University of Cincinnati

Date: 10/20/2015

I, Danni A. Lanaway , hereby submit this original work as part of the requirements for the degree of Master of Arts in Psychology.

It is entitled:

Perceived Racial Discrimination and Motivations for Illicit Substance Use among Black College Student Drug Users

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Perceived Racial Discrimination and Motivations for Illicit Substance Use among Black College
Student Drug Users

A thesis study submitted to the
Graduate School
of the University of Cincinnati
in partial fulfillment of the
requirements for the degree of

Master of Arts

Department of Psychology
of the College of Arts and Sciences
by

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August 2010

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Abstract

The current study sought to examine Black college students' motivations for illicit substance use, investigate whether particular motivations associated with managing negative feelings and with enhancing academic performance are associated with greater frequency of drug use, and examine particular motivations as potential mediators for the relationship between PRD and frequency of substance use. The sample consisted of 151 participants (self-identified Black race, self-reported past year illicit substance user, enrolled in college at least part-time and at least 18 years of age) who were recruited using convenience sampling. Participants completed an online survey that captured demographic information, frequency of substance use, motivations for illicit drug use and experiences of perceived racial discrimination in the academic setting. For any substance use ($n=151$), the most commonly endorsed motivations included: enjoyment (83.4%; $n=126$), celebration (66.2%; $n=100$), and experimentation (58.9%; $n=89$). For cannabis, enjoyment (87.8%; $n=115$), celebration (66.4%; $n=87$) and perceived relatively low risk (60.3%; $n=79$) were endorsed most frequently. Self-medicating motivations were reported most often for opioids (81.3%, $n=13$). Academic enhancement motives were reported most frequently (80.6%; $n=25$) for stimulants. For sedatives ($n=17$), sleep (82.4%; $n=14$) was the most commonly reported motive. For hallucinogens ($n=13$), experimentation (92.3%; $n=12$), enjoyment (76.9%; $n=10$) and altered perceptions motivations (69.2%; $n=9$) were endorsed most frequently. Lastly, for cocaine ($n=5$), in conjunction with alcohol, altered perceptions, enjoyment and experimentation were endorsed by 100% of the cocaine users ($n=5$). No gender differences in reported coping or self-medicating motivations were found. Students who reported coping motives for cannabis use had higher frequencies of cannabis use ($n=59$, $M=32.93$ $SD=23.90$) compared to those who did not report coping motives ($n=72$, $M=16.08$, $SD=20.18$), $t(113.83) = -4.30$, $p < .001$. And, students who were in the high cannabis frequency group endorsed higher levels of coping motives for cannabis use ($n=60$, $M=1.75$, $SD=1.72$) compared to those students in the low cannabis frequency group ($n=66$, $M=0.74$, $SD=1.32$), $t(110.52) = -3.66$, $p < .001$. Further, level of PRD was found to be associated with cannabis coping motivations $\beta=0.48$, $t(46)=3.54$, $p < .001$.

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Perceived Racial Discrimination and Motivations for Illicit Substance Use among Black College Student Drug Users

Patterns of illicit substance use on college campuses have shifted dramatically over the past decade (SAMHSA, 2014). In particular, illicit substance use, defined as the use of any illegal substance or the use of a legal substance that is not taken as directed, has increased significantly for Black college students. Nearly one in five Black college students report current (past 30 day) illicit drug use (Substance Abuse and Mental Health Services Administration, 2014), a marked increase compared to their reported rates of use a decade ago (Compton, Grant, Colliver, Glantz and Stinson, 2004; SAMHSA, 2014). From 1996 to 2013, current illicit drug use among Black college students rose from nine percent (exclusively reporting cannabis use) to 19% (reporting the use of cannabis, opioids and stimulants; Globetti, Globetti, Lo & Brown, 1996; SAMHSA, 2014).

Cannabis has been the most commonly used substance among Black college students over time, with rates of use seeing the largest increase over the past 10 years. Similar to the patterns of use for all drugs, studies have found that past year cannabis use rates rose from 16% to 46% among Black college students from 1996 to 2012 (Globetti et al., 1996; SAMHSA, 2013). Illicit cannabis use trends also reflect an increase in the monthly frequency of use among Black college students between 2002 and 2012 (SAMHSA, 2003; SAMHSA, 2013). Similar patterns show a noteworthy increase in illicit opioid (e.g., heroin, morphine and a variety of pain pills) and stimulant (e.g., Adderall, Ritalin, other amphetamines and methamphetamines) use among Black college students (SAMHSA, 2012; Teter, McCabe, LaGrange, Cranford & Boyd, 2006). From the late 90's to the early 2000's, Black college students were reporting the illicit use of opioids and stimulants at rates of less than one percent (Globetti et al., 1996; Meilman, Presley & Cashin, 1995; SAMHSA, 2003). However, rates of illicit opioid and stimulant use have been increasing and, as of 2012, have reached approximately eight percent and five percent respectively (McCabe et al., 2007; SAMHSA, 2003; SAMHSA, 2012).

The available research on motivations for substance use suggests 14 different reasons for why people engage in illicit drug use. These motives include: enjoyment, experimentation, conformity, celebration, in conjunction with alcohol, boredom, altered perceptions, perceived low risk, availability, coping, self-medicating, academic enhancement, sleep and social anxiety (Lee, Neighbors, Hendershot & Grossbard, 2009). Certain motivations have been found to differ based on the drug that is used; however, many of these motives fit across drug classes. For example, social motives, which tend to include enjoyment (to have fun), experimentation, conformity (fitting in with your peers or the social norms), celebration, and in conjunction with alcohol, are often observed across substance types. Similarly, motivations associated with health, coping (dealing with emotional difficulties), self-medicating (dealing with physical difficulties, e.g., tension reduction), sleep (to aid with sleep difficulties) and social anxiety are found for a variety of substances. Academic enhancement is one motivation that is often only associated with two substances: stimulants and, on occasion, cannabis.

The problem with the available literature is that it fails to examine motivations among different racial groups. The known studies have examined majority White samples almost exclusively, despite Black college students showing rising rates of illicit cannabis, opioid and stimulant use. In order to adequately understand the reasons for the rising trend in illicit drug use and address this growing problem, it is necessary to investigate potential motivations specific to Black students as well as factors that may be influencing said motivations. Perceived racial discrimination (PRD) or being treated unjustly due to one's race, is one potential factor that may be influencing motivations for use among Black college students. Up to 98% of Black college students report experiencing PRD over an academic year and up to 60% of these individuals describe experiencing negative affect and stress as a result of these events (Swim, Hyers, Cohen, Fitzgerald & Bylsma, 2003). PRD is shown to be highly associated with increases in substance use among Black college students, both directly and indirectly (through symptoms of mental health; Banks, Kohn-Wood & Spencer, 2006; Broman, Mavaddat & Hsu, 2000; Fuller-Rowell et al., 2012). In addition, experiences of PRD within the academic setting are negatively related to academic performance,

academic curiosity and self-esteem, leading many students to experience increased levels of stress as well as doubts about their academic competence (Neblett, Philip, Cogburn, & Sellers, 2006).

When considering the potential influence of PRD on motivations for drug use, it can be suggested that for some Black students, substance use serves as a mechanism to seek relief from these negative experiences. Black college students are shown to underutilize traditional mental health services and a subset of this population may be motivated to use drugs to self-medicate and/or cope with the negative symptoms associated with experiences of PRD (i.e., Developmental theories of immediate gratification and Theory of self-medication; Green, Myerson, Lichtman, Rosen & Fry, 1996; Khantzian, 2007; Romer, Duckworth, Sznitman & Park, 2010). Further, the potential threats posed to one's academic competence based on experiences of PRD may motivate some students to engage in non-traditional methods to increase their academic performance, such as with the use of stimulants. Because of the aforementioned negative outcomes associated with PRD, coping, self-medicating and academic enhancement motives are of particular interest in the current study.

Research clearly indicates that illicit drug use rates are rising among Black college students, yet no known studies have investigated potential reasons for why this trend is occurring. Because this information is crucial to the success of substance use reduction efforts, this study seeks to fill this gap in the literature by examining the reported motivations for illicit drug use in an all-Black college student sample. Further, this study will focus on coping, self-medicating and academic enhancement motives. Additionally, gaining an understanding of the potential factors that are influencing these students' motivations for drug use will provide essential information for understanding the problem of rising drug use rates. Therefore, this study will expand on the existing literature to investigate whether, among Black college student drug users, coping, self-medicating and academic enhancement motivations are related to greater frequencies of substance use. The current study will also help to develop an understanding of the influence of these motivations on the association between Black student's experiences of PRD and illicit drug use. Specifically, this study will examine whether the aforementioned motivations will mediate the relationship between PRD and substance use.

Theory on Motivations for Illicit Substance Use

Economic and developmental theories suggest that age, decision making, and delayed gratification can influence one's behaviors with regards to engaging in substance use (Bickel & Marsch, 2001; Kirby, Petry & Bickel, 1999; Madden, Bickel & Jacobs, 1999; Steinberg et al., 2009). In particular, younger individuals tend to engage in more impulsive behaviors irrespective of the risks (Green et al., 1996; Romer et al., 2010). This impulsivity in making decisions creates a tendency to choose more immediate as opposed to delayed rewards. Research has shown that people often discount the value of delayed rewards even if the delayed reward is larger. However, the rate at which one may discount delayed rewards is positively associated with age (Green, Fry & Myerson, 1994; Green, Myerson & O'Staszewski, 1999). Although young adults are shown to be better than children at examining the risks/benefits of a delayed versus an immediate reward, patterns of spontaneous decision making are thought to remain unstable until one's 30's (Green et al., 1996). For college students, who tend to be in their young adult years, the immediate benefits that may arise from engaging in substance use, such as improving efficiency when studying for a final exam, may be more desirable than participating in more cumbersome, long-term strategies for success. This type of decision making process may lead students to engage in substance use as a quick fix for problems they are encountering instead of using a more in depth, long-term method to handle their challenges (e.g., psychotherapy or tutoring).

Social norms and peer effects also have a large influence on potential motivations for substance use among college students. Social theorists posit that individuals misperceive the attitudes and beliefs of others, which may cause them to alter their own behavior to mimic inaccurately perceived norms (Prentice & Miller, 1993). With regards to substance use, studies have consistently demonstrated that college students overestimate rates of use by their peers and tend to match their personal behavior with these inaccurately perceived norms (Perkins, 1994; Perkins, Meilman, Leichliter, Cashin & Presley, 1999). Prentice and Miller (1993) demonstrated significant behavioral adjustment with regards to alcohol consumption (engaging in more drinking) due to misperceived norms in a sample of undergraduate students. They also found that going against the apparent norm was associated with perceived alienation

from one's reference group. Students often feel increased pressure to conform to the misperceived social norms of the college culture, with these misperceptions both facilitating and justifying increased substance use (Berkowitz, 2003; Palmer, McMahon, Moreggi & Rounsaville 2012). Viewing your peers as engaging in what is perceived to be appropriate behavior may cause some students to both engage in drug use and also use substances for similar motivations as their reference group.

Lastly, the theory of self-medication illustrates potential motivations for drug use and suggests that for some individuals, substance use functions as an external means of altering negative affect (Khantzian, 2007), and serves as a coping mechanism to alleviate the stress associated with negative experiences (e.g., racial discrimination, negative affect and the pressure to perform academically; Jackson, Knight & Rafferty, 2010). The distress that can result from experiencing negative feelings/events can cause some individuals to search for means of reducing said distress. Research has found support for substance use in response to symptoms of depression and anxiety, as well as high levels of stress (Miller et al., 2002). Further, individuals have been shown to use drugs, specifically cannabis, with the expectation that it would reduce symptoms of anxiety (De Dios et al., 2010). As evidenced by Simons and colleagues (2005), various cognitive-affective variables have been shown to indirectly effect substance use behaviors through motivations for substance use associated with negative affect, highlighting the potential for substance use to act as a coping strategy. Specifically, in a study of 831 college students, results revealed that negative affect as well as affective lability were indirectly associated with alcohol use problems through coping motivations. The aforementioned results were found irrespective of race. One difference that is not accounted for in the existing research is that fact that Black students are at increased risk for experiencing negative events while in college due to the racial climate of a predominantly White institutions. For those students who do experience negative events while in college, substance use may be initiated and maintained with the purpose of coping and/or self-medicating to deal with these negative situations.

Current Research on Motivations for Illicit Substance Use

The aforementioned theories provide guidance towards potential motivations for college students, yet to date, no known studies have adequately examined motivations for substance use exclusively among Black college students. The literature that investigates motivations for drug use among the overall college student body, as well as the general population, provides useful information to guide the investigation of motivations for illicit cannabis, opioid and stimulant among Black college students. For cannabis, motivations for use among the predominantly White college student body tend to be focused around social motives. In a study examining motivations for cannabis use among 634 predominantly White college students (1% Black), Lee and colleagues (2007) found students to report enjoyment/fun (54%), conformity (42%) and experimentation (41%) most often. Another set of studies examined a total of 340 college students (predominantly White; 8% Black) and revealed enjoyment, enhancement and coping motives were consistently reported most often within these studies (Simons, Correia & Carey, 2000; Simons, Correia, Carey & Borsari, 1998).

For opioids, motivations consistent with self-medicating, social engagement, coping and getting high are frequently reported. In a study investigating motivations for opioid use among 4500, majority White (7% Black) undergraduates, frequently reported motivations included: relief of physical pain, to get high, experimentation, to help with sleep and to decrease anxiety (McCabe et al., 2007). A second study examined a sample of 12, 441 predominantly White undergraduates (10% Black) and found that: relaxation and tension reduction, to feel good, experimentation, pain relief, to have a good time with friends, and , to help with sleep were the most commonly reported motivations (McCabe, Boyd, Cranford & Teter, 2009). To “get away from problems” was reported by 16.6% of the sample. Similarly, self-medicating to relieve pain, sleep, decreasing anxiety and getting high were most frequently endorsed among a sample of 184 youth (Boyd, McCabe, Cranford & Young, 2006). Rigg and Ibañez’s (2010) qualitative study examining motivations for illicit opioid use found that among the general population (n=684, 37% Black), the most common motivations included: to get high, to aid with sleep and to help with anxiety/stress.

Within the stimulant use research, Boys, Marsden and Strang (2001) examined the motivations for amphetamine use in a sample of 160 predominately White college students. Results reflected that students were most often reporting use to: “keep going,” stay awake, enhance activity, feel elated or intoxicated, enjoy the company of others, and increase confidence. Contrary to Boys et al. (2001) Low and Gendaszek (2002) found improving intellectual performance, increasing efficiency on academic assignments, in combination with alcohol, and enhancing athletic endurance as the most common motivations for stimulant use among 150 majority White college students. Similar to Low and Gendaszek’s (2002) findings, other research examining 9,100 undergraduates (approximately 6% Black) revealed improving intellectual performance, increasing efficiency on assignments (increasing concentration and alertness), getting high, and in combination with alcohol (e.g., to counteract the depressive effects of alcohol) were the most commonly reported motivations (Teter et al., 2005). Additional studies have found motives more aligned with the therapeutic purpose of stimulants: to help with concentration, help with studying and increase alertness (with both academics and social situations) (Babcock & Byrne, 2000; Kollins, MacDonald & Rush, 2001; Teter et al., 2006).

Gender Differences. Motivations for substance use associated with coping and self-medicating have been found to differ by gender. For cannabis, a study of 392 college students (82% White) found that women reported coping motivations at higher rates compared to men (without taking race into account; Buckman, Yusko, Farris, White & Pandina, 2011). Further, Simons and colleagues (1998) demonstrated that coping motives predicted greater frequency of cannabis use for females compared to males among 299 college students (mainly White; 6% Black). Additional research demonstrated that among 4,500 college students who engage in pain medication use (predominantly White; 7% Black), women are more likely to indicate motives for coping (i.e., to aid with negative affect) and self-medicating (sleep) compared to men (McCabe, Cranford, Boyd and Teter, 2007). One potential explanation for this pattern of findings is that females are often thought to internalize their difficulties and as a result may experience more distress and symptoms of mental illnesses such as depression and anxiety (Eaton et al., 2012). In contrast to this idea, females are shown to engage in fewer externalizing behaviors

when compared to males; however, among the females who engage in substance use, coping and self-medicating motivations may be reported more often compared to males, in an effort to deal with the increased internal distress (Eaton et al., 2012).

Limitations to the Existing Motivations Research

In summary, the rise in illicit cannabis, opioid and stimulant use patterns among Black students highlights the necessity to understand motivations specific to Black students. Yet, the existing literature focuses on motivations for substance use among majority White samples. The motivations found to be most salient among mostly White students provide a good starting point for the current investigation. However, it is likely that these motives do not fully capture the unique experiences of Black students compared to their non-Black peers. When considering the diverse experiences of Black students attending predominantly White institutions and also the theories related to substance use (e.g., increased propensity to choose immediate gratification, converging towards the perceived norms of the reference group and self-medicating), the possibility exists that Black students may have distinct motives for engaging in substance use that take these stressors and experiences into account. The existing research does not account for any of these factors with regards to Black students, suggesting the need to investigate motivations for use in more detail in order to adequately address the rise in illicit substance use.

Perceived Racial Discrimination

Perceived racial discrimination is one promising factor that may have a strong influence on motivations for substance use among Black college students. PRD is defined as the unfavorable treatment of an individual due to one's racial background and is often considered a "subjectively experienced form of stress" (Banks et al., 2006). This particular type of stress, which can be both blatant (e.g., direct racial slurs) and covert (e.g., staring), is frequently described by Black college students attending predominantly White institutions at rates ranging from 50-98% (D'Augelli & Hershberger, 1993; Swim et al., 2003). Many students perceive at least one racially discriminating event bi-weekly including: experiences of staring (suspiciousness and hostility), verbal expressions (racial slurs, insensitive racial comments and expressions of racial stereotypes), bad service (not being helped or having questions answered sufficiently

in class) and interpersonal offenses (rude or awkward interactions with Whites; Swim et al., 2003). These perceived offences have been found to be committed by a wide range of university affiliated individuals, including students (43%), university staff (43%), faculty (36%) and administrative personnel (18%; D'Augelli & Hersberger, 1993).

Negative Effects of Perceived Racial Discrimination

Substance Use. Perceived Racial Discrimination is associated with several maladaptive behaviors and negative outcomes, one of which includes substance use (Fuller-Rowell et al., 2012). In a sample of Black youth (N=485), Choi and colleagues (2006) found that events of discrimination in the academic setting were positively associated with having ever used cannabis and crack/cocaine, and having ever gotten drunk or high. Brody and colleagues (2012) conducted a three year longitudinal study examining 520 Black youth at ages 16, 17 and 18.5. They found that among the Black males, experiences of PRD at age 16 were significantly related to increases in substance use at age 18.5. A second longitudinal study found similar results such that PRD was associated with substance use at baseline and also at the two year follow-up (Fuller-Rowell et al., 2012). In 2014, Boynton and researchers found that, among their sample of 619 Black undergraduates, lifetime experiences of discrimination were marginally related to alcohol consumption and significantly related to alcohol problems.

Research also shows that in addition to experiences of PRD being associated with using drugs, these events also predict increases in substance use. Choi and colleagues' (2006) study demonstrated that among Black youth, PRD was positively associated with increases in frequency of substance use. The study conducted by Body and researchers (2012) further demonstrated that racial discrimination had a significant influence on increases in substance use from age 16 to age 18.5. Fuller-Rowell and colleagues (2012) also found that heightened levels of PRD at baseline were associated with increased drug use between baseline and two year follow-up among 417 Black youth.

Mental Health. For Black students, experiences of PRD have also been directly linked to poor mental health with up to 60% of these individuals reporting negative affect and stress as a result of these events (Swim, Hyers, Cohen, Fitzgerald & Bylsma, 2003). A study conducted by Broman and colleagues

(2000) found that among their sample of approximately 300 Black individuals, experiences of PRD were significantly related to increased levels of psychological distress. Banks and colleagues (2006) investigated discrimination and specific types of psychological distress in 570 Black participants. They found that increases in PRD were significantly associated with depressive and anxiety symptoms. In addition to PRD being significantly associated with psychological distress, it is also indirectly linked to substance use through poor mental health and negative feelings. Recent research has found that among Black undergraduates, lifetime experiences of discrimination were significantly indirectly related to alcohol use and problems, through depressive symptoms (Boynton et al., 2014).

Academics. The impact of PRD has also been shown to have a negative influence on academics. In particular, experiences of PRD within the academic setting are negatively related to academic performance, academic curiosity and self-esteem, leading many students to experience increased levels of stress as well as doubt their academic competence (Neblett, Philip, Cogburn, & Sellers, 2006). Other research reflects that experiences of PRD are significantly related to lower levels of mastery among Black individuals (Broman, Mavaddat & Hsu, 2000). One study examined the mediating role of delinquent behavior on experiences of PRD and drug use and found that disengagement from school and affiliation with substance-using peers mediated the relationship between PRD and substance use (Brody et al., 2012).

Perceived Racial Discrimination and Motivations for Use

Given the negative effects of experiencing PRD as described above, it can be suggested that PRD may have a strong influence on motivations for substance use, in particular, coping, self-medicating and academic enhancement motives. As was previously stated, PRD is associated with engaging in substance use among Black college students (Choi, Harachi, Gillmore & Catalano, 2006); however, specific factors behind this relationship are not clear. A significant proportion of Black students are reporting experiencing PRD while in college and the associated stress as a result of these events may cause these individuals to search for a means of reducing this distress. The possibility exists that Black college

students are engaging in substance use to deal with these negative experiences in the absence of utilizing traditional treatment services (e.g., counseling).

If substance use is a means to handle difficulties for some Black college students, the types of drugs that are being used may be dependent on the motivations being reported. Specifically, Black students may be attempting to cope and self-medicate with the use of cannabis and opioids respectively, in response to the distress of PRD. The effects of both of cannabis and opioids provides support for why said substances may be used for the purposes of coping and self-medicating as both have indicated purposes of regulating pleasure and pain relief (intended for physical pain but is also commonly utilized for emotional stress; National Institute on Drug Abuse, 2014; 2015). Further, the literature contends that Black individuals may express psychological distress in the form of physical symptoms, due to the stigma attached to experiencing symptoms of mental illness. This suggests that cannabis and opioids may be used to cope and self-medicate physical pains that are a somatic response to psychological symptoms (Office of the Surgeon General, 2001). In addition, as a result of PRD, Black students may be experiencing distress due to threats to their academic abilities (Neblett et al., 2006). Thus academic enhancement motivations may explain the use of stimulants among this population as they attempt to increase focus and efficiency on academic activities to counteract the negative academic impact of PRD.

Theoretical perspectives also provide support for why Black students may report coping, self-medicating and academic enhancement motivations. The large majority of Black college students are in their young adult years, and are therefore more susceptible to seeking immediate gratification (Green et al., 1996; Romer et al., 2010) instead of pursuing more delayed rewards, such as tutoring or counseling. Further, the Black college students that are experiencing PRD may be motivated to engage in substance use to deal with the resulting distress of PRD, to reduce negative affect and somatic pain (i.e., Theory of Self-Medication; Khantzian, 2007). The social norms on college campuses also highlight potential reasons for why Black students would be reporting coping, self-medicating and academic enhancement motivations. Students tend to be most influenced by their reference group and the perceived norms associated with that group, which for Black students attending predominantly White institutions tends to

be similarly Black peers. For this reason, it could be expected that Black students are engaging in substance use for similar reasons (cannabis for coping, opioids for self-medicating and stimulants for academic enhancement) in response to their shared experiences of PRD.

Motivations and Substance Use

Few studies within the literature have examined how coping, self-medicating and academic enhancement motivations impact the rates of cannabis, opioid and stimulant use. Simons and colleagues (1998; 2005) examined motivations for cannabis use among 608 college students (predominantly White; 11% Black) and found that coping motives were a significant predictor of using cannabis at the six month follow-up. Buckner (2013) found similar results such that coping motives had a strong positive association with frequency of cannabis use in a sample of 233 college students (mostly White; 6% Black). One study examined the longitudinal relationship between illicit opioid use for pain relief purposes and for other motivations among approximately 12,400 high school students (largely White; 10% Black). When compared to students reporting only pain relief motivations, results revealed that the odds of engaging in substance use were significantly higher among students who reported using opioids for non-pain relief motives, and for those reporting pain relief in conjunction with other motivations (e.g., coping with mental health symptoms). In addition, they found that students who used opioids for motivations other than physical pain relief noted using a variety of additional drugs (e.g., cannabis, stimulants and psychedelics) at higher rates compared to those students using for pain relief purposes only (McCabe et al., 2009). Currently, no known studies have examined the relationship between illicit stimulant use and particular motivations for use, clearly indicating a need to examine this potential association. It can be hypothesized that if students are motivated to increase their academic performance with the use of stimulants, then they will likely increase their illicit use of this substance. The limited amount of research available about the association between specific motivations and substance use highlights the need to further examine this relationship. In addition, as can be seen by the reported demographic compositions of previous studies, the relationship between motivations and illicit drug use has yet to be examined among Black samples to investigate whether certain motivations are predictive of substance use.

Perceived Racial Discrimination, Motivations and Substance Use

Even with the research examining PRD, motivations for use and frequency of use separately, no known studies have examined these factors in conjunction with one another, to determine the effect of specific motivations on the relationship between PRD and illicit substance use among Black college students. Several studies have illustrated a positive association between PRD and both using substances and increases in the frequency of drug use as described above (Brody et al., 2012; Fuller-Rowell et al., 2012). Specifically, those Black students who experience heightened levels of PRD are using more substances and at higher rates. In addition, PRD is strongly associated with symptoms of negative affect and feelings of academic incompetence. Thus, taking PRD into account, it is expected that PRD is not only influencing students to engage in drug use but this relationship may exist in part because of students' motivations to use. Further, the types of motivations that may lend to this relationship are those resulting from experiences of PRD: coping, self-medicating and academic enhancement motivations. If PRD is influencing one's motivations, to include coping, self-medicating and academic enhancement motives, then perhaps these motivations are significantly contributing to the relationship between PRD and substance use.

Rationale for the Current Study

As the research highlights, Black students are increasing their use of cannabis, opioids and stimulants, yet little is known about why this trend is occurring among this population specifically. Accurately understanding the reasons why Black college students engage in substance use is imperative, in particular because of the adverse consequences associated with drug use. Research shows that illicit drug use tends to impair academic outcomes, increase early college drop-out rates (McCabe, Knight, Teter & Wechsler, 2005; McCabe, Teter, & Boyd, 2005) and negatively impact mental health and self-esteem (Cranford, Eisenberg & Serras, 2009). The existing literature about motivations for illicit substance use is limited to majority White samples, making it challenging to draw any conclusions that may be applicable to Black college students. Also, the previously conducted research does not examine factors that are unique to Black college students that may have an influence on their reported motivations

for drug use, specifically PRD. Without a sufficient awareness of why these students are participating in illicit substance use, and the factors that are impacting these negative behaviors, addressing the rise in substance use will be difficult.

The current study seeks to expand on the available literature by investigating the motivations for substance use reported by Black college students, with an emphasis on coping, self-medicating and academic enhancement motives that may arise in response to PRD. Further, this study aims to replicate findings of gender differences in coping and self-medicating motivations that have been found among White samples. Few studies to date have examined the association between particular motivations and frequency of illicit substance use. As such, this study will be the first of its kind to explore whether, among Black college students, coping, self-medicating and academic enhancement motivations are associated with frequency of illicit cannabis, opioid and stimulant use, respectively. Finally, this study will fill the gap in the literature by examining whether particular motivations will mediate the previously established relationship between experiences of PRD and illicit drug use.

Specific Aims and Hypotheses

Specific aim 1: To explore Black college students' motivations for illicit substance use (not specific to any one substance, and for six classes of illicit substances: sedatives/anxiolytics, stimulants, cannabis, opioids, cocaine and hallucinogens).

Hypothesis 1a/b: Among Black college students who have used illicit substances in the past year, coping and self-medicating motivations will be the most commonly reported motives for the use of a) cannabis and b) opioids.

Hypothesis 1c: Among Black college students who have used illicit substances in the past year, academic enhancement motivations will be the most commonly reported motive for stimulant use.

Hypothesis 1d/e: The current study seeks to expand on previous literature that has found gender differences in motivations related to coping among the general college student body. Specifically, it is expected that, among Black college students who have used illicit substances in the past year,

more Black female students will report d) coping and e) self-medicating motives for illicit drug use compared to Black male students.

Specific aim 2: To investigate whether particular motivations associated with managing negative feelings and with enhancing academic performance are associated with greater frequency of drug use, for specific substances.

Hypothesis 2a: Among past year cannabis users, coping motivations will be associated with higher frequencies of cannabis use.

Hypothesis 2b: Among past year illicit opioid users, self-medicating motivations will be associated with higher frequencies of opioid use.

Hypothesis 2c: Among past year illicit stimulant users, academic enhancement motivations will be associated with higher frequencies of stimulant use.

Specific aim 3: To expand previous research that has demonstrated a positive association between perceived racial discrimination and illicit drug use. Specifically, this study seeks to examine particular motivations as potential mediators behind this relationship, for certain drugs.

Hypothesis 3a: Among Black college students who report illicit cannabis use over the past year, it is expected that coping motivations will mediate the relationship between the level of PRD and frequency of illicit cannabis use. See Figure 1.

Hypothesis 3b: Among Black college students who report illicit opioid use over the past year, it is expected that self-medicating motivations will mediate the relationship between the level of Black college students' experiences of PRD and frequency of illicit opioid use. See Figure 1.

Hypothesis 3c: Among Black college students who report illicit stimulant use over the past year, it is hypothesized that academic enhancement motivations will mediate the relationship between the level of PRD and frequency of illicit stimulant use. See Figure 1.

Method

Participants

Participants were recruited using convenience sampling from the university research subject pool (SONA), university listservs and marketing (e.g., flyers and social media) from February through August, 2015. Inclusion criteria consisted of: self-identified Black race (including Caribbean, African nationality and bi/multiracial including Black), self-reported past year illicit substance use (chosen based on previous studies examining motivations for use, e.g., McCabe et al., 2009; Simons et al., 2005), enrolled in college at least part-time and at least 18 years of age. A total of 219 people initiated the survey. Of those 219 participants, 36 people did not meet inclusion criteria and were excluded from the current study. Specifically, three participants did not indicate consent, two were not of self-identified Black race, one was not enrolled in college, and 30 denied any past-year substance use. Further, 31 individuals who did not answer any items beyond demographic questions were unable to be used in analyses. Only one participant indicated a gender other than male or female and was subsequently excluded from analyses in order to increase the potential power of any gender comparisons. The final sample consisted of 151 participants that met eligibility criteria and were included in various analyses within the study.

Of the 151 participants, 124 individuals (82%) finished the full survey and 27 students (18%) completed only a portion of survey (demographic information and a minimum of the motivations for any substance use section). Students stopped participating at various points throughout the questionnaire. For example, a student may have completed all information about cannabis, but did not go any further, thus being classified as a partial completer. The use of cannabis was reported most often (91%; $n=137$). Of the 137 participants that indicated past-year cannabis use, six did not complete the cannabis coping motives section and were not included in any further analyses involving cannabis. Stimulants were the next most frequently reported substance (21%; $n=31$), with all participants completing the full stimulant academic enhancement motivations measure. A total of 20 students (13%) indicated past-year opioid use; however, two students were significant outliers on the frequency of opioid use variable (scores beyond three standard deviations from the mean), and were not included in any analyses involving opioids.

Additionally, two participants did not complete the opioid-specific self-medicating motivations section, and were not included in any analyses beyond aim one. Sedatives/anxiolytics were reported by 11% ($n=17$) of students followed by hallucinogens (9%; $n=13$) and cocaine (3%; $n=5$). All students indicating each of these three substances were included in descriptive analyses for specific aim one.

The majority of the sample self-identified as Black only (83%; $n=126$) while 17% identified as Multiracial (Black and another race; $n=25$). The sample was 68% female ($n=103$) and 32% male ($n=48$). Three-quarters of participants (77%; $n=117$) were between the age of 18 and 21, with a mean age of 21. An overwhelming majority of participants were enrolled in college full-time (90%, $n=136$) and in undergraduate studies (98%; $n=149$). Twenty-six percent ($n=39$) were freshman, 34% ($n=51$) were sophomores, 21% ($n=32$) were juniors, 18% ($n=27$) were seniors and 1% ($n=2$) were in a graduate or professional program. College major varied; however, most participants indicated a Social Science major 19% ($n=29$), followed by an Arts or Humanities major 18% ($n=27$) and other 15% ($n=22$). The mean grade point average of participants was 3.2. The sample was relatively split with regards to employment; 30% ($n=45$) reported not working, 40% ($n=61$) were working part-time and 30% ($n=45$) were working full-time. Over one-third of the sample (38%; $n=57$) indicated that their present economic situation was “at or below the poverty level,” 20% ($n=30$) were “working class,” 30% ($n=44$) were “lower middle class,” and 12% ($n=18$) were “upper-middle class.” Half of the sample (52%; $n=78$) reported living in an off-campus home or apartment, with most others living in a campus residence hall (25%; $n=37$), or a parent or guardian’s home (16%; $n=24$). Only 17% ($n=25$) indicated that they belonged to a Fraternity or a Sorority.

Procedure

Participants were asked to complete a set of online questionnaires within a web-based survey program. The set of questionnaires included: demographic questions; motives for any illicit drug use; frequencies of illicit drug use; substance-specific motivations and the associated CMMM questions; and experiences of perceived racial discrimination within the academic setting. Provided the sensitive nature of the study, an information sheet was used (as opposed to an informed consent) to aide in maintaining

anonymity. Participants were provided with the information sheet prior to beginning the questionnaire, and were given the option to print/save it for their records. Upon finishing the survey, participants were provided with a code (2HQ8K5) used to verify completion. Participants were required to email the code to the study coordinator, at which time they would be provided with compensation (up to one hour of SONA credit or compensation with a \$10 online gift card, distributed through their email address).

Measures

Demographics. Assessed with 12 items including: race, gender, age, college enrollment status (part-time versus full-time), attending institution, class standing (year in college), college major, grade point average, current employment status, current economic status, economic status growing up, involvement in Greek organizations and living situation (off versus on campus).

Frequency of substance use. The type and amount of drugs used over the past 12 months were assessed with self-reported frequencies of use. The six substance categories included cannabis, stimulants, sedatives/anxiolytics, cocaine, opioids and hallucinogens. Common substances within these categories as well as common street names were listed on the survey for reference. For example, the cannabis category included the use of hashish, THC, grass, weed, reefer, pot and cannabis. Substance categories were chosen based on the Structured Clinical Interview for DSM Disorders (SCID; First, Spitzer, Gibbon, Williams, 2002). Frequency choices were presented in a dropdown menu, beginning at “0” and included all whole numbers up to “59.” All frequencies greater than 59 were captured as “60+” times over the past year (modeled after McCabe et al., 2007 and Tarter & Kirisci, 1997).

Adapted version of the Comprehensive Marijuana Motives Measure (CMMM; Lee et al., 2009). Motivations for substance use (over the past 12 months) were assessed with an adapted version of the CMMM. The original 35 item measure consists of 12 motivational domains: enjoyment, conformity, coping, experimentation, boredom, alcohol, celebration, altered perceptions, social anxiety, relatively low risk, sleep and availability. Exploratory factor analysis supported these 12 factors and found the CMMM to have good convergent validity (Lee et al., 2009). Two supplementary domains were added to assess for academic enhancement and self-medicating motivations. The two added domains have also been

validated throughout the literature (Boyd et al., 2006; Boys et al., 2001). Each domain consists of three questions; sample questions include “Because you were depressed” and “To forget your problems.”

The adapted CMMM measure was presented to participants in three separate sections. First, participants were asked to report motivations for overall substance use (not specific to any one substance) from the above 14 categories on a dichotomous scale (e.g., “In the past year, have you ever used any illicit drug to cope?”). Examples of each motivation were included with the motivation category (e.g., coping: to help with depressed mood). Second (following the reported frequency for use for each drug class), substance-specific motivations (from the same 14 categories) were assessed for each of the six drug classes, again on a dichotomous scale (e.g., “In the past year, have you ever used opioids to cope?”). A “yes” response to any substance-specific motivation category prompted participants to answer the associated three questions on the adapted CMMM, the third and final section of the adapted measure. The third section assessed level of a particular motivation, with the items being assessed on a five-point Likert scale ranging from “almost never” (1) to “always” (5). Scores were attained by taking the average of the three questions for each domain, with higher averaged scores indicating greater endorsement of a motivation.

The three scales of interest from the third section of the adapted CMMM measure were cannabis-specific coping motivations, opioid-specific self-medicating motives and stimulant-specific academic enhancement motives. A reliability analysis was conducted to examine the internal consistency for these three scales. The cannabis coping motives scale (three items, $\alpha=0.82$), the opioid self-medicating motivations scale (three items, $\alpha=0.70$) and the stimulant academic enhancement motivations scale (three items, $\alpha=0.88$) were found to be highly reliable.

Everyday Discrimination Scale (Williams, Yu, Jackson & Anderson, 1997). This nine item measure was used to assess perceived racial discrimination over the past 12 months, related to the academic setting. Sample questions included “You are treated with less courtesy than other people are because of your race,” “People act as if they think you are not smart because of your race” and “People act as if they are afraid of you because of your race.” Items were scored on a six-point Likert scale

ranging from “never (0)” to “almost every day (5)” in the past year. Higher scores indicate greater levels of perceived racial discrimination. Research shows that the Everyday Discrimination Scale has good internal consistency of scale items, split-half reliability, construct validity and criterion-related validity (Clark, Coleman & Novak, 2004). A reliability analysis within the current study revealed high internal consistency among the nine items of the Everyday Discrimination Scale ($\alpha = 0.92$) in this sample.

Results

All analyses were conducted using SPSS version 23. Because the entire sample did not complete the full survey, a series of independent samples t-tests, ANOVAs and Pearson’s Chi-Square tests were used to assess for potential differences between full completers and partial completers on demographic variables. Similarly, a series of independent samples t-test analyses assessed for differences between full and partial completers on: the continuous motivations variables, the frequency of substance use variables and the level of perceived racial discrimination variable. Pearson’s Chi-Square analyses tested for differences between full and partial completers on the dichotomous substance-specific motivation variables. Results of these tests revealed no significant differences for any of the variables of interest, suggesting that within the current sample, there was no selection bias associated with missing data on PRD, frequency and motivations measures.

Overall and Substance Specific Motivations.

Descriptive analyses were used to accomplish specific aim one: explore the proportion of students reporting each of the 14 motivations for illicit substance use (not specific to any one substance), as well as for each of the six substance classes (cannabis, stimulants, opioids, sedatives/anxiolytics, hallucinogens and cocaine). For motivations to engage in any illicit substance use (irrespective of the substance), a total of 151 participants were included in the analysis. Complete results are presented in Table 1 (motivations are listed in descending order based on the reported motivations for any drug). The most commonly endorsed motivations included: enjoyment (83.4%; $n=126$), celebration (66.2%; $n=100$), and experimentation (58.9%; $n=89$).

Consistent with previous research (SAMHSA, 2013), cannabis, stimulants and opioids were used most often among the current sample, followed by sedatives/anxiolytics, hallucinogens and cocaine. For cannabis, 131 students completed the full cannabis motives section and were included in the analysis. The vast majority of participants reported enjoyment (87.8%; $n=115$) as their primary motive for cannabis use. The next most commonly reported motivations included celebration (66.4%; $n=87$) and perceived relatively low risk (60.3%; $n=79$). Coping and self-medicating motivations were the 9th and 10th reported motivations for cannabis use at rates of 45.0% ($n=59$) and 43.5% ($n=57$) respectively. Although coping and self-medicating motivations for cannabis use were reported by almost half of the sample, these results do not support hypothesis 1a which predicted that coping and self-medicating motivations would be the two most commonly reported motives for cannabis use.

For opioids, a total of 16 students completed the motives measure for any substance use and were included for analysis. Due to the small sample, these results should be interpreted cautiously. Results revealed that 81.3% ($n=13$) indicated self-medicating as their primary motivation for use. Experimentation was reported by 68.8% ($n=11$) of the sample and enjoyment was next with 62.5% ($n=10$). Just under half of the sample endorsed coping motives (43.8%; $n=7$; 5th most reported motive) for the illicit use of opioids. Partial support was found for hypotheses 1b. As expected, self-medicating motivations were reported most often; however, coping motives were the third most commonly endorsed motive as opposed to the first and/or second as predicted.

Analyses examining the motivations for illicit stimulant use included 31 students. Consistent with the proposed hypothesis 1c, academic enhancement motives were reported most frequently by eighty percent of the sample (80.6%; $n=25$). The next most common motivations were availability, experimentation, and perceived relatively low risk, all at rates of 41.9% ($n=13$).

Sedatives/anxiolytics, hallucinogens and cocaine were all used by fewer than 20 participants. Therefore, these results should be viewed with caution. For sedatives/anxiolytics, 17 students endorsed use and completed the motives measure. The most commonly reported motives included sleep (82.4%; $n=14$), followed by self-medicating and availability (both at rates of 41.2%; $n=7$). Descriptive analyses

examining hallucinogens included a total of 13 participants. Experimentation was the most commonly endorsed motivation at rates of 92.3% ($n=12$). Three quarters of the sample reported enjoyment motives (76.9%; $n=10$) and over half indicated altered perceptions motivations (69.2%; $n=9$) for illicit hallucinogen use. Cocaine use was reported by only five participants. All five students (100%) endorsed the following motives: in conjunction with alcohol, altered perceptions, enjoyment and experimentation. Four of the five students reported celebration, coping, availability and boredom motives for cocaine.

Gender Differences. Pearson's chi-square analyses were used to assess for gender differences in the proportion of students reporting 1) coping and 2) self-medicating motivations for overall substance use (not specific to any one substance). The analysis for hypothesis 1d utilized gender (female/male) and the dichotomous coping variable (yes/no to coping for any drug use) from the full sample. Hypothesis 1e was assessed using gender (female/male) and the dichotomous self-medicating variable (yes/no to self-medicating not specific to any one drug) among all 151 participants. Complete results are shown in the top panel of Table 2. Results were inconsistent with the proposed hypotheses, such that no gender differences in reported coping or self-medicating motivations were observed. The proportions of females and males reporting coping motivations for any substance use were statistically similar. For self-medicating motivations, the rates of females and males indicating self-medicating motivations were also statistically similar.

Follow-up analyses were conducted to examine gender differences in reported coping, self-medicating and academic enhancement motivations specifically among students reporting past-year cannabis, opioid, and stimulant use, respectively. A Pearson's Chi-Square test was used in all instances except for those calculations that had a low expected cell count of less than 5, in which Fisher's Exact test was then utilized. Among Cannabis users, the Chi-Square analysis included gender (female/male) and the dichotomous cannabis-specific coping motivation variable (yes/no to coping for cannabis). Similar procedures were utilized for past-year opioid and stimulant users. For opioids, test variables included gender (female/male) and opioid self-medicating motivations (yes/no to opioid-specific self-medicating motives). Among stimulant users, analyses utilized gender (female/male) and academic enhancement

motivations (yes/no) specific to stimulant use. Complete results are presented in the bottom panel of Table 2. No significant gender differences in motivations were found for any of the specific drugs.

Relationship between Motivations and Frequency of Substance Use

Hypothesis 2a predicted that cannabis-specific coping motivations would be positively associated with frequency of cannabis use. Preliminary frequency analyses revealed that the frequency of cannabis use variable had a bimodal distribution. The data likely presented in this fashion due to the frequency scale including all whole numbers up to 59, then grouping all values above 59 as 60+ (30 students indicated cannabis use 60+ times over the past year). Due to this non-normal distribution, two separate statistical procedures were used to test this hypothesis.

First, prior to any data transformations, an independent samples t-test was used to examine differences in the frequency of cannabis use (using all 131 participants indicating past-year cannabis use) among students reporting coping motivations and among those who did not (using the yes/no cannabis coping variable). It should be noted that the bimodal distribution of the cannabis frequency variable violated the assumption of normality required for a t-test. Further, Levene's Test for Equality of Variances concluded that the yes/no coping groups did not have equal variance, consequently, the Welch-Satterthwaite correction was used. It was found that those who reported coping motives for cannabis use had higher frequencies of cannabis use ($n=59$, $M=32.93$ $SD=23.90$) compared to those who did not report coping motives ($n=72$, $M=16.08$, $SD=20.18$), $t(113.83) = -4.30$, $p < .001$.

Second, a median split was applied to the frequency of cannabis use variable to address the bimodal distribution. The original cannabis frequency variable was recoded it into two dichotomous groups: the first to be considered low frequency (10 or less times over the past year) and the second as high frequency of cannabis use (greater than 10 times over the past year). The median split allowed for more similar sample sizes when conducting comparison tests. Using the transformed frequency variables, a second independent samples t-test assessed for a mean difference in level of coping motivations between the low versus high cannabis use groups. As was seen in the t-test above, Levene's Test for Equality of Variances revealed heterogeneity of variance for the low/high frequency groups, requiring the

use of the Welch-Satterthwaite correction. Results concluded that those students who were in the high cannabis frequency group endorsed higher cannabis coping scores ($n=60$, $M=1.75$, $SD=1.72$) compared to those students in the low cannabis frequency group ($n=66$, $M=0.74$, $SD=1.32$), $t(110.52) = -3.66$, $p < .001$.

A Pearson's Chi-Square analysis provided further support for the hypothesized difference in coping motivations (yes/no to cannabis coping) and frequency of cannabis use (low/high use variable). Over half (63%) of the students who endorsed coping motivations were in the high cannabis frequency group, while only 37% of students who denied coping motivations were in the high frequency group, $\chi^2(1, N=131)=16.96$, $p < .001$. Consistent with the literature (Buckner, 2013; Simons et al., 1998; 2005), results of these three analyses show a relationship between coping motivations and higher frequencies of cannabis use, providing support for this hypothesis.

Hypothesis 2b, that self-medicating motivations were associated with higher frequencies of opioid use among past-year opioid users, was tested with an independent samples t-test and a bivariate correlation analysis. The t-test analysis assessed for differences in the frequency of opioid use among those students endorsing self-medicating motivations and those who denied this particular motive (using the dichotomous yes/no opioid-specific self-medicating motives variable). In opposition to the hypothesis, results indicated no significant differences in frequency of opioid use between those who reported self-medicating motivations for opioid use ($n=13$, $M=5.23$, $SD=5.26$) and those students who did not ($n=3$, $M=4.00$, $SD=5.20$), $t(14) = -0.37$, $p = .72$.

The correlation analysis assessed for a linear association between frequency of opioid use and level of opioid-specific self-medicating motivations. A total of 12 students were included in this analysis (one student who indicated self-medicating motives on the dichotomous motives variable did not complete the full level of self-medicating motivations measure, thus was not included). A frequency analysis revealed that both variables of interest were skewed. But, due to the small sample size, transformations to achieve normality were not conducted. No evidence was found in support of this hypothesis. The correlation analysis revealed no association between frequency of opioid use and opioid-specific self-medicating motivations, $r(12) = -0.37$, $p = .24$.

Hypothesis 2c predicted that stimulant-specific academic enhancement motivations were associated with frequency of stimulant use among past-year stimulant users. Preliminary frequency analyses, histogram plots and skewness statistics revealed a positively skewed distribution for both the frequency and level of academic enhancement motives variables, which were adjusted with a $\log_{10}$ transformation (with 1 added to each score to account for zeros). An independent samples t-test and a bivariate correlation analysis were used to test this hypothesis.

The independent samples t-test examined mean differences in the frequency of stimulant use (using the $\log_{10}$ transformed variable) between those stimulant users who reported stimulant-specific academic enhancement motives and those who did not (using the yes/no motives variable). Contrary to hypotheses, similar levels of stimulant use were found for those endorsing academic-enhancement motives ($n=25$, $M=0.73$, $SD=0.51$) and those who denied academic enhancement motives ($n=6$, $M=0.63$, $SD=0.47$), $t(29) = -0.44$, $p = .66$.

A bivariate correlation analysis tested the linear association between frequency of stimulant use (using the transformed stimulant frequency variable) and level of academic enhancement motivations (with the use of the transformed motives measure) among the 25 students reporting academic enhancement motives for stimulant use. The relationship between frequency of stimulant use and stimulant-specific academic enhancement motivations was not significant, $r(25) = 0.29$, $p = .16$. Based on the results of the t-test and the correlation analysis, no evidence was found to support this hypothesis.

Relationship between PRD, Motivations and Substance Use

In Aim 3, I sought to examine particular motivations as potential mediators for the relationship between PRD and substance use.

Hypothesis 3a predicted that cannabis-specific coping motives would mediate the relationship between level of perceived racial discrimination and frequency of cannabis use. The proposed predictor variable was level of perceived racial discrimination, level of cannabis-specific coping motivations was the mediator, and the outcome variable was frequency of cannabis use.

The products of coefficients method, bootstrapping with replacement (1000 samples) and the PROCESS software (Hayes, 2015) were used to test for the direct effect of PRD on frequency of cannabis use (using the continuous measure), and indirect effects of PRD on frequency of cannabis use through coping motives. As illustrated in Figure 2, the unstandardized regression coefficient for the association between level of PRD and cannabis-specific coping motivations was significant; however, there was no significant relationship between PRD and frequency of cannabis use or between coping motivations and frequency of cannabis use. The overall model predicted almost none of the variance in cannabis use frequency. Further, the indirect effect of PRD on cannabis use frequency through coping motivations was not significant based on the 95% confidence intervals including zero (indicating no mediation). Complete results are presented in the top panel of Table 3.

A second analysis was conducted using the same procedures described above; however, the low/high cannabis frequency variable was included as the outcome variable. Further, this mediation analysis utilized a logistic regression due to the inclusion of the dichotomous outcome variable. Results of this analysis matched the findings above. The significant relationship between level of PRD and coping motivations was replicated, but no relationship was found between level of PRD and low/high cannabis use, or between coping motivations and low/high cannabis use (see figure 3). Consistent with the results above, this overall model predicted none of the variance in the frequency of cannabis use. In addition, no support was found for coping motivations mediating the relationship between level of PRD and low/high cannabis frequency (based on the 95% confidence intervals of the indirect effect including zero). Completed results are shown in the bottom panel of Table 3. Based on both of these analyses, no evidence was found in support of the current hypothesis.

Hypothesis 3b, expected that opioid-specific self-medicating motivations would mediate the relationship between level of perceived racial discrimination and frequency of opioid use. A total of 9 students reported PRD, opioid use and opioid self-medicating motivations. Initial bivariate correlation analyses tested for a relationship between: level of PRD and frequency of illicit opioid use, level of PRD and level of opioid-specific self-medicating motivations, and level of opioid-specific self-medicating

motivations and frequency of opioid use (see Table 4). No significant associations were found. These results, together with the fact that only nine students completed the measures of interest, a mediation analysis was unable to be conducted.

Hypothesis 3c predicted that stimulant-specific academic enhancement motivations would mediate the association between level of PRD and stimulant use frequency. The predictor variable was level of PRD, frequency of stimulant use was the outcome, and level of stimulant-specific academic enhancement motivations was the mediating variable. A total of 22 students had a score on the three variables of interest and were included in the analysis. The $\log_{10}$ transformation of frequency of stimulant use and academic enhancement motivation variables (based on hypothesis 2c) as well as for level of PRD were used in the current analysis.

As with hypothesis 3b, a series of preliminary bivariate correlation analyses tested for any associations between the variables of interest prior to attempting a mediation analysis. Comprehensive results are shown in Table 4. No relationship was found between PRD and frequency of stimulant use, between PRD and level of stimulant-specific academic enhancement motivations, or between level of stimulant-specific academic enhancement motivations and frequency of stimulant use. The non-significant associations show a lack of support for this hypothesis.

Discussion

The current study sought to explore motivations for illicit substance use among Black college students, expand on previous literature to further establish a relationship between motivations for use and frequency of substance use, and also investigate the role of motivations for use on the relationship between perceived racial discrimination and frequency of substance use. Overall, findings highlight that Black college students are reporting a wide variety of motives for illicit substance use. The most commonly endorsed motivations (irrespective of drug type) appear to fit with previous research among majority White samples that have found social motives (enjoyment, celebration and experimentation) to be frequently reported among college students (Boys et al., 2001; Lee et al., 2007; McCabe et al., 2009; Simons et al., 2000; Simons et al., 1998).

Substance Specific Motivations

Similar conclusions can be drawn when examining the motivations for specific substances. Consistent with past research, cannabis was overwhelmingly the most commonly used illicit substance by Black college students (SAMHSA, 2013) at rates of 91%. The motives for cannabis use varied significantly, with 12 of the 14 motivation categories endorsed by over 40% of the sample. Social motives were again among the most frequently reported motivations for cannabis use (53-87%), followed by perceived low risk and availability. This finding was in opposition of the proposed hypotheses in this study, which expected that coping and self-medicating motivations would be the most frequently endorsed reasons for cannabis use. In fact, coping and self-medicating motives for cannabis use were the 9th and 10th most commonly reported reasons (45% and 43% respectively) despite being endorsed by nearly half of the sample. These findings are consistent with previous literature that has examined motivations for cannabis use among majority White samples. Existing literature, as well as the present study, demonstrated that students are using cannabis for coping purposes (Buckner, 2013; Simons et al., 1998; 2005), but, social motives are consistently found to be among the most commonly endorsed motivations for cannabis use (Lee et al., 2007; Simons et al., 1998; 2000).

Within this study, 10% of the overall sample indicated past-year illicit opioid use, a proportion that is similar to the rates of use found in previous studies (McCabe et al., 2007; SAMHSA, 2012). It was predicted that self-medicating and coping motivations would be the most frequently endorsed motives for opioid use. Among opioid users, the motivations are far less varied than with cannabis and appear to serve two main purposes: self-medication (81.3%) and social purposes (50-69%), partially in line with this hypothesis. These results are consistent with those found by McCabe and colleagues (2007; 2009) such that the most frequently reported motives included self-medicating (e.g., relax and reduce tension, and reduce physical pain) and social reasons (e.g., to experiment and to have a good time with friends). Notably, the proportion of students reporting self-medicating motives for opioid use was significantly higher within the current sample than what has been indicated in previous studies of majority White participants (rates between 56 and 63%; McCabe et al., 2007; McCabe et al., 2009). Contrary to the

proposed hypothesis, coping motives for opioid use were the fifth most frequently reported reason (43.8%), not the second as expected. In addition, as was observed with self-medicating motivations, the proportions of students indicating coping motives in the present study was significantly higher than has been observed in other known studies examining motives for opioid use in majority White samples (< 17%; McCabe et al., 2007; 2009). The only known study to examine opioid motives among a Black population found that dealing with anxiety/stress was a common motive for illicit opioid use (Rigg & Ibañez, 2010). It is possible that, within the current sample, Black students may not only be more highly motivated to use opioids for pain relief purposes compared to Whites, but opioids may also serve the purpose of reducing stress and/or symptoms of negative affect at higher rates compared to White students (e.g., Theory of self-medication; Khantzian, 2007). Together, these findings suggest potential racial differences for self-medicating and coping motivations, specific to opioids, which should be examined in future studies.

Full support was found for hypothesis 1c such that academic enhancement motivations were the most frequently reported motivation for illicit stimulant use. This finding is consistent with previous literature that has examined mainly White students (Boys et al., 2001; Low & Gendaszek, 2002; Teter et al., 2005). Black students are also reporting the illicit use of stimulants in an attempt to improve their academic performance. Developmental theories highlight that, similar to White students, Black students may be seeking immediate gratification with regards to academic difficulties they may encounter. Instead of relying on traditional methods to improve academic performance, such as obtaining a tutor, or beginning to study sooner or for additional hours, using stimulants provides a more immediate reward, allowing students to remain awake, increase focus and ultimately be more productive over a shorter period of time (Green et al., 1994; 1999). Furthermore, stimulants have become more readily available on college campuses (Arria & DuPont, 2010). Traditionally, stimulants were not utilized by Black college students. Yet, as these types of substances become more common and are easier to access, the norms of utilizing stimulants while in college were more widely accepted and may have extended past majority White students to include Black students as well.

Motivations for use of sedatives/anxiolytics, hallucinogens and cocaine have rarely been examined throughout the literature as Black students infrequently report the use of these drugs. In the current study, few students were reporting use of these substances, similar to the past research, making definitive conclusions difficult. For sedatives/anxiolytics, 17 students (11% of the sample) indicated past-year use. The most frequently endorsed motivations (sleep and self-medicating) are consistent with the intended purpose of sedatives/anxiolytics. Availability was also commonly reported for the use of sedative/anxiolytics. The 13 participants who reported hallucinogen use most frequently endorsed social motives (enjoyment and experimentation), followed by altered perception motivations. All five students indicating past-year cocaine use indicated social motives and altered perception motives for use. As with the more commonly endorsed substances, social motives appear to be regularly reported for the less used drugs as well (aside from sedatives/anxiolytics). Additionally, drug use on college campuses is often found to center around certain substances of choice and frequently depends on what students have access to (McCabe et al., 2007). These three substances may be less available on campuses and may also be less desirable to the students, thus deterring their use by the majority of students.

Gender Differences in Motivations

Analyses examining gender differences in motivations failed to support the proposed hypothesis that more females would report coping and self-medicating motivations compared to males. Contrary to findings displayed throughout the literature (Buckman et al., 2011; Simons et al., 1998), the number of males and females reporting coping and self-medicating motivations are statistically similar. The literature suggests that females are shown to internalize problems and as a result may experience a greater need to cope with symptoms of mental health when compared to males (Eaton et al., 2012). However, this does not appear to be the case among the Black students in the current sample with regards to motives for any substance use. One potential explanation for this finding could be the types of stressors that are experienced by Black students in comparison to their White peers. Irrespective of gender, Black students are exposed to similar types of stressors, some of which may be racially motivated (i.e., PRD), while others may be more cultural such as low SES, being a first-generation college student and experiencing financial

strain while attending college (Engle & Tinto, 2008; Gladieux & Swail, 1999). Notably, many of these stressors do not differ by gender. Therefore, if Black college students are utilizing substances to deal with things such as the aforementioned stressors, a gender difference may be less likely to be observed. Since this study is the first to examine gender differences in coping and self-medicating motives among Black students, factors that may be influencing this relationship should be examined in future studies.

Gender differences for motivations specific to cannabis, opioids and stimulant use were also explored. Similar to previous studies examining majority White students, there were no gender differences found between males and females for each of the substances and the associated motivation. These findings suggest that when considering specific substances, Black students are using these drugs for similar purposes as their White peers, irrespective of gender (Hall, Irwin, Bowman, Frankenberger and Jewett, 2005; Teter et al., 2005).

Coping Motivations and Frequency of Cannabis Use

Consistent with previous literature (Buckner, 2013; Simons 1998; 2005), a relationship was observed between cannabis coping motivations and frequency of cannabis use. The current study found that students endorsing coping motivations had higher frequencies of cannabis use compared to those who denied coping motives. Similarly, students who reported higher frequencies of cannabis use (scores above the median) had higher coping scores compared to those participants indicating low frequencies of use. Further, the majority of students who had endorsed coping motivations for cannabis use were in the high cannabis frequency group. Together, these findings among a sample of Black students are consistent with previous studies of majority White students, suggesting that, regardless of race, students who are motivated to use cannabis for coping purposes may also be using cannabis at higher rates (Buckner, 2013; Simons 1998; 2005).

PRD, Coping Motivations and Frequency of Cannabis Use

The current study expanded on the relationship between coping motives and frequency of cannabis use by suggesting that PRD would be the preceding agent that is leading to coping motivations. It was expected that coping motivations would mediate the relationship between PRD and frequency of

cannabis use. A moderately positive association between PRD and cannabis-specific coping motivations was found. However, in contrast to previous studies (Buckner, 2013; Choi et al., 2006; Fuller-Rowell et al., 2012; Simons et al., 1998; 2005), there was a lack of support for the relationship between PRD and frequency cannabis use, and for the association between cannabis coping motivations and frequency of use. This was surprising given the results from hypothesis 2a, described above, that found a relationship between coping motivations and frequency of cannabis use. The type of analysis conducted for this hypothesis may play a role in the findings. Specifically, the relationship between cannabis-specific coping motivations and frequency of cannabis use was first tested using a series of linear regressions. However, these variables violated several key assumptions of a regression that may have negatively impacted the results (e.g., frequency of cannabis use was non-linear and non-normal, and there was heteroscedasticity). The second analysis utilized a logistic regression to compare coping motivations to low/high frequency of cannabis use. The low/high frequency variable corrected the previously violated assumptions and although result of this analysis is not significant, the positive regression coefficient appears to be leaning in the direction of the relationship found between cannabis coping motives and frequency of cannabis use from hypothesis 2a. Both of these analyses were impacted by a lack of power due to the small sample size, which likely contributed to the non-significant findings.

The lack of a relationship between PRD and frequency of cannabis use was also not as expected. Previous studies have reported this association throughout the literature. However, several of these studies examine multiple substances (e.g., cigarettes, alcohol and marijuana), but appear to combine all substances when reporting results (Boynton et al., 2014; Brody et al., 2012; Fuller-Rowell et al., 2012). It is possible that perhaps the relationship between PRD and frequency of substance use that has been found before can be accounted for by alcohol, or cigarettes, and not by cannabis. In addition, as described above, the lack of power due to small sample size likely impacted the overall findings. For these reasons, few conclusions can be drawn about the associations between PRD and frequency of cannabis use, and also between cannabis coping motivations and frequency of use due to the lack of power in the current study. Yet, the relationship between PRD and coping motivations that was found had sufficient power to

detect the observed effect. This relationship suggests that a portion of students who are experiencing PRD, are motivated to cope with cannabis in response to these events (Khantzian, 2007). Previous research has demonstrated that PRD is linked to stress, negative affect and anxiety symptoms, to name a few (Banks et al., 2006; Broman et al., 2000; Swim et al., 2003). Given the association that was found between PRD and coping, future studies may benefit from determining if these stressors/symptoms may be related to the relationship between PRD and coping. In addition, the overall findings from this hypothesis indicate a need to investigate the entire model in larger samples to determine if a relationship exists between any of these variables.

It is also important to consider the high rates of social motives reported within the sample. The possibility exists that although cannabis is related to coping motivations for some, the majority of students in this study are using cannabis for social purposes. This has a large impact on the types of prevention and/or treatment efforts that may be employed to target substance use. Within a substance use programming context, instead of focusing on dealing with the negative effects of PRD, perhaps energy may be better spend addressing the social norms among Black college students, and on college campuses in particular, as it is these norms that have a large impact on social reasons for use (Perkins, 1994; Perkins, Meilman, Leichliter, Cashin & Presley, 1999).

Self-Medicating Motivations and Frequency of Opioid Use/ Academic Enhancement Motivations and Frequency of Stimulant Use

Contrary to what was expected, there was no association found between opioid-specific self-medicating motivations and frequency of opioid use, or between stimulant-specific academic enhancement motivations and stimulant frequency. Thus far, no other known studies have examined these particular relationships throughout the literature. However, numerous studies (the present study included) have found that for opioids, self-medicating motives, and for stimulants, academic enhancement motives are the most frequently reported motivations for use (Babcock & Byrne, 2000; Kollins, et al., 2001; McCabe et al., 2007; McCabe et al., 2009; Teter et al., 2006). This finding suggests an expected relationship between these motives and frequency of these drugs, yet that was not found within the

present study. One explanation for the current findings may be highlighted by the frequency distribution of both opioids and stimulants. The distributions for these substances clearly show a positive skew, with frequency scores plateauing very early on. For opioids, using twice in the past year had the highest frequency of use, while frequency of stimulant use plateaued after only using one time in the past year. Given the low frequencies in which the students in the current sample are reporting use of opioids and stimulants, it makes it difficult to find a linear association between opioid frequency and self-medicating motives, and stimulant frequency and academic enhancement motivations. This also may account for the negative correlation coefficient observed with opioids. Although students are indicating the aforementioned motives most frequently, this may not be related to their frequency of substance use.

Another probable reason for these findings is the small sample sizes which likely reduced the power to detect a significant effect, and increased the type II error rates. For opioids, 12 students are included in the correlation analysis and although this test revealed a moderate correlation coefficient (-0.37), the findings are not significant. Similarly, for stimulants, 25 students are used in the analyses, resulting in a non-significant, moderate correlation coefficient (0.29). These coefficients suggest the possibility of a relationship that may have not been detected due to the low power.

PRD, Self-Medicating Motivations, and Frequency of Opioid Use/ PRD, Academic Enhancement Motivations, and Frequency of Stimulant Use

A relationship was also expected to be observed between PRD, opioid-specific self-medicating motivations and frequency of opioid use, but no paths were found to be significant. In addition, PRD, stimulant-specific academic enhancement motives and stimulant frequency were expected to be related, but as with opioids, none of the variables were associated. Potential limitations to the current study may illustrate why these expected associations were not observed. The main limitation was the small sample sizes, which negatively impacted: power to detect an effect (for all paths in the opioid and stimulant analyses), possibility of conducting transformations to make data more appropriate for the proposed analyses and generalizability. Due to these limitations, any definitive conclusions about these analyses are challenging. Yet, future studies may want to investigate the potential association between PRD and

opioid-specific self-medicating motivations. As was described earlier, the Black students in the current sample reported both self-medicating and coping motivations at much higher rates than studies examining White students. Perhaps the stressors experienced by Black students, in particular PRD, may cause this population to be more highly motivated to cope and self-medicate with the use of opioids.

Strengths, Limitations and Future Directions

The current study had several limitations that may have impacted the overall findings. As described above, the first includes the small sample size which negatively impact the power, limited the types of analyses that could be conducted and made generalizability to other samples challenging. Another limitation consists of only collecting substance use frequency data up to 60 plus times, preventing any variability in frequency scores above 60 times over the past year. This limitation was highlighted for analyses involving cannabis, which required a median split to correct a bimodal distribution in order to examine low versus high categories. Previous substance use literature suggested the use of a median split (Kaye & Wisniewski, 1997) and although this type of split was the most effective way to correct for data abnormalities here, all participants who were included in the high frequency group (more than 10 times over the past year) may not necessarily be considered a high substance user (Aktan, Kumpfer & Turner, 1996). Lastly, the gender composition of the sample (majority females, $n=103$) is also a limitation. Had there been a more equal distribution of males and females, comparisons examining gender differences in reported motivations for use may have produced significant gender differences among coping, self-medicating and academic enhancement motivations. This would have also made the findings more representative of males.

Regardless of the limitations, this study has several strengths. It is the first known study to examine motivations for illicit substance use among an all-Black college student sample. The results of this study add pertinent information to the literature by showing that, in general, the motivations for illicit substance use reported by Black students are similar to those endorsed by their White peers (Boys et al., 2001; Lee et al., 2007; McCabe et al., 2009; Simons et al., 2000; Simons et al., 1998). But, there are also some notable differences in the frequencies in which students are endorsing motivations, specifically with

regards to self-medicating and coping for cannabis and opioid use (McCabe et al., 2007; McCabe et al., 2009). This study was also able to identify PRD as an antecedent for endorsing cannabis-specific coping motivations, a relationship that is likely particular to Black or other minority populations. The present study was also the first of its kind to examine such a wide array of motivations for use of a large number of drug classes whereas many other studies have focused on motivations for the use of a particular substance. Lastly, the current results replicate previous studies that have demonstrated minimal rates of hallucinogen and cocaine use among Black college students. It is possible that the convenience sample may not have captured these students, but it is also likely that the students sampled from this particular institution are not utilizing these substances.

Results of this research highlight several potential areas for future study. Provided that the majority of motivations research is conducted with mainly White samples (Boys et al., 2001; Lee et al., 2007; McCabe et al., 2007; McCabe et al., 2009; Simons et al., 2000; Simons et al., 1998; 2005), a factor analysis on the motivations for substance use measures would aid in determining if the CMMM measure is adequate for Black samples. In addition, research would benefit from examining motivations specific to the illicit use of opioids and stimulants among larger samples. The current study could not make any definitive conclusions for these substances due to the small sample size and lack of power, but the possibility exists that the originally hypothesized trends may be observed when examining more students. Further, sedatives/anxiolytics are being reported at rates similar to that of opioids, suggesting the need to examine why students are using these substances. Finally, findings in this sample suggested that fewer than half of Black students are engaging in substance use to cope with the negative experiences of PRD. Future studies should examine how the majority of students are dealing with these negative experiences while in college if it is not through illicit drug use.

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Table 1

Proportion of Students Reporting each Motivation for Any Substance Use and for Specific Substances.

Motivations	Any (n=151)		Cannabis (n=131)		Stimulants (n=31)		Opioids (n=16)		Sedatives/ Anxiolytics (n=17)		Hallucinogens (n=13)		Cocaine (n=5)	
	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Enjoyment	83.4	126	87.8	115	32.3	10	62.5	10	29.4	5	76.9	10	100	5
Celebration	66.2	100	66.4	87	16.1	5	25.0	4	11.8	2	30.8	4	80.0	4
Experimentation	58.9	89	53.4	70	41.9	13	68.8	11	29.4	5	92.3	12	100	5
Relatively low risk	49.7	75	60.3	79	41.9	13	37.5	6	23.5	4	30.8	4	20.0	1
Sleep	47.7	72	47.3	62	12.9	4	37.5	6	82.4	14	7.7	1	40.0	2
Coping	46.4	70	45.0	59	16.1	5	43.8	7	29.4	5	23.1	3	80.0	4
Alcohol	45.7	69	46.6	61	16.1	5	37.5	6	17.6	3	7.7	1	100	5
Availability	44.4	67	59.5	78	41.9	13	50.0	8	41.2	7	61.5	8	80.0	4
Self-medicating	43.0	65	43.5	57	16.1	5	81.3	13	41.2	7	30.8	4	60.0	3
Boredom	42.4	64	49.6	65	12.9	4	37.5	6	5.9	1	38.5	5	80.0	4
Altered perceptions	34.4	52	38.2	50	16.1	5	43.8	7	5.9	1	69.2	9	100	5
Conformity	31.1	47	37.4	49	19.4	6	31.3	5	5.9	1	30.8	4	40.0	2
Academic enhancement	25.8	39	20.6	27	80.6	25	18.8	3	29.4	5	15.4	2	20.0	1
Social anxiety	25.8	39	27.5	36	12.9	4	25.0	4	17.6	3	30.8	4	60.0	3

Note. Motivations are listed in descending order based on the reported motivations for any drug use.

Table 2

Proportion of males and females reporting any, and substance-specific motivations for past-year cannabis, opioid and stimulant use.

Variable	Female		Male		Gender Differences	
	%	<i>n</i>	%	<i>n</i>	χ^2	<i>df</i>
Overall Motivations for Use of Any Substance						
Coping ^a	47.6	49	43.8	21	0.19	1
Self-medicating ^a	40.8	42	47.9	23	0.68	1
Motivations for Use of Certain Substances						
<i>Cannabis</i> ^b						
Cannabis-specific coping	44.3	39	46.5	20	0.06	1
<i>Opioids</i> ^c						
Opioid-specific self-medicating	80.0	8	87.5	7	1.00 ^e	1
<i>Stimulants</i> ^d						
Stimulant-specific academic enhancement	76.5	13	85.7	12	0.66 ^e	1

Note. ^aMotivations for overall substance use, not specific to any substance. ^bMotivations among cannabis users. ^cMotivations among opioid users. ^dMotivations among stimulant users. ^eResults based on Fisher's Exact Test for cells with an expected count of less than 5.

Table 3

Summary of Regression and Mediation Analyses

<i>Linear Regression/Mediation using the Continuous Frequency Variable</i>				
(<i>n</i> =48)	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>
<u>PRD</u>				
Frequency of cannabis use	1.50	3.18	0.47	.64
Cannabis coping motives	0.48	0.14	3.54	< .001
<u>Cannabis coping motives</u>				
Frequency of cannabis use	-3.61	3.42	-1.05	.52
Direct effects	3.24	3.58	0.91	.37
Indirect effects ^a	-1.74	1.73	-	-
$R^2=0.03$				
<i>Logistic Regression/Mediation using the Low/High Frequency Variable</i>				
(<i>n</i> =48)	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>
<u>PRD</u>				
Frequency of cannabis use	0.002	0.29	0.006	.99
Cannabis coping motives	0.48	0.14	3.54 ^b	< .001
<u>Cannabis coping motives</u>				
Frequency of cannabis use	0.13	0.31	0.40	.69
Direct effects	-0.06	0.33	-0.18	.85
Indirect effects ^c	0.06	0.19	-	-
Nagelkerke $R^2=0.005$				

Note. All values are derived from the PROCESS output.

^aConfidence intervals for the indirect effect using the continuous frequency variable are -6.12 – 0.71 (95% confidence interval). ^bReported a t-statistic given that both variables were continuous. ^cConfidence intervals for the indirect effect using the dichotomous frequency variable are -0.29 – 0.46 (95% confidence interval).

Table 4

Summary of Bivariate Correlation Analyses for Opioids and Stimulants

Opioids ($n=9$)	1	2	3
1. PRD	-		
2. Frequency of opioid use	-0.25	-	
3. Opioid self-medicating motives	0.17	-0.20	-
Stimulants ($n=22$)	1	2	3
1. PRD	-		
2. Frequency of stimulant use	-0.03	-	
3. Stimulant academic enhancement motives	-0.21	0.37	-

Note. Sample size for opioids insignificant to produce statistically significant results. No significant results found for either opioids or stimulants ($p < .05$).

Figure 1. Proposed mediation model for hypothesis 3a-c.

Note. The proposed mediation path is the same for hypotheses 3a, b and c.

^aCannabis-specific coping motivations and frequency of illicit cannabis use. ^bOpioid-specific self-medicating motivations and frequency of illicit opioid use. ^cStimulant-specific academic enhancement motives and frequency of illicit stimulant

Figure 2. *Unstandardized regression coefficients for the relationship between level of PRD and frequency of cannabis use, mediated by cannabis specific coping motivations.*

The regression coefficient for the association between level of PRD and frequency of cannabis use, controlling for coping motivations (direct effect) is shown in parentheses.

* $p < 0.001$.

Figure 3. *Unstandardized regression coefficients for the relationship between level of PRD and frequency of cannabis use (using the low/high frequency variable), mediated by cannabis specific coping motivations.*

The regression coefficient for the association between level of PRD and low/high frequency of cannabis use, controlling for coping motivations (direct effect) is shown in parentheses.

* $p < 0.001$.