

## ABSTRACT

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  Relationship between Gender and  
  Crack/Cocaine Use and Dependence

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Building on previous research, this cross-sectional, exploratory study of 142 crack/cocaine users, currently enrolled in residential substance abuse treatment, aimed to replicate previous findings indicating that females evidence greater use (past year and heaviest use) and dependence (current and lifetime) of crack/cocaine compared to males. In addition, this study sought to examine potential risk factors in the relationship between gender and crack/cocaine drug use. Results indicated that females used crack/cocaine significantly more frequently in the past year. Males and females did not differ on dependence or lifetime heaviest use. Frequency of use by romantic partner and lifetime major depressive disorder diagnosis were significantly related to both gender and past year crack/cocaine use frequency, and met criteria as risk factors in this relationship. This study adds to previous reports of greater crack/cocaine use among inner-city females and identified potential factors underlying this greater frequency of use by women.

TOWARD A BETTER UNDERSTANDING OF THE RELATIONSHIP BETWEEN  
GENDER AND CRACK/COCAINE USE AND DEPENDENCE

By

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# Chapter 1: Introduction

## 1.1 Overview

An emerging body of literature suggests that inner-city substance-misusing females evidence greater crack/cocaine use and are more likely to be crack/cocaine dependent than their male counterparts (Daley, Argeriou, & McCarty, 2000; Peters, Strozier, Murrin, & Kearns, 1997; Sterk, Theall, & Elifson, 2003; Tortu, Goldstein, & Deren, 1998). Yet, little or no psychosocial empirical work addresses why these gender differences in crack/cocaine use/dependence may exist. This gap in the literature is noteworthy and unfortunate, as crack/cocaine, more so than any other drug, has been associated with a number of serious health-compromising behaviors, including condom non-use, exchange of sex for money and/or drugs, and contraction of HIV (Booth, Kwiatkowski, & Chitwood, 2000; Chiasson, Stoneburner, & Hildebrandt, 1991; Cottler, Helzer, & Tipp, 1990; Hoffman, Klein, Eber, & Crosby, 2000; Leigh & Stall 1993; Lejuez, Bornoalova, Daughters, & Curtin, 2005; Ross, Hwang, Zack, Bull, & Williams, 2002; Word & Bowser, 1997).

One initial effort to better understand potential risk factors in the relationship between gender and drug choice was conducted by Lejuez, Bornoalova, Reynolds, Daughters, and Curtin (2007). In this study, the role of theoretically relevant personality (i.e. negative emotionality, and impulsivity) and environmental (history of sexual abuse) variables were examined as potential risk factors in this relationship between gender and crack/cocaine use/dependence. Results from this study indicated that females were significantly more likely to use crack/cocaine than any other drug, and further were more likely to use crack/cocaine than males across current use and

lifetime heaviest use. Surprisingly, females evidenced higher levels of impulsivity than males. When considering lifetime heaviest use, impulsivity mediated the relationship between gender and crack/cocaine use, yet mediation by impulsivity (or any other individual difference variable utilized) was not evident when considering current drug use. Negative emotionality and history of sexual abuse were related at a univariate level to gender but were not found to be mediators in any case. Together, these results suggested that impulsivity may underlie female's crack/cocaine use when considered over their lifetime.

Although Lejuez et al. (2007) was the first study to address psychosocial reasons why females are more likely to use crack/cocaine compared to other drugs, use crack/cocaine more frequently, and show greater evidence of dependence on crack/cocaine than males, several future directions were indicated. First, the study lacked a theoretical framework to guide the selection of measures. Second, although this study utilized measures of trait differences and early environmental adversity, measures of immediate social context (e.g., drug availability, use of drugs by social context, means of obtainment) and one's response to that context (e.g., conformity, need for closure, sensitivity to ostracism) were noticeably absent. Finally, the assessment of impulsivity, the one variable that showed some promise as a mediator, was overly simplistic calling for a more complex assessment in future studies.

Building upon the Lejuez et al., (2007) study, the current study proposes to further investigate the relationship between gender and crack/cocaine use/dependence. First, this current study aims to replicate the previous findings indicating that females evidence greater dependence and use (current and lifetime

heaviest) of crack/cocaine compared to males. In addition, this study aims to better understand the role of impulsivity as a mediator in the relationship between gender and crack/cocaine drug use. Because impulsivity has been identified as a multidimensional construct (Evenden, 1999; Monterosso, Ehrman, Napier, O'Brien, & Childress, 2001; Whiteside and Lynam, 2001), impulsivity will be measured in a multidimensional manner using both self-report and behavioral tasks in order to address how specific components of impulsivity are related to crack/cocaine use/dependence. Further, this study aims to expand upon previous research by exploring the environmental context surrounding drug use and individual difference variables. This extension is guided by the Social Action Theory (Ewart, 2004; 1994; 1991) and has two specific aims. First, in line with previous research, this study aims to replicate previous findings indicating that females in residential substance use treatment evidence greater use of crack/cocaine (current and heaviest use) and are more likely to be dependent (current lifetime) compared to males. Second, extending these findings, the SAT will be used to guide the exploration of potential risk factors in the relationship between gender and crack/cocaine use/dependence. These potential risk factors fall within the three domains of the SAT: 1) environmental context (e.g., demographic variables, social context, and history of abuse), 2) self-regulation capacities/personality of the individual (e.g., impulsivity, negative emotionality, need for closure, conformity, and sensitivity to ostracism) and, 3) internal-affective states that influence self-regulation (e.g., psychopathology).

## 1.2 Females and Crack/Cocaine

Research suggests that inner-city substance-misusing females evidence greater crack/cocaine use and are more likely to be crack/cocaine dependent than their male counterparts. According to epidemiological estimates, females are 3–4 times more likely than males to become cocaine dependent within 24 months after first cocaine use (O'Brien & Anthony, 2005). Females also report higher rates of cocaine use and shorter cocaine-free periods than males (Griffin et al., 1989). Peters, Strozier, Murrin, and Kearns (1997) conducted a study designed to identify gender differences in psychosocial characteristics and substance abuse treatment needs among jail inmates. Their results indicated that female inmates more frequently reported cocaine as their primary drug of choice. When asked to identify the major problem substance, 74% of female inmates reported that it was cocaine, in contrast to only 49% of male inmates. Further, Tortu, Goldstein, and Deren (1998) examined 1,434 East Harlem male and female crack users. In this study, females reported using crack more days than males in the prior 30 days. Males reported using alcohol and speedball (a mixture of heroin and cocaine) more often than females.

Efforts to understand this difference in use/dependence have mainly been preclinical and have focused on addressing sex differences in response to cocaine. The primary consensus is that sex differences exist in response to cocaine and that some of these differences can be accounted for by gonadal hormones (i.e., primary gonadal hormone of interest has been estradiol; Carroll, Lynch, Roth, Morgan, & Cosgrove, 2004). Whereas these biological factors clearly exert influence, less is known about the role of psychosocial risk factors.

### 1.3 Social Action Theory

To examine the role of psychosocial risk factors, the Social Action Theory (SAT) may be useful as a theoretical framework to guide the work. The SAT elaborates upon existing social-cognitive models (Bandura, 1994; Fisher et al., 1994) by specifically targeting social-environmental contextual influences on substance use and behavior change, self-regulations processes, social relationships, and health promotion (Lightfoot, Rotheram-Borus, Milburn, & Swendeman, 2005). Although the model was presented initially as a framework for health behavior change more generally (Ewart, 1991), Ewart subsequently proposed an SAT approach to HIV risk reduction (Ewart, 1994) which has stimulated investigators to apply the model to a variety of inner-city substances and its associated consequences (Gore-Felton et al., 2005; Johnson et al., 2003; Lightfoot, et al., 2005, Remien et al., 2003). SAT encompasses three domains relevant to the examination of psychosocial risk factors in the relationship between gender and crack/cocaine use/dependence: 1) environmental context (e.g., demographic variables, social context, history of abuse), 2) self-regulation capacities of the individual (e.g., impulsivity, negative emotionality, need for closure, conformity, and sensitivity to ostracism) and, 3) internal-affective states that influence self-regulation (e.g., psychopathology; Ewart, 2004; 1994; 1991). SAT views drug use/dependence as influenced by the personal resources and social power afforded by environmental contexts/settings in combination with the individual's self-regulation capacity and corresponding relevant internal states. SAT was selected as the theoretical framework to guide this work because of its comprehensive nature, specifically the fact that it includes both variables "within" the

individual, self-regulation capacities and internal-affective states, but also the role of external influences, environmental context. This fits with prior research showing that choice of drug is often mediated by factors such as drug availability, drug culture, regional drug use habits, and individual drug user preferences (e.g. Diaz et al., 1994; Gossop, Marsden, Stewart, & Rolfe 2000). Beyond this more general overview, the specifics of each domain and the particular variables of interest within each domain are outlined below.

*Environmental Context.* The SAT considers drug use as operating within a larger context based in individual demographic characteristics and environmental systems. These systems create contextual influences that hinder or assist self-protective acts (Ewart, 1991). Environmental context variables that are likely to influence drug use/dependence include personal resources and social power as reflected in such demographic/background variables as gender (Lejuez et al., 2007), ethnicity (Daley, Argeriou, McCarty, 2000), drug availability, means of obtainment, and support within different social networks (Latkin, Knowlton, Hoover, & Mandell, 1999; Laudet, Magura, Furst, & Kumar, 1999; Latkin et al., 1995), and history of abuse (Brems, Johnson, Neal, & Freemon, 2004; Dube, Anda, Felitti, Edwards, & Croft, 2002; Roy, 2002; Easton, Swan, & Sinha, 2000; Bensley, Spieker, Van Eenwyk, & Schoder, 1999).

*Self-regulation Capacities of the Individual.* The SAT also considers drug use to result from self-regulation capacities as they relate to motivation and problem solving (Ewart 1991). Self-regulation capacities that are likely to influence drug use/dependence are the personality variables of impulsivity (Lejuez et al., 2004;

Lejuez et al., 2005) and trait negative emotionality (Kreuger, 1999). This study will attempt to expand this construct by adding the social cognitive variables of sensitivity to ostracism, conformity, and need for closure. Social cognitive variables theoretically belong in the self-regulation construct as they are thought to be relatively stable and influence the way a person thinks or feels across different situations (Kosic, Kruglanski, Pierro, & Mannetti, 2004).

*Internal-affective States that Influence Self-regulation.* This domain in the SAT describes the way in which, for example, affect and psychopathology interfere with one's ability to self-regulate. Not using drugs is dependent upon an individual's ability to regulate their internal affective state. The internal-affective state that is likely to influence self-regulation relevant to drug use is psychopathology (e.g. Ross-Durow & Boyd, 2000).

Rationales for the relevance of these domains to gender differences and crack/cocaine use/dependence are provided below specifically, how each of these risk factors are related to both crack/cocaine use/dependence and gender.

#### 1.4 Environmental Context

##### *1.4.1 Social Context*

Social context variables that may support greater crack/cocaine use among females involve means to drug access, availability, and use within one's social network. Whereas males may be able to obtain crack/cocaine 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, Bornovalova, & Daughters 2005; Sterk 1999; Wechsberg et al.,

2003; Tortu et al., 1998) and are less likely to be supplying and distributing drugs than males (Rees, Johnson, Randolph, & Liberty, 2005), these factors may create reliance on males for obtaining drugs. Given that male crack/cocaine users are more likely to engage in risky sexual behavior than heroin users (Lejuez, Bornovalova, & Daughters 2005), it is possible that female's primary source of drug availability may be male crack/cocaine users, especially in the context of sex work (Lejuez, Bornovalova, & Daughters 2005; Camacho, Bartholomew, Joe, & Cloud, 1996; Camacho, Bartholomew, Joe, & Simpson, 1997; Joe & Simpson, 1995; Bux, Lamb, & Iguchi, 1995; Grella, Anglin, & Wugalter, 1995). 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 et al., 1999; Ross et al., 2002; Ross et al., 1999).

In terms of use within one's social network, prior research has consistently demonstrated a relationship between an individual's substance use and the substance use of their social network members (e.g. Best et al., 2005; Latkin et al., 1995; Latkin et al., 1999). Although literature has examined the social networks of inner-city drug users (both male and female), these studies have focused more on how social networks influence the use of drugs but not the choice of a specific drug and have not often taken into account the differential influence of social network members such as romantic partner versus family members or friends (Van Etten, Neumark, & Anthony, 1999; Crum, Lillie-Blanton, & Anthony, 1996). In addition to romantic partner, family, and friends, the neighborhood has been shown to be a factor influencing

crack/cocaine use in that it provides a context that can alter an individual's risk for starting and escalating crack/cocaine use. Availability is thought to be a major component of the risk contributed by the neighborhood as well as resident's shared attitude toward use and socioeconomic factors (e.g., employment opportunities, alternative reinforcers; Lillie-Blanton, Anthony, & Schuster, 1993).

#### *1.4.2 History of Abuse*

Evidence from the traumatic stress literature suggests that females are more likely than males to be victims of childhood sexual abuse (Windle, Windle, Scheidt, & Miller, 1995; Wellman, 1993). Further, several studies suggest that childhood sexual abuse is strongly related to an earlier age of substance use initiation and severity of substance abuse problems (Brems, Johnson, Neal, & Freemon, 2004; Dube, Anda, Felitti, Edwards, & Croft, 2002; Roy, 2002; Easton, Swan, & Sinha, 2000; Bensley, Spieker, Van Eenwyk, & Schoder, 1999). For instance, Brems, Johnson, Neal, and Freemon (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 and gender, several studies have found that abuse is related to crack/cocaine use among females (Boyd, 1993; Boyd, Guthrie, Pohl & Whitmarsh, 1994; El-Bassel, Gilbert & Rajah, 2003; Freeman, Collier & Parillo, 2002).

## 1.5 Self-Regulation Capacities of the Individual

### *1.5.1 Impulsivity*

In the preliminary work conducted by Lejuez et al. (2007), impulsivity was found to mediate the relationship between gender and crack/cocaine use at lifetime heaviest use, yet mediation by impulsivity (or any other individual difference variable utilized) was not evident when considering current drug use. In addition to this study identifying impulsivity as a mediator of the relationship between gender and heaviest lifetime use of crack/cocaine, additional evidence implicates the dispositional variable of trait-impulsivity in the relationship between gender and drug choice. Impulsivity often co-occurs with a substance abuse or dependence diagnosis (APA, 1994). Further, substance use itself has been conceptualized as impulsive behavior (e.g., Lane et al., 2003). Considered more generally, impulsivity has been linked to substance use vulnerability, use frequency, severity including social and emotional consequences, and dependence (e.g., Allen et al., 1998; Fishbein, Lozovsky, & Jaffe, 1989; King et al., 1991; Moeller et al., 2001, 2002; Monterosso, Ehrman, Napier, O'Brien, & Childress, 2001; Patton et al., 1995; Petry, 2001).

Yet, one difficulty in examining impulsivity and its relationship with the other key variables is the multidimensional nature of the construct (Evenden, 1999; Monterosso et al., 2001; Whiteside and Lynam, 2001). Definitions of the construct include, but are not limited to, the inability to delay gratification (Mischel, Shoda, & Rodriguez, 1989), the process of discounting a reward as a function of delay (Ainslie, 1975), and the inability to inhibit prepotent responding (Logan, 1994; Newman, Patterson, & Kosson, 1987). Several tasks and self-report instruments have been

developed to measure each of these dimensions. Despite the recognized multidimensionality of impulsivity, most studies examining the construct examine one dimension of the construct in isolation (for an exception, see Lane et al., 2003). Thus, it is difficult to speculate on the generalizability of the results across other dimensions of impulsivity, and more importantly, on how specific components of impulsivity are related to substance use.

In considering the most relevant aspects of impulsivity to examine here, several studies are of relevance. First, previous studies have found that substance abusers discount delayed monetary rewards at a greater rate than control groups (non-substance users; Coffey, Gudleski, Saladin, & Brady, 2003; Madden, Petry, Badger, & Bickel, 1997). Further and more specific to cocaine, data have shown that in chronic cocaine users, acute cocaine administration impairs response inhibition and long-term cocaine self-administration impairs inhibitory functions and leads to a loss of control over behavioral impulses (Fillmore, Rush, & Hays, 2002). Recent work shows that diminished performance monitoring can be a critical cognitive mechanism underlying impaired response inhibition in cocaine dependent patients (Li, Milivojevic, Kemp, Hong, & Sinha, 2006). In work more aligned with drug class differences, Bornovalova and colleagues (2005) found that crack/cocaine users evidenced greater levels of impulsivity and risk-taking propensity than heroin users.

Unclear, is the extent to which these findings are due to specific acute intoxication effects of crack cocaine and/or personality differences that may underlie drug preference. The reported results may be due to a preexisting disposition that leads one to gravitate toward drugs such as crack/cocaine (Miller, & Neaigus, 2002).

Indeed, it is well-accepted that traits such as impulsivity have a biological basis (Cloninger, 1987), and these biologically based factors render an individual vulnerable to substance use. However, these differences may be partially accounted for by contextual factors such as the strong association of crack/cocaine use and involvement in the sex-for-crack market (Baseman, Ross, & Williams 1999; Ross et al., 2002; Ross et al., 1999). In other words, environmental cues imposed on crack/cocaine and heroin users may differ dramatically and therefore may differentially provide opportunities for, and reinforcement of, impulsive and risky behaviors.

Finally, results may be due to selective brain damage and consequent impairment in decision making resulting from chronic crack/cocaine use. There is evidence that chronic cocaine abuse leads to neuropsychological impairments and neuroanatomical abnormalities, such as deficits in the domains of attention, memory, learning, and perceptual motor speed (Strickland, & Stein, 1995). Regardless of whether it is personality, context, or neuropsychological impairment, both acute-effects and long-term cocaine self-administration appears to compromise the ability to control impulses long enough to engage in alternative safe behavior. Despite providing a link between crack/cocaine and impulsivity, this literature has yet to address the role of gender in these relationships. As such, to the proposed study will focus on the definitions/measurements of impulsivity that have been shown to be related to substance use including self-reported trait impulsivity, delay discounting, risk-taking propensity, and response inhibition in order to understand whether this construct plays a role in the relationship between crack/cocaine and gender.

### *1.5.2 Negative Emotionality*

A wealth of literature suggests that negative emotionality and specifically stress reactivity is related to substance-related problems. High negative emotional temperament is defined as a proneness to experience anxiety, anger, and related emotional and behavioral negative engagement. Cross-sectional (Clark, Lynch, Donovan & Block, 2001) and more compellingly, longitudinal studies (Cooper, Wood, Orcutt & Albino, 2003; Krueger, 1999) have demonstrated the association of this variable with severity of substance-related problems (Johnson & Pandina, 1993; Labouvie, Pandina, White & Johnson, 1990). Additionally, Sinha and colleagues have shown that exposure to personalized stressful imagery as well as cocaine-related imagery, compared to neutral imagery, lead to increased cocaine craving (Sinha et al., 2003). With regard to gender, 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). Thus, evidence suggests that negative emotionality 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.

### *1.5.3 Social Cognitive Variables.*

As described above, prior research has consistently demonstrated a relationship between an individuals' substance use and the substance use of their social network members (e.g. Best et al., 2005; Latkin et al., 1995; Latkin et al.,

1999); for example, there is evidence that the number of friends who use illicit drugs is positively associated with one's own illicit drug use (Jenkins & Zunguze, 1998). Yet, it is also necessary to understand the processes through which social network exerts its influence. Social psychologists have long theorized that the pressure from one's peers and the desire to fit into a group greatly influence behavior (Festinger, 1950; Petraitis, Flay & Miller, 1995). Further, a number of specific processes have been proposed including, social comparison processes, fear of social sanctions, information exchange, and socialization of new members (Fisher, 1988; Hall, & Wellman, 1985). Building from this prior research, three individual difference variables that may add to our understanding of how a female drug user is influenced by their social network are sensitivity to ostracism, conformity, and need for closure.

One can theorize that once a person starts using a substance in order to be accepted by peers that this acceptance may be based upon the use of that specific substance. Thus, not using the same drugs as those in one's social network is likely to place a female drug user in socially stressful situations. A high level of sensitivity to ostracism (or social distress) would explain why some users are more or less responsive to the behaviors of those in their social network. High sensitivity to ostracism would lead to greater stress and negative affect in the face of negative peer behaviors, and would therefore correlate with match of drug use to those in one's social network.

While social ostracism taps one's affective response to social rejection, another important aspect of social cognition is one's level of conformity. Conformity can be defined as a change in a person's behavior or opinions as a result of real or

imagined pressure from a person or a group of people (Aronson, Wilson, & Akert, 2005). A number of variables have shown to moderate one's tendency to conform. These variables can be broken down into two categories 1) perceptions of the group including, perceived similarity, group attractiveness, and rewards, 2) attributes about the behavior about the group including peer pressure and personal consequences (Bearden, Randall, Rose, & Teel, 1994). Thus, in terms of drug-using females, one can hypothesize that females may conform to the use of drugs in their social network because their social group may provide some kind of reward or positive consequence such as belonging or security. Females in the inner-city are often in a more precarious situation than males, in terms of their ability to access both legal and illegal resources. Thus, females may be more likely to conform to substance use in their network than males.

In conjunction with conformity and sensitivity to ostracism, the need for closure construct reflects the desire for “*an answer on a given topic, any answer, as compared to confusion and ambiguity*” (Kruglanski 1990, p. 337, italics in original). A person high in need for closure is hypothesized to prefer order and predictability, to be decisive, to be uncomfortable with ambiguity, and to be closed-minded (Neuberg, Judice & West, 1997). More recently, it has been suggested that a high need for closure contributes to the emergence of a behavioral syndrome called *group centrism* - a pattern that includes pressures toward group uniformity, which can lead to attempts at influencing other group members as well as the readiness to accept other members' influence (Kruglanski, Pierro, Mannetti & De Grada, 2006). Thus, one can conjecture that females high on need for closure may feel pressure for group

uniformity and thus desire to conform to the crack/cocaine use of those in their social network.

## 1.6 Internal-Affective States that Influence Self-Regulation

### *1.6.1 Psychopathology*

A wealth of literature suggests that psychopathology is related to both gender and crack/cocaine use/dependence. Psychopathology is thought to occur preexisting, concomitantly with and subsequent to chronic cocaine use. Khantzian (1985) proposed the self-medication hypothesis of substance use, arguing that individuals self-administer a particular psychoactive substance to alleviate psychopathological symptomatology. He stated that addicted individuals employ cocaine to cure premorbid psychological disturbances such as low self-esteem, depression, and attention/concentration deficits. In contrast, several researchers examining comorbid psychiatric disorders in cocaine abusers have argued that because of negative sequelae inherent to abuse of the substance, psychopathology is a consequence of persistent use rather than a predisposing factor (e.g., Alterman, O'Brien, McLellan, & McKay, 2001). Combining these two approaches, some researchers have proposed interactive models that incorporate the role of premorbid and postmorbid psychopathology. For example, Rounsaville et al. (1991) found that childhood attention-deficit hyperactivity disorder, anxiety disorders, and antisocial personality disorders were preexisting conditions that came before cocaine abuse and that mood disorders and alcohol abuse occurred subsequent to cocaine abuse. While there is continuing debate about the etiologic significance of psychiatric disorders in the development of substance use (e.g., Biderman et al., 1997), there is a general

agreement that substance abuse and other psychopathological problems coexist and that substance-abusing treatment clients with comorbid psychiatric disorders have poorer treatment outcomes (Chilcoat, & Johanson, 1998). In terms of specificity females, several studies have shown that females suffering from substance use disorders reported more mood and anxiety disorders than males (Weiss et al., 2003; Griffin et al., 1989; Brooner et al., 1997).

### 1.7 Current Study

Building on previous research, this cross-sectional, exploratory study of crack/cocaine users, currently enrolled in residential substance abuse treatment, aims to replicate the previous findings indicating that females evidence greater use (past year and heaviest use) and dependence (current and lifetime) of crack/cocaine compared to males. In addition, this study will examine potential risk factors in the relationship between gender and crack/cocaine drug use including the role of impulsivity. Because impulsivity has been identified as a multidimensional construct, it will be measured in a multi-method manner using both self-report and behavioral tasks in order to address how specific components of impulsivity are related to drug use/dependence. Further this study plans to expand upon previous research by exploring the environmental context surrounding drug use and individual difference variables (e.g., negative emotionality, psychopathology). To accomplish this goal, both self-report and behavioral tasks will be used to assess the social context variables of drug availability within a user's social networks and means of drug obtainment, as well as the social cognitive variables of sensitivity to ostracism, need for closure, and tendency to conform to the drug use of those in one's network. The

Social Action Theory (SAT) will be used as a framework to guide the work. The SAT elaborates upon existing social-cognitive models. Specifically, the application of SAT to drug choice will encompass 3 major domains: 1) environmental context, 2) self-regulation capacities of the individual and, 3) internal-affective states that influence self-regulation. In terms of public health, this research has the potential to inform and aid in the development of drug treatment and intervention strategies specifically tailored to inner-city crack/cocaine abusing females, a currently underserved and poorly understood population, with the goal of limiting resulting consequences especially linked to this drug including incarceration and HIV infection.

## **Chapter 2: Research Design and Methods**

### *2.1 Overall Design and Procedure*

This study was integrated into a larger study of drug choice, impulsivity, and risky sexual behavior. Prospective participants were sampled from 399 consecutive admissions in a substance use residential treatment facility in the DC Metropolitan area. The study took place over two days. On the first day (typically Monday evenings), participants were administered consent and completed the diagnostic interview (SCID-NP and DIPD-IV). At the beginning of this session the participant was given a detailed explanation of the procedures and asked to provide written informed consent. Given issues of reading comprehension, efforts were made to ensure that participants understand all facets of the consent form and the study itself. Individuals trained in administering the diagnostic interviews completed the interview in accordance with the recommendations of First et al (2003).

On the second day of testing (typically Friday afternoons), participants completed the self-report questionnaires, the series of computerized behavioral tasks, and the interview on drug use and availability. The questionnaires, interview, and behavioral tasks were counter-balanced across participants. During the time that the participants were completing the questionnaires, individuals trained in administering the computer tasks would bring a participant to a private area away from other participants to complete the tasks. Each participant was reminded before the task that the better they perform on the task the more money they would earn. After completion of the tasks, the participant returned to the main area and finished completing the questionnaires. The interview was conducted in a similar manner, with a trained research assistant taking the participants to a private area to complete the interview. A proctor was in the main area at all times to provide instruction and answer any questions the participants had.

Questionnaire data for the first 14 participants were initially collected using an audio-enhanced computer-assisted self-interviews software system (Audio CASI) on laptop computers in classrooms at the Harbor Light Facility. Due to difficulties with the system, the decision was made to collect data using paper and pencil questionnaires after 10% of the data was collected.

At the end of the two sessions, participants were told how much they had earned in grocery store gift cards and they signed a receipt (either \$20 or \$25 depending on their performance on the BART; above \$10 on the BART received \$25 and below \$10 received \$20). The participants were given a receipt to keep with the amount earned and the gift-card pick-up line phone number. Participants were

instructed to call this number once they left treatment in order to receive their gift cards. The gift cards were sent via certified mail to an address of their choosing upon receipt of their message saying they had left treatment. In total, the entire session lasted on average about 180 minutes: one hour for session one and two hours for session two.

## 2.2 Inclusion/exclusion and Design considerations

One of the initial considerations of the study was what population to choose: those in treatment or current substance users. Although the ultimate goal of this line of research is to understand the relationship between gender and crack/cocaine drug use/dependence, research in this area is at a basic stage and this study marks an initial investigation in this area. In making this decision, there were a number of factors to take into account. First is the issue of absence of current substance use. In the current design, this study cannot determine the extent to which gender may directly account for the variability in crack/cocaine use as actual drug use is not permitted in the treatment center and is cause for dismissal from the facility. Yet, the study sample of those in treatment allows the examination of the proposed relationships and potential vulnerabilities without involving acute pharmacological effects of drugs which may serve as confounds. Although understanding the impact of acute pharmacological effects is important, this would be a question for a subsequent study. Of course, due to the cross-sectional nature of this investigation, it may be possible that chronic pharmacological effects could influence findings; however the elimination of acute effects represents an important initial step in this avenue of research. An additional limitation of using those in treatment is that some of the measures ask how they are

currently and thus when sober, they may respond to things differently than when using drugs and when they were making drug choices. However, we are most interested in things that are trait-like (and thus would remain stable across different environments and whether using or not) – gender, availability of drugs in particular settings, and trait affectivity. In addition, if we were to sample those currently abusing drugs/in the general community, there would be a number of additional disadvantages such as differential attrition, sampling bias, and safety. We understand that our generalizability is limited due to the fact that we are only studying those in treatment. Yet, our decision to use those in residential treatment is believed to strengthen the study design and provide a foundation from which to begin to examine this line of research.

Our second decision focused on the most appropriate period of time for initial assessment. To ensure that initial withdrawal symptoms do not interfere with an individual's ability to complete the assessment session or their performance on the behavioral procedures, as well as to control for the effects of time in treatment, participants will be assessed no sooner than 48 hours and no later than 7 days after they arrive at the facility. It should be noted that individuals must have passed through detoxification and are completely free of drugs at intake, thereby limiting the likelihood of extreme withdrawal effects even at the 48 hour period.

Third, we considered the inclusion of individuals over the age of 60, as well as those who are demonstrating acute psychotic symptoms. We decided to exclude these individuals for two reasons. Regarding age, one finding is that impulsivity and risky behavior increase throughout youth, peak in young adulthood, and then decline

with age (e.g., Stall et al, 1992). Together, it is clear that the inclusion of individuals over the age of 60 would introduce unnecessary variance into the data. Similarly, inclusion of individuals demonstrating acute psychotic symptoms introduces concerns of reporting accuracy, insight, and memory (Heinrichs & Zakzanis, 1998), that is, qualities that are necessary for an accurate completion of the experimental procedures. Thus, individuals that are acutely psychotic will be excluded from the study.

Finally, when originally conceptualizing the study we had hoped to be able to examine distinct groups of drug users to hone in on drug choice. Thus, it had been proposed to have distinct groups of drugs users: primary crack/cocaine, primary heroin, both crack/cocaine and heroin, and neither crack/cocaine nor heroin. Once we started data collection this goal became unobtainable. Over the course of the study no females were primary heroin users and only 11 fell into the group of using both crack/cocaine and heroin. Thus, instead of having the outcome variable be the distinct drug groups, it was decided to look within crack/cocaine users at crack/cocaine both continuously with frequency of use at the two time points of past year and heaviest use as well as dependence both current and lifetime. Subjects were selected who had used crack/cocaine at least once in the past year. Other drug use was controlled for in the analyses to get at specificity of crack/cocaine use and dependence.

### 2.3 Participants

The final sample consisted of 142 participants who had used crack/cocaine at least once in the past year. The average frequency of crack/cocaine use in the past year and at heaviest use was 2-3 times per week, 84% met for lifetime crack/cocaine

dependence, and 71% met for current dependence. The sample ranged in age from 23-60 years, with a mean age of 45.39 years (SD = 7.25). 33% were female (n = 47), and 88% were Black (n = 125). With regard to highest education level achieved, 25% completed less than high school, 44% had graduated from high school or had a GED, and 32% had completed more than high school. 55% had an income of \$10,000 or less per year (n = 78). 70% reported single as their marital status. 53% were court mandated to attend treatment.

#### 2.4 Measures

Drug Use		General assessment of frequency of drug use: past year and heaviest use	Drug Use Questionnaire ○ Saunders, Aasland, Babor, De la Fuente, & Grant, 1993
		Dependence Diagnoses	SCID-NP First, Spitzer, Gibbon, and Williams, 1995
Environmental Context (SAT Domain 1)		Demographics	Demographics Sheet
		Availability, means of obtainment, use in social network	Drug Use and Availability Interview ○ Study Created
		Childhood Trauma	CTQ-SF ○ Bernstein, Stein, Newcomb., 2003
Self-regulation Capacities / Personality (SAT Domain 2)	Social Cognitive	Conformity	International Personality Item Pool ○ Goldberg, 1999
		Need for Closure	Need for Closure Scale ○ Webster & Kruglanski, 1994
		Sensitivity to ostracism	Williams' Need-Threat Questionnaire (WNTQ) Cyberball ○ Williams, Cheung, & Choi, 2000
	Negative Emotionality	Negative emotional temperament	MPQ-BF ○ Patrick, Curtin, & Tellegen, 2002
	Impulsivity	Attentional, motor, and non-planning impulsiveness	BIS ○ Patton, Stanford, and Barratt, 1995
		Ability to inhibit prepotent responding	Stop-GO ○ Logan, Schachar, and Tannock, 1997
		Propensity to discount a reward as a function of delay	Delay Discounting ○ Kirby & Marakovic, 1996
Risk-taking Propensity		BART ○ Lejuez et al., 2002	
Internal Affective States (SAT Domain 3)		Diagnostic Information (All Axis I Psychopathology, Select Assessment of Personality Disorders)	SCID-NP ○ First, Spitzer, Gibbon, and Williams, 1995 DIPD-IV ○ Zanarini, Frankenburg, Sickel, & Yong, 1996

#### 2.4.1 Drug Use

Drug Use Questionnaire (Saunders, Aasland, Babor, De la Fuente, & Grant, 1993). Frequency of drug (i.e., marijuana, PCP, heroin, and crack/cocaine) and alcohol use was assessed with a standard drug use questionnaire modeled after the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993). Specifically, participants were asked how often they used each substance in the past year prior to treatment (past year), as well as how often they used the drug during the period of their life when they were using it most frequently (heaviest lifetime use). Response options were: never (0), one time (1), monthly or less (2), 2-4 times a month (3), 2-3 times a week (4), and 4 or more times a week (5).

SCID–NP-non-patient version (First, Spitzer, Gibbon, & Williams, 1995).

Prevalence of Drug Dependence was determined using the Structured Clinical Interview for DSM-IV (SCID–NP, non-patient version; First, Spitzer, Gibbon, & Williams, 1995). This measure has demonstrated reliability (Spitzer, Williams, Gibbon, & First, 1989). All eligible participants were administered the interviews in a private area by trained research staff.

#### 2.4.2 Environmental Context (SAT Domain 1)

Demographic Information. A short self-report questionnaire was administered to obtain age, gender, race, education level, marital status, total household income, number of children, and court mandated to treatment status.

Drug Use and Availability Interview. Drug availability, means of obtainment, and use by/with one's social network was assessed with a new interview measure

created for this study. The development of this measure was based on Important People and Activities Instrument (Clifford & Longabaugh, 1991) and the Oregon Public School Drug Use Survey from the Social Development Research Group (Arthur et al., 1998). All participants were administered the interview in a private area by trained research staff. The measure assesses availability of crack/cocaine (i.e., how easy/difficult it is to get), frequency of use by social network (i.e., romantic partner, close group of friends, immediate family, and neighborhood), frequency of use with those in social network, frequency of getting crack/cocaine from those in social network, frequency of using different means of crack/cocaine obtainment (i.e., gift, money from legal employment, money from illegal means, sex exchange, dealing drugs, and stealing drugs), and frequency of giving crack/cocaine to others (i.e., free, sex exchange, dealing). The questions were asked for the two time points: past year prior to treatment and period of lifetime heaviest use. Response options for ease of availability ranged from very hard (1) to very easy (5). Response options for all the frequency questions were: (0) Not applicable, (1) Never, (2) less than once per month, (3) once per month, (4) 2-3 times per month, (5) once per week, (6) 2-3 times a week, and (7) more than 4 times per week. Responses of not applicable were recoded into user missing (i.e, 777).

The Childhood Trauma Questionnaire-Short Form (CTQ-SF; Bernstein, Stein, Newcomb, 2003). Abuse was measured using the CTQ-SF. The CTQ-SF assesses childhood maltreatment experiences (i.e., "while you were growing up") using a 5-point scale ranging from 1 (never true) to 5 (very often true). The CTQ-SF contains 28 items assessing five internally consistent subscales measuring emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. The CTQ has

been validated in more than 2,200 individuals in clinical and community samples. Internal consistency of the scales ranges from .66 to .92 (Bernstein et al., 1997; Bernstein & Fink, 1998; Bernstein et al., 1994; Fink et al., 1995; Scher et al., 2001; Wright et al., 2001). Scores are stable over time and show convergent and discriminant validity with other trauma measures (Bernstein et al., 1994; Fink et al., 1995). The CTQ has good sensitivity (.86–.78) and satisfactory specificity (.61–.76) when self-reports are compared with trauma ratings from child welfare records and reports of family members and clinicians (Bernstein et al., 1997). In past studies conducted with this sample, internal consistency was good for the abuse subscales (i.e., .84, .83, and .90 for emotional, physical, and sexual abuse respectively), but less than adequate for the neglect subscales (.39 and .60 for emotional and physical neglect, respectively). As such, the neglect subscales were not used in the current study.

#### *2.4.3 Self-Regulation Capacities (SAT Domain 2)*

Conformity (Goldberg, 1999). The personality construct of conformity was measured with a ten-item scale from the International Personality Item Pool (IPIP), a scientific collaboratory for the development of advanced measures of personality and other individual differences. This scale from the IPIP was based of the Jackson Personality Inventory (JPI-R). Examples of questions include “worry about what people think of me”, “need the approval of others”, “do what others do”. Response options are: very inaccurate (1), moderately inaccurate (2), neither inaccurate nor accurate (3), moderately accurate (4), and very accurate (5). Previous work indicated an alpha of .71.

Need for Closure Scale (NFCS; Webster & Kruglanski, 1994). Need for closure reflects the desire for “*an* answer on a given topic, *any* answer, as compared to confusion and ambiguity” (Kruglanski, 1990, p. 337, italics in original). A person high in need for closure is hypothesized to prefer order and predictability, to be decisive, to be uncomfortable with ambiguity, and to be closed-minded (Neuberg, Judice & West, 1997). The Need for Closure Scale (NFCS; Webster & Kruglanski, 1994) was designed to operationalize this construct. It is a 42-item scale and items are scored along 6-point Likert scales. The NFCS has satisfactory reliability and test–retest reliability over 12 weeks (Kruglanski, Webster, & Klem, 1993). Previous work indicated an alpha of .76.

Cyberball and Williams’ Need-Threat Questionnaire (Williams, Cheung & Choi, 2000). This is a computer task of ostracism, social exclusion, and rejection. The Cyberball procedure which was followed is outlined in Zadro, Williams & Richardson (2004). Participants were told that the game will be accessed via the Internet (a downloadable version of this game is available at: <http://www.psy.mq.edu.au/staff/kip/Announce/cyberball>). The game depicts four ball-tossers, the middle one representing the participant. The game is animated and shows the icon throwing a ball to one of the other two players. When the ball is tossed to the participants, they were instructed to click on one of the other two icons to choose a recipient, and the ball moved toward that icon. The game was set for 20 total throws and lasted for approximately 3 minutes. To simulate ostracism, the participants received the ball twice at the beginning of the game and never received the ball again.

Outcomes for Cyberball were obtained using the Williams Needs Threat Questionnaire, which was given to participants immediately after the Cyberball task, to examine how the game threatened their levels of four needs which are fundamental to human motivation, efficacy, and survival (Williams, Cheung & Choi, 2000). This was used to operationalize sensitivity to ostracism. The needs, and examples of the items associated with each, are: belonging (i.e. "I felt disconnected," "I felt rejected," "I felt like an outsider"), control (i.e. "I felt powerful," "I felt superior," "I felt I had control over the course of the game"), self-esteem (i.e. "I felt good about myself," "My self-esteem was high," "I felt liked"), and meaningful existence (i.e. "I felt invisible," "I felt non-existent," "I felt meaningless "). Respondents were instructed to rate each item on how well it represented their feelings during the Cyberball game. There are 15 items, and ratings are made on a 5-point Likert scale ranging from 1 (not at all) to 5 (extremely). These four needs have been shown repeatedly by Williams and colleagues (2000; 2002; Zadro, Williams, & Richardson, 2004) to be lowered by this socially distressing virtual rejection task (Cyberball; Williams, Cheung & Choi, 2000). This measure has demonstrated high internal consistency, with an alpha reliability of .90 (Williams, 2002).

Multidimensional Personality Questionnaire Brief Form (MPQ-BF; Patrick, Curtin, & Tellegen, 2002). The MPQ-BF is a 155-item version of the original 240-item MPQ, developed to assess a variety of personality traits and temperamental dispositions. Like the original MPQ, the MPQ-BF includes 11 primary trait scales which load onto three higher-order factors. The Negative Emotionality subscale was specifically used. This subscale includes the traits of Stress Reactivity, Alienation, and Aggression. The

subscale has demonstrated high internal consistency (Cronbach's alphas range from .74 to .84; see Patrick Curtin, & Tellegen, 2002).

Barratt (BIS-11) Trait-Impulsivity 11 (BIS-11; Patton, Stanford, & Barratt, 1995). Trait-impulsivity was assessed using the Barratt Impulsiveness Scale, version 11 (BIS-11; Patton, Stanford, & Barratt, 1995). The BIS-11 is a 30-item self-report questionnaire that asks participants to rate how often a series of statements applies to them. The BIS-11 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-11 contains three subscales, which have been termed Motor Impulsiveness, Attentional, and Nonplanning.

Stop-Go Task (Logan, Schachar, & Tannock, 1997). This task is based on the hypothesis that impulsive behavior is reflected by the inability to inhibit prepotent responding. Research using the Stop-Go Task has corroborated this hypothesis showing a direct relationship between stop-signal reaction time and impulsivity as measured by self-report (Logan, Schachar, Tannock, 1997). This suggests that the Stop-Go Task is an accurate measure of impulsive behavior. This task begins with the presentation of either an *X* or an *O* in the center of the computer screen. Subjects were instructed to press the “z” key when the *X* appears and the “/” key when the *O* appears. The letters were presented at 2-s intervals, and reaction times (RTs) are recorded. On 25% of the trials (25% of the *X* trials and 25% of the *O* trials), a tone (stop signal) sounds after the presentation of the *X* or *O*. Subjects were instructed to refrain from pressing any keys when they hear the sound. The delay from the onset of the letter presentation to the onset of the tone (stop-signal delay) is systematically adjusted in 50-ms increments. If

the subject failed to refrain from pressing a key after hearing the tone, the stop-signal delay is decreased by 50 ms on the following stop-signal trial. If the individual successfully refrained, the stop-signal delay was increased by 50 ms on the next trial. Eventually, the stop-signal delay reaches a duration at which the subject will inhibit his or his/her key press responses on approximately 50% of trials. Stop reaction time is computed by subtracting the average stop-signal delay at which the individuals are able to inhibit their response 50% of the time from the average key pressing RTs. The task consisted of 256 total trials. We only included those who had a stopping time between .25 and .75 because values outside this range means they were not getting enough correct (i.e. not inhibiting their response). There are four trail blocks. Trial 1 is considered a practice round and thus is not included in analyses. We averaged across trail blocks 2-4. Higher values are more impulsive.

Delay Discounting Procedure (Kirby & Marakovic, 1996; Monterosso et al., 2001). Delay discounting refers to the degree to which an individual shows preference for either small, readily available rewards or larger, delayed rewards. This procedure was a paper/pencil-administered version of the original monetary-choice questionnaire (Kirby & Marakovic, 1996) that has extensively been used in research on sensation-seeking, impulsivity, and risk-taking, and has been found to correlate highly with other behavioral measures of impulsivity (Monterosso et al., 2001; Madden, Petry, Badger, & Bickel, 1997). The questionnaire consists of a fixed set of 27 choices between smaller, immediate rewards and larger delayed rewards. The order is contrived to not correlate choice amounts, ratios, differences, delays or discount-rates implied by indifference to the two rewards. From the responses an estimate “k” is derived to indicate level of

impulsivity (higher score indicating higher impulsivity).

Balloon Analogue Risk Task (BART; Lejuez et al., 2002). As an additional behavioral task, the Balloon Analog Risk Task (BART; Lejuez et al., 2002) was administered. In this task, the BART was presented on the computer in the experimental room. Specifically, the computer screen displayed a small simulated balloon accompanied by a balloon pump, a reset button labeled “Collect \$\$\$,” a permanent money earned display labeled “Total Earned,” and a second display listing the money earned on the last balloon and labeled “Last Balloon.” Participants were directed to pump the balloon to earn as much money as possible, taking into consideration that the balloon can pop at any time. Each pump inflates the balloon about .125” in all directions, and 5 cents are accumulated in a temporary bank (this amount will not be indicated). After a balloon is pumped past its individual explosion point, a “pop” sound effect is generated from the computer. When a balloon explodes, all money in the temporary bank is lost and the next uninflated balloon appears on the screen. At any point during each balloon trial, the participant can stop pumping the balloon and click the “Collect \$\$\$” button. Clicking this button transfers all money from the temporary bank to the permanent bank, during which the new total earned is incrementally updated cent by cent while a slot machine payoff sound effect plays. After each balloon explosion or money collection, the participant’s exposure to that balloon ends, and a new balloon appears until a total of 30 balloons (i.e., trials) are completed. These 30 trials are comprised of different balloon types, all with the same probability of exploding. Participants were not be given any detailed information about the probability of an explosion, but were told that at some point each balloon

will explode and this explosion can occur as early as the first pump all the way up to the point at which the balloon expands as large as the computer screen. The probability that a balloon will explode is arranged by constructing an array of N numbers. The number “1” is designated as indicating a balloon explosion. With each pump of the balloon, a number will be selected without replacement from the array. The balloon explodes if the number 1 is selected. For this experiment N equaled 128. Thus, the probability that the balloon exploded on the first pump was 1/128. If the balloon did not explode after the first pump, the probability that the balloon would explode was then 1/127 on the second pump, and so on up until the 128<sup>th</sup> pump at which the probability of an explosion was 1/1 (i.e., 100%). According to this algorithm, the average breakpoint is 64 pumps.

#### *2.4.5 Internal Affective States (SAT Domain 3)*

SCID–NP, non-patient version (First et al., 1995)/ DIPD-IV; Zanarini, Frankenburg, Sickel, & Yong, 1996). Prevalence of Axis I (MDD, PTSD, and Psychosis) was determined using the Structured Clinical Interview for DSM-IV (SCID–NP, non-patient version; First et al., 1995). Prevalence of Axis II diagnoses (BPD and APD) was determined using the Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV; Zanarini et al., 1996). Both measures have demonstrated reliability (Spitzer et al., 1989; Zanarini et al., 1987). All eligible participants were administered the interviews in a private area by trained research staff.

## Chapter 3: Results

To address the hypotheses (identify potential risk factors in the relationship between gender and crack/cocaine) a number of steps were undertaken. Before moving on it is important to distinguish between the uses of the terms mediator versus risk factor. This study design does not meet all the assumptions for mediation; specifically, the assumption that the mediation chain is correct or temporal ordering has been established (i.e., the independent variable before the mediator before the dependent variable). As this is a cross-sectional design temporal sequencing cannot be established. Thus, following from the suggestion of Kraemer, Stice, Kazdin, Offord, and Kupfer (2001) the term of “risk factor” is more appropriate. The same analysis can be utilized. The steps provided by Baron and Kenny (1986) as well as Judd and Kenny (1981) were used to assess potential risk factors that could account for gender differences in crack/cocaine use/dependence. Separate tests will be conducted for each of the four crack/cocaine measures (past 12 months use, lifetime heaviest use, current dependence and lifetime dependence). First, the independent variable (gender) must significantly predict the dependent variable (crack/cocaine use/dependence). Second, the independent variable (gender) must significantly predict the risk factor (e.g., impulsivity, social cognitive, or social context). Third, the risk factor must significantly predict the dependent variable (crack/cocaine use/dependence). Finally, when both the independent variable and the risk factor are included in the same model to predict the dependent variable, the risk factor must still significantly predict the dependent variable. If these criteria are met, then the effect of

the independent variable must be reduced. The results section will be organized by step as outlined in figure 1.

### 3.1 Step 1: Gender must significantly predict crack/cocaine use/dependence

As shown in Table 1, an ANOVA was used to compare males and females on their frequency of use of crack/cocaine during two time periods: in the past year and at their heaviest use. In addition, using chi-square tests, they were compared on their dependence diagnoses (current and lifetime) from the SCID for crack/cocaine. Males and females did not significantly differ on their mean frequency of crack/cocaine use at the heaviest use time period but did significantly differ on their frequency of crack/cocaine use in the past year ( $F_{(1, 140)} = 4.24, p < .05$ ). Males and females did not significantly differ on crack/cocaine dependence diagnoses for current or lifetime, however, current crack/cocaine dependence diagnosis approached significance at  $p = .07$ .<sup>1</sup>

Males and females were also compared on their frequency of use of marijuana, alcohol, PCP, and heroin during two time periods: in the past year and at their heaviest use. In addition, using chi-square tests, they were compared on their dependence diagnoses (current and lifetime) from the SCID for the same four substances. Males and females did not differ on their frequency of marijuana, heroin, or PCP use during the two time periods with all  $p$ 's  $> .18$ . Males and females significantly differed on their alcohol use with males having a higher mean frequency

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<sup>1</sup> Please remember that the sample used here is limited to those using any crack/cocaine in the past year, which was necessary for many of the social context questions. When examining the entire sample of the larger study, regardless of whether any crack/cocaine use, males and females significantly differed on past year frequency of use ( $F_{(1, 240)} = 10.68, p < .01$ ) and current dependence ( $\chi^2(1) = 6.49, p = .05$ ) but not on heaviest lifetime use and lifetime dependence.

at both heaviest use ( $F_{(1, 131)} = 4.85, p < .05$ ) and past year use ( $F_{(1, 131)} = 7.24, p < .01$ ).

### 3.2 Step 2: Gender must significantly predict the risk factor

In order to address step 2, males and females were compared on the various potential risk factors.

#### 3.2.1 Environmental Context

*Demographic characteristics.* As shown in Table 2, males and females were compared on several demographic characteristics (i.e., age, marital status, race, education, income, employment status, number of children, and court mandated to treatment status) using chi-square tests (categorical variables) and ANOVA (continuous variables). Males and females did not differ across any of the demographics variables, with all  $p$ 's  $> .09$ .

*Childhood Trauma.* To examine gender differences in history of childhood trauma, four univariate ANOVAs were conducted with the CTQ total score (CTQ-TOT), and its three subscales: physical (CTQ-PHY), emotional (CTQ-EMO), and sexual (CTQ-SEX). Results are shown in Table 3. Males and females did not significantly differ on the CTQ total score ( $F_{(1, 137)} = 2.8, p = .10$ ) or on physical ( $F_{(1, 137)} = .05, p = .83$ ) and emotional ( $F_{(1, 137)} = 2.69, p = .10$ ) abuse histories. Males and females did significantly differ on their history of sexual abuse with females reporting significantly higher mean frequency of sexual abuse ( $F_{(1, 137)} = 5.05, p < .05$ ).

*Social Context.* Results are reported in Table 4. Participants had the option of saying “not applicable” for the various groups in their social network; for example, a

number of participants reported not having a romantic partner at the two time points. As such, data are not available for several items across multiple participants.

Availability. A univariate ANOVA was used to compare males and females on their report of how easy it was to obtain crack/cocaine in the past year and during the time period of heaviest use. Males and females did not differ on their report of ease of obtainment in the past year ( $F_{(1, 128)} = .40, p = .53$ ) but did significantly differ on their report of ease of crack/cocaine obtainment during the period of heaviest use ( $F_{(1, 131)} = 3.95, p < .05$ ), with males finding obtainment significantly easier.

Use of crack/cocaine by others in social network. A univariate ANOVA was used to compare males and females on their report of crack/cocaine use frequency by their romantic partner, group of friends, immediate family, and neighbors for past year and heaviest use. Males and females did not significantly differ on use by friends or commonness of crack/cocaine use in the neighborhood. In terms of use by romantic partner males and females did not significantly differ during heaviest use. Yet a significant difference was found for use of crack/cocaine by romantic partner in the past year ( $F_{(1, 102)} = 3.55, p < .05$ ), with females having a higher mean frequency of crack/cocaine use by their romantic partner. Males and females also significantly differed on their report of crack/cocaine use by their immediate family both in the past year ( $F_{(1, 125)} = 4.95, p < .05$ ) and during their period of heaviest use ( $F_{(1, 119)} = 5.65, p < .05$ ) with females having a higher mean frequency of crack/cocaine by their family at both time points.

Use of crack/cocaine with others in social network. A univariate ANOVA was used to compare males and females on their report of crack/cocaine use with their

romantic partner, group of friends, immediate family, and neighbors for past year and heaviest use. Males and females were marginally significantly different on their use of crack/cocaine with their romantic partner in the past year ( $F_{(1, 102)} = 3.67, p = .058$ ), with females having a higher mean frequency of use with their romantic partner. Besides this, males and females did not significantly differ on their use of crack/cocaine with those groups in their social network.

Obtaining crack/cocaine from others in social network. A univariate ANOVA was used to compare males and females on their report of getting crack/cocaine from their romantic partner, group of friends, immediate family, and neighbors for past year and heaviest use. Males and females significantly differed on their report of obtaining crack/cocaine from their family during the period of heaviest use ( $F_{(1, 121)} = 3.96, p < .05$ ) with females having a higher mean frequency of getting crack/cocaine from their family. Beyond this difference, males and females did not significantly differ on getting crack/cocaine from those groups in their social network.

Means of crack/cocaine obtainment. A univariate ANOVA was used to compare males and females on method of crack/cocaine obtainment (i.e., get for free, money from legal employment, money from illegal means, sex exchange, money from dealing, and stealing the drug) during the past year at the period of heaviest use. A number of significant gender differences were observed. Females had a significantly higher mean frequency of getting crack/cocaine for free both during the past year ( $F_{(1, 126)} = 11.13, p < .01$ ) and during the period of heaviest use ( $F_{(1, 129)} = 7.40, p < .01$ ). While males and females did not significantly differ on using money from legal employment to buy crack/cocaine in the past year, males had a higher

mean frequency of using money from legal employment during the period of heaviest use ( $F_{(1, 128)} = 4.82, p < .05$ ). Females had a significantly higher mean frequency of sex exchange for crack/cocaine both during the past year ( $F_{(1, 126)} = 19.45, p < .001$ ) and during the period of heaviest use ( $F_{(1, 129)} = 13.91, p < .001$ ). Males had a significantly higher mean frequency of using money from dealing to obtain crack/cocaine both during the past year ( $F_{(1, 126)} = 6.83, p = .01$ ) and during the period of heaviest use ( $F_{(1, 129)} = 7.75, p < .01$ ). Males and females did not significantly differ at either of the two time points for using money from illegal means (e.g., selling stolen goods) or for actually stealing the drug as a method of crack/cocaine obtainment.

Giving crack/cocaine to others. A univariate ANOVA was used to compare males and females on giving crack/cocaine to others (i.e., give for free, in exchange for sex, dealing) during the past year at the period of heaviest use. Males had a significantly higher mean frequency of giving crack/cocaine in exchange for sex during both the past year ( $F_{(1, 125)} = 22.36, p < .001$ ) and the period of heaviest use ( $F_{(1, 128)} = 91.02, p < .001$ ). Males had a significantly higher mean frequency of dealing during the period of heaviest use ( $F_{(1, 129)} = 5.29, p < .05$ ) and had a marginally higher mean frequency of dealing in the past year ( $F_{(1, 126)} = 3.41, p = .067$ ). Males and females did not significantly differ on giving crack/cocaine to others for free.

### 3.2.2 Self-Regulation Capacities

*Impulsivity.* To address multicollinearity, significant inter-relationships among the impulsivity variables were assessed. Table 5 presents the Pearson correlation matrix

for all self-report and behavioral measures of impulsivity. Overall, the correlations among the behavioral measures of impulsivity were variable and weak. The only correlation that reached significance is that between the BART and the BIS-A ( $r = .18, p < .05$ ). Notably, correlations between the behavioral measures of impulsivity were uniformly low and highly variable, some were negative, and none were statistically significant. This is consistent with previous research indicating low uniformity across these measures. As such there is not a need to combine variables into a reduced set.

A series of ANOVAs were conducted with the specific types of impulsivity as the dependent variable(s) and gender as the independent variable. Results are shown in Table 6.

Barratt Impulsiveness Scale (BIS). The first four univariate ANOVAs were conducted with the BIS total score (BIS-TOT), and its three subscales: non-planning (BIS-NP), motor impulsiveness (BIS-MI), and attentional (BIS-A). Males and females did not significantly differ on the BIS total score ( $F_{(1, 137)} = .01, p = .91$ ) or any of the three subscales: nonplanning ( $F_{(1, 137)} = .29, p = .59$ ), motor impulsiveness ( $F_{(1, 137)} = .11, p = .75$ ), and attentional ( $F_{(1, 137)} = .69, p = .41$ ).

Balloon Analogue Risk Task (BART). A univariate ANOVA was conducted to examine differences in BART score as a function of gender. A significant effect of gender was not observed ( $F_{(1, 130)} = 1.32, p = .25$ ).

Stop-Go Task (SG). A univariate ANOVA was conducted to examine differences in stop reaction time as a function of gender. No significant effect of gender was found ( $F_{(1, 115)} = .79, p = .38$ ).

Delay Discounting Task (DD). The k values were analyzed with a 2x3 repeated measures ANOVA with gender as the between subject variable and magnitude of the delayed reward (low, med, & high) as the within subject variable. Repeated measures ANOVA tests allow for the examination of the means for two groups that are related to each other. There was not a significant main effect of gender ( $F_{(1, 137)} = .34, p = .56$ ), nor a significant interaction of gender and magnitude ( $F_{(1, 137)} = 1.49, p = .23$ ). There was a significant effect of magnitude ( $F_{(1, 137)} = 78.26, p < .001$ ).

*Negative Emotionality*. To examine gender differences on negative emotionality, four univariate ANOVAs were conducted with the MPQ negative emotionality total score (NEM-TOT), and its three subscales: alienation (NEM-AL), aggression (NEM-AG), and stress reactivity (NEM-SR). Results are shown in Table 7. Males and females did not significantly differ on the NEM total score ( $F_{(1, 132)} = 2.24, p = .14$ ) or on aggression ( $F_{(1, 134)} = 1.45, p = .23$ ) and stress reactivity ( $F_{(1, 133)} = 2.74, p = .10$ ). Males and females did significantly differ on the alienation subscale with females reporting significantly higher alienation ( $F_{(1, 135)} = 7.46, p < .01$ ).

*Social Cognitive*. In order to address multicollinearity, significant inter-relationships among the social cognitive variables were assessed. Table 8 presents the Pearson correlation matrix for all self-report social cognitive measures. Overall, the correlations among the measures were uniformly low and none were statistically significant.

A series of ANOVAs were conducted with the social cognitive variables as the dependent variable(s) and gender as the independent variable. Results are shown in Table 9.

Conformity. The first univariate ANOVAs was conducted with the Conformity total score (CON). Males and females significantly differed on the conformity total score ( $F_{(1, 135)} = 6.85, p = .01$ ) with males having higher mean conformity.

Need for Closure. A univariate ANOVA was conducted with the Need for Closure total score (NFC-TOT). Males and females did not significantly differ ( $F_{(1, 137)} = 1.51, p = .22$ ).

Sensitivity to Ostracism. A univariate ANOVA was conducted with the Williams' Need-Threat total score (WNTQ-TOT). This questionnaire was given to participants immediately after the Cyberball task, to examine how the game threatened their levels of four needs which are fundamental to human motivation, efficacy, and survival. Males and females did not significantly differ on the WNTQ-TOT ( $F_{(1, 132)} = .35, p = .56$ ).

### *3.2.3 Internal Affective States that influence Self-Regulation*

*Psychopathology.* Using chi-square tests, males and females were compared on diagnoses of Major Depressive Disorder (MDD, current and lifetime), Posttraumatic Stress Disorder (PTSD, current), Borderline Personality Disorder (BPD, current), and Antisocial Personality Disorder (APD, current) from the SCID. Results are shown in Table 10. Males and females significantly differed on their lifetime diagnosis status for MDD and trended toward significance for current MDD

with females being more likely to have both a lifetime ( $\chi^2 (1) = 11.25, p = .001$ ) and current diagnosis ( $\chi^2 (1) = 3.22, p = .07$ ). Males and females did not significantly differ on their PTSD diagnosis status. Males and females did significantly differ on Axis II diagnoses with females being significantly more likely to have a current diagnosis of BPD ( $\chi^2 (1) = 5.59, p < .05$ ) and males being significantly more likely to have a diagnosis of APD ( $\chi^2 (1) = 9.85, p < .01$ ).

### 3.3 The risk factor must significantly predict crack/cocaine use/dependence

Chi-square, ANOVA, Pearson correlations were used to examine the relationship between crack/cocaine past year use frequency, heaviest use frequency, current crack/cocaine dependence status, and lifetime crack/cocaine dependence status with each of the potential risk factors. Significant findings are reported.

#### *3.3.1 Substance Use Frequencies and Diagnoses*

As expected, crack/cocaine use frequency (past year and lifetime) and dependence status (current and lifetime) were each related to each other. Among those with lifetime alcohol dependence there was greater past year ( $F_{(1, 129)} = 7.19, p < .01$ ) and heaviest crack/cocaine use frequency to ( $F_{(1, 129)} = 4.19, p < .05$ ) as well as lifetime crack/cocaine dependence ( $\chi^2 (1) = 4.39, p < .05$ ). Current crack/cocaine dependence was related to current alcohol dependence ( $\chi^2 (1) = 3.93, p < .05$ ), past year heroin frequency ( $F_{(1, 130)} = 5.23, p < .05$ ) and heaviest use heroin frequency ( $F_{(1, 130)} = 5.83, p < .05$ ) with those who are not dependent having higher mean heroin use at both time points and greater likelihood of current alcohol dependence.

### 3.3.2 Environmental Context

*Demographic characteristics.* In general the four measurements of crack/cocaine were largely unrelated to the demographic factors. Mean frequency of use in the past year differed marginally by race ( $F_{(3, 141)} = 2.67, p < .06$ ). Yet, this is difficult to interpret because the groups besides Black are small and there were only 2 people in the Hispanic group (the groups the slightly lowest mean). Those with an annual income less than ten thousand dollars had a higher mean frequency of use in the past year ( $F_{(1, 140)} = 7.69, p < .01$ ). Heaviest use frequency was not related to any demographic variables. Current crack/cocaine dependence status was significantly related to being court mandated to treatment with being non-dependent being more likely to be court mandated ( $\chi^2(1) = 5.36, p < .05$ ), this was also true for lifetime dependence status ( $\chi^2(1) = 7.81, p < .01$ ). Lifetime dependence status was also related to income; those with a lifetime dependence diagnosis were more likely to have an income less than ten thousand dollars ( $\chi^2(1) = 5.08, p < .05$ ).

*Childhood Trauma.* Crack/cocaine past year use frequency was not significantly related to CTQ-TOT or any of the three subscales (CTQ-PHY, CTQ-EMO, and CTQ-SEX). Heaviest use frequency was significantly related to CTQ-TOT ( $r = .20, p < .05$ ) and CTQ-EMO ( $r = .20, p < .05$ ). Current crack-dependence significantly differed from non-dependence on CTQ-TOT ( $F_{(1, 127)} = 6.06, p < .05$ ), CTQ-EMO ( $F_{(1, 127)} = 4.86, p < .05$ ), and CTQ-SEX ( $F_{(1, 127)} = 4.61, p < .05$ ) and was marginally significantly different on CTQ-PHY ( $F_{(1, 127)} = 3.72, p < .06$ ). Those who met criteria for current dependence had higher mean scores on CTQ-TOT and each of the three subscales. Lifetime crack-dependence significantly differed from non-

dependence on CTQ-TOT ( $F_{(1, 127)} = 6.61, p < .05$ ), CTQ-EMO ( $F_{(1, 127)} = 5.05, p < .05$ ), and CTQ-SEX ( $F_{(1, 127)} = 5.67, p < .05$ ) and was marginally significantly different on CTQ-PHY ( $F_{(1, 127)} = 3.61, p < .07$ ). Those who met criteria for lifetime dependence had higher mean scores on CTQ-TOT and each of the three subscales.

### *Social Context*

Availability. Ease of obtainment in the past year and heaviest use were not related to any of the four measurements of crack/cocaine use/dependence.

Use of crack/cocaine by others in social network. Crack/cocaine past year frequency of use was significantly related to use by romantic partner in the past year ( $r = .28, p < .01$ ) and use by friends in the past year ( $r = .27, p < .01$ ). Heaviest frequency of use was significantly related to use by friends in the past year ( $r = .20, p < .05$ ), commonness of crack/cocaine use in the neighborhood at heaviest use ( $r = .37, p < .01$ ) and commonness of crack/cocaine use in the neighborhood in the past year ( $r = .33, p < .01$ ). Current dependence status was significantly related to commonness of crack/cocaine use in the neighborhood in the past year ( $F_{(1, 117)} = 4.77, p < .05$ ). Lifetime dependence status was only marginally significantly related to use by family in the past year ( $F_{(1, 112)} = 3.41, p < .07$ ).

Use of crack/cocaine with others in social network. Past year crack/cocaine frequency of use was significantly related to use with friends at heaviest time point ( $r = .22, p < .05$ ), use by friends in the past year ( $r = .33, p < .01$ ), and use with neighbors in the past year ( $r = .22, p < .05$ ). Heaviest frequency of use was significantly related to use with friends in the past year ( $r = .21, p < .05$ ), use with neighbors at heaviest use ( $r = .22, p < .05$ ), and use with neighbors in the past year ( $r$

= .22,  $p < .05$ ). Current dependence was significantly related to use with neighbors at the heaviest time point ( $F_{(1, 118)} = 4.23, p < .05$ ). Lifetime dependence was also significantly related to use with neighbors at the heaviest time point ( $F_{(1, 118)} = 5.37, p < .05$ ) and was marginally related to use with family at heaviest ( $F_{(1, 118)} = 3.58, p < .07$ ) and use with neighbors in the past year ( $F_{(1, 115)} = 3.72, p < .06$ ).

Obtaining crack/cocaine from others in social network. Past year use frequency was significantly related to getting crack/cocaine from a romantic partner at heaviest use ( $r = .22, p < .05$ ), getting crack/cocaine from friends in the past year ( $r = .33, p < .01$ ), getting crack/cocaine from neighbors a heaviest use ( $r = .21, p < .05$ ), and getting crack/cocaine from neighbors in the past year ( $r = .39, p < .01$ ). Heaviest frequency of use was significantly related to getting crack/cocaine from friends in the past year ( $r = .22, p < .05$ ), getting crack/cocaine from neighbors a heaviest use ( $r = .26, p < .01$ ), and getting crack/cocaine from neighbors in the past year ( $r = .29, p < .01$ ). Current dependence was significantly related to getting crack/cocaine from neighbors a heaviest use ( $F_{(1, 118)} = 11.04, p < .01$ ), and getting crack/cocaine from neighbors in the past year ( $F_{(1, 115)} = 22.07, p < .001$ ). Lifetime dependence was significantly related to getting crack/cocaine from neighbors a heaviest use ( $F_{(1, 118)} = 8.77, p < .01$ ), and getting crack/cocaine from neighbors in the past year ( $F_{(1, 115)} = 10.34, p < .01$ ).

Means of crack/cocaine obtainment. Past year frequency of use was significantly related to getting crack/cocaine for free in the past year use ( $r = .22, p < .05$ ). Heaviest use was significantly related to getting crack/cocaine through illegal means at heaviest use ( $r = .20, p < .05$ ), getting crack/cocaine through illegal means

in the past year use ( $r = .19, p < .05$ ), and exchanging sex for crack/cocaine at heaviest use ( $r = .18, p < .05$ ). Current dependence was significantly related to getting crack/cocaine through money earned from legal employment at heaviest use ( $F_{(1, 120)} = 6.30, p < .05$ ). Lifetime dependence was significantly related to getting crack/cocaine for free in the past year ( $F_{(1, 118)} = 4.28, p < .05$ ).

Giving crack/cocaine to others. Past year frequency of use was significantly related to giving crack/cocaine to others for free at heaviest use ( $r = .22, p < .05$ ). Heaviest use was also significantly related to giving crack/cocaine to others for free at heaviest use ( $r = .18, p < .05$ ). Current and lifetime dependence status were not related to any of the giving crack/cocaine to others variables.

### 3.3.3 Self-Regulation Capacities

#### *Impulsivity*

Barratt Impulsiveness Scale (BIS). Crack/cocaine use frequency in the past year was significantly related to BIS-TOT score ( $r = .35, p < .01$ ), BIS-NP ( $r = .22, p < .05$ ), BIS-MI ( $r = .27, p < .01$ ), and BIS-A ( $r = .31, p < .01$ ). Crack/cocaine heaviest use frequency was significantly related to BIS-TOT score ( $r = .28, p < .01$ ), BIS-NP ( $r = .18, p < .05$ ), BIS-MI ( $r = .23, p < .01$ ), and BIS-A ( $r = .22, p < .01$ ). For BIS-TOT, there was a significant difference between those who are currently dependent versus not ( $F_{(1, 127)} = 8.35, p < .01$ ) and those who have lifetime dependence versus not ( $F_{(1, 127)} = 16.58, p < .0001$ ), with those who met criteria for dependence having a significantly higher mean score. For current dependence status the BIS-NP and BIS-MI were only marginally significant. Yet, there was a significant difference between those who are currently dependent versus non-dependent on BIS-A ( $F_{(1, 127)} = 7.77, p$

< .01), with those being dependent having a higher mean score. Those meeting criteria for lifetime dependence significantly differed from those who did not meet criteria on BIS-NP ( $F_{(1, 127)} = 7.92, p < .01$ ), BIS-MI ( $F_{(1, 127)} = 7.98, p < .01$ ), and BIS-A ( $F_{(1, 127)} = 12.14, p < .01$ ), again with those meeting criteria having a higher mean score i.e. more impulsivity.

Balloon Analogue Risk Task (BART). BART was not significantly related to any of the four measurements of crack/cocaine use/dependence.

Stop-Go Task (SG). SG was not significantly related to any of the four measurements of crack/cocaine use/dependence.

Delay Discounting Task (DD). DD was not significantly related to current or heaviest crack/cocaine use frequency. In order to examine the relationship with current and lifetime dependence status, the k values were analyzed with a 2x3 repeated measures ANOVA with dependence status as the between subject variable and magnitude of the delayed reward (low, med, & high) as the within subject variable. For current dependence status, there was a significant main effect of dependence status ( $F_{(1, 126)} = 6.46, p < .05$ ) and a significant effect of magnitude ( $F_{(1, 126)} = 41.24, p < .001$ ). There was not a significant interaction of current dependence status and magnitude ( $F_{(1, 126)} = 1.55, p = .22$ ). For lifetime dependence status, there was not a significant main effect of dependence status ( $F_{(1, 126)} = 2.68, p = .10$ ) nor a significant interaction of lifetime dependence status and magnitude ( $F_{(1, 126)} = .22, p = .80$ ). There was a significant effect of magnitude ( $F_{(1, 126)} = 29.90, p < .001$ ).

*Negative Emotionality*. Crack/cocaine past year use frequency was significantly related to NEM-TOT ( $r = .27, p < .01$ ), NEM-AL ( $r = .21, p < .05$ ), and

NEM-SR ( $r = .29, p < .01$ ). Heaviest use frequency was significantly related to NEM-TOT ( $r = .22, p < .01$ ), NEM-AL ( $r = .18, p < .05$ ), and NEM-SR ( $r = .18, p < .01$ ). Neither past year nor heaviest use was related to NEM-AG. Current crack-dependence significantly differed from non-dependence on NEM-TOT ( $F_{(1, 122)} = 14.44, p < .001$ ), NEM-AL ( $F_{(1, 125)} = 4.49, p < .05$ ), NEM-AG ( $F_{(1, 124)} = 4.52, p < .05$ ), and NEM-SR ( $F_{(1, 123)} = 12.49, p < .01$ ). Those who met criteria for current dependence had higher mean scores on NEM-TOT and each of the three subscales. Lifetime crack-dependence significantly differed from non-dependence on NEM-TOT ( $F_{(1, 125)} = 17.31, p < .001$ ), NEM-AG ( $F_{(1, 124)} = 4.03, p < .05$ ), and NEM-SR ( $F_{(1, 123)} = 19.25, p < .001$ ) and was marginally significantly related to NEM-AL ( $F_{(1, 125)} = 3.68, p < .06$ ). Those who met criteria for lifetime dependence had higher mean scores on NEM-TOT and each of the three subscales.

#### *Social Cognitive*

Conformity. Conformity was not significantly related to any of the four measurements of crack/cocaine use/dependence.

Need for Closure. Need for closure was not significantly related to any of the four measurements of crack/cocaine use/dependence.

Sensitivity to Ostracism. Sensitivity to ostracism (WNTQ-TOT) was not significantly related to any of the four measurements of crack/cocaine use/dependence.

#### *3.3.4 Internal Affective States that influence Self-Regulation*

*Psychopathology.* Past year frequency of use was significantly related to MDD lifetime ( $F_{(1, 130)} = 14.09, p < .001$ ), MDD current ( $F_{(1, 129)} = 8.56, p < .01$ ), and

BPD ( $F_{(1, 129)} = 8.81, p < .01$ ). Heaviest use frequency was significantly related to MDD lifetime ( $F_{(1, 130)} = 6.51, p < .05$ ), BPD ( $F_{(1, 129)} = 8.08, p < .01$ ), and APD ( $F_{(1, 141)} = 6.51, p < .05$ ). Current dependence status was significantly related to MDD lifetime ( $\chi^2(1) = 15.08, p = .001$ ) and MDD current ( $\chi^2(1) = 13.19, p = .001$ ), with those who are currently dependent being more likely to also have depression. Current dependence was not related to PTSD, BPD or APD. Lifetime dependence status was significantly related to MDD lifetime ( $\chi^2(1) = 10.82, p = .01$ ), MDD current ( $\chi^2(1) = 6.91, p = .05$ ), and BPD ( $\chi^2(1) = 6.91, p = .01$ ).

### 3.3.5 Specificity to Crack/Cocaine

To understand whether these significant relationships are specific to crack/cocaine and not drug use in general, these analyses were recalculated controlling for other drug use. When controlling for marijuana, alcohol, PCP and heroin, past year frequency of crack/cocaine use was *no longer* significantly related to BIS-NP ( $r = .22, p = .08$ ), BIS-A ( $r = .20, p = .09$ ), NEM-AL ( $r = .14, p = .26$ ), using crack/cocaine with neighbors in the last year ( $r = .18, p = .13$ ), getting crack/cocaine from a romantic partner at heaviest use ( $r = .18, p = .10$ ), and getting crack/cocaine for free in the past year ( $r = .22, p = .08$ ). All other relationships remained significant.

When controlling for marijuana, alcohol, PCP and heroin, frequency of heaviest crack/cocaine use is *no longer* significantly related to BIS-TOT ( $r = .17, p = .13$ ), BIS-NP ( $r = .07, p = .51$ ), BIS-A ( $r = .08, p = .49$ ), CTQ-TOT ( $r = .13, p = .25$ ), CTQ-EMO ( $r = .16, p = .15$ ), NEM-AL ( $r = .17, p = .13$ ), NEM-SR ( $r = .21, p = .05$ ; marginal), friend's frequency of crack/cocaine in the past year ( $r = .21, p = .05$ ; marginal), use with neighbors at heaviest ( $r = .15, p = .18$ ), using illegal means to

obtain crack/cocaine at heaviest ( $r = .19, p = .09$ ) and past year ( $r = .20, p = .07$ ; marginal), and obtaining sex through crack/cocaine at heaviest ( $r = .15, p = .18$ ). All other relationships remained significant.

When controlling for marijuana, alcohol, PCP and heroin current diagnoses, current crack/cocaine dependence diagnosis was *no longer* significantly related to: current alcohol dependence ( $F_{(1, 129)} = 3.82, p = .05$ ; marginal), court mandated to treatment ( $F_{(1, 124)} = 3.32, p = .07$ ; marginal), CTQ-TOT ( $F_{(1, 126)} = 3.86, p = .05$ ; marginal), CTQ-EMO ( $F_{(1, 126)} = 2.47, p = .05$ ), CTQ-SEX ( $F_{(1, 123)} = 3.30, p = .07$ ; marginal), NEM-AL ( $F_{(1, 124)} = 3.19, p = .08$ ), NEM-AG ( $F_{(1, 123)} = 3.30, p = .07$ ), commonness of crack/cocaine use in neighborhood is the past year ( $F_{(1, 116)} = 3.92, p = .05$ ; marginal), use with neighbors at heaviest ( $F_{(1, 117)} = 3.62, p = .06$ ; marginal), getting crack/cocaine through money earned from legal employment at heaviest use ( $F_{(1, 116)} = 1.49, p = .23$ ). All other relationships remained significant.

When controlling for marijuana, alcohol, PCP and heroin lifetime diagnoses, lifetime crack/cocaine dependence diagnosis was *no longer* significantly related to: CTQ-TOT ( $F_{(1, 127)} = 2.99, p = .09$ ), CTQ-EMO ( $F_{(1, 127)} = 1.59, p = .21$ ), ( $F_{(1, 127)} = 3.77, p = .06$ ; marginal), NEM-AG ( $F_{(1, 124)} = 2.43, p = .12$ ), ( $F_{(1, 127)} = 2.99, p = .09$ ), MDD current diagnosis ( $F_{(1, 129)} = 3.36, p = .07$ ; marginal), BPD diagnosis ( $F_{(1, 129)} = 3.68, p = .06$ ; marginal), and use with neighbors at heaviest ( $F_{(1, 115)} = 3.05, p = .08$ ). All other relationships remained significant.

### 3.4 Exploring risk factors between gender and crack/cocaine

Following the steps of Baron and Kenny (1986) as well as Judd and Kenny (1981) outlined above, we review eligible variables here. Males and female

crack/cocaine users only significantly differed on past year crack/cocaine use frequency thus this is the now the only dependent variable that will be considered. In order for variables to be considered risk factors, they must be significantly related to both gender and past year crack/cocaine use frequency (steps 2 and 3). The following variables meet this criterion: crack/cocaine use by romantic partner in the past year, lifetime MDD diagnosis, and BPD diagnosis. Although NEM alienation and getting crack/cocaine for free in the past year were significantly related to gender and past year crack/cocaine frequency of use, when controlling for other substance use, these relationships did not remain significant. Thus, they will not be considered in the risk-factor analysis. Finally for the fourth step, when both the independent variable and the mediator are included in the same model to predict the dependent variable, the mediator must still significantly predict the dependent variable. If these criteria are met, then the effect of the independent variable must be reduced.

To accomplish this fourth step, separate stepwise linear regressions were used with past year crack/cocaine use frequency as the dependent variable, gender in the first step and independently each of the potential mediators in the second step (lifetime MDD diagnosis, BPD diagnosis, crack/cocaine use by romantic partner in the past year). MDD lifetime (Table 16), BPD diagnosis (Table 17), and crack/cocaine use by romantic partner in the past year (Table 18), when included in the same model with gender significantly predicted past year crack/cocaine use frequency and the effect of gender was reduced. Sobel tests were conducted to establish whether the reduction of the effect of the gender was significant. The Sobel test of the mediated effect was significant for MDD lifetime diagnosis ( $z = 2.54, p <$

.05) and crack/cocaine use by romantic partner in the past year ( $z = 9.37, p < .001$ ). The Sobel test was not significant for BPD diagnosis ( $z = 1.81, p = .07$ ). In sum, the following variables met criteria as risk factors in the relationship between gender and crack/cocaine: MDD lifetime diagnosis and crack/cocaine use by romantic partner in the past year.

### 3.5 Follow-up examination of moderation

Many researchers advocate the evaluation of moderator variables and risk factor variables in the same study because the strength and form of risk factor effects may depend on other variables (i.e., moderators; Kraemer, Wilson, Fairburn, & Agras, 2002). It was proposed that one high on sensitivity to ostracism, conformity, or need for closure would be more responsive to the behaviors of those in their social network that is, serve as moderators and alter the relationship. Since frequency of use by romantic partner served as a risk factor, this variable was used. Interaction between this variable and sensitivity to ostracism, conformity, or need for closure were examined independently in stepwise regression with past year frequency of use as the dependent variable (step 1: frequency of use by romantic partner and sensitivity to ostracism or conformity, or need for closure; step 2: interaction term). None of the interactions were significant; thus, the social cognitive variables did not qualify (i.e., strengthen, weaken, remove) the relationship between frequency of use by romantic partner and past year frequency of use.

## **Chapter 4: Discussion**

### 4.1 Summary of Main Findings

Building on previous research, this cross-sectional, exploratory study of 142 chronic, inner-city crack/cocaine users currently enrolled in residential substance abuse treatment aimed to replicate previous findings indicating that females evidence greater use (past year and heaviest use) and dependence (current and lifetime) of crack/cocaine compared to males. In addition, this study sought to examine potential risk factors in the relationship between gender and crack/cocaine drug use/dependence. The Social Action Theory was used as a framework to guide the work; specifically the 3 major domains: 1) environmental context, 2) self-regulation capacities of the individual and, 3) internal-affective states that influence self-regulation.

Aim 1 which sought to replicate previous findings indicating that females in residential substance use treatment evidence greater use of crack/cocaine (current and heaviest use) and are more likely to be dependent (current, lifetime) compared to males, was not entirely supported. For heaviest frequency of crack/cocaine use and lifetime dependence, males and females did not significantly differ. Yet, males and females did significantly differ on current frequency of crack/cocaine use and current dependence status was marginally significant. Thus, the Lejuez et al. (2007) findings were not entirely replicated. One potential reason for the non-replication is that the fact that this study selected only those who had used crack/cocaine at least once in the past year. While this inclusion criterion allowed us to examine within crack/cocaine users frequency of use and dependence, it obviously left out those who have never

used crack/cocaine. As such we are not getting at a full range of drug users like the previous study by Lejuez et al. (2007). However, when looking at the entire sample (larger parent study) regardless of whether any crack/cocaine use, males and females significantly differed on past year frequency of use and current dependence but not on heaviest lifetime use and lifetime dependence. Thus, the use of the entire sample does not replicate completely the previous findings by Lejuez et al. (2007) but does show a significant gender difference on current dependence. Our use of this sample (only those who had used crack/cocaine at least once in the past year) does strengthen the evidence that within crack/cocaine users, females are using on a more frequent basis. This more frequent use puts them at risk for a number of serious health-compromising behaviors specifically associated with crack/cocaine use, including condom non-use, exchange of sex for money and/or drugs, and contraction of HIV (Booth et al., 2000; Chiasson et al., 1991; Cottler et al., 1990; Hoffman et al., 2000; Leigh & Stall 1993; Lejuez et al., 2005; Ross et al., 2002; Word & Bowser, 1997). While not part of these studies' aims, HIV status data was available for this sample. Females within this sample are more likely to be HIV positive than males ( $\chi^2(1) = 4.00, p < .05$ ). Clearly the examination of risk factors linking gender to greater crack/cocaine use is necessary.

As such, potential risk factors were examined in order to account for the greater frequency of crack/cocaine use in the past year among females. The selection of risk factors to examine was guided by the Social Action Theory: environmental context (e.g., demographic variables, social context, history of abuse), 2) self-regulation capacities/personality of the individual (e.g., impulsivity, negative

emotionality, need for closure, conformity, and sensitivity to ostracism) and, 3) internal-affective states that influence self-regulation (e.g., psychopathology). The steps of Baron and Kenny (1986) as well as Judd and Kenny (1981) outlined above were followed. Males and female crack/cocaine users differed significantly only on past year crack/cocaine use frequency thus it was the only dependent variable that was considered. Males and females differed on the following variables: frequency of alcohol use in the past year and heaviest use, history of sexual abuse, availability of crack/cocaine at heaviest use, frequency of use by romantic partner and family in the past year, frequency of use by family at heaviest use, getting crack/cocaine for free at past year and heaviest, getting crack/cocaine from money earned from legal employment at heaviest, exchanging sex for crack/cocaine at past year and heaviest, using money earned from dealing at past year and heaviest, giving crack/cocaine in exchange for sex at past year and heaviest, dealing crack/cocaine at heaviest, alienation, conformity, MDD lifetime diagnosis, BPD diagnosis, and APD diagnosis. Crack/cocaine frequency of use in the past year was significantly related to lifetime alcohol dependence, total yearly income, employment status, MDD lifetime and current diagnoses, BPD, frequency of use by romantic partner and friends in the past year, use with friends at heaviest and past year, use with neighbors in the past year, getting crack/cocaine from romantic partner at heaviest use, getting from friends in the past year, getting from neighbors at heaviest use and past year, getting crack/cocaine for free in the past year, giving crack/cocaine to others for free at heaviest, BIS total score, nonplanning, motor impulsiveness, and attentional

subscales, negative emotionality total score, and the alienation and stress reactivity subscales.

The following variables met the criterion of being related to both gender and past year crack/cocaine use frequency (steps 2 and 3): lifetime MDD diagnosis, BPD diagnosis, and crack/cocaine use by romantic partner in the past year. Although NEM alienation and getting crack/cocaine for free in the past year were significantly related to gender and past year crack/cocaine frequency of use, when controlling for other substance use, these relationships did not remain significant. Thus, they were not considered in the risk-factor analysis. MDD lifetime diagnosis and crack/cocaine frequency of use by romantic partner in the past year met risk factor criteria and passed the Sobel test (i.e., established that the reduction of the effect of the gender was significant). Although BPD diagnosis was related to both gender and crack/cocaine frequency of use, it did not, according to the Sobel test, significantly reduce the effect of gender. Thus, it appears not be serving as a risk factor. Although this is not a small sample, a larger sample may provide more power to detect BPD as a significant risk factor (at most small effect) and it may be worth pursuing in future research. MDD lifetime diagnosis and crack/cocaine use by romantic partner in the past year were the identified risk factors, suggesting the potential importance of these variables for understanding increased crack/cocaine use among females.

Lifetime MDD served as a risk factor in the relationship between gender and past year frequency of use. At first glance, it was somewhat surprising that lifetime rather than current diagnosis served as a risk factor as one would expect that current affective state to have more influence rather than a positive history for depression.

Current MDD was significantly related to past year crack/cocaine use frequency but males and females did not significantly differ on this variable (it was marginally significant,  $p = .07$ ). The fact that this relationship is not driven by the presence of current symptoms could have a number of explanations including a potential halo effect of treatment; a person may report lower current depressive symptoms because their belief that they are taking care of themselves or engaging in healthy behavior by entering treatment (percentage of current depression is lower in comparison to lifetime for both males and females). In a study on effects of biasing information on judgments for major depressive episode, Mumma (2002) found that prior information about a clear-cut history of depression resulted in lower rated severity of current symptoms. Yet, it may also just be that there are lower rates of current depression in the sample and that it is something about the experience of a depressive episode that has an impact.

Part of the issue in interpretation is that we do not have exact information on the timing of the lifetime depression episode(s) - a lifetime diagnosis can be applied to someone who at any point in his/her life prior to current state (last month) has met criteria for an episode of major depression. This means that the episode could have been within the last year prior to treatment but they may not be currently meeting criteria for an episode. As such, interpretation of this finding is difficult. We do know that individuals with a past diagnosis of major depressive disorder are at risk for the development of subsequent episodes of depression (e.g., Mueller et al., 1999). And since major depressive disorder is typically a recurrent illness, this is a group that may be particularly vulnerable to the development of severe functional impairment

over time. Recent research has also shown that even a lifetime history of depression can increase the risk of heavy alcohol consumption particularly for females (Dixit & Crum, 2000). Thus, individuals with either past/lifetime or current depression may comprise a particularly vulnerable population.

In considering MDD lifetime diagnosis as a risk factor, it falls within the internal-affective states that influence self-regulation domain of the SAT. History of depression, therefore, may interfere with one's ability to self-regulate. Not using crack/cocaine is dependent upon an individual's ability to regulate their internal affective state. This impaired capacity to self regulate may put females at an increased risk for crack/cocaine use potentially because of an inability to inhibit their craving to use and/or crack/cocaine could be used as a way to cope with a proclivity towards depression. According to the self-medication hypothesis (SMH; Khantzian, 2003), substance addiction functions as a compensatory means to modulate distressful affects and self-soothe from unmanageable psychological states which may be relevant for individuals with a history of a diagnosis even in the absence of current symptoms sufficient for a current diagnosis. Khantzian (1997; 2003) asserted that substance users experience dysphoric emotions as intolerable and overwhelming and cannot manage these emotional states on their own; thus, they turn to substance's physiological and psychological effects to regulate distressful emotions and achieve an emotional stability (Khantzian, 1997). Specific to crack/cocaine, the acute psychological effects of crack/cocaine use include elevation of mood, increased self-confidence and self-esteem, improved mental performance, a decrease in fatigue, and increased energy and productivity (Dodgen & Shea, 2000). Clinical findings

(Khantzian, 1985; Khantzian et al., 1990) demonstrate that cocaine is used by “low-energy”-type individuals (consistent with depression). It has been suggested that low-energy individuals use cocaine because they do not possess an adequate degree of psychological capacity to relieve themselves from the feelings of boredom, emptiness, and fatigue state. Recently, Shu, Ruffins, Robins, Albanese, and Khantzian (2008) showed that a higher level of desire for elation and restlessness significantly predicted cocaine preference (opposed to heroin and alcohol). Such a state of restlessness has been identified as a subtype of depression (Arieti & Bemporad, 1980). There is also recent work showing a positive reinforcement connection between crack/cocaine use and depression. Uslander et al. (1999) reported a significant relationship between Beck Depression Inventory (BDI) scores and cocaine induced high, suggesting that depressive symptomatology enhances cocaine use through amplification of its reinforcing properties. In addition to this evidence for a specific relationship between crack/cocaine and depression, we also know that in the general population that females are almost twice as likely as males to experience depression (e.g., Bebbington, 1998). This is also found within African-America drug users such that females within this group have higher reported levels of depression than males (Peters et al., 1997). So, depression’s unique relationship with female gender and crack/cocaine appear to confer it as a risk factor.

Use by one’s romantic partner in the past year also served as risk factor between gender and crack/cocaine frequency of use in the past year. A number of hypotheses can be generated about how/why use by a romantic partner serves as a risk factor in the relationship between gender and crack/cocaine use. For example, it

could be that use by the romantic partner means that a female is ingrained in a culture of use thereby impacting the frequency of use. Yet, much of the literature examining the romantic partner with substance use has focused on treatment outcomes. In that domain, the social environment has often been recognized to play an important role in affecting treatment outcomes (e.g., Havassy et al., 1995). Both the quantity and quality of social relationships affect substance abuse treatment outcomes and the time to readmission (Booth et al., 1992; Hawkins, & Fraser, 1987, Havassy et al., 1991). Drug use in the social networks promotes the risk of relapse while sober networks increase abstinence. Havassy et al. (1995) suggest that avoidance of other drug users may result in decreased drug availability, the number and frequency of drug cues and the social pressure to use. Thus, while there is considerable support for the role of social relationships in affecting treatment outcomes particularly among females, less quantitative research has been available on the romantic partner's impact on frequency of use before treatment. Laudet et al. (1999) conducted a qualitative exploratory study to learn more about male partners of crack/cocaine-addicted females. They found that the majority of females had partners who were currently using crack/cocaine (76%). The authors suggest that there may be interpersonal consequences of drug abuse by male partners based on how substance abuse is integrated into female users' daily lives; for example, that when partners use crack/cocaine together, that practice becomes an integral component of their social and sexual lives. Further, sexual and recreational activity patterns tend to be established and centered on the shared abuse of drugs. Quantitative research is called for to better understand how/why use by a romantic partner serves as a risk factor.

It is notable that frequency of use by romantic partner had the expected effect but none of the other social context variables did (frequency of use by friends, family, and neighbors, using with each of these groups, and obtaining from each of these groups). One can speculate that romantic partner is somehow a more influential member of one's social network than the others (friends, family, neighbors) but future research would benefit from studying this in more depth. It will be important to understand if there something unique about this type of relationship or whether other variables like amount of time spent together or closeness really account for the relationship. It will be necessary to compare those who do versus do not have a romantic partner to see if those without a romantic partner are more influenced by other members of their network (our sample size was too small for these analyses).

Follow-up analyses were conducted to see if the relationship between frequency of use by romantic partner and own frequency of use was moderated by any of the social cognitive variables (sensitivity to ostracism, conformity, and need for closure). It had been thought that those high on these constructs would potentially be more responsive to the behaviors of those in their social network. None of the interactions were significant; thus, the social cognitive variables did not qualify (i.e., strengthen, weaken, remove) the relationship between frequency of use by romantic partner and past year frequency of use. This is not to say that these variables are not important or relevant for this sample, they just are not serving a moderating role. As will be discussed below in the limitations, these social cognitive variables may exert more influence if other substance use (e.g., heroin, alcohol, PCP) within one's social network had been assessed in order to examine "match" of own substances to those in

one's network. These variables could be valuable targets for experimental manipulation. For instance, it may be useful to induce a state of exclusion (e.g., with Cyberball) and see how it impacts crack/cocaine craving differentially across gender.

In the Lejuez et al. (2007), impulsivity served as a risk factor between gender and lifetime heaviest use. This could not be replicated in the current study because males and females did not differ on their frequency of crack/cocaine use at the lifetime heaviest time point. Further, none of the impulsivity measures served as risk factors for current use which is consistent with the Lejuez et al. (2007) study. Males and females did not significantly differ in any of the measures of impulsivity. Beyond the relationship to gender, the self-report Barratt Impulsiveness Scale, total score and the subscales of motor impulsiveness, attentional, and nonplanning were significantly related to all four measurements of crack/cocaine use/dependence. Both the BART and Stop-Go (behavioral measures) were not significantly related to any of the four measures of crack/cocaine use/dependence. Delay discounting was not significantly related to current or heaviest crack/cocaine use frequency or lifetime dependence; yet, it was significantly related to current diagnosis. Thus, although the self-report measure of impulsivity was significantly related to crack/cocaine use/dependence, the behavioral measures were not. This seemingly disparate pattern might potentially be explained by considering the specificity of a given impulsivity scale. That is, self-reports are presumably requiring a subject to tap into some global self-representation (i.e., cross-situational patterns, Caprara, & Cervone, 2000). On the other hand, behavioral tests by their very nature are specific to situational demands. Thus, the context of the drug treatment facility may impact impulsive responding on the

behavioral tasks but not exert as much influence on the self-report of trait impulsivity where the subject may be considering themselves overtime outside the context of the treatment facility.

In terms of the relationships between the measures, overall, the correlations among the behavioral and self-report measure of impulsivity were variable and weak. The only correlation that reached significance was that between the BART and the BIS-A. Notably, correlations between the behavioral measures of impulsivity were uniformly low and highly variable, some were negative, and none were statistically significant. This pattern of findings is frequent within the impulsivity literature (e.g., Monterosso et al., 2001).

While availability and means of obtainment did not serve as risk factors between gender and crack/cocaine use/dependence, a number of important gender differences were found that may be useful for developing further questions. At the period of lifetime heaviest use, males reported significantly higher ease of crack/cocaine obtainment than females. Yet, in the past year, males and females did not significantly differ on their report of ease of obtainment. Males and females also significantly differed on their means of crack/cocaine obtainment. Females reported a significantly higher mean frequency of obtaining crack/cocaine for free and exchanging sex at both time points. Males, on the other hand, reported significantly higher mean frequency of crack/cocaine obtainment from money earned through dealing. At heaviest use, males also reported higher mean frequency of using money earned from legal employment. These findings are consistent with prior work suggesting that males are more able to obtain drugs on their own as a function of

greater income and/or engagement in criminal activity, whereas females in these settings are less likely to be supplying and distributing drugs than males (Rees et al., 2005) and engage in higher levels of commercial sexual activity (Lejuez et al., 2002; Sterk, 1999; Wechsberg et al., 2003). More simply, females most frequently get their drugs in a social exchange (i.e. for free or in sex-exchange) whereas males are more independent in their crack/cocaine acquisition. It is notable that despite these gender differences on means of obtainment these variables were not risk factors linking gender and crack/cocaine use. While means of crack/cocaine obtainment through sex exchange was not a risk factor of crack/cocaine use/dependence, we know from prior research that it puts females at risk for HIV transmission (Baumeister, & Vohs, 2004). As such this differential means of obtainment could be a beneficial target for HIV prevention work.

#### 4.2 Limitations/Future Directions

There were several limitations which should be noted. First, our design was cross-sectional and ultimately dependent upon self-report data. The retrospective nature of the measures may have limited accuracy, especially given the possibility of chronic pharmacological drug effects (e.g., brain damage). One drawback of a cross-sectional design is the inability to determine temporal sequencing among the variables; specifically with the mediator and outcome variable of crack/cocaine use and dependence. Our design leaves open questions about whether depression and use of crack/cocaine by romantic partner came before or after the initiation and continued use of crack/cocaine. These variables could potentially be both risk factors for initiation as well as outcomes of continued chronic use. Thus, in future work a more

detailed history/timeline regarding drug use, social context, and psychopathology could shed some light on the temporal sequencing of these variables.

Next, our Drug Use and Availability Interview was developed to target crack/cocaine and modeled after a single substance measure; thus, we did not assess other drug use within the participant's social network (e.g., heroin, PCP, alcohol, marijuana). As such, we are missing key information for understanding the varying influence of substances in one's social network. Since we only assessed crack/cocaine use in the social network, we were not able to examine the social cognitive variables (sensitivity to ostracism, conformity and need for closure) as variables that may have influenced the users match of drug to those in their network. In the future, we will need a more comprehensive measure of various substances used within the social context to get at match of substances. We can glean from this an understanding of differential characteristics for male and female crack/cocaine users; however we cannot make comparisons to other substance such as heroin. Thus, availability and use of other drugs within the social network needs to be assessed in order to obtain specificity on the female-crack/cocaine relationship. Also, because the Drug Use and Availability Interview was a study created measure, we do not have information of its validity. Further, we looked at the items individually within the measure rather than creating a total score and subscale score. While the single items were appropriate for our questions of interest, future work with this measure could benefit from utilizing data reduction techniques.

We had a fair amount of missing data in the study. While some of the data was missing completely at random, the primary reason for having missing data was

that participants at times had difficulty completing the required questionnaires, interviews, and computer tasks. Low education level of this sample, coupled with possible effects of long-term substance use, appeared to lead to some fatigue and comprehension difficulties. On several occasions we offered to have the participant split the session into two days yet this led to attrition as subjects dropped out the treatment center between appointments. The missing data affects the generalizability of the results in that we may have been taping those who had the cognitive ability and energy to complete the study protocol.

Finally, it is important to acknowledge the parsimonious hypothesis that the direct relationship between gender and crack/cocaine use in the past year may be a result of sampling bias, which would obviate the efforts to identify risk factors. That is, perhaps 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 (as described above in design considerations). 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), or that the observed gender difference in crack/cocaine frequency of use in the past year might be simply a case of the over-inclusion of the most severe substance users occurring differently more so among females. Indeed, 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 (Belenko, & Peugh, 2005; Daley et al., 2000). As such, the females in our sample may be considerably more impaired than those who are not mandated or choose to enroll in residential treatment. It could be that we get such low rates of female heroin users because they are less likely to engage in criminal behavior thereby bypassing being court mandated to treatment. 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.

In spite of these limitations, the current results provide further insight into the question of “why” inner-city females use crack/cocaine more frequently than their male counterparts (at least of the measure of past year use) by identifying frequency of use by romantic partner and lifetime major depression diagnosis as risk factors. 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 future cross-sectional and longitudinal studies with a more detailed study of risk factors (including depression and use by romantic partner), replicating this work in similar samples as well as in more diverse samples to establish generalizability. In terms of public health, this research has the potential to inform and aid in the development of drug treatment and intervention strategies specifically tailored to inner-city crack/cocaine abusing females, a currently underserved and poorly understood population, with the goal of limiting resulting consequences especially linked to crack/cocaine including incarceration and HIV infection.

Table 1. Substance Use Frequencies and Diagnoses by Gender

	Male (n = 95)	Female (n = 47)
Crack/Cocaine - past year, mean (SD)*	4.15 (1.13)	4.53 (.86)
Crack/Cocaine - heaviest use, mean (SD)	4.55 (.88)	4.64 (.99)
Crack/Cocaine – current, %	67.8	78.0
Crack/Cocaine - lifetime, %	80.0	92.7
Marijuana - past year, mean (SD)	1.54(1.92)	1.57 (1.73)
Marijuana - heaviest use, mean (SD)	3.93 (1.65)	3.50(1.90)
Marijuana – current, %	7.8	4.9
Marijuana – lifetime, %	22.0	22.0
Alcohol - part year, mean (SD)**	3.57 (1.86)	2.79 (1.96)
Alcohol - heaviest use, mean (SD)*	4.25 (1.29)	3.48 (2.00)
Alcohol – current, %	36.0	29.3
Alcohol – lifetime, %	43.8	46.3
PCP - past year, mean (SD)	.40 (1.12)	.50 (1.25)
PCP - heaviest use, mean (SD)	1.92 (2.12)	1.50 (2.09)
PCP – current, %	2.2	7.3
PCP – lifetime, %	13.3	9.8
Heroin - past year, mean (SD)	1.43 (2.10)	1.11 (1.83)
Heroin - heaviest use, mean (SD)	1.79 (2.24)	1.38 (2.03)
Heroin – current, %	18.0	14.6
Heroin - lifetime, %	22.2	17.1

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table2. Demographic Information by gender

	Male (n = 95)	Female (n = 47)
Age, mean (SD)	45.81 (6.72)	44.55 (8.24)
Marital Status		
Single, %	70.5	70.2
Living with a partner as if married, %	6.3	6.4
Married but separated, %	12.6	12.8
Married, %	10.5	10.6
Race		
White, %	3.2	8.5
Black, %	88.4	87.2
Hispanic, %	2.1	0
Other, %	6.3	4.3
Education		
Less than high school, %	26.3	21.3
High School/GED, %	44.2	42.6
More than high school, %	29.5	36.2
Total Income < 10,000, %	51.1	63.8
Unemployed, %	77.4	89.4
Number of Children, mean (SD)	2.10 (1.41)	2.17 (2.34)
Court Mandated to Tx, %	57.5	43.6

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 3. Childhood Trauma by Gender

	Male (n = 95)	Female (n = 47)
CTQ-TOT, mean (SD)	26.91 (13.71)	31.34 (15.26)
CTQ-PHY, mean (SD)	9.36 (4.89)	9.56 (5.73)
CTQ-EMO, mean (SD)	9.90 (5.28)	11.60 (6.51)
CTQ-SEX, mean (SD)*	7.64 (5.66)	10.18 (7.28)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 4. Social Context by Gender

	Male (n = 95)	Female (n = 47)
Availability		
Availability-HEAV, mean (SD)*	4.77 (.56)	4.53 (.82)
Availability-PY, mean (SD)	4.58 (.75)	4.67 (.83)
Use By		
Romantic-HEAV, mean (SD)	3.17 (2.76)	3.51 (2.85)
Romantic-PY, mean (SD)*	2.54 (2.52)	3.58 (2.8)
Friends-HEAV, mean (SD)	5.65 (2.14)	4.89 (2.66)
Friends-PY, mean (SD)	5.32 (2.32)	5.03 (2.76)
Family-HEAV, mean (SD)*	1.83 (2.04)	2.77 (2.65)
Family-PY, mean (SD)*	1.54 (1.68)	2.44 (2.46)
Neighbors-HEAV, mean (SD)	5.91 (1.90)	5.98 (2.23)
Neighbors-PY, mean (SD)	5.81 (2.00)	6.07 (2.10)
Use With		
Romantic-HEAV, mean (SD)	3.31 (2.77)	3.97 (2.90)
Romantic-PY, mean (SD) <sup>†</sup>	2.52 (2.51)	3.58 (2.82)
Friends-HEAV, mean (SD)	5.13 (2.24)	4.43 (2.61)
Friends-PY, mean (SD)	4.65 (2.41)	4.32 (2.74)
Family-HEAV, mean (SD)	1.51 (1.49)	2.02 (1.90)
Family-PY, mean (SD)	1.44 (1.53)	1.55 (1.52)
Neighbors-HEAV	4.01 (2.61)	4.64 (2.72)
Neighbors-PY, mean (SD)	3.59 (2.57)	4.22 (2.74)
Obtainment From		
Romantic-HEAV, mean (SD)	2.23 (2.26)	2.95 (2.61)
Romantic-PY, mean (SD)	1.96 (2.11)	2.53 (2.53)
Friends-HEAV, mean (SD)	4.19 (2.43)	4.29 (2.69)
Friends-PY, mean (SD)	3.85 (2.46)	4.46 (2.78)
Family-HEAV, mean (SD)	1.37 (1.30)	1.93 (1.79)
Family-PY, mean (SD)	1.28 (1.07)	1.56 (1.52)
Neighbors-HEAV, mean (SD)	4.95 (2.51)	5.16 (2.50)
Neighbors-PY, mean (SD)	4.78 (2.50)	5.14 (2.46)
Means of Obtainment		
Free-HEAV, mean (SD)**	3.31 (2.37)	4.49 (2.27)
Free-PY, mean (SD)**	2.95 (2.29)	4.42 (2.45)
Legal-HEAV, mean (SD)**	5.45 (1.99)	4.55 (2.58)
Legal-PY, mean (SD)	4.81 (2.29)	4.21 (2.64)
Illegal-HEAV, mean (SD)	3.13 (2.57)	2.51 (2.22)
Illegal-PY, mean (SD)	2.98 (2.56)	2.23 (2.06)
Sex-HEAV, mean (SD)***	1.83 (1.70)	3.19 (2.40)
Sex-PY, mean (SD)***	1.42 (1.24)	2.72 (2.09)
Deal-HEAV, mean (SD)**	3.73 (2.82)	2.33 (2.46)
Deal-PY, mean (SD)*	3.38 (2.72)	2.12 (2.26)
Steal-HEAV, mean (SD)	1.61 (1.48)	1.77 (1.57)
Steal-PY, mean (SD)	1.33 (1.11)	1.21 (.60)

*Table 4 Continued*

	Male	Female
Give to Others		
Sex-HEAV, mean (SD)***	3.30 (2.57)	1.00 (.00)
Sex-PY, mean (SD)***	2.85 (2.45)	1.05 (.31)
Free-HEAV, mean (SD)	4.35 (2.30)	4.16 (2.56)
Free-PY, mean (SD)	4.01 (2.36)	4.19 (2.56)
Deal-HEAV, mean (SD)*	3.70 (2.85)	2.53 (2.46)
Deal-PY, mean (SD) <sup>t</sup>	3.27 (2.80)	2.35 (2.38)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$ , HEAV is an abbreviation for period of heaviest use, and PY is an abbreviation for the past year

Table 5. Correlation matrix for self-report and behavioral measures of impulsivity

	1	2	3	4	5	6	7	8	9
1. BIS-TOT	--	.76**	.75**	.74**	.09	-.001	-.13	-.05	-.07
2. BIS-NP		--	.28**	.37**	-.04	-.01	-.13	-.08	-.02
3. BIS-MI			--	.41**	.10	-.03	-.09	.02	-.02
4. BIS-A				--	.18*	.04	-.05	-.05	-.14
5. BART					--	-.12	-.03	.01	-.15
6. SG						--	.05	.03	-.02
7. DD-low							--	.70**	.62**
8. DD-medium								--	.72**
9. DD-high									--

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 6. Impulsivity by Gender

	Male (n = 95)	Female (n = 47)
BIS-TOT, mean (SD)	68.53 (11.20)	68.31 (9.39)
BIS-NP, mean (SD)	27.27 (5.40)	26.76 (5.04)
BIS-MI, mean (SD)	24.75 (5.33)	24.46 (3.99)
BIS-A, mean (SD)	16.51 (3.87)	17.10 (3.94)
BART, mean (SD)	41.84 (13.54)	38.80 (14.90)
SG, mean (SD)	198.00 (126.29)	218.37 (89.89)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 7. Negative Emotionality by Gender

	Males (n = 95)	Females (n = 47)
MPQ Negative Emotionality		
NEM-TOT, mean (SD)	16.15 (8.83)	18.44 (7.17)
NEM-AL, mean (SD)**	5.37 (3.44)	7.03 (3.01)
NEM-AG, mean (SD)	3.75 (3.13)	2.07 (2.97)
NEM-SR, mean (SD)	7.00 (4.64)	8.34 (3.91)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 8. Correlation matrix for social cognitive measures

	1	2	3
1. CON-TOT	--	.12	.004
2. NFC-TOT		--	.05
3. WNTQ-TOT			--

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 9. Social Cognitive Variables by Gender

	Male (n = 95)	Female (n = 47)
CON-TOT, mean (SD)*	27.66 (6.06)	24.61 (7.04)
NFC-TOT, mean (SD)	49.71 (12.05)	52.40 (12.04)
WNTQ-TOT, mean (SD)	28.87 (9.00)	27.88 (9.09)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 10. Psychopathology by Gender

	Males (n = 95)	Females (n = 47)
Psychopathology		
MDD Lifetime, % **	32.2	63.4
MDD Current, % <sup>t</sup>	25.8	41.5
PTSD, %	17.8	22.0
BPD, % *	22.2	42.5
APD, % **	32.6	8.5

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$

Table 11. Past year crack/cocaine use frequency relationship to categorical risk factors

	Past Year
<b>Drug Dependence</b>	
Crack/Cocaine dependence lifetime***	
Dependent, mean (SD)	4.54 (.80)
Not dependent, mean (SD)	3.00 (1.23)
Crack/Cocaine dependence current***	
Dependent, mean (SD)	4.60 (.69)
Not dependent, mean (SD)	3.53 (1.33)
Marijuana dependence lifetime	
Dependent, mean (SD)	4.31 (1.14)
Not dependent, mean (SD)	4.28 (1.02)
Marijuana dependence current	
Dependent, mean (SD)	4.44 (1.33)
Not dependent, mean (SD)	4.28 (1.02)
Alcohol dependence lifetime**	
Dependent, mean (SD)	4.55 (.80)
Not dependent, mean (SD)	4.07 (1.17)
Alcohol dependence current	
Dependent, mean (SD)	4.41 (.84)
Not dependent, mean (SD)	4.22 (1.13)
PCP dependence lifetime	
Dependent, mean (SD)	4.12 (1.20)
Not dependent, mean (SD)	4.31 (1.02)
PCP dependence current	
Dependent, mean (SD)	3.80 (1.64)
Not dependent, mean (SD)	4.31 (1.02)
Heroin dependence lifetime	
Dependent, mean (SD)	4.19 (1.15)
Not dependent, mean (SD)	4.32 (1.02)
Heroin dependence current	
Dependent, mean (SD)	4.18 (1.22)
Not dependent, mean (SD)	4.31 (1.01)
<b>Demographics</b>	
Marital Status	
Single, mean (SD)	4.27 (1.06)
Living with a partner as if married, mean (SD)	4.33 (.87)
Married but separated, mean (SD)	4.44 (1.04)
Married, mean (SD)	4.07 (1.22)
Race <sup>t</sup>	
White, mean (SD)	4.71 (.49)
Black, mean (SD)	4.26 (1.06)
Hispanic, mean (SD)	2.50 (.71)
Other, mean (SD)	4.62 (1.06)

Table 11 Continued

	Past Year
Education	
Less than high school, mean (SD)	4.37 (1.24)
High School/GED, mean (SD)	4.16 (1.03)
More than high school, mean (SD)	4.36 (.96)
Total Income**	
< 10,000, mean (SD)	4.49 (.85)
>10,000, mean (SD)	4.00 (1.23)
Employment*	
Unemployed, mean (SD)	4.36 (1.05)
Employed, mean (SD)	3.85 (1.05)
Court Mandated to Tx	
Yes, mean (SD)	4.16 (1.11)
No, mean (SD)	4.42 (.97)
Psychopathology	
MDD Lifetime***	
Present, mean (SD)	4.67 (.67)
Absent mean (SD)	4.01 (1.17)
MDD Current**	
Present, mean (SD)	4.68 (.62)
Absent mean (SD)	4.11 (1.15)
PTSD	
Present, mean (SD)	4.44 (1.04)
Absent mean (SD)	4.25 (1.04)
BPD*	
Present, mean (SD)	4.70 (.74)
Absent mean (SD)	4.12 (1.10)
APD	
Present, mean (SD)	4.51 (.92)
Absent mean (SD)	4.20 (1.09)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$

Table 12. Heaviest crack/cocaine use frequency relationship to categorical risk factors

	Heaviest Use
<b>Drug Dependence</b>	
Crack/Cocaine dependence lifetime***	
Dependent, mean (SD)	4.79 (.49)
Not dependent, mean (SD)	3.33 (1.62)
Crack/Cocaine dependence current***	
Dependent, mean (SD)	4.83 (.53)
Not dependent, mean (SD)	3.89 (1.43)
Marijuana dependence lifetime	
Dependent, mean (SD)	4.59 (1.05)
Not dependent, mean (SD)	4.55 (.92)
Marijuana dependence current	
Dependent, mean (SD)	4.33 (1.66)
Not dependent, mean (SD)	4.47 (.88)
Alcohol dependence lifetime*	
Dependent, mean (SD)	4.40 (1.06)
Not dependent, mean (SD)	4.74 (.76)
Alcohol dependence current	
Dependent, mean (SD)	4.59 (.97)
Not dependent, mean (SD)	4.53 (.94)
PCP dependence lifetime	
Dependent, mean (SD)	4.38 (1.20)
Not dependent, mean (SD)	4.58 (.91)
PCP dependence current	
Dependent, mean (SD)	3.80 (1.64)
Not dependent, mean (SD)	4.59 (.91)
Heroin dependence lifetime	
Dependent, mean (SD)	4.56 (1.09)
Not dependent, mean (SD)	4.56 (.91)
Heroin dependence current	
Dependent, mean (SD)	4.55 (1.14)
Not dependent, mean (SD)	4.56 (.91)
<b>Demographics</b>	
<b>Marital Status</b>	
Single, mean (SD)	4.62 (.79)
Living with a partner as if married, mean (SD)	4.67 (.71)
Married but separated, mean (SD)	4.39 (1.6)
Married, mean (SD)	4.47 (.74)
<b>Race</b>	
White, mean (SD)	4.86 (.38)
Black, mean (SD)	4.57 (.93)
Hispanic, mean (SD)	4.00 (1.41)
Other, mean (SD)	4.62 (1.06)
<b>Education</b>	
Less than high school, mean (SD)	4.51 (1.10)

Table 12 Continued

	Heaviest Use
High School/GED, mean (SD)	4.53 (.97)
More than high school, mean (SD)	4.69 (.67)
Total Income	
< 10,000, mean (SD)	4.67 (.80)
>10,000, mean (SD)	4.46 (1.05)
Employment	
Unemployed, mean (SD)	4.61 (.92)
Employed, mean (SD)	4.42 (.95)
Court Mandated to Tx	
Yes, mean (SD)	4.43 (1.05)
No, mean (SD)	4.69 (.84)
MDD Lifetime*	
Psychopathology	
Present, mean (SD)	4.80 (1.03)
Absent mean (SD)	4.38 (1.03)
MDD Current	
Present, mean (SD)	4.46 (.97)
Absent mean (SD)	4.78 (.86)
PTSD	
Present, mean (SD)	4.88 (.33)
Absent mean (SD)	4.48 (1.03)
BPD**	
Present, mean (SD)	4.92 (.28)
Absent mean (SD)	4.41 (1.08)
APD*	
Present, mean (SD)	4.91 (.28)
Absent mean (SD)	4.47 (1.02)

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$

Table 13. Correlation of crack/cocaine use frequency and dependency status with continuous risk factors

	Crack/Cocaine frequency past year	Crack/Cocaine frequency heaviest use
<b>Drug Use</b>		
Crack/Cocaine frequency past year	--	
Crack/Cocaine frequency heaviest use	.64**	--
Marijuana frequency past year	.03	-.03
Marijuana frequency heaviest use	.13	.19
Alcohol frequency past year	.02	.05
Alcohol frequency heaviest use	.05	.06
PCP frequency past year	-.05	-.11
PCP frequency heaviest use	.09	.08
Heroin frequency past year	.01	.03
Heroin frequency heaviest use	-.02	.07
<b>Demographics</b>		
Age	.06	.02
Number of Children	.05	.12
<b>Trauma</b>		
CTQ-TOT	.12	.20*
CTQ-PHY	.05	.16
CTQ-EMO	.14	.20*
CTQ-SEX	.11	.14
<b>Social Context</b>		
<b>Availability</b>		
Availability-HEAV	.003	.12
Availability-PY	-.02	.03
<b>Use By</b>		
Romantic-HEAV	.08	.12
Romantic-PY	.28**	.09
Friends-HEAV	.10	.09
Friends-PY	.27**	.20*
Family-HEAV	.06	.15
Family-PY	-.01	.09
Neighbors-HEAV	.16	.37**
Neighbors-PY	.17	.33**
<b>Use With</b>		
Romantic-HEAV	.09	.14
Romantic-PY	.17	.09
Friends-HEAV	.22*	.14
Friends-PY	.33**	.21*
Family-HEAV	.05	.15
Family-PY	-.05	.09
Neighbors-HEAV	.15	.22*
Neighbors-PY	.22*	.22*

Table 13 continued

	Crack/Cocaine frequency past year	Crack/Cocaine frequency heaviest use
Obtainment From		
Romantic-HEAV	.22*	.10
Romantic-PY	.18	.18
Friends-HEAV	.14	.11
Friends-PY	.33**	.22*
Family -HEAV	.02	.14
Family -PY	-.08	.08
Neighbors-HEAV	.21*	.26**
Neighbors-PY	.39**	.29**
Means of Obtainment		
Free-HEAV	.01	.02
Free-PY	.22*	.08
Legal-HEAV	-.01	.04
Legal-PY	.05	.02
Illegal-HEAV	.05	.20*
Illegal-PY	.15	.19*
Sex-HEAV	.02	.18*
Sex-PY	.17	.17
Deal-HEAV	.05	.10
Deal-PY	.13	.11
Steal-HEAV	-.03	.10
Steal-PY	.05	.11
Give to Others		
Sex-HEAV	-.001	.06
Sex-PY	.04	.10
Free-HEAV	.22*	.18*
Free-PY	.27	.20
Deal-HEAV	.12	.14
Deal-PY	.15	.11
Impulsivity		
BIS-TOT	.35**	.28**
BIS-NP	.22*	.18*
BIS-MI	.27**	.23**
BIS-A	.31**	.22**
BART	.10	.07
SG	.02	-.03
DD-low	.004	-.09
DD-medium	-.02	-.07
DD-high	.02	-.02
Negative Emotionality		
NEM-TOT	.27**	.22**
NEM-AL	.21*	.18*

*Table 13 Continued*

	Crack/Cocaine frequency past year	Crack/Cocaine frequency heaviest use
NEM-AG	.11	.15
NEM-SR	.29**	.18**
Social Cognitive		
CON-TOT	-.02	-.07
NFC-TOT	.09	.08
WNTQ-TOT	.09	.01

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$ , HEAV is an abbreviation for period of heaviest use, and PY is an abbreviation for the past year

Table 14. Relationship of current crack/cocaine dependence status to risk factors

	Not Dependent	Dependent
<b>Drug Use</b>		
Crack/Cocaine frequency past year, mean (SD)***	3.53 (1.33)	4.60 (.69)
Crack/Cocaine frequency heaviest use, mean (SD)***	3.89 (1.43)	4.83 (.43)
Crack/Cocaine dependence lifetime, %***	44.7	100.0
Marijuana frequency past year, mean (SD)	1.79 (1.92)	1.48 (1.83)
Marijuana frequency heaviest use, mean (SD)	3.74 (1.87)	3.80 (1.700)
Marijuana dependence current, %	5.3	7.5
Marijuana dependence lifetime, %	18.4	23.7
Alcohol frequency past year, mean (SD)	3.37 (1.88)	3.31 (1.97)
Alcohol frequency heaviest use, mean (SD)	4.00 (1.54)	3.99 (1.62)
Alcohol dependence current, %*	21.1	39.1
Alcohol dependence lifetime, % <sup>†</sup>	31.6	50.0
PCP frequency past year, mean (SD)	.45 (1.22)	.43 (1.16)
PCP frequency heaviest use, mean (SD)	1.58 (2.10)	1.85 (2.12)
PCP dependence current, %	5.3	3.2
PCP dependence lifetime, %	10.5	12.9
Heroin frequency past year, mean (SD)*	1.89 (2.28)	1.03 (1.82)
Heroin frequency heaviest use, mean (SD)*	2.26 (2.38)	1.29 (1.97)
Heroin dependence current, %	21.1	15.2
Heroin dependence lifetime, %	28.9	17.2
<b>Demographics</b>		
Age, mean (SD)	46.58 (8.30)	45.33 (6.73)
<b>Marital Status</b>		
Single, %	60.5	71.0
Living with a partner as if married, %	10.5	5.4
Married but separated, %	13.2	14.0
Married, %	15.8	9.7
<b>Race</b>		
White, %	5.3	5.4
Black, %	86.8	87.1
Hispanic, %	2.6	1.1
Other, %	5.3	6.5
<b>Education</b>		
Less than high school, %	23.7	25.8
High School/GED, %	42.1	46.2
More than high school, %	34.2	28.0
Total Income < 10,000, %	47.4	59.1
Unemployed, %	75.7	84.9
Number of Children, mean (SD)	2.08 (1.56)	2.18 (2.27)
Court Mandated to Tx, %*	69.4	46.7
<b>Trauma</b>		
CTQ-TOT, mean (SD)*	23.38 (12.04)	30.44 (15.83)
CTQ-PHY, mean (SD) <sup>†</sup>	7.99 (4.01)	9.92 (5.61)

Table 14 Continued

	Not Dependent	Dependent
CTQ-EMO, mean (SD)*	8.76 (4.96)	11.23 (6.10)
CTQ-SEX, mean (SD)*	6.63 (4.62)	9.28 (6.98)
Social Context		
Availability		
Availability-HEAV, mean (SD)	4.67 (.65)	4.71 (.64)
Availability-PY, mean (SD)	4.58 (.85)	4.64 (.68)
Use By		
Romantic-HEAV, mean (SD)	3.57 (2.72)	3.18 (2.82)
Romantic-PY, mean (SD)	2.54 (2.47)	3.06 (2.76)
Friends-HEAV, mean (SD)	5.71 (1.96)	5.30 (2.44)
Friends-PY, mean (SD)	5.19 (2.23)	5.27 (2.51)
Family -HEAV, mean (SD)	1.75 (2.02)	2.37 (2.45)
Family -PY, mean (SD)	1.48 (1.57)	2.00 (2.18)
Neighbors-HEAV, mean (SD)	5.48 (2.39)	6.05 (1.86)
Neighbors-PY, mean (SD)*	5.13 (2.53)	6.07 (1.87)
Use With		
Romantic-HEAV, mean (SD)	3.83 (2.75)	3.43 (2.85)
Romantic-PY, mean (SD)	2.73 (2.57)	2.90 (2.69)
Friends-HEAV, mean (SD)	5.03 (1.99)	4.88 (2.51)
Friends-PY, mean (SD)	4.36 (2.36)	4.73 (2.55)
Family -HEAV, mean (SD)	1.45 (1.20)	1.80 (1.83)
Family -PY, mean (SD)	1.30 (1.21)	1.54 (1.64)
Neighbors-HEAV, mean (SD)*	3.31 (2.58)	4.44 (2.67)
Neighbors-PY, mean (SD)	3.00 (2.51)	3.99 (2.66)
Obtainment From		
Romantic-HEAV, mean (SD)	2.53 (2.45)	2.46 (2.40)
Romantic-PY, mean (SD)	1.77 (2.0)	2.32 (2.38)
Friends-HEAV, mean (SD)	4.32 (2.32)	4.22 (2.60)
Friends-PY, mean (SD)	3.72 (2.37)	4.17 (2.66)
Family -HEAV, mean (SD)	1.47 (1.14)	1.58 (1.59)
Family -PY, mean (SD)	1.24 (.79)	1.40 (1.32)
Neighbors-HEAV, mean (SD)**	3.72 (2.74)	5.39 (2.32)
Neighbors-PY, mean (SD)***	3.10 (2.47)	5.41 (2.26)
Means of Obtainment		
Free-HEAV, mean (SD)	3.56 (2.44)	3.84 (2.38)
Free-PY, mean (SD)	3.20 (2.36)	3.65 (2.48)
Legal-HEAV, mean (SD)*	4.38 (2.37)	5.48 (2.06)
Legal-PY, mean (SD)	4.20 (2.40)	4.85 (2.38)
Illegal-HEAV, mean (SD)	3.06 (2.68)	2.86 (2.42)
Illegal-PY, mean (SD)	2.70 (2.42)	2.72 (2.41)
Sex-HEAV, mean (SD)	2.25 (1.70)	2.23 (2.12)
Sex-PY, mean (SD)	1.83 (1.51)	1.88 (1.78)
Deal-HEAV, mean (SD)	3.28 (2.66)	3.10 (2.78)

Table 14 Continued

	Not Dependent	Dependent
Deal-PY, mean (SD)	2.97 (2.55)	2.80 (2.60)
Steal-HEAV, mean (SD)	1.69 (1.51)	1.62 (1.52)
Steal-PY, mean (SD)	1.13 (.35)	1.36 (1.13)
Give to Others		
Sex-HEAV, mean (SD)	2.53 (2.19)	2.57 (2.43)
Sex-PY, mean (SD)	2.10 (1.97)	2.28 (2.22)
Free-HEAV, mean (SD)	4.72 (2.14)	4.24 (2.40)
Free-PY, mean (SD)	4.20 (2.30)	4.11 (2.46)
Deal-HEAV, mean (SD)	3.28 (2.72)	3.24 (2.78)
Deal-PY, mean (SD)	2.83 (2.69)	2.84 (2.66)
Impulsivity		
BIS-TOT, mean (SD)**	64.10 (11.70)	70.03 (10.11)
BIS-NP, mean (SD) <sup>t</sup>	25.57 (5.66)	27.51 (5.17)
BIS-MI, mean (SD) <sup>t</sup>	23.39 (5.20)	25.30 (4.93)
BIS-A, mean (SD)**	15.13 (3.78)	17.22 (3.91)
BART, mean (SD)	41.20 (13.54)	40.52 (14.02)
SG, mean (SD)	207.23 (50.80)	206.25 (137.09)
Negative Emotionality		
NEM-TOT, mean (SD)***	12.52 (7.87)	18.50 (8.06)
NEM-AL, mean (SD)*	4.89 (3.29)	6.28 (3.41)
NEM-AG, mean (SD)*	2.75 (2.27)	4.01 (3.31)
NEM-SR, mean (SD)**	5.14 (4.15)	8.04 (4.20)
Social Cognitive		
CON-TOT, mean (SD)	26.89 (6.08)	26.38 (6.66)
NFC-TOT, mean (SD)	51.05 (12.85)	50.13 (11.72)
WNTQ-TOT, mean (SD)	28.03 (9.55)	28.71 (9.00)
Psychopathology		
MDD Lifetime, %***	15.8	52.7
MDD Current, %***	7.9	40.2
PTSD, %	10.5	22.6
BPD, %	21.6	31.2
APD, %	18.4	30.1

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$ , HEAV is an abbreviation for period of heaviest use, and PY is an abbreviation for the past year

Table 15. Relationship of lifetime crack/cocaine dependence status to risk factors

	Not Dependent	Dependent
<b>Drug Use</b>		
Crack/Cocaine frequency past year, mean (SD)***	3.00 (1.23)	4.54 (.80)
Crack/Cocaine frequency heaviest use, mean (SD)***	3.33 (1.62)	4.79 (.49)
Crack/Cocaine dependence current, %***	0	84.5
Marijuana frequency past year, mean (SD)	1.67 (1.91)	1.55 (1.86)
Marijuana frequency heaviest use, mean (SD)	3.62 (2.01)	3.81 (1.70)
Marijuana dependence current, %	4.8	7.3
Marijuana dependence lifetime, %	9.5	24.5
Alcohol frequency past year, mean (SD)	3.95 (1.56)	3.21 (1.98)
Alcohol frequency heaviest use, mean (SD)	4.38 (1.47)	3.92 (1.61)
Alcohol dependence current, %	28.6	34.9
Alcohol dependence lifetime, %*	23.8	48.6
PCP frequency past year, mean (SD)	.57 (1.53)	.41 (1.10)
PCP frequency heaviest use, mean (SD)	1.71 (2.17)	1.78 (2.11)
PCP dependence current, %	9.5	2.7
PCP dependence lifetime, %	19.0	10.9
Heroin frequency past year, mean (SD)	1.67 (2.27)	1.21 (1.94)
Heroin frequency heaviest use, mean (SD)	1.95 (2.40)	1.50 (2.08)
Heroin dependence current, %	19.0	16.5
Heroin dependence lifetime, %	28.6	19.1
<b>Demographics</b>		
Age, mean (SD)	46.90 (8.23)	45.46 (7.01)
<b>Marital Status</b>		
Single, %	47.6	71.8
Living with a partner as if married, %	9.5	6.4
Married but separated, %	19.0	127
Married, %	23.8	9.1
<b>Race</b>		
White, %	0	6.4
Black, %	90.5	86.4
Hispanic, %	4.8	.9
Other, %	4.8	6.4
<b>Education</b>		
Less than high school, %	14.3	27.3
High School/GED, %	57.1	42.7
More than high school, %	28.6	30.0
Total Income < 10,000, %*	33.3	60.0
Unemployed, %	70.0	84.5
Number of Children	2.29 (1.65)	2.12 (2.17)
Court Mandated to Tx, %**	81.0	47.6
<b>Trauma</b>		
CTQ-TOT, mean (SD)*	20.76 (5.14)	29.83 (15.96)
CTQ-PHY, mean (SD) <sup>†</sup>	7.38 (2.50)	9.73 (5.56)

Table 15 Continued

	Not Dependent	Dependent
CTQ-EMO, mean (SD)*	7.90 (2.76)	11.01 (6.20)
CTQ-SEX, mean (SD)*	5.48 (1.25)	9.09 (6.91)
Social Context		
Availability		
Availability-HEAV, mean (SD)	4.71 (.59)	4.70 (.65)
Availability-PY, mean (SD)	4.69 (.60)	4.62 (.74)
Use By		
Romantic-HEAV, mean (SD)	3.00 (2.48)	3.33 (2.84)
Romantic-PY, mean (SD)	2.00 (1.90)	3.10 (2.79)
Friends-HEAV, mean (SD)	5.47 (2.07)	5.40 (2.37)
Friends-PY, mean (SD)	4.50 (2.28)	5.37 (2.44)
Family -HEAV, mean (SD)	1.35 (1.46)	2.34 (2.44)
Family -PY, mean (SD) <sup>†</sup>	1.00 (.00)	2.01 (2.18)
Neighbors-HEAV, mean (SD)	5.65 (2.29)	5.93 (1.98)
Neighbors-PY, mean (SD)	5.38 (2.31)	5.89 (2.06)
Use With		
Romantic-HEAV, mean (SD)	3.40 (2.53)	3.56 (2.87)
Romantic-PY, mean (SD)	2.13 (2.16)	3.00 (2.72)
Friends-HEAV, mean (SD)	4.25 (2.24)	5.04 (2.38)
Friends-PY, mean (SD)	3.80 (2.31)	4.77 (2.51)
Family -HEAV, mean (SD) <sup>†</sup>	1.00 (.00)	1.82 (1.79)
Family -PY, mean (SD)	1.00 (.00)	1.55 (1.64)
Neighbors-HEAV, mean (SD)*	2.76 (2.33)	4.36 (2.28)
Neighbors-PY, mean (SD) <sup>†</sup>	2.56 (2.16)	3.92 (2.68)
Obtainment From		
Romantic-HEAV, mean (SD)	1.93 (1.94)	2.56 (2.56)
Romantic-PY, mean (SD)	1.53 (1.60)	2.29 (2.37)
Friends-HEAV, mean (SD)	4.07 (2.31)	4.28 (2.56)
Friends-PY, mean (SD)	3.36 (2.27)	4.15 (2.62)
Family -HEAV, mean (SD)	1.19 (.75)	1.61 (1.56)
Family -PY, mean (SD)	1.20 (.78)	1.38 (1.26)
Neighbors-HEAV, mean (SD)**	3.25 (2.70)	5.20 (2.42)
Neighbors-PY, mean (SD)**	2.93 (2.40)	5.09 (2.43)
Means of Obtainment		
Free-HEAV, mean (SD)	3.13 (2.33)	3.87 (2.39)
Free-PY, mean (SD)*	2.33 (2.16)	3.71 (2.44)
Legal-HEAV, mean (SD)	5.00 (1.83)	5.22 (2.25)
Legal-PY, mean (SD)	4.00 (2.14)	4.79 (2.42)
Illegal-HEAV, mean (SD)	2.44 (2.25)	2.98 (2.48)
Illegal-PY, mean (SD)	2.07 (2.09)	2.81 (2.44)
Sex-HEAV, mean (SD)	1.56 (1.09)	2.34 (2.10)
Sex-PY, mean (SD)	1.20 (.78)	1.96 (1.79)
Deal-HEAV, mean (SD)	3.38 (2.83)	3.11 (2.74)

Table 15 Continued

	Not Dependent	Dependent
Deal-PY, mean (SD)	3.00 (2.80)	2.82 (2.56)
Steal-HEAV, mean (SD)	1.13 (.34)	1.72 (1.60)
Steal-PY, mean (SD)	1.07 (.26)	1.34 (1.06)
Give to Others		
Sex-HEAV, mean (SD)	3.00 (2.53)	2.49 (2.34)
Sex-PY, mean (SD)	2.80 (2.54)	2.15 (2.09)
Free-HEAV, mean (SD)	4.19 (2.37)	4.40 (2.34)
Free-PY, mean (SD)	3.60 (2.32)	4.21 (2.42)
Deal-HEAV, mean (SD)	2.88 (2.66)	3.31 (2.78)
Deal-PY, mean (SD)	2.93 (2.84)	2.83 (2.64)
Impulsivity		
BIS-TOT, mean (SD)***	59.90 (11.24)	69.91(10.11)
BIS-NP, mean (SD)**	24.00 (5.92)	27.51 (5.10)
BIS-MI, mean (SD)**	21.95 (4.79)	25.30 (4.96)
BIS-A, mean (SD)**	13.95 (3.20)	17.12 (3.91)
BART, mean (SD)	40.12 (13.81)	40.84 (13.89)
SG, mean (SD)	203.15 (52.90)	207.11 (128.11)
Negative Emotionality		
NEM-TOT, mean (SD)***	9.96 (6.09)	19.01 (8.22)
NEM-AL, mean (SD) <sup>t</sup>	4.57 (2.99)	6.12 (2.45)
NEM-AG, mean (SD)*	2.41 (2.23)	3.87 (3.18)
NEM-SR, mean (SD)***	3.51 (3.42)	7.88 (4.19)
Social Cognitive		
CON-TOT, mean (SD)	27.40 (6.18)	26.36 (6.55)
NFC-TOT, mean (SD)	46.86 (13.30)	51.10 (11.69)
WNTQ-TOT, mean (SD)	30.86 (9.23)	23.06 (9.07)
Psychopathology		
MDD Lifetime, %**	9.5	48.2
MDD Current, %*	9.5	34.9
PTSD, %	9.5	20.9
BPD, %**	4.8	33.0
APD, %	19.0	28.2

Note. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , <sup>t</sup> marginally significant,  $p < .07$ , HEAV is an abbreviation for period of heaviest use, and PY is an abbreviation for the past year

Table 16. Lifetime MDD Diagnosis risk factor test

Predictor(s)	$\Delta R^2$	$F$	$p$	$\beta$	$p$	$sr^2$
<b>Step 1</b>	.04	4.94	.03			
Gender				-.19	.03	.04
<b>Step 2</b>	.07	7.87	.001			
Gender				-.11	.21	.01
MDD Lifetime				.28	.002	.07

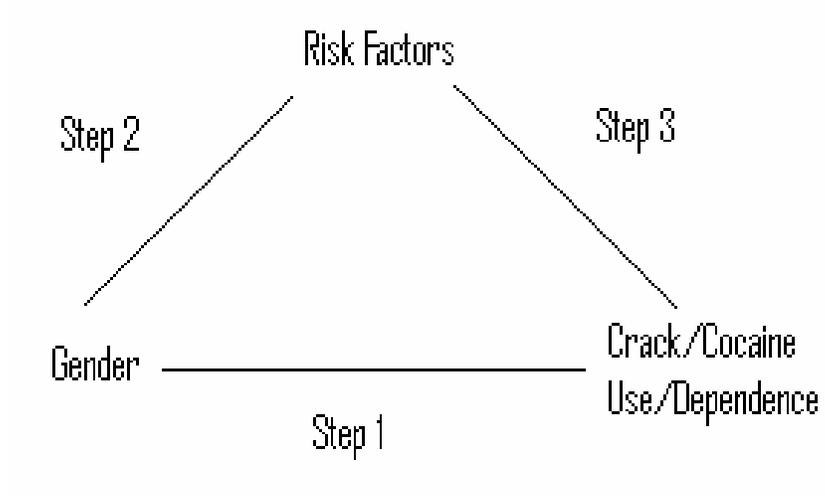
Table 17. BPD Diagnosis risk factor test

Predictor(s)	$\Delta R^2$	$F$	$p$	$\beta$	$p$	$sr^2$
<b>Step 1</b>	.04	4.60	.03			
Gender				-.19	.03	.04
<b>Step 2</b>	.05	5.75	.004			
Gender				-.14	.11	.02
BPD Diagnosis				.23	.01	.05

Table 18. Crack/cocaine use by romantic partner, past year risk factor test

<b>Predictor(s)</b>	$\Delta R^2$	<i>F</i>	<i>p</i>	$\beta$	<i>p</i>	<i>sr</i> <sup>2</sup>
<b>Step 1</b>	.05	5.05	.03			
Gender				-.23	.03	.05
<b>Step 2</b>	.06	5.59	.005			
Gender				-.18	.08	.03
Use by romantic, PY				.24	.02	.05

Figure 1. Risk Factor Model



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