajah, 2003; Freeman, Collier & Parillo, 2002). However, because these studies have focused

exclusively on females, further work across both genders is necessary to establish the role of abuse in the relationship between gender and drug choice.

Finally, literature suggests that trait negative emotionality including a tendency toward mood disturbances as well as poor reaction to stress, alienation, and aggression is related to substance-related problems. For example, an 11 year prospective study by Jackson and Sher (2003) indicated that trait distress was related to a tendency to meet criteria for an alcohol use disorder. Similarly, Krueger (1999) found that high negative emotionality (defined as a propensity to experience aversive affective states) at the first time point was linked with substance dependence three years later. Further, Elkins, King, McGue, & Iacono (2006) found that high negative emotionality and low constraint were significantly related to the later onset of alcohol, nicotine, and illicit drug use disorders, further demonstrating the unique contribution of this variable beyond history of past substance disorders (Elkins, King, McGue, & Iacono, 2006). In terms of stress reactivity (a key subscale of negative emotionality), Sinha and colleagues (2003) have shown that exposure to personalized stressful imagery as well as cocaine-related imagery, compared to neutral imagery, leads to increased cocaine craving. Although these aforementioned studies did not specifically examine gender differences, several studies have shown that substance using females report more mood related problems than substance using males (Brooner, King, Kidorf & Schmidt, 1997; Griffin, Weiss, Mirin & Lange, 1989; Weiss, Kung & Pearson, 2003). Additionally, female cocaine users demonstrated greater stress reactivity than male cocaine users (Back, Brady, Jackson, Salstrom & Zinzow, 2005; Fox et al., 2006), suggesting that the mechanisms linking stress and substance use may be gender-specific. Together these studies propose that females may be more susceptible to experiencing increases in subjective stress and therefore may be more likely to use in response to negative emotions or situations. Thus, negative emotionality and specifically stress reactivity may play an integral role in the association between gender and drug choice, but again the role of this variable specific to the relationship between gender and drug choice is lacking.

Taken together, the current study sought to provide further clarification into the relationship between gender and drug choice, with a specific focus on elevated use and dependence associated with crack/cocaine for females compared to their male counterparts. In addition to controlling for demographic variables and other drug use across heroin, alcohol, cannabis, and hallucinogens including PCP, we specifically examined self-reported impulsivity, childhood trauma, and negative emotionality as potential risk factors that could account for the predicted gender differences in current dependence diagnosis, current use (past 12 months prior to treatment), and lifetime heaviest use.

Method

Participants

One hundred and eighty inpatient residents in a drug and alcohol abuse treatment center in the greater Washington DC metropolitan area were invited to participate in the study. Questionnaire packets were completed by 171; nine residents refused participation with six citing other commitments in the center at the time of assessment and 3 citing a lack of interest. Recruitment averaged 7 participants per week and lasted about 12 months. To limit the influence of withdrawal effects at the very start of treatment and treatment gains near the end of treatment, participants were recruited no earlier than their third day in the treatment center and no later than their second week; Regarding potential withdrawal effects, it also should be noted that participants were required to complete off-site detoxification as needed prior to entering the treatment center.

Treatment contracts included 30, 60, 90, and 180 days (41.4%, 29.7%, 6.3%, and 22.5% of the patients respectively) and 76.4% were court-mandated to treatment; neither contract date nor court-mandated status was related to the key variables of interest in the current study. Participants in the study received standard treatment at the center which included a mix of strategies adopted from Alcoholics and Narcotics Anonymous as well as group sessions focused on relapse prevention and functional analysis. The center requires complete abstinence from drugs and alcohol (including any form of pharmacological treatment, such as methadone), with the exception of caffeine and nicotine; regular drug testing is provided and any substance use is grounds for dismissal. Aside from scheduled activities (e.g., group retreats, physician visits), residents are not permitted to leave the center grounds during treatment.

Nineteen participants were excluded from analyses due to an invalid MPQ profile; these data were removed because of the likelihood that responses on the MPQ as well as other measures could be corrupted by a lack of comprehension or motivation to answer incorrectly (due to both boredom and demand characteristics; Patrick, Curtin, & Tellegen, 2002). The final sample of 152 participants ranged in age from 18 to 67, with a mean age of 41.95 ($SD = 8.94$). Thirty-seven percent of the participants were female ($n = 56$), and 92.8% were African-American ($n = 141$). With regard to highest education level achieved, 18.4% had not completed high school or received a GED, 42.1% had completed high school or received a GED, and 39.5% had attended at least some college or technical school or had graduated college. Fifty percent of participants reported an income of \$10,000 or less per year.

Measures

Demographics Questionnaire—A short self-report questionnaire was administered to obtain information on age, gender, race, education level, and income.

Multidimensional Personality Questionnaire-Brief Form—Trait affect was measured using the Multidimensional Personality Questionnaire-Brief Form (MPQ; Patrick, Curtin, & Tellegen, 2002). This version of the MPQ is a 155-item version of the original 300-item MPQ, developed to assess a variety of personality traits and temperamental dispositions. Like the original MPQ, the brief form of the MPQ includes 11 primary trait scales which load onto three higher-order factors. The traits of Well-Being, Achievement, Social Closeness, and Social Potency load onto the higher-order factor of Positive Emotionality; the traits of Stress Reactivity, Alienation, and Aggression make up the higher-order factor of Negative Emotionality; the traits of Control, Harm Avoidance, and Traditionalism load on the higher-order factor of Constraint; and the trait of Absorption does not load on any of the higher-order factors. Scores from the traits scales of the brief form of the MPQ are highly correlated with the equivalent trait scales from the original MPQ (r 's ranged from .92 to .96) and have demonstrated high internal consistency (Cronbach's alphas range from .74 to .84). In the current sample, alphas ranged from .85 to .91.

Barratt Impulsiveness Scale—Trait-impulsivity was assessed using the Barratt Impulsiveness Scale, version 11 (BIS; Patton, Stanford, & Barratt, 1995). The BIS is a 30-item, self-report questionnaire that asks participants to rate how often a series of statements applies to them, based on the following scale: rarely/never, occasionally, often, or always/almost always. Item scores range from one to four. Cumulative scores range from 30 (low in trait-impulsivity) to 120 (high in trait-impulsivity). The BIS contains three subscales, which have been termed Motor Impulsiveness, Cognitive Impulsiveness, and Nonplanning. The BIS has been normed on a variety of sample populations, including college students ($M = 63.82$, $SD = 10.17$), inpatient substance abusers ($M = 69.26$, $SD = 10.28$), and prison inmates ($M = 76.30$, $SD = 11.86$). The BIS has been shown to be reliable in both clinical and

community samples, with Cronbach's alpha coefficients ranging from .79 to .83 (Patton et al., 1995); a similar alpha was evidenced in the current study ($\alpha = .83$).

The Childhood Trauma Questionnaire-Short Form—As a measure of childhood trauma, we used the 3 abuse subscales of the short form of the Childhood Trauma Questionnaire (CTQ; Bernstein, Stein, Newcomb, Walker, Pogge & Ahluvalia, 2003). Each subscale has 5 items utilizing a 5-point scale ranging from 1 (never true) to 5 (very often true). Each subscale has been shown to be internally consistent (α 's: emotional abuse = .89, physical abuse = .86, sexual abuse = .95), with similar levels of internal consistency evidenced in the current study (i.e., .84, .83, and .90 for emotional, physical, and sexual abuse respectively).

Drug Use—Drug use was measured in three ways: dependence diagnosis, current use, and lifetime heaviest use.

Substance Dependence Module of the Structured Clinical Interview for DSM-IV, Axis I—The Substance Dependence Module of the Structured Clinical Interview for DSM-IV, Axis I (SCID; First, Spitzer, Gibbon & Williams 1, 1995), a measure with demonstrated reliability (First, Spitzer, Gibbon & Williams 2, 1995), was used to assess diagnosis of current drug dependence. For the current study, interviews were conducted by senior graduate students trained in the administration of the interview. Twenty-five percent of the interviews were reviewed by a PhD-level clinician (Lejuez). In the three cases for which a discrepancy was evident, areas of disagreement were discussed as a group and a consensus was reached. All assessments were masked.

Drug Use Diagnostic Identification Test—In addition to assessing dependence, the *Drug Use Diagnostic Identification Test* (DUDIT; Babor & Del Boca, 2003) was used as a quantity/frequency measure of drug and alcohol use (Babor & Del Boca, 2003). This self-report measure was modeled after the Alcohol Use Disorders Identification Test (Saunders, Aasland, Babor & de la Fuente, 1993) and included the following Likert scale for current (past 6 months prior to treatment) and lifetime heaviest use: never (0), one time (1), $\leq$ once per month (2), $\leq$ once per week (3), 2-3 times a week (4), more than 4 times a week (5).

Procedure

IRB-approved consent forms were obtained for each participant, after which participants completed the substance dependence module of the SCID. Following the interview, participants completed a self-report questionnaire packet including the measures described above. Measures were randomly sequenced across participants to limit order effects. Participants were actively encouraged to seek assistance regarding questions that were unclear. At least one male and one female researcher were available at each session to provide participants with a same-sex individual for queries regarding the questionnaires.

Results

Gender differences in drug use frequency and SCID substance dependence diagnoses

Comparable analyses were conducted for three dependent measures of drug use and dependence including: 1) lifetime frequency of use, 2) current frequency (past 12 months prior to treatment), and 3) current dependence using SCID diagnoses for each of five categories of drugs (crack/cocaine, alcohol, cannabis, hallucinogens including PCP, and heroin). First, each of these three dependent measures was analyzed separately within a multivariate repeated measures ANOVA with Gender (male vs. female) as a between subject factor and Drug category (alcohol vs. cannabis vs. crack/cocaine vs. hallucinogens vs.

heroin) as a within subject factor. The primary focus of these analyses was to determine if differential gender effects were observed across the various drug categories (i.e., Gender X Drug Category interactions). Given the specific focus on differential patterns of use for crack/cocaine, these complex overall Gender X Drug category interactions also were decomposed into independent simple interaction effect contrasts with crack/cocaine as the reference group (e.g., 1. Gender X crack/cocaine vs. alcohol, 2. Gender X crack/cocaine vs. cannabis, 3. Gender X crack/cocaine vs. hallucinogens, and 4. Gender X crack/cocaine vs. heroin). Finally, for each dependent measure, simple gender effects (t-tests) were conducted for each drug category (see Tables 1-3 for descriptive statistics and simple gender effect results for lifetime heaviest use, past 12 month use, and SCID diagnosis, respectively).

Lifetime heaviest frequency of use—A significant Gender X Drug category interaction was observed for lifetime frequency of use, $F(4, 146) = 2.53, p = .043$, indicating that the magnitude of gender differences in lifetime frequency of use varied significantly across drug use categories. Simple interaction effects indicated that the size of the gender effect was larger for crack/cocaine than for all other drug categories (p-values for simple interaction contrasts of crack/cocaine versus: alcohol, $p = .004$; cannabis, $p = .042$; hallucinogens, $p = .039$, heroin, $p = .038$). Moreover, simple gender effects (t-tests) confirmed that females reported significantly more frequent lifetime heaviest use of crack/cocaine ($M = 4.3$; $SD = 1.4$) than males ($M = 3.8$; $SD = 1.7$), $t(150) = 2.18, p = .031$. No significant simple gender effects were observed for any other drug category. See the top third of Table 1 for means and standard deviations for lifetime frequency of use for all drug categories.

Current frequency of use—A significant Gender X Drug category interaction was also observed for past 12 month frequency of use, $F(4, 142) = 4.08, p = .004$, indicating that the magnitude of gender differences in past 12 month frequency of use varied significantly across drug use categories. Simple interaction effects indicated that the size of the gender effect was larger for crack/cocaine than for all other drug categories (p-values for simple interaction contrasts of crack/cocaine versus: alcohol, $p = .007$; cannabis, $p < .001$; hallucinogen, $p = .001$, heroin, $p = .001$). Moreover, simple gender effects (t-tests) confirmed that females reported significantly more current use of crack/cocaine ($M = 4.3$; $SD = 1.3$) than males ($M = 3.1$; $SD = 2.0$), $t(150) = 4.03, p < .001$. No significant simple gender effects were observed for any other drug category. See the middle third of Table 1 for means and standard deviations for past 12 month frequency of use for all drug categories.

Current dependence—The Gender X Drug category interaction failed to reach a conventional level for significant for SCID diagnoses, $F(4, 146) = 1.77, p = .139$. However, simple interaction effect contrasts indicated that the size of the gender effect for SCID diagnoses was larger for crack/cocaine than for cannabis ($p = .035$), hallucinogens ($p = .019$) and heroin ($p = .016$). The simple Gender X crack/cocaine vs. alcohol contrast was not significant ($p = .192$). Simple gender effects (t-tests)¹ indicated that significantly more females (81.8%) than males (60.4%) received SCID diagnoses of crack/cocaine use disorder, $t(149) = 2.77, p = .006$. No significant simple gender effects were observed for any

¹Results from t-tests with dichotomous SCID diagnoses as an outcome variable are statistically equivalent to results from significant testing for Phi correlation coefficients (Phi is a special case of Pearson's r with two dichotomous variables). We choose to report the analyses as t-tests rather than tests of Phi to simplify the report and because the associated descriptive statistics (mean percentages of positive diagnosis) are more intuitively accessible. Qualitatively similar conclusions about simple gender effects are reached if the dichotomous SCID diagnoses are analyzed with individual logistic regressions rather than t-tests/Phi coefficients. A significant gender effect ($p < .001$) was observed for crack/cocaine dependence with an odds ratio of 2.94 (i.e., women have a 2.94 increase in their odds of receiving a diagnosis of crack/cocaine dependence than men). No significant simple gender effects were observed for other drugs within these logistic regression analyses.

SCID diagnoses for any other drug category. See bottom third of Table 1 for frequency of positive SCID diagnoses by gender for all drug categories.

Gender differences on individual difference measures

Independent sample t-tests were conducted to determine if gender differences were observed on demographic and individual difference measures of personality (MPQ negative emotionality, positive emotionality and constraint broadband factors, trait impulsivity, and childhood trauma history). Means, standard deviations and *p*-values from these tests are presented in Table 2. With respect to demographic variables, no significant gender effects were observed for age or education level. However, females reported significantly lower yearly income than males, $t(147) = 2.55, p = .012$. Specifically, 57% of males reported earning > \$10,000/year whereas only 36% of females reported yearly income above \$10,000.

With respect to broadband personality indices from the MPQ, females displayed significantly higher trait negative emotionality ($M = 54.8; SD = 16.5$) than males ($M = 48.4; SD = 16.7$), $t(150) = 2.26, p = .025$. No significant gender differences were observed for positive emotionality or constraint. Females reported significantly more childhood trauma on the CTQ ($M = 2.1; SD = 0.7$) than males [$(M = 1.8; SD = 0.6), t(150) = 2.79, p = .006$]. Females also reported significantly higher trait impulsivity on the BIS ($M = 79.9; SD = 11.4$) than males [$(M = 74.2; SD = 0.6), t(144) = 2.71, p = .008$].

Individual difference predictors of crack/cocaine use and dependence

Pearson correlation coefficients were calculated to test for relationships between the demographic and individual difference measures and crack/cocaine frequency of use (lifetime and past 12 months) and SCID crack/cocaine diagnosis (see Table 3 for all correlations). All three indices of crack/cocaine were negatively correlated with income and two of the three were positively related to age. All three indices of crack/cocaine were positively correlated with BIS total score and many of its subscales, and negatively correlated with the MPQ constraint factor (and primary trait scores on Control).

Testing for gender indirect effects via impulsivity and other individual differences

To further examine possible explanations for the observed gender differences in crack/cocaine use/dependence, tests of indirect gender effects were conducted for impulsivity and all individual difference measures described above that could potentially function as intervening variables that could account for gender differences in crack/cocaine use/dependence. Separate tests were conducted for each of the three crack/cocaine measures (SCID dependence, past 12 months use, lifetime heaviest use). Mackinnon et al (MacKinnon, Taborga, & Morgan-Lopez, 2002) advocate for the use of the Joint Tests of Significance to test for indirect effects. Two criteria must be met to demonstrate a significant indirect Gender effect on a crack/cocaine measure via an intervening individual difference variable. First, Gender must be significantly associated with the intervening variable. This criterion is reported as “Criterion A” in table 4 and is the same test regardless of crack/cocaine measure. Second, the intervening variable must be significantly and uniquely related to the crack/cocaine measure when Gender is controlled (“Criterion B”). Criterion B was tested for each intervening variable separately for each of the three crack/cocaine measures. In other words, in separate analyses, each crack/cocaine measure was regressed simultaneously on both the intervening variable and Gender. These *p*-values for the unique intervening variable effect, controlling for gender are also provided in Table 4 (with separate columns for each of the three crack/cocaine measures). An indirect effect of gender on crack/cocaine use/dependence via the specific intervenient variable is supported when both Criterion A and B is significant that intervening variable. Given these criteria, support for an

indirect effect of Gender on both crack/cocaine dependence diagnosis and lifetime highest frequency of crack/cocaine use via BIS was provided. Similarly, support for an indirect effect of Gender on lifetime highest frequency of crack/cocaine use via the attention subscale of the BIS was also provided.

Discussion

In a sample of inner-city, treatment-seeking drug users, the relationship between gender and crack/cocaine use and dependence was investigated, with impulsivity, childhood trauma, and negative emotionality explored as potential risk factors in this relationship. Results indicated that females evidenced greater use (current and lifetime heaviest) of crack/cocaine and were significantly more likely to evidence crack/cocaine dependence than their male counterparts, with no such gender difference for any other substance. Consistent with the literature showing elevated crack/cocaine use among females, this finding is noteworthy given the range of aggressive and health compromising behaviors more common of males than females and typically associated with crack/cocaine compared to other drugs, including crime, homelessness, condom non-use, exchange of sex for money and/or drugs, and contraction of HIV (e.g., heroin; Henderson et al., 1994; Hoffman et al., 2000; Evans et al., 2002; Lam et al., 2004; Lejuez et al., 2002; Wechsberg et al., 2003). As such, efforts to identify the precise mechanisms underlying this relationship are necessary to further understand this phenomenon.

BIS total score was higher in females compared to males and related to all three indices of crack/cocaine use, and most importantly, it served as a risk factor in the relationship between gender and frequency of lifetime heaviest use and current diagnosis, suggesting the potential importance of this variable for understanding crack/cocaine use among females. Of note, the relationship was not found for current use. As expected, gender was related to most subscales of abuse and negative emotionality, yet no subscales of abuse and emotionality served as a risk factor in the relationship between gender and crack/cocaine dependence or use.

Several aspects of the current findings are suggestive and raise important questions worthy of interpretation. First, regarding the fact that impulsivity served as a risk factor for lifetime heaviest use but not current use, one may consider that impulsivity was measured here as a trait-like variable and therefore may have been related to drug use over participants' lifetime, as opposed to current use. As such, these findings highlight the absence of measures in the current study aimed at immediate social context that may have shed light on the relationship between gender and current drug choice. One such social context variable that may support greater crack/cocaine use among females involves means to drug access and availability. Whereas males may be able to obtain drugs on their own as a function of greater income and/or engagement in criminal activity, females in these settings typically report extremely low income and high levels of commercial sexual activity (Lejuez et al., 2002; Sterk, 1999; Wechsberg et al., 2003) and are less likely to be supplying and distributing drugs than males (Rees, Johnson, Randolph & Liberty, 2005), which may create reliance on males for obtaining drugs. Given empirical data strongly suggesting that crack/cocaine users are more likely to engage in risky sexual behavior than heroin users (Lejuez et al., 2002), it is possible that females' primary source of drug availability may be male crack/cocaine users, especially in the context of sex work (Bux, Lamb, & Iguchi, 1995; Camacho, Bartholomew, Joe, & Cloud, 1996; Camacho, Bartholomew, Joe, Simpsons, 1997; Grella, Anglin, & Wugalter, 1995; Joe & Simpson, 1995; Lejuez et al., 2002). Supporting this hypothesis, Baseman, Ross, & Williams (1999) noted that in poverty-stricken, urban environments, crack/cocaine is tightly intertwined with elevated rates of prostitution, such that crack/cocaine is considered "currency", and sex a "commodity" (Baseman, Ross &

Williams, 1999; Ross, Hwang, Leonard, Teng, & Duncan, 1999; Ross, Hwang, Zack, Bull, Williams, 2002).” Although speculative at this point and in need of empirical support, these findings suggest the possibility that impulsivity in females may lead them to environments where crack/cocaine is prevalent, with the social context possibly playing a role in perpetuating crack/cocaine use. Of course, one limitation of the conjecture above is the assumption that simply because females may be obtaining drugs from males who are primarily crack/cocaine users, that access to other drugs such as heroin is not available. As such, future work must consider all aspects of social context.

Second, although the lack of consistency across the BIS subscales and MPQ control subscale in their relationship with gender and drug choice could be interpreted as evidence against the identification of impulsivity as a risk factor, it also could be used to suggest the need for a greater level of precision in the measurement of impulsivity as a multidimensional construct (deWit, & Richards, 2004; Evenden, 1999). In terms of precision, we exclusively used measures that were retrospective in nature, and therefore responses may have been based on behavior occurring under the influence of drugs especially for those with a long history of drug use. Although it is important to consider level of impulsivity while intoxicated, doing so provides an index that may be influenced by differential acute pharmacological effects across crack/cocaine and heroin, which may provide a different picture than an index of more *trait-like* impulsivity, independent of acute pharmacological effects. To address limitations pertaining to self report and multidimensional issues, the use of behavioral measures that allow for a real time assessment of impulsivity, such as the stop go task for behavioral inhibition (Logan, Schachar, & Tannock, 1997) and the money choice task for delay discounting (Kirby, & Maraovic, 1996), are necessary in future studies to further clarify this relationship. Indeed, previous studies have shown crack/cocaine users to be impulsive across these dimensions of impulsivity with these studies indicating that crack/cocaine users: a) differ from nonusers in terms of poor response inhibition (Fillmore & Rush, 2002) and b) differ from heroin users in terms of delay discounting (Bornoalova et al., 2005). Although neither study examined gender, both suggest the potential value of extending such measurement strategies to the questions posed here. Relatedly, Krueger and colleagues (2002) indicated that impulsivity may occur within a larger externalizing spectrum linking substance use, personality factors such as impulsivity, and psychological conditions such as antisocial personality disorder. Based on this work, it may be useful to move towards larger models with a focus on the externalizing spectrum that can accommodate more thoroughly the complexity underlying the relationship between gender and drug choice.

Other limitations in measurement also are of consideration. The retrospective nature of the measures may have limited accuracy, especially given the possibility of chronic pharmacological drug effects (e.g., brain damage). Additionally, greater detail would be helpful regarding drug use frequency across crack/cocaine and heroin at the point of initiation, as opposed to patterns more indicative of chronic use as indexed by current and lifetime heaviest use. Moreover, information on route of administration may shed light on gender differences, with one hypothesis that females may use a drug such as crack/cocaine more than heroin because the latter is more frequently injected, a route of administration that may be less appealing to females (Brecht, O’Brien, & von Mayrhauser, 2004). Information on route of administration across drugs would provide useful information to address such a hypothesis. Finally, our clinical interview was limited to substance use, and therefore the influence of other co-morbid conditions could not be evaluated.

Beyond these limitations, it also is important to acknowledge the parsimonious hypothesis that the direct relationship between gender and drug choice may be the result of a sampling bias, which would obviate efforts to identify risk factors. That is, perhaps females in the

current sample may not be representative of female substance users in general or even the larger population of inner-city substance users. In the current study, we utilized drug users in a residential drug treatment center. As such, our sample is both a major strength and a limitation. Specifically, although drug users in residential drug treatment may be most severe and most in need of assistance, there is also a chance that the current results may not generalize to individuals who are not seeking treatment or who reside outside of an inner-city setting (Evans et al., 2002). Alternatively, as discussed above, it may be that gender differences in both drug choice and impulsivity are simply due to the over-inclusion of the most severe substance users occurring differently more so among females. In this way, it may be that the level of substance use severity and consequences would need to be considerably greater for females than males to choose residential treatment or engage in behaviors that would result in court-ordered treatment (Belenko, & Peugh, 2005; Daley, Argeriou, McCarty, Callahan, Shepard & Williams, 2000). As such, the females in our sample may be considerably more impaired than those who are not mandated and do not choose to enroll in residential treatment. This account would explain both the preference for crack/cocaine and higher levels of childhood abuse and negative affectivity in the females compared to the males. This result also may help understand the surprising higher impulsivity scores in females compared to males, which stand in marked contrast to a larger body of research in other types of sample (e.g., college students, community samples) indicating that males are more impulsive than females (Hunt, Hopko, Bare, Lejuez, 2005; Zuckerman & Kuhlman, 2000). Thus, it is important not to overgeneralize these findings to all females, or even all inner-city females without addressing these potentially confounding issues more clearly.

Despite limitations, the current results represent the first systematic effort to highlight and explain the somewhat counterintuitive finding of greater crack/cocaine use and dependence in females compared to males. Clearly, these results are preliminary and must be evaluated in light of limitations and additional questions raised for future work. Nevertheless, these findings set the stage for cross-sectional and longitudinal studies with a more comprehensive set of potential risk factors within the context of more well defined frameworks (e.g., externalizing spectrum; Krueger et al., 2002), replicating this work in similar samples as well as more diverse samples to establish generalizability. In extending this work, there are great public health possibilities including the development of prevention and treatment efforts targeting females who are especially at risk for crack/cocaine use and its consequences.

References

- Allen T, Moeller F, Rhoades H, Cherek D. Impulsivity and history of drug dependence. *Drug and Alcohol Dependence*. 1998; 50:137–145. [PubMed: 9649965]
- Babor, TF.; Del Boca, FK., editors. *Treatment matching in alcoholism*. United Kingdom University press; Cambridge: 2003.
- Back S, Brady K, Jackson J, Salstrom S, Zinzow H. Gender differences in stress reactivity among cocaine-dependent individuals. *Psychopharmacology*. 2005; 180:169–176. [PubMed: 15682303]
- Baseman JM, Ross M, Williams M. Sale of sex for drugs and drugs for sex: An economic context of sexual risk behavior for STDs. *Sexually Transmitted Diseases*. 1999; 26:444–449. [PubMed: 10494935]
- Belenko S, Peugh J. Estimating drug treatment needs among state prison inmates. *Drug and Alcohol Dependence*. 2005; 77:269–281. [PubMed: 15734227]
- Bensley L, Spieker S, Van Eenwyk J, Schoder J. Self-reported abuse history and adolescent problem behaviors. II. Alcohol and drug use. *Journal of Adolescent Health*. 1999; 24:173–180. [PubMed: 10195800]

- Bernstein D, Stein J, Newcomb M, Walker E, Pogge D, Ahluvalia T, et al. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse and Neglect*. 2003; 27:169–190. [PubMed: 12615092]
- Bornoalova M, Lejuez C, Daughters S, Rosenthal M, Lynch T. Impulsivity as a common process across borderline personality and substance use disorders. *Clinical Psychology Review*. 2005; 25:790–812. [PubMed: 16005556]
- Boyd C. The antecedents of women's crack cocaine abuse: Family substance abuse, sexual abuse, depression and illicit drug use. *Journal of Substance Abuse Treatment*. 1993; 10:433–438. [PubMed: 8246316]
- Boyd C, Guthrie B, Pohl J, Whitmarsh J. African-American women who smoke crack cocaine: Sexual trauma and the mother/daughter relationship. *Journal of Psychoactive Drugs*. 1994; 26:243–247. [PubMed: 7844653]
- Brecht ML, O'Brien A, von Mayrhauser C. Methamphetamine use behaviors and gender differences. *Addictive Behaviors*. 2004; 29:89–106. [PubMed: 14667423]
- Brems C, Johnson M, Neal D, Freemon M. Childhood abuse history and substance use among men and women receiving detoxification services. *American Journal of Drug and Alcohol Abuse*. 2004; 30:799–821. [PubMed: 15624550]
- Broner R, King V, Kidorf M, Schmidt C. Psychiatric and substance use comorbidity among treatment-seeking opioid abusers. *Archives of General Psychiatry*. 1997; 54:71–80. [PubMed: 9006403]
- Bux D, Lamb R, Iguchi M. Cocaine use and HIV risk behavior in methadone maintenance patients. *Drug and Alcohol Dependence*. 1995; 37:29–35. [PubMed: 7882871]
- Camacho L, Bartholomew N, Joe G, Cloud M. Gender, cocaine and during treatment HIV risk reduction among injection opioid users in methadone maintenance. *Drug and Alcohol Dependence*. 1996; 41:1–7. [PubMed: 8793304]
- Camacho L, Bartholomew N, Joe G, Simpson D. Maintenance of HIV risk reduction among injection opioid users: A 12 month posttreatment follow-up. *Drug and Alcohol Dependence*. 1997; 47:11–18. [PubMed: 9279493]
- de Wit, H.; Richards, JB. Dual determinants of drug use in humans: Reward and impulsivity. In: Bevens, RA.; Bardo, MT., editors. *Motivational Factors in the Etiology of Drug Abuse*, Nebraska Symposium on Motivation. Vol. 50. University of Nebraska Press; Lincoln, Nebraska: 2004.
- Daley M, Argeriou M, McCarty D, Callahan J, Shepard D, Williams C. The costs of crime and the benefits of substance abuse treatment for pregnant women. *Journal of Substance Abuse Treatment*. 2000; 19:445–458. [PubMed: 11166509]
- Donovan J, Soldz S, Kelley H, Penk W. Four addictions: The MMPI and discriminant function analysis. *Journal of Addictive Disorders*. 1998; 17:41–55.
- Easton C, Swan S, Sinha R. Prevalence of family violence in clients entering substance abuse treatment. *Journal of Substance Abuse Treatment*. 2000; 18:23–28. [PubMed: 10636603]
- El-Bassel N, Gilbert L, Rajah V. The relationship between drug abuse and sexual performance among women on methadone. Heightening the risk of sexual intimate violence and HIV. *Addictive Behavior*. 2003; 28:1385–1403.
- Elkins JJ, King SM, McGue M, Iacono WG. Personality traits and the development of nicotine, alcohol, and illicit drug disorders: prospective links from adolescence to young adulthood. *Journal of Abnormal Psychology*. 2006; 115:26–39. [PubMed: 16492093]
- Evans ER, Forsyth CJ, Gauthier DK. Gendered pathways into and experiences within crack cultures outside of the inner city. *Deviant Behavior*. 2002; 23:483–510.
- Evenden J. Varieties of impulsivity. *Psychopharmacology*. 1999; 146:348–361. [PubMed: 10550486]
- Fillmore MT, Rush CR. Impaired inhibitory control of behavior in chronic cocaine users. *Drug and Alcohol Dependence*. 2002; 66:265–273. [PubMed: 12062461]
- First M, Spitzer R, Gibbon M, Williams J. The Structured Clinical Interview for DSM-III-R Personality Disorders (SCID-II): I. Description. *Journal of Personality Disorders*. 1995; 9:83–91.
- First M, Spitzer R, Gibbon M, Williams J. The Structured Clinical Interview for DSM-III-R Personality Disorders (SCID-II): II. Multi-site test-retest reliability study. *Journal of Personality Disorders*. 1995; 9:92–104.

- Fishbein D, Lozovsky D, Jaffe J. Impulsivity, aggression, and neuroendocrine responses to serotonergic stimulation in substance abusers. *Biological Psychiatry*. 1989; 5:1049–1066. [PubMed: 2720017]
- Fox HC, Garcia M, Keemp K, Millivojevic V, Kreek MJ, Sinha R. Gender differences in cardiovascular and corticoadrenal response to stress and drug cues in cocaine dependent individuals. *Psychopharmacology*. 2006; 185:348–357. [PubMed: 16514523]
- Freeman R, Collier K, Parillo K. Early life sexual abuse as a risk factor for crack cocaine use in a sample of community-recruited women at high risk for illicit drug use. *American Journal of Drug and Alcohol Abuse*. 2002; 28:109–131. [PubMed: 11853128]
- Grella C, Anglin M, Wugalter S. Cocaine and crack use and HIV risk behaviors among high-risk methadone maintenance clients. *Drug and Alcohol Dependence*. 1995; 37:15–21. [PubMed: 7882869]
- Griffin M, Weiss R, Mirin S, Lange U. A comparison of male and female cocaine abusers. *Archives of General Psychiatry*. 1989; 46:122–126. [PubMed: 2913971]
- Henderson DJ, Boyd C, Mieczkowski T. Gender, relationships, and crack cocaine: A content analysis. *Research of Nursing Health*. 1994; 17:265–272.
- Hoffman J, Klein H, Eber M, Crosby H. Frequency and intensity of crack use as predictors of women's involvement in HIV-related sexual risk behaviors. *Drug and Alcohol Dependence*. 2000; 58:227–236. [PubMed: 10759033]
- Hunt M, Hopko D, Bare R, Lejuez CW, Robinson E. Construct Validity of the Balloon Analog Risk Task (BART): Associations With Psychopathy and Impulsivity. *Assessment*. 2005; 12:416–428. [PubMed: 16244122]
- Jackson KM, Sher KJ. Alcohol use disorders and psychological distress: a prospective state-trait analysis. *Journal of Abnormal Psychology*. 2003; 112:599–613. [PubMed: 14674872]
- Joe G, Simpson D. HIV risks, gender, and cocaine use among opiate users. *Drug and Alcohol Dependence*. 1995; 37(1):23–28. [PubMed: 7882870]
- King R, Curtis D, Knoblich G. Complexity preference in substance abusers and controls: Relationships to diagnosis and personality variables. *Perceptual and Motor Skills*. 1991; 72:35–39. [PubMed: 2038532]
- Kirby K, Marakovic N. Delay-discounting probabilistic rewards: Rates decrease as amounts increase. *Psychonomic Bulletin Review*. 1996; 3:100–104.
- Krueger RF. Personality traits in late adolescence predict mental disorders in early adulthood: A prospective-epidemiological study. *Journal of Personality*. 1999; 67:39–65. [PubMed: 10030020]
- Krueger RF, Hicks BM, Patrick CJ, Carlson SR, Iaconno WG, McGue M. Etiologic Connections among Substance Dependence, Antisocial Behavior, and Personality: Modeling the Externalizing Spectrum. *Journal of Abnormal Psychology*. 2002; 111:411–424. [PubMed: 12150417]
- Lam W, Wechsberg W, Zule W. African-American women who use crack cocaine: A comparison of mothers who live with and have been separated from their children. *Child Abuse and Neglect*. 2004; 28:1229–1247. [PubMed: 15567026]
- Lejuez CW, Bornovalova MA, Daughters SB. Differences in impulsivity and sexual risk behavior among inner-city crack/cocaine users and heroin users. *Drug and Alcohol Dependence*. 2005; 77:169–175. [PubMed: 15664718]
- Lejuez CW, Read JP, Kahler CW, Richards JB, Ramsey SE, Stuart GL, Strong DR, Brown RA. Evaluation of a behavioral measure of risk-taking: The Balloon Analogue Risk Task (BART). *Journal of Experimental Psychology: Applied*. 2002; 8:75–84. [PubMed: 12075692]
- Logan G, Schachar R, Tannock R. Impulsivity and inhibitory control. *Psychology Science*. 1997; 8:60–64.
- MacKinnon D, Taborga M, Morgan-Lopez A. Mediation designs for tobacco prevention research. *Drug Alcohol Depend*. 2002; 68:S69–s83. [PubMed: 12324176]
- Moeller GF, Dougherty DM. Impulsivity and substance abuse: What's the connection? *Addictive Diseases Treatment*. 2002; 1:3–10.
- Moeller GF, Dougherty DM, Barratt ES, Schmitz JM, Swann AC, Grabowski JU. The Impact of impulsivity on cocaine use and retention in treatment. *Journal of Substance Abuse Treatment*. 2001; 21:193–198. [PubMed: 11777668]

- Monterosso J, Ehrman R, Napier K, O'Brien C, Childress A. Three decision-making tasks in cocaine-dependent patients: Do they measure the same construct? *Addiction*. 2001; 96:1825–1837. [PubMed: 11784475]
- Patrick C, Curtin J, Tellegen A. Development and validation of a brief form of the Multidimensional Personality Questionnaire. *Psychological Assessment*. 2002; 14:150–163. [PubMed: 12056077]
- Patton J, Stanford M, Barratt E. Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*. 1995; 51:768–774. [PubMed: 8778124]
- Patton LH. Adolescent substance abuse. Risk factors and protective factors. *Pediatric Clinics of North America*. 1995; 42:283–93. [PubMed: 7724259]
- Peters R, Strozier A, Murrin M, Kearns W. Treatment of substance-abusing jail inmates: Examination of gender differences. *Journal of Substance Abuse Treatment*. 1997; 14:339–349. [PubMed: 9368210]
- Petry N. Substance abuse, pathological gambling, and impulsiveness. *Drug and Alcohol Dependence*. 2001; 63:29–38. [PubMed: 11297829]
- Rees DW, Johnson BD, Randolph D, Liberty HJ. Gender differences in the distribution of cocaine and heroin in Central Harlem. *Drug and Alcohol Dependence*. 2005; 77:115–127. [PubMed: 15664713]
- Ross M, Hwang L, Leonard L, Teng M, Duncan L. Sexual behaviour, STDs and drug use in a crack house population. *International Journal of STDs and AIDS*. 1999; 10:224–230.
- Ross M, Hwang L, Zack C, Bull L, Williams M. Sexual risk behaviours and STIs in drug abuse treatment populations whose drug of choice is crack cocaine. *International Journal of STDs and AIDS*. 2002; 13:769–774.
- Roy A. Urinary free cortisol and childhood trauma in cocaine dependent adults. *Journal of Psychiatric Research*. 2002; 36:173–177. 2002. [PubMed: 11886695]
- Substance Abuse and Mental Health Services (SAMHSA). Office of Applied Studies (OAS). Results from the 2003 national survey on drug use and health: National findings. Rockville, MD: 2004. (DHHS Publication No. SMA 04-3964, NSDUH Series H-25)
- Saunders J, Aasland O, Babor T, de la Fuente J. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption: II. *Addiction*. 1993; 88:791–804. [PubMed: 8329970]
- Sinha R, Talih M, Malison R, Cooney N, Anderson GM, Kreek MJ. Hypothalamic–pituitary–adrenal axis and sympathoadreno-medullary responses during stress-induced and drugcue-induced cocaine craving states. *Psychopharmacology*. 2003; 170:62–72. [PubMed: 12845411]
- Sterk C. Building bridges: Community involvement in drug and HIV research among minority populations. *Drugs and Society*. 1999; 14:107–121.
- Sterk C, Theall K, Elifson K. Effectiveness of a risk reduction intervention among African American women who use crack cocaine. *AIDS Education and Prevention*. 2003; 15:15–32. [PubMed: 12627741]
- Wechsberg W, Lam W, Zule W, Hall G, Middlesteadt R, Edwards J. Violence, homelessness, and HIV risk among crack-using African-American women. *Substance Use and Misuse*. 2003; 38:669–700. [PubMed: 12747401]
- Weiss SR, Kung HC, Pearson JL. Emerging issues in gender and ethnic differences in substance abuse and treatment. *Current Women*. 2003; 3:245–253.
- Zuckerman M, Kuhlman D. Personality and risk-taking: Common biosocial factors. *Journal of Personality*. 2000; 68:999–1029. [PubMed: 11130742]

Table 1

Means, standard deviations, and *p* values for drug use *frequency* across lifetime heaviest use and current use as well as current *dependence* for females and males.

	Females	Males	<i>p</i> value
Lifetime Heaviest Use Frequency			
Alcohol	3.4 (1.8)	3.8 (1.5)	.114
Cannabis	3.1 (2.0)	3.4 (1.7)	.393
Crack/Cocaine	4.3 (1.4)	3.8 (1.7)	.031*
Hallucinogens	1.1 (1.4)	1.2 (1.5)	.580
Heroin	2.1 (2.4)	2.5 (2.3)	.367
Current Use Frequency (past 12 months)			
Alcohol	3.4 (1.8)	3.2 (1.7)	.682
Cannabis	2.2 (1.9)	2.4 (1.8)	.447
Crack/Cocaine	4.3 (1.3)	3.1 (2.0)	.001***
Hallucinogens	0.6 (1.1)	0.6 (1.1)	.974
Heroin	1.9 (2.3)	2.4 (2.3)	.285
Current Dependence			
Alcohol	41.1%	32.3%	.278
Cannabis	12.5%	12.5%	1.000
Crack/Cocaine	81.8%	60.4%	.006**
Hallucinogen	3.6%	1.0%	.282
Heroin	39.3%	47.9%	.305

Note. Frequency for each substance indexed with a Likert scale as: never (0), one time (1), ≤ once per month (2), ≤ once per week (3), 2-3 times a week (4), more than 4 times a week (5); *p* values are from simple effect t-tests with gender as grouping variable;

< .001;

**
< .01;

*
< .05.

Table 2

Means, standard deviations and p-values for individual difference across gender.

	Females	Males	<i>p</i> value
Positive emotionality (MPQ)	64.9 (16.5)	66.7 (13.5)	.450
Well-being	8.1 (3.5)	8.0 (2.9)	.782
Social potency	5.7 (2.7)	5.9 (2.6)	.681
Achievement	6.4 (3.0)	6.7 (3.0)	.493
Social closeness	5.8 (2.8)	6.7 (3.0)	.074
Negative Emotionality (MPQ)	54.8 (16.5)	48.4 (16.7)	.025*
Stress reaction	7.4 (2.9)	6.0 (3.3)	.007**
Alienation	6.1 (3.0)	4.6 (2.9)	.002**
Aggression	3.6 (2.9)	4.0 (3.0)	.463
Constraint (MPQ)	79.2 (12.2)	80.9 (12.6)	.407
Control	7.3 (2.7)	7.7 (2.8)	.367
Harm avoidance	8.2 (2.7)	8.3 (2.8)	.847
Traditionalism	8.1 (1.9)	8.0 (1.8)	.834
Impulsivity (BIS)	79.9 (11.4)	74.2 (12.6)	.006**
Non-planning	27.4 (5.3)	26.0 (5.0)	.103
Attention	31.3 (4.6)	29.6 (5.4)	.044*
Motor	23.4 (4.6)	20.7 (5.1)	.001***
Childhood Abuse (CTQ)	2.1 (0.9)	1.7 (0.8)	.005**
Emotional	2.3 (1.1)	1.8 (0.9)	.003**
Physical	2.0 (1.1)	1.9 (0.9)	.639
Sexual	1.9 (1.2)	1.3 (0.8)	.001***

*** *Note.* < .001;

** < .01;

* < .05.

Table 3

Correlations between individual differences and crack/cocaine diagnosis and use.

	SCID (Current)	Current Use (Past 12 months)	Heaviest Use (Lifetime)
Age	0.14	0.26***	0.17*
Education	0.11	0.07	0.05
Income	-0.16*	-0.17*	-0.16*
Positive Emotionality (MPQ)	-0.04	-0.04	-0.07
Well-being	-0.01	0.00	-0.03
Social potency	0.07	0.06	0.03
Achievement	-0.02	-0.02	-0.10
Social closeness	-0.15	-0.13	-0.09
Negative emotionality (MPQ)	0.12	0.07	0.05
Stress reaction	0.13	0.08	0.16*
Alienation	0.15	0.12	0.05
Aggression	0.02	-0.03	-0.06
Constraint (MPQ)	-0.30***	-0.20*	-0.19*
Control	-0.33***	-0.19*	-0.21**
Harm avoidance	-0.14	-0.14	-0.07
Traditionalism	-0.05	0.00	-0.05
Impulsivity (BIS)	0.22**	0.21**	0.28***
Non-planning	0.25**	0.24*	0.28***
Attention	0.15	0.16*	0.24**
Motor	0.14	0.11	0.19*
Childhood Abuse (CTQ)	0.19*	0.15	0.11
Emotional	0.16*	0.11	0.11
Physical	0.13	0.08	0.04
Sexual	0.19*	0.20*	0.11

Note. < .001;**
< .01;*
< .05

Table 4

Tests of Indirect Gender Effects - Joint test of significance.

Intervening variable	Criterion A	Criterion B		
		SCID (Current)	Current Use (Past 12 months)	Heaviest (Lifetime)
Age	.778	.074	.001***	.030*
Education	.323	.241	.611	.660
Income	.012*	.136	.155	.114
Positive emotionality (MPQ)	.450	.740	.832	.429
Well-being	.782	.915	.917	.652
Social potency	.681	.331	.355	.630
Achievement	.493	.966	.986	.261
Social closeness	.074	.132	.278	.429
Negative emotionality(MPQ)	.025*	.285	.857	.798
Stress reaction	.007**	.311	.912	.132
Alienation	.002**	.242	.564	.911
Aggression	.463	.654	.867	.582
Constraint (MPQ)	.407	.001***	.023*	.026*
Control	.367	.001***	.035*	.013*
Harm avoidance	.847	.085	.083	.396
Traditionalism	.834	.510	.968	.547
Impulsivity (BIS)	.006**	.032*	.064	.002**
Non-planning	.103	.006**	.010**	.001***
Attention	.044*	.161	.144	.008**
Motor	.001***	.267	.708	.065
Childhood Trauma (CTQ)	.005**	.069	.267	.424
Emotional	.003**	.155	.638	.393
Physical	.639	.125	.365	.645
Sexual	.001***	.123	.161	.451

Note. Separate “Joint Tests of Significance” (JTS; MacKinnon, Taborga, & Morgan-Lopez, 2002) were conducted for each of the three crack/cocaine measures (SCID dependence, current use, lifetime heaviest use) to detect individual difference variables that may account for the observed Gender differences in crack/cocaine use/dependence. Criterion A of the JTS is a test of the Gender effect when the intervening variable is regressed on Gender. Criterion B of the JTS is a test of the intervening variable effect when the crack/cocaine outcome variable is regressed simultaneously on the intervening variable and Gender (i.e., the unique effect of the intervening variable controlling for Gender). Gender has an indirect effect on the crack/cocaine outcome measure via the intervening variable if both Criterion A and B are significant. *p* values of the specific tests for Criteria A&B are listed in the table body.

< .001;

**
< .01;

*
< .05.