

**TRAUMA AND RACIAL DISCRIMINATION: EXAMINING THEIR
ASSOCIATION WITH MARIJUANA BEHAVIORS AMONG BLACK
YOUNG ADULTS**

by

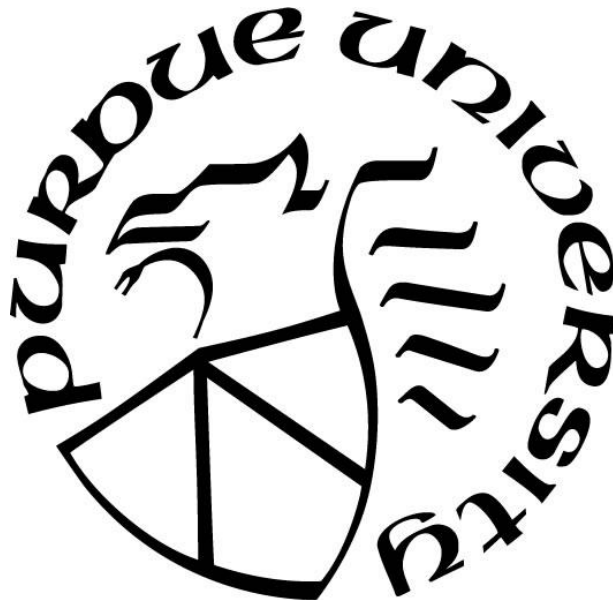
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To family!
Past, future, and present.

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ABSTRACT

Marijuana use has been shown to increase and peak during young adulthood (i.e., ages 18-35). However, it appears that Black individuals do not decline in use at rates similar to other race groups. Marijuana use among Black adults has been linked to more problems such as increased arrests, greater mental health disorder diagnoses, and substance dependence. The biopsychosocial model of racism and race-based theoretical framework aims to understand how factors such as racial discrimination as a traumatic event could be associated with marijuana behaviors, particularly among Black adults. The present study aims to examine the association between racial discrimination and marijuana use and problem use above and beyond trauma exposure. Further, I aimed to explore whether gender or vocation (college, community, and military) moderated the relationships. 391 Black adults (57.5% female; mean age 24.9) completed measures on marijuana use and problems, trauma exposure, and racial discrimination distress. Hierarchical linear regression and Hayes PROCESS macro were used to evaluate the study aims. Racial discrimination distress was associated with marijuana use above and beyond trauma exposure ($\Delta R^2=.016, p=.004$). However, racial discrimination distress did not add significant variance within the model for problem marijuana use ($\Delta R^2=.001, p=.419$). Additionally, moderation by gender and vocation were not supported in either model. Taken together, the present results support that examining psychological and health outcomes among Black young adults should include an evaluation of racial discrimination distress. Further, future studies should continue to evaluate sociodemographic factors in larger more representative community-based studies to better understand potential variation in risk among Black young adults.

INTRODUCTION

Recreational marijuana use has increased among Americans as use has become more normative (Blevins et al., 2018). To date, marijuana has been legalized in 18 states, with the use of small quantities of marijuana (10-30 grams) decriminalized in 27 states including the District of Columbia (Hartman, 2021). Of note, young adults appear to be the most frequent users (Hartman, 2021). Young adulthood has been broadly defined as a distinct period of the life course typically between the ages of 18 and 35, that is characterized by the change and exploration of possible life directions (Arnett, 2001). This exploration and increased independence have been found to make young adults particularly vulnerable for impulsive and risky behavior, like marijuana use (Arnett et al., 2014). For example, across substances, the prevalence of substance use tends to peak during the first half of young adulthood (Arnett, 2001; Substance Abuse and Mental Health Services Administration [SAMHSA], 2013), with 18–29-year-old adults being more than twice as likely to report past month substance use than 12–17-year-old adolescents and 30-40-year-old adults (Hedden, 2015). Justification for this peak involves the combination of increased independence, availability of substances and alcohol, increased peer acceptance, lowered inhibition, and genetic predisposition (Arnett, 2014; Furstenberg, 2008). However, despite the increase in popularity of marijuana use during young adulthood and increasing normalization of use within American society, marijuana use remains a public health concern given the adverse consequences associated with use. A recent review by Memedovich and colleagues (2018) found evidence of harm associated with marijuana use such as risk of testicular cancer, permanent brain changes in dopamine, decreased hippocampal volume and poorer global functioning, increases in mental health symptoms (e.g., psychosis, mania, and relapse in psychosis or schizophrenia), neurological soft signs, and harms associated with use during pregnancy (e.g., low birth weight, birth complications). Given these associated risks, studies evaluating marijuana use among young adults remain integral.

In addition to developmental age, it is also important to understand the risk for marijuana use and related outcomes based on racial/ethnic background. Although trends indicate a peak in substance use during the early part of young adulthood and a decline around the late 20s, this trend does not hold for all groups (Chen & Jacobson, 2012; Evans-Polce et al., 2015; Keyes et al., 2015). Specifically, although the highest levels of marijuana use have been found among

White, Hispanic, and Asian individuals aged 20-25, prevalence of use continues to increase through 35 for Black individuals before declining (Chen & Jacobson, 2012; Keyes et al., 2015). These findings indicate that while the peak of substance use tends to occur during the early stage of young adulthood for most individuals, there appears to be a notable difference in this trend for Black young adults. These differences in marijuana use patterns are important to understand, as despite relaxed cultural beliefs around marijuana use, there is a robust body of literature indicating that Black young adults are disproportionately impacted by use compared to other racial groups (Kovera, 2019; McCarter, 2018; St John & Lewis, 2019; Stringer & Holland, 2016). For example, regarding legal consequences, compared to their White counterparts, Black Americans are eight times more likely to be arrested for marijuana possession, are more likely to be offered custodial pleas, less likely to be offered pleas to reduce charges, and face harsher sentences (McCarter, 2018). Additionally, studies have indicated that among Black adults marijuana use is more likely to lead to later problem use, substance use disorder diagnoses, adverse physical health problems like asthma and high blood pressure, as well as mental health disorders like psychosis and anxiety disorders (Bechtold et al., 2015; Green et al., 2016; Kogan et al., 2017).

When examining health disparities among racial/ethnic minorities, several models have proposed a link between external factors that influence outcomes. For example, according to Lazarus and Folkman's (1984) model of stress and coping, effective coping to stressful situations depends on a person's cognitive appraisal of the stressful event. Others have built upon this model to understand how minorities appraise and cope with threatening stressful situations (Berjot & Gillet, 2011; Clark et al., 1999; Zapolski et al., 2021). Specifically, Clark and colleagues (1999) extended the stress-coping model to attribute perceptions of racism on health outcomes.

The biopsychosocial model of racism by Clark et al. (1999) posits that the *perception* of an environmental stimulus as racist results in exaggerated psychological and physiological stress responses, that in turn influence health outcomes (See Figure 1 for a depiction of the model). According to the model, individual perceptions of an environmental stimuli as racist are first influenced by constitutional, sociodemographic, and psychological/behavioral factors. Constitutional factors include physiological characteristics such as skin tone, hereditary predispositions, and cardiovascular systems that contribute to personality and temperament.

Sociodemographic factors include socio-economic status, age, and gender. Finally, psychological and behavioral factors influence perception and response to environmental stimuli, such as personality traits, self-esteem, and perceived control.

At the next step in the model, perception of racism leads to coping and stress responses which ultimately influence health outcomes. The intensity and duration of the perceived stress elicited from these stimuli are dependent upon the available coping responses. These coping responses can be general strategies to deal with stressful stimuli, or race-specific coping responses such as cognitions and behaviors used to mitigate the effects of perceived racism. When those coping responses do not decrease stress, they are considered maladaptive.

When maladaptive coping responses are used, the perception of an environmental stressor as racist triggers psychological and physiological stress responses (Clark et al., 1999). These stress responses include anger, paranoia, anxiety, frustration, and immune, neuroendocrine, and cardiovascular functioning. For example, if perceptions of racism stimulate anger, this may lead to coping responses such as anger suppression, aggression, or the use of alcohol to blunt angry feelings (Clark et al., 1999). Additionally, upon repeated exposure to racial stressors, the intensity and duration of neuroendocrine and cardiovascular responses would depend in part on one's ability to successfully cope with a stressor (Clark et al., 1999).

In the final step of the model, these stress responses influence various health outcomes over time, such as mental health diagnoses like depression and substance use disorder, low birth weight and infant mortality, heart disease, and high blood pressure. Thus, the biopsychosocial model is applicable to understanding the association of racial discrimination on health behaviors like marijuana use specifically among Black adults. Given the breath of literature highlighting how pervasive racism is within American society towards Black Americans (Assari et al., 2017; Williams & Mohammed, 2009), the stress coping and biopsychosocial models may aid in understanding how marijuana use may be used as a common coping strategy. As such, experiencing traumatic events, particularly those that one perceives to be racially motivated (i.e., exposure to racism) may add to our understanding of why Black young adults engage in marijuana use. Therefore, it is integral to continue to quantify the impact of racism on health behaviors with the same rigor as non-race specific traumatic events.

Racial discrimination, trauma, and marijuana use

Only two previous studies have examined the relationship between trauma and marijuana use specifically among Black young adults (Rich et al., 2005; Seth et al., 2013). Both studies found that Black men who indicate high levels of urban stress or victimization are more likely to report a history of marijuana use (Seth et al., 2013) and qualitatively indicate the purpose of use is to alleviate distress (Rich et al., 2005). Within qualitative studies on trauma and coping, findings indicate that Black young adults report marijuana use as a coping mechanism to alleviate the distress associated with traumatic experiences (e.g., childhood physical abuse, community violence, sexual violence, sudden or threatened death; Goodwill et al., 2018; Rich & Grey, 2005; Sullivan et al., 2018). Moreover, the consequences of such exposure may be more pronounced for Black young adults. Specifically, previous work has found when looking across race groups, while White young adults report greater frequency of traumatic experiences (Hatch & Dohrenwend, 2007; Roberts et al., 2011), Black young adults are more likely than their counterparts to report more problems as a consequence of traumatic experiences such as post-traumatic stress disorder (PTSD), diabetes, and heart disease (Nobles et al., 2016; Roberts et al., 2011). Thus, a very limited body of research has been conducted examining the positive association of experiences of trauma with marijuana use specifically among Black young adults (Rich et al., 2005; Seth et al., 2013).

Moreover, based on Clark and colleagues (1999) biopsychosocial model of racism, it is also important to consider unique circumstances through which Black young adults experience trauma, particularly within the context of race. Previous studies evaluating the relationship between trauma alone and marijuana use have missed that even within our standard definition of traumatic events, there are culturally specific factors, like racial discrimination, that may add to our understanding of the risk trauma poses on behaviors, specifically among Black young adults. Despite race-specific events not being considered a “criterion A1” traumatic event, the race-based traumatic stress theoretical framework (Bryant-Davis 2005; Bryant-Davis, 2007; Carter, 2007; Polanco-Roman et al., 2016) has been used to assert that overt experiences of racial discrimination fit within the standard definition of trauma as they involve verbal, physical, or some type of abuse or assault. In line with this theory, the physiological response and negative health outcomes associated with racial discrimination have been found to be similar to those from trauma exposure, including anxiety, stress, PTSD symptoms and diagnosis, substance use

prevalence and substance use disorders (American Psychiatric Association [APA], 2013; Assari et al., 2017; Bryant-Davis 2005; Bryant-Davis, 2007; Carliner et al., 2016; Carter, 2007; Carter et al., 2017; Rich & Grey, 2005; Williams & Mohammed, 2009). Moreover, similar to trauma, there is also evidence of an association between racial discrimination and marijuana use (e.g., Assari et al., 2019; Borrell et al., 2007; Carliner et al., 2016; Stevens-Watkins et al., 2012; Williams & Mohammed, 2009). Thus, the biopsychosocial model of perceived racism and the race-based traumatic stress framework provide a basis for examining the relationship between marijuana use behaviors and distress associated with racial discrimination specifically among Black young adults.

Yet, to date, to my knowledge, only one study has been conducted that has included both trauma and racial discrimination in the same model when examining marijuana use behaviors among Black individuals. Copeland-Linder and colleagues (2011) found that among a sample of Black adolescents, both trauma (i.e., community violence exposure and neighborhood disorder) and racial discrimination were associated with marijuana use. While outside of the young adult developmental period, this study provides some evidence that both trauma and racial discrimination are important factors related to marijuana use among Black individuals, which may also be observed within the young adult developmental period. However, this study is limited in that it did not examine the unique effect of trauma and racial discrimination on marijuana use, as it is speculated that due to the unique circumstances that surround race-based discrimination, which are not captured within traditional models of trauma, racial discrimination can provide unique and incremental prediction in risk for marijuana use that is likely missed when examining non-race specific trauma alone.

Therefore, when evaluating health outcomes, such as marijuana behaviors, particularly among Black young adults, it is important to consider the unique effect of both trauma and racial discrimination as well as their combined impact on marijuana use. Despite legalization of marijuana, Black young adults remain the most vulnerable population for problems associated with use – both in the legal system and the health care system – compared to other race groups (Kovera, 2019; McCarter, 2018; St John & Lewis, 2019; Stringer & Holland, 2016). This group will continue to be vulnerable to these negative implications if associated factors are not identified and addressed. Thus, I aim to extend upon the work by Copeland-Linder et al. (2011) by examining a more comprehensive model for marijuana use and problem use among Black

young adults by examining the relationship of racial discrimination on marijuana outcomes above and beyond non-race specific trauma exposure.

In addition to understanding the association between trauma, racial discrimination, marijuana consumption and, problem marijuana use among Black young adults, research is also needed to examine the complexity of lived experience within the Black community. For the present study, consistent with the moderation of sociodemographic factors of the biopsychosocial model (Clark et al., 1999), I will be examining variations in the effect of trauma and racial discrimination on marijuana use outcomes based on gender (male versus female) and vocation (current college students versus community and military service members).

Trauma, racial discrimination, and marijuana use by gender

A large body of literature suggests an association between sociodemographic factors, like age, race, gender, and socioeconomic status, and various health outcomes (Assari et al., 2018; Hudson et al., 2013; Wi et al., 2016). The biopsychosocial model specifies gender as a moderator on the relationship between perceived racism and health outcomes, warranting further examination in modern models (Clark et al., 1999). Within the present proposed model, gender is an important factor to examine given evidence of differences in prevalence rates of marijuana use among Black male and female young adults separately. For example, Keyes and colleagues (2015) found Black males to be consistently more likely than their female counterparts to use marijuana. Yet, among active marijuana smokers, they found Black women to have a greater frequency of marijuana use by age 28 compared to Black men (Keyes et al., 2015). There are also gender differences in exposure to trauma and racial discrimination. Black women tend to report elevated prevalence of childhood trauma as well as sexual victimization (Balsam et al., 2015; Hakimi et al., 2018), while men report more exposure to violent crime (Goodwill et al., 2018; Rich & Grey, 2005). With respect to racial discrimination, there is evidence of greater risk among Black males compared to Black females (Hurd et al., 2014).

However, there are a limited number of studies evaluating gender differences in the effect of trauma or racial discrimination specifically on marijuana use. To my knowledge, no study has examined gender differences within the relationship between trauma and marijuana use. As for racial discrimination, there are a few studies that have examined gender differences; however inconsistent results were reported. Assari et al. (2019) found that the effect of adolescent

experiences of racial discrimination on adult marijuana use was stronger among Black males than females. Conversely, Vu and colleagues (2019) found that Black women who experience racial discrimination reported more marijuana use compared to women who reported not experiencing any discrimination. But no effect of racial discrimination on marijuana use was found for men. Thus, as previously stated, literature is lacking in its evaluation of the association between trauma, racial discrimination, and marijuana behaviors in one model, but also more research is needed to understand gender differences. A comprehensive understanding of gender as a sociodemographic factor moderating the relationship between racial discrimination distress and marijuana use behaviors would help to guide treatment based on gender identity. Additionally, if a clear gender difference exists, when resources are limited one group may require additional resources compared to the other. Thus, a comprehensive understanding of gender could provide context for future studies evaluating implications of marijuana use and problems that may be different for men compared to women.

Trauma, racial discrimination, and marijuana use by vocation

Many previous studies mentioned above focus on college students (Arria et al., 2015; Carter et al., 2010; Chao et al., 2012; Edman et al., 2016; Goodwill et al., 2018; Kilmer et al., 2006; Slutske, 2005; Vu et al., 2019; White et al., 2005). However, only 15% of 18.4 million college students in 2017 identified as Black, which is far from capturing the 4.4 million Black young adults living in the United States (Musu-Gillette et al., 2016; US Census Bureau, 2019). Moreover, given that Black young adults have the highest college dropout rates (Tate, 2017), only including current college students within research studies misses a significant proportion of Black young adults. Ford (2012) found that educational attainment may play a protective role in the relationship between trauma symptoms and substance use. If this is true, the association between substance use and trauma may be weakest among those who are currently enrolled in college. Additionally, previous studies have found educational level and financial status to moderate the relationship between trauma and discrimination separately on substance use outcomes among Black adults, finding that those who were less educated or from poorer backgrounds were more adversely affected (Borrell et al., 2007; Ford, 2012; Marcenko et al., 2000). In comparison to college students, non-college Black young adults may have greater exposure to racial discrimination experiences, as they are more likely to be in a variety of

environments where discriminatory experiences can occur (Hudson et al., 2016). As stated previously, long-term stressors during young adulthood such as moving away from home, beginning full time jobs, and increased peer associations can differentially impact an individual's propensity for substance use (Carter et al., 2010; Slutske, 2005; White et al, 2005). Therefore, it would be beneficial to compare different vocational paths of young adults who are not currently in college to those who are currently in college on the relationship of racial discrimination distress and marijuana use behaviors. Consistent with the biopsychosocial model, the strength of the relationship between racial discrimination and marijuana use and problems may be different based on sociodemographic factors like vocation. As observed in previous studies, college could be a protective factor against problem marijuana use. Thus, the association between racial discrimination distress and marijuana outcomes may be more pronounced among non-college community Black young adults – a subgroup that has been missed in previous studies.

Relatedly, another group of Black young adults that is important to examine as it relates to trauma, racial discrimination, and marijuana use are US military service members. It is known that service members are at an increased risk for developing substance use disorders, in part due to increased occupational risk for experiencing traumatic events (Teeters et al., 2017). Despite efforts to decrease substance use among service members, rates of use remain problematic (Ames et al., 2002; Department of Defense, 2018). For example, it has been found that young adult male veterans abuse illegal substances at a rate higher than their civilian counterparts (Hoggatt et al., 2017). Moreover, being deployed also increased the prevalence of illegal substance use (Lan et al., 2016; Schmid et al., 2017). Yet, consistent with the general population of young adults, what is less known is the prevalence of specific types of substance use, such as marijuana among service members, as many studies are limited to only assessing general substance use (Teeters et al., 2017). Among studies that have assessed specific substances, 61.8% of young adult veterans report lifetime marijuana use and 20.4% report past month marijuana use, with those who screen for PTSD more likely to use marijuana at any point compared to veterans who did not meet criteria for PTSD (Grant et al., 2016).

More alarmingly, studies have found that even when controlling for military-specific trauma exposure, minority veterans experience higher rates of PTSD symptoms compared to their White counterparts, suggesting race-specific experiences (e.g., racial discrimination) may play a role in health outcomes (Carlson et al., 2018; Dohrenwend et al., 2008). Racial/ethnic

minority service members are at a greater risk of experiencing trauma, potentially due to the impact of race-related trauma (Foyne et al., 2015; Roberts et al., 2011) and are also at a greater risk for substance use (Hruby et al., 2018; Williams et al., 2016) compared to their White counterparts. However, no previous studies have controlled for general forms of trauma and evaluated the relationship between racial discrimination and marijuana use and problem use specifically among Black US service members. A greater understanding of the nuances of a sociodemographic factor such as vocation may help to allocate resources specific to these various settings that have potentially been missed when restricting to college students.

Present Study

In sum, current literature is lacking in its understanding of both marijuana use and problem use among Black young adults. This is important to consider within the context of increasing marijuana legalization. Clark and colleagues (1999) biopsychosocial model of perceived racism has been used to understand the role racism plays in influencing coping responses to stress, such as engagement in substance use, and health outcomes. The present study aims to apply this model on the association between trauma, racial discrimination distress and marijuana use behaviors, which is critically important for Black young adults given disparities in health outcomes as a consequence of marijuana use. I hypothesize that among my total sample of Black young adults that experiences of general trauma (e.g., violence, sudden death, sexual victimization) will be associated with marijuana use outcomes, specifically consumption and problems associated with use. Second, I aim to explore if the inclusion of racial discrimination into the model will account for additional variance in explaining marijuana use among Black young adults. I hypothesize that racial discrimination will add unique incremental associations with both marijuana use and problem marijuana use above effects observed for general trauma. Further, it is unknown whether there are unique differences within this relationship among specific subgroups of Black young adults based on gender and vocation. For the third aim I will explore if the magnitude of the association between racial discrimination distress and marijuana use and problem use, controlling for trauma, will be statistically different for Black men than it is for women. Given the limited and mixed existing evidence on gender differences in trauma or racial discrimination separately on marijuana use, no a priori hypothesis is made for this aim. Finally, I hypothesize that the association between racial discrimination and marijuana use and

problem use, controlling for trauma, when evaluated by vocation will differ. I hypothesize that the association between racial discrimination and marijuana behaviors will be stronger among community and military adults when each group is compared to college students. Given the limited research within community and military samples, no a priori hypothesis is made when comparing these two groups.

METHODS

Study Design

Data for the current study is taken from a large online parent study conducted at a midwestern university assessing stress, trauma, and health behaviors among young adults 18-35. The survey contained 26 measures and demographic variables, with no deception or experimentation. The parent study was distributed through three recruitment methods with different incentives: 1) an introductory psychology course where course credit was awarded, 2) community flyers where participants could be entered for a chance to win a \$50 gift card for every 150 participants, and 3) Mechanical Turk where participants earned \$2.50 for completion. For the present study, a fourth recruitment source was added, after IRB approval, through social media flyers where participants earned a \$5 Amazon gift card upon completion. These flyers specifically targeted Black adults with and without military involvement. Across all recruitment sources all participants were instructed to endorse that they will not complete the survey more than once both at the beginning and the end of the survey. This instruction was also indicated in all recruitment materials. To monitor this, emails were retained for the duration of the study to observe any overlap across study participants. If so, second attempts were eliminated. The survey lasted 30-45 minutes and could be completed on any internet-capable device. All survey questions were counterbalanced to control for fatigue.

Manipulation checks were placed throughout the assessment. Specifically, within two measures (depression anxiety stress scale (DASS) and traumatic life events questionnaire (TLEQ)) contained embedded questions as attention checks. The statements were “I have been to every country in the world. This question is designed to ensure that you are paying attention – please select ‘never’” and “You were president of the United States. This question is designed to ensure that you are paying attention- please select ‘never.’”

Measures

Demographics and background information

For the present study, participants were asked to indicate their racial/ethnic background, age, gender, income, current college status, and lifetime military status. With reference to race, participants were allowed to self-select whichever race/ethnicity applied to them, with the option of selecting multiple races. Racial categories included were: White, Black, Hispanic, Asian/Pacific Islander, Native American/Alaskan Native, multicultural, and Other with the option to enter text. For the present study participants were included if they selected “Black/African American.” If they endorsed “other” or being “multiracial” without indicating a specific racial group, they were not included in the present analysis. To assess gender, participants were asked “what gender do you most identify with” with response options as male, female, transgender male, transgender female, and other with the option to enter text. Due to low endorsement (n=2, 0.51% of total sample), individuals who selected categories other than “male” or “female” were excluded from analysis. Participants were asked to indicate their annual income prior to taxes from a Likert style scale range with seven options: 1) less than \$25,000, 2) \$25,000-\$34,999, 3) \$35,000-\$49,999, 4) \$50,000-\$74,999, 5) \$75,000-\$99,999, 6) \$100,000-\$149,999, and 7) \$150,000 or more. With respect to vocation, participants were asked “do you currently attend college” where they could select yes or no. Additionally, they were asked “have you ever served in the military” where they could endorse “yes currently”, “yes but not currently”, or “never.”

Marijuana use

The Cannabis Use Disorders Identification Test-Revised (CUDIT-R; Adamson et al., 2010) was used to evaluate cannabis/marijuana use. The CUDIT-R is an 8-item measure that contains items relating to consumption, dependence, cannabis-related problems, and psychological features of cannabis use within the past 6 months. Marijuana use/consumption was measured using a 2-item subscale asking about cannabis use frequency: “How often do you use marijuana or other cannabis products?” and “How many hours were you “stoned” on a typical day when you had been using marijuana?” Scores were summed and ranged from 0 to 8 where for the first question response items were as follows: (0) “never,” (1) “monthly or less,” (2) “2-4

times a month” (3) “2-3 times a week” or (4) “4 or more times a week.” For the second question response items were as follows: (0) “less than 1,” (1) “1 or 2,” (2) “3 or 4,” (3) “5 or 6,” or (4) “7 or more.” The CUDIT-R has shown high reliability from previous studies ($\alpha = .91$; Adamson et al., 2010) and consumption was high for the present study ($\alpha = .84$).

Problem marijuana use

The CUDIT-R (Adamson et al., 2010) was also used to evaluate problem cannabis/marijuana use. Problem marijuana use was measured using the remaining 6 items relative to problems and consequences of marijuana use from the CUDIT-R, excluding the 2 consumption items mentioned previously. Scores ranged from 0-4 where: (0) never, (1) less than monthly, (2) monthly, (3) weekly, and (4) daily or almost daily. The 6 items were summed, and scores could range from 0 to 24. The CUDIT-R has shown high reliability from previous studies ($\alpha = .91$; Adamson et al., 2010) and problem use was high for the present study ($\alpha = .88$).

Trauma

The Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000) was used to assess lifetime history of traumatic events that were not race-specific. The lifetime TLEQ is comprised of 24 items such as: “you witnessed the severe assault of an acquaintance or stranger,” “you were physically abused by a partner, spouse, or significant other,” and “you had a major financial crisis.” Responses were rated on a Likert style scale with the following response options: “never” (0), “once” (1), “twice” (2), “three times” (3), “four times” (4), “five times” (5), and “more than five times” (6). Items were summed to create a composite, with high scores indicating greater experiences of traumatic events. Reliability for this measure among minority young adults has been high in previous studies ($\alpha = .84$; Edman et al., 2016) and was high in the present study ($\alpha = .94$).

Racial discrimination distress

Index of Race Related Stress (IRRS-B; Utsey, 1999) was used to assess lifetime experiences of racist events using 22 items. Sample items include “you have been threatened with physical violence by an individual or group of Whites,” “White people or other people not in your ethnic race have treated you as if you were unintelligent and needed things explained to

you slowly or numerous times,” and “you have observed the police treat White people with more respect and dignity than they do members of your ethnic group.” Response items were on a 5-point Likert scale ranging from “never happened to me” (0) to “event happened, and I was extremely upset” (4). Items were summed to create a global score of racial discrimination. Scores can range from 0-88. Higher global scores indicate more overall race-related distress. Cronbach’s alphas among Black adults have been relatively high for the global scale ($\alpha = .84$; Franklin-Jackson & Carter, 2007; Utsey, 1999) and remained so for the present study ($\alpha = .96$).

Data Cleaning

The parent study obtained 1,872 participants across the three initial recruitment sources (See Figure 2 for cleaning decision tree). The primary data cleaning process involved eliminating participants who did not endorse identifying as Black/African American. I observed 193 (8.5%) participants who fit that inclusion criteria, which is comparable to the state (9.9% in Indiana) but lower than the national (12%) representation of Black adults (United States Census Bureau, 2020; Census data does not include those who identify as multiracial including Black). After oversampling Black adults through the fourth recruitment source, I obtained an additional 219 participants for a total of 412 participants who identify as Black/African American.

As a caveat, within the first week of data collection for the fourth recruitment targeting Black adults specifically, I obtained a total of 618 responses. Given the alarming number in a short period of time far exceeding our goal, I sought to observe the data more strategically. Upon inspection, I determined there were systematic ways multiple responses were recorded that were not reliable. Instead of discarding all data, I decided to scan the data visually, and through Qualtrics fraud metrics, to determine if there were responses that could be retained. I determined four factors that would provide sufficient reason to exclude these responses (see decision tree in Figure 2). The factors were determined in the order that follows: 225 failed the Qualtrics fraud metrics embedded in the program, 58 failed manipulation checks embedded in the survey, 80 indicated response fraud (duplicate responses where names and email were duplicated and only first attempts were kept, nonsensical responses in text entries, or responses that included characters not available on qwerty keypads), and 181 had incomplete information (incomplete survey completion of less than 25%). Ultimately, 74 participants were determined to pass the above screening. The IRB was consulted and approved a modification to add RECAPTCHA tests

at the beginning of the survey as another measure of screening out systematic duplicate software. After this point the study was monitored more regularly and postings on Craigslist were removed. The data collection was closed for the project on February 1, 2021, at which point the data was downloaded and consolidated.

The initial data cleaning process included verifying manipulation checks and eliminating those who did not meet inclusion criteria. Fourteen participants were excluded for failing manipulation checks, five participants were excluded for not completing the outcome measure, and due to low power two participants were omitted as they did not identify as male or female. Next, three distinct vocation path subgroups were created. First, the military group included those who responded to “have you ever served in the US military” with either a “yes, currently” or “yes but not currently.” Next, the college sample only included participants who endorsed yes to the question “are you currently enrolled in college,” and did not indicate that they were in the military. Thus, while the military group could include those who are currently in college, the college group could not contain any participants who have ever served in the military. In this manner, the college sample is more specifically a non-military college sample. Finally, the community sample included all remaining participants who did not endorse current college enrollment and those who endorsed “never served in the military.” Due to this categorization, there was no overlap across groups. Additionally, given that vocation was a nominal variable at three levels, dummy coding was used with college as the reference group and repeated with military as the reference group.

Missing data were handled such that I evaluated if data were systematically missing or missing at random. There appeared to be 34 missing from the marijuana consumption composite variable and 47 missing from problem marijuana use. Upon visual inspection, there appeared to be an error in coding such that if the item was skipped when participants endorsed not using marijuana, the subsequent items were omitted. However, they were ultimately changed to indicate zeros to capture those who did not use. The racial discrimination composite score revealed 15 scores were missing, which is 3% of the sample. Upon visual inspection it was determined that composite scores were not created when participants omitted items. Given that there were only 15 cases, the items were inspected by hand and determined to be missing at random given that each participant missed only one item on the scale, and it was not the same item across all 15 participants. No item was missed by more than two participants. Thus, missing data was imputed

with the average score of the participants remaining items. Previous studies evaluating bias estimates recommend this method in samples with small sizes where missing data is less than 10% of the scale items (Eekhout et al., 2014; Parent et al., 2013).

Data Analysis

A hierarchical linear regression was used to evaluate the relationship between racial discrimination distress above and beyond the effects of trauma on marijuana use and problem use, while controlling for age, income, gender, and vocation. At the first step I examined the association between demographic variables (i.e., age, gender, income, dummy coded vocation) and experiences of trauma with marijuana use. At the second step, I added racial discrimination distress into the model, which examined the association between racial discrimination distress and marijuana use controlling for demographics and the effect of trauma alone. The full model was then duplicated for the problem marijuana use outcome.

For the third aim to examine the interactions between gender and vocation with racial discrimination on the marijuana outcomes, I used PROCESS macro simple moderation model. Demographic covariates were included in the analysis (age, income, and either gender or vocation), as well as trauma (Hayes, 2013). For these analyses, a 10,000-bootstrap sample was used to calculate standard errors and confidence intervals with the marijuana use outcomes indicated separately as the dependent variables, racial discrimination distress indicated as the independent variable, and gender and vocation indicated as the moderators separately. First, gender was entered as a moderator of racial discrimination with marijuana use while controlling for other demographics, including vocation, and trauma. This was duplicated for the problem marijuana use outcome. Because vocation is a categorical variable, dummy coding was necessary to evaluate vocation as a three-way moderator. First, I evaluated college students and community sample, with college students as the reference group, controlling for other demographics and trauma. Second, I evaluated college students and military samples, again with college students as the reference group, controlling for other demographics and trauma. Third, I explored the relationship between military and community subgroups with a second set of dummy coding with the military group as the reference group.

Finally, exploratory sensitivity analyses were conducted to evaluate the impact of current or previous military involvement on study variables to observe if the effect in this group was

accounted by differences in active duty versus veteran status. Additionally, sensitivity analyses compared military service members currently in college to those who are not currently in college, to evaluate if there were significant differences between these groups. All sensitivity analyses were conducted after preliminary analyses were completed.

Power Analysis

An a priori power analysis was conducted to determine an appropriate sample size to observe a medium effect size for the regression analyses. This analysis was conducted using G*Power 3.1 software (Faul et al., 2007). To obtain a medium effect size ($f^2 = 0.15$) with a hierarchical linear regression analysis, at an α -level of .05, a 95% confidence interval, and 9 predictors (age, gender, income, 2 vocation levels, trauma, discrimination, and 2 interaction terms) it is determined that a sufficient sample size would be 166 for the total sample. Thus, I aimed to collect at least 100 participants for each vocation group, and at least 100 females and 100 males to account for invalid data and any other potential errors.

RESULTS

Demographics

The final sample yielded 391 participants included in the present analysis. A slight majority of the sample identified as female ($n=225$; 57.5%). Age was restricted to those 18-35, with the average age being 25 years old (mean=24.9, $sd=5.0$). While income was presented as integers, 56% of the sampled endorsed earning \$35,000 a year or less. Participants were primarily recruited from the social media flyers that were targeted specifically for Black young adults (49.9%), with 28.1% from the introductory psychology course, 21.8% from MTurk, and 0.8% from the community flyer. Recruitment source was omitted from analysis as a covariate due to multicollinearity found with the vocation group variable ($\chi^2(6, N=391) = 258.08, p < .001$). Vocation groupings were constructed in the data cleaning process. The groups were comprised as follows with no overlap across groups: 91 were currently involved in the military or in the past, 175 were current college students with no military involvement, and 125 represented the community sample that were not in college nor had military involvement (see table 1 for all study demographics).

With respect to other variables of interest, 91.6% endorsed ever experiencing a traumatic event and 91.2% reported ever experiencing discrimination based on their race. As for marijuana use, 42.3% reported any marijuana use in the past 6 months, with 13.7% engaging in problematic cannabis use suggestive of a potential cannabis use disorder based on a total CUDIT-R score greater than 13 (Bonn-Miller et al., 2016). Upon inspection racial discrimination distress was adequately normally distributed (skew= .108, $se= .123$; kurtosis= -.988, $se= .246$). However, the remaining study variables were positively skewed: trauma skewness= 2.075 ($se= .123$) and kurtosis= 4.159 ($se= .246$), marijuana consumption skewness = 1.407 ($se= .129$) and kurtosis= 1.097 ($se= .257$), and problem marijuana use skewness= 1.523 ($se= .131$) and kurtosis= 1.443 ($se= .262$). Given that ranges were outside of the commonly applied rule of less than an absolute value of 1.00 (Changyong et al., 2014; Johnson et al., 2018), log transformations were used as normality is an assumption of regression analysis (Singh & Masuku, 2014). Given that all the variables have a minimum value of zero instead of a minimum of one, each value was increased by one prior to log transformation (Changyong et al., 2014). After such transformations the

variables of interest were adjusted to more normally distributed ranges: trauma skewness= -.015 (se= .123) and kurtosis= -.654 (se= .246), marijuana consumption skewness= .879 (se= .123) and kurtosis= -.796 (se= .246), and problem marijuana use skewness= .855 (se= .123) and kurtosis= -.963 (se= .246).

All demographic variables (age, income, gender) were correlated with at least one study variable (see table 3 for Pearson's r correlations). Regarding the outcome variables of marijuana consumption and problem marijuana use, they were strongly positively correlated ($r = .811, p < .001$). As stated previously, problem marijuana use did not include consumption items, but all items stemmed from the same CUDIT-R measure. Regarding the predictor variables, trauma and racial discrimination distress were moderately correlated ($r = .419, p < .001$). Of note, the assessment for trauma did not include racial trauma. Trauma was moderately associated with marijuana use ($r = .420, p < .001$) and problem use ($r = .418, p < .001$). Finally, racial discrimination distress was weakly associated with marijuana use ($r = .244, p < .001$) and problem use ($r = .121, p = .017$).

Aims 1-2: Unique effect of trauma and racial discrimination on marijuana behaviors

Marijuana use

The first hierarchical linear regression analysis conducted was to examine the unique and additive effect of racial discrimination with marijuana use above the effects observed for trauma alone (see table 4). The model was run in two steps, the first step with demographic variables (age, income, gender, and dummy coded vocation variables) and trauma on marijuana use, and a second step with racial discrimination distress added into the regression model. At the first step with trauma alone, results indicated that after controlling for the effect of the demographic variables, trauma was associated with marijuana use ($b = .211, se = .029, p < .001; R^2 = .246, p < .001$). At the second step with racial discrimination distress added, trauma was again associated with marijuana use ($b = .183, se = .030, p < .001$) and racial discrimination distress provided unique and incremental prediction of marijuana consumption ($b = .002, se = .001, p = .004; \Delta R^2 = .016, p = .004$). The total amount of variance accounted for by the demographic variables, trauma exposure, and racial discrimination distress on marijuana consumption among Black young adults was 26.3 percent.

Problem marijuana use

Duplicate models were performed as outlined previously but with problem marijuana use as the outcome (see table 5). At the first step with demographics (age, income, gender, and dummy coded vocation variables) and trauma, results indicated that after controlling for the effect of the demographic variables, trauma was significantly associated with problem marijuana use ($b = .321$, $se = .042$, $p < .001$; $R^2 = .311$, $p < .001$). In the second step with racial discrimination added, trauma exposure remained significant ($b = .310$, $se = .044$, $p < .001$), however racial discrimination distress did not provide unique and incremental prediction of problem marijuana use ($b = .001$, $se = .001$, $p = .419$; $\Delta R^2 = .001$, $p = .419$). The total amount of variance accounted for by the demographic variables, trauma exposure, and racial discrimination distress on problem marijuana use among Black young adults was 31.2 percent, which did not differ from the model with only demographic variables and trauma exposure ($R^2 = .311$, $p < .001$).

Aim 3a: Moderation of gender

The third aim of the study was to examine the moderating effect of gender within the proposed pathway of racial discrimination on marijuana use outcomes with non-race specific trauma included in the model (See table 6). In the model of racial discrimination distress on marijuana consumption with gender as a moderator, no statistically significant interaction effect between racial discrimination and gender on marijuana consumption was observed ($b = .001$, $se = .001$, $p = .595$). While not statistically different from one another, the results indicate that accounting for demographics and trauma experiences, the association between racial discrimination and marijuana use consumption was significant for females ($b = .002$, $se = .001$, $p = .006$) but not males ($b = .002$, $se = .001$, $p = .127$; See Figure 3a for visual depiction).

Additionally, although in aim two of the study I found no additive effect of racial discrimination distress on problem marijuana use after accounting for trauma, I sought to evaluate if there was a moderation effect of gender that may have been missed in the previous model. Yet, no interaction effect between racial discrimination distress and gender on problem marijuana use was observed, when age, income, vocation, and trauma were controlled for in the model ($b = .002$, $se = .002$, $p = .301$). The conditional effects of the moderation analysis revealed that the effect of racial discrimination distress on problem marijuana use was not found for males

($b = -.001$, $se = .002$, $p = .815$) nor females ($b = .002$, $se = .001$, $p = .220$; See Figure 3b for visual depiction).

Aim 3b: Moderation of vocation

The third aim of the study also included examining the moderating effect of vocation within the proposed pathway of trauma and racial discrimination with marijuana behaviors. Again, although racial discrimination distress did not add significant variance in the model with trauma and demographics on problem marijuana use, I aimed to assess whether this relationship differs by vocation.

Community versus College

In the model of racial discrimination distress on marijuana consumption with group membership as a moderator, a significant interaction was not observed ($b = .002$, $se = .002$, $p = .306$) for the community versus college subgroup while controlling for the effect of military subgroup membership compared to college subgroup, as well as other demographic variables (See table 7). While not statically different from one another, the results indicate that racial discrimination distress was associated with marijuana use for the community subgroup ($b = .003$, $se = .001$, $p = .031$), but not the college subgroup ($b = .001$, $se = .001$, $p = .275$; See Figure 4a for visual depiction).

With reference to problem marijuana use, in the model of racial discrimination on problem use with group membership as a moderator, a significant interaction was not observed ($b = .001$, $se = .002$, $p = .554$) for the community versus college subgroup while controlling for the effect of military subgroup membership compared to college subgroup, as well as other demographic variables (See table 7). The results indicate that racial discrimination distress and problem marijuana use were not associated among the college subgroup ($b = -.001$, $se = .001$, $p = .866$) nor the community subgroup ($b = .001$, $se = .002$, $p = .544$; See Figure 4b for visual depiction).

Military versus College

Models were also run examining the moderating effect of military versus college vocation on the association between racial discrimination distress and marijuana use outcomes. In the model with marijuana consumption as the outcome, a significant interaction was not observed ($b = .004$, $se = .002$, $p = .055$) for the military versus college subgroup but was trending in that direction (See table 7). The conditional effects indicate that the association between racial discrimination distress and marijuana consumption was found among the military subgroup ($b = .005$, $se = .002$, $p = .007$) but was not found among the college subgroup ($b = .001$, $se = .001$, $p = .275$), when age, income, gender, community subgroup, and trauma were included as covariates (See Figure 4a for visual depiction).

With reference to problem marijuana use, in the model of racial discrimination distress on problem marijuana with group membership as a moderator, a significant interaction was again not observed ($b = .005$, $se = .003$, $p = .102$; See table 7). The results indicate that the effect of racial discrimination distress was not associated with problem marijuana use for the college subgroup ($b = -.001$, $se = .001$, $p = .866$) nor military subgroup ($b = .004$, $se = .003$, $p = .085$) when age, income, gender, community subgroup, and trauma were included as covariates (See Figure 4b for visual depiction).

Community versus Military

The final moderation analysis included the military subgroup as the reference group to observe the association between racial discrimination distress and marijuana consumption for the military versus community subgroups. With group membership as a moderator a significant interaction was not observed ($b = -.002$, $se = .002$, $p = .290$; See table 8). While not statistically different from each other, the results indicate that racial discrimination distress was associated with marijuana use for both the military subgroup ($b = .005$, $se = .002$, $p = .007$) and community subgroup ($b = .003$, $se = .001$, $p = .031$) separately when age, gender, income, college subgroup, and trauma were included as covariates (See Figure 4a for visual depiction).

With reference to problem marijuana use, in the model of racial discrimination on problem marijuana with group membership as a moderator, a significant interaction was not observed ($b = -.003$, $se = .003$, $p = .269$). When probed, the results indicate that the effect of racial

discrimination distress was not associated with problem marijuana use within the military subgroup ($b = .004$, $se = .003$, $p = .085$) nor community subgroup ($b = .001$, $se = .002$, $p = .544$) when age, gender, income, college subgroup, and trauma were included as covariates (See Figure 4b for visual depiction).

Post-hoc sensitivity analyses

Active duty versus Veteran

To investigate the association between active-duty status within my military subgroup, additional post-hoc moderation analyses were conducted. Of the 91 participants in the military vocation group, 45 endorsed currently serving, while 46 reported previous military affiliation (veteran). In this model when examining the association between racial discrimination distress and marijuana consumption with veteran status as a moderator, no significant interaction was observed ($b = .003$, $se = .004$, $p = .435$; See table 9). When examining the conditional effects, results indicated that racial discrimination distress was associated with marijuana for veterans ($b = .009$, $se = .002$, $p < .001$) but not active duty service members ($b = .006$, $se = .004$, $p = .113$) when demographics variables and trauma were included as covariates (see Figure 6).

With reference to problem marijuana use, similar results were observed. With veteran status as a moderator, no significant interaction was observed within the association between racial discrimination distress and problem marijuana use ($b = .002$, $se = .007$, $p = .806$; See table 9). When examining conditional effects, results indicate that racial discrimination distress was associated with problem marijuana use for veteran service members ($b = .008$, $se = .004$, $p = .029$) but not active service members ($b = .007$, $se = .006$, $p = .283$) when demographics variables and trauma were included as covariates (see Figure 6).

Military and College versus no College

As previously stated, the college and community samples could not contain those who had ever served in the military, however, the military sample could contain those who are currently enrolled in college. To investigate the effect of current college enrollment within our military sample, additional moderation analyses were conducted. There was much less variability in this subgroup. Of the 91 participants in the military vocation group, 87 participants endorsed

not currently being enrolled in college, whereas only 4 participants reported being currently enrolled. In this model when examining the association between racial discrimination distress and marijuana consumption with enrollment as a moderator, no significant interaction was observed ($b = .015$, $se = .011$, $p = .179$; See table 10). While not statistically different from one another, when examining the conditional effects, results indicated that racial discrimination distress was associated with marijuana use for both service members currently in college ($b = .023$, $se = .011$, $p = .045$) and those not currently in college ($b = .008$, $se = .002$, $p < .001$), when demographics variables and trauma were included as covariates.

With reference to problem marijuana use, similar results were observed. With enrollment status as a moderator, no significant interaction was observed within the association between racial discrimination distress and problem marijuana use ($b = .033$, $se = .019$, $p = .089$; See table 10). When examining conditional effects, results indicate that racial discrimination distress was associated with problem marijuana use for both service members currently in college ($b = .008$, $se = .003$, $p = .026$) and those not currently in college ($b = .040$, $se = .019$, $p = .038$), when demographics variables and trauma were included as covariates.

DISCUSSION

The present study aimed to evaluate the relationship between trauma and racial discrimination distress, with marijuana use/consumption and problem use among Black young adults. I hypothesized that general trauma would be associated with marijuana behaviors. Second, in line with the biopsychosocial model of racial discrimination (Clark et al., 1999), I hypothesized that racial discrimination distress would be positively associated with the health outcome of marijuana use and problem use above and beyond non-race specific traumatic experiences. Third, I explored whether there was variation in the association between racial discrimination distress and marijuana behaviors, controlling for trauma and demographic variables, among subgroups of Black young adults. Specifically, I examined the moderating effect of gender and vocation.

General observations of the present data indicate that the present sample was not representative of clinical levels of marijuana use. For participants included in the current study, mean values across all variables except racial discrimination were below the average scores of each measure. This was interesting to observe particularly as it pertains to the outcome variables, given a major component of the present study is the concept that Black young adults are using marijuana at elevated rates. Marijuana use could range from 0-8 with problem use ranging from 0-24. In the present study the average score on the marijuana use subscale was 1.21 and 2.99 for problem marijuana use. This is important to consider as many of those who met inclusion criteria for the present study are only consuming small amounts of marijuana and are not experiencing significant problems associated with use. Comparable studies have found marijuana use rates on average about 4.78 using the full CUDIT (Zapolski et al., 2021). Possible explanations could include that there is a chance of systematic underreporting, or that this is not a representative sample that may impact the generalizability of the findings.

Conversely, these findings could add to the necessity for improvements in cannabis use assessment. Perhaps these values misrepresent accurate assessment of use based on the study instrument. While the CUDIT is the most widely used measure of marijuana use, it may garner inconsistent interpretation of dose and content (Watkins et al., 2021). What I report in the present study as marijuana use mostly captures frequency and duration of use, not quantity of use, which does have important implications on the effects obtained. Marijuana use can include various

methods with varying degrees of intensity (blunt/tobacco co-use, wax, bowl, edible, medicinal CBD with no THC). Participants may have different interpretations of the duration of feeling “stoned” relative to the method of use. For example, blunt use in a small group of people may yield a different response pertaining to intoxication duration compared to solo wax use which has a greater proportion of THC but used in a shorter duration (Watkins et al., 2021). Future studies can continue to examine more effective ways to measure marijuana use to potentially capture more accurate representation. Additionally, the following results should be interpreted with a degree of caution given that the sample were not heavy users. Replication in a larger sample with more range in reported use could impact findings and implications of findings presented below.

Association between trauma and marijuana use behaviors

As an important first step the present findings, as hypothesized, I found that experiences of trauma were associated with both marijuana use behaviors. This finding is consistent with the stress coping theory, which posits that engagement in substance use may be used as a coping response to stressful external stimuli (Lazarus & Folkman, 1984). Given the overlap of marijuana behaviors with exposure to trauma at subclinical levels, these results provide helpful context to other patterns of health outcomes we observe within this population. For example, Black adults report high rates of adverse mental and physical health problems like asthma and high blood pressure, and psychosis (Bechtold et al., 2015; Green et al., 2016; Kogan et al., 2017) When evaluating these prevalence rates, it is also important to consider the relationship trauma exposure and marijuana use have on their physical health risk. For example, treating high blood with medication alone may not consider the impact of prolonged experiences of neighborhood violence or marijuana use to cope with said violence. These factors remain areas of continued concern as both trauma and marijuana use are significantly impactful on health independently, but future research should continue to examine their collective impact on health, given this association. What was surprising is that the effect sizes were relatively small. As aforementioned, the relatively small effect size could be a function of the sample, which reported low rates of marijuana use. However, I would still consider these effects meaningful, as they do provide empirical support for a positive association between trauma and marijuana use. Yet, given the dearth of literature that has examined the relationship between trauma and marijuana use, particularly among Black young adults, additional research in this area is warranted.

Moreover, research is needed that employs prospective or experimental designs to test the temporal ordering of trauma on marijuana behaviors.

If there is strong evidence to suggest the temporal relationship between trauma and marijuana use, this could have particularly important implications from a clinical standpoint, as often substance and trauma treatment are not considered clinical concepts to examine until they reach pathological levels (substance use disorder diagnosis or PTSD diagnosis). However, significant associations between these concepts at a subclinical level, such as levels observed within the current study, is important information to consider in the concept of overall health. A holistic treatment approach would ascertain utility in providing support for the whole person, not just their mental health needs. This could look like any provider assessing for experiences of trauma as we know this to impact the entire body. Additionally, marijuana use is often only observed through the lens of the deleterious implications on physical health, without consideration of the role the individual reports marijuana plays for them (Bechtold et al., 2015; Green et al., 2016; Kogan et al., 2017; Memedovich et al., 2018). Perhaps all parties invested in the health of marijuana users could first inquire about the individual's perception about their use, as it could be associated with alleviation of distress, as opposed to purely maladaptive behavior. These are concepts that should continue to be evaluated as there is evidence of overlap that can increase vulnerability adverse health outcomes.

Association between racial discrimination and marijuana use behaviors

The second aim of the study was to examine the unique and additive effect of racial discrimination distress and marijuana behaviors among Black young adults. For marijuana consumption, the present findings indicated that racial discrimination provides unique and incremental variance in marijuana use above effects observed by trauma and study covariates. While the present study is not longitudinal therefore causal claims cannot be made, these results indicate that higher levels of racial discrimination related distress is associated with higher levels of marijuana consumption. Moreover, given that study findings indicated that the association between racial discrimination distress and marijuana consumption was found above the effect of general trauma, providing unique and additive variance in the model, suggests that racial discrimination should be considered in models with general trauma. This finding is also in line with the race-based traumatic stress theoretical framework (Bryant-Davis 2005; Bryant-Davis,

2007; Carter, 2007; Polanco-Roman et al., 2016), positing that racial discrimination should be considered within traditional forms of trauma. Given the pervasive nature of racism against Black young adults (Assari et al., 2017; Williams & Mohammed, 2009), one could gather from the present study that the prevalence of marijuana use within this community should be examined within the context of compounding psychological stressors, such as exposure to racial discrimination, as well as other forms of stress.

The present findings are also important to consider within the context of the normalization of marijuana use. The pattern of use experienced by other race groups may be indicative of using marijuana in a recreational and social context. However, it could be that use within Black adults may be initiated with the same intentions, but the sedating effect of marijuana may also serve as a mechanism by which to alleviate symptoms of distress based on racist experiences. As such, legalization could play a deleterious role in aiding in the alleviation of distress but not adequately addressing the root of the problem (i.e., racism). Therefore, the present results would be beneficial for providers and health professionals to inquire with Black young adults who endorse marijuana use about experiences of race-related distress. Moreover, Bryant-Davis and Ocampo (2006) have established models to integrate race-related distress into traditional trauma treatments. Utilizing labelling of racist experiences, creating affirming environments in the therapeutic space, and educating Black adults on the ways racism negatively impact health have been effective strategies to not only decrease PTSD symptoms but also maladaptive behaviors and health concerns (Carter et al., 2020; Williams et al., 2021).

For problem marijuana use, while trauma alone predicted problem marijuana use, racial discrimination distress did not uniquely predict above traditional forms of trauma. One plausible explanation for this null effect is that despite findings with trauma alone, racial discrimination may not add to our understanding of problem use during this timeframe. It could be that this effect may be observed later into adulthood where Black individuals report more problems as a consequence of marijuana use (Bechtold et al., 2015; Green et al., 2016; Kogan et al., 2017). It could be that particularly during young adulthood these experiences of racial discrimination distress in new environments may not yet be as impactful on problem marijuana use in the way we see with trauma (Assari et al., 2017). Relatedly, although the current sample included some individuals with more severe cannabis use, they made up less than 14% of the sample and given that the CUDIT-R is not a diagnostic tool, these individuals may not actually meet criteria for a

CUD diagnosis. Thus, these findings may have been different if I oversampled for clinical populations. This potentially could have led to enough power to detect an effect if one were present (Hasin et al., 2016). Replicating these findings among clinical samples or later into adulthood may be critical to understanding the role racial discrimination plays in problem marijuana use.

Additionally, it is of note that problem marijuana use was weakly correlated with racial discrimination in this sample. These findings could be accurate, suggesting that racial discrimination distress is not significantly related to problem marijuana use. While I do not believe this to be the case, it could be that the assessment of problem marijuana use does not accurately capture cultural indicators of problem use. Many factors we know to be associated with prolonged use such as increased feelings of paranoia, police involvement, excessive money spent obtaining marijuana, and cardiovascular concerns are missing from the CUDIT assessment. Thus, this adds to the necessity of a more nuanced definition of problem marijuana use. Perhaps there are differences based on culture, health, normality of use, availability and access that are correlated with discrimination experiences, but missed in this evaluation.

Future Directions for Aims 1-2

Given the differential findings by marijuana consumption and problem use, the present study adds utility in assessing marijuana use from both perspectives. Limiting studies to marijuana consumption may not capture previous findings that problem marijuana use is associated with other substance use disorder diagnoses, affective disorders, anxiety, and personality disorders (Hasin et al., 2016). Additionally, as marijuana legalization, availability, and norms about use increase in the United States, our culture may benefit from a greater understanding of motives of use, misuse, and abstinence particularly among Black young adults. Ultimately, while opinions of marijuana consumption have shifted to be somewhat normative (Blevins et al., 2018), use to combat the effects of external factors should remain a public health concern, as well as in the forefront of future studies in this area.

Finally, the present findings are an initial step indicative of future exploration. These results provide an example of the biopsychosocial model of racial discrimination but there are other facets in the model that were not explicitly examined in this study. Clark and colleagues (1999) proposed that maladaptive coping strategies associated with racial discrimination

experiences influence health behaviors. Perhaps other coping responses are elicited as a result of racial discrimination distress that may influence problem marijuana use or potentially act as a protective factor. As mentioned previously, based on the model coping responses can be general strategies to deal with stressful stimuli to mitigate the effects of perceived racism. As such, perhaps what is missing within the present studies applicability of this model, due to its correlational nature, is a richer consideration of adaptive coping strategies that may protect against health outcomes like problem marijuana use as a consequence of racial discrimination distress (Bravo et al., 2017; Jones et al., 2018). While outside of the scope of the present study, perhaps prior to marijuana use reaching a problematic level other adaptive coping responses to racial discrimination distress are elicited to combat negative health outcomes like cannabis use disorder diagnosis (Clark et al., 1999). The psychological and physiological response to marijuana use may feedback into the formulation of more adaptive coping strategies through the increased feelings of elation, focus, and enjoyment experienced during use (Green et al., 2003; Jones et al., 2018; Reboussin et al., 2020). Thus, further research is needed to better understand other facets of the model of perceptions of racism on health outcomes.

Racial discrimination and marijuana use by gender and vocation

The biopsychosocial model of racism asserts that one's perception of an event as racist is moderated by sociodemographic factors including gender and vocation (Clark et al., 1999). As such, an important implication to consider when examining the association between racial discrimination and marijuana use behaviors are these factors. The third aim of the present study was to evaluate if the hypothesized association of racial discrimination with marijuana use and problem use varied based on gender (male versus female) and by vocation (current college students, military service members, and a community sample).

Gender

When examining study variables by gender, a significant difference was observed in reported racial discrimination scores with females reporting more racial discrimination distress on average compared to males, and males were more likely to report more problem marijuana use. Trauma and marijuana use were comparable in each group, but gender was not correlated with either variable. While there are many explanations and implications for this observed

relationship, perhaps specific to racial discrimination distress, males may be less likely to report distress associated with these experiences as the items included may be more prevalent among men (Franklin & Boyd-Franklin, 2000; Hoggard et al., 2015). According to the invisibility syndrome model, Black men engage in an inner evaluative process and adaptive behavior as a consequence of lifetime experiences of racism (Franklin & Boyd-Franklin, 2000). Thus, they may be less likely to indicate distress as a consequence of these experiences in the same way we observe in women (Franklin & Boyd-Franklin, 2000). In turn, women are more likely to externalize and may be more motivated to disclose (Abrams et al., 2019). This struck me as a rich area of continued exploration. These findings are wholly inconsistent with previous studies, which is still notable as many studies have looked at these concepts in a vacuum and not in a comprehensive model (Assari et al., 2019; Balsam et al., 2015; Goodwill et al., 2018; Hakimi et al., 2018; Hurd et al., 2014; Keyes et al., 2015; Rich & Grey, 2005; Vu et al., 2019). Future studies may continue to evaluate these variables and how they may or may not differ by gender.

With respect to the primary aims, neither model predicted a gender by racial discrimination interaction effect such that there were no statistically significant differences in the relationship between racial discrimination and marijuana use or problem use for males compared to females. However, conditional effects revealed the association between racial discrimination distress and marijuana use was found for females but not males. Taken together, these results indicate that prevention and intervention methods aimed at combating the negative effects of racial discrimination may not need to be tailored to differences experienced by gender. As noted previously, literature by gender is mixed, with Vu and colleagues (2019) findings similar results to the present study, yet Assari and colleagues (2019) found the opposite. While comprehensive conclusions were not obtained in the present study, future studies may consider the interaction of gender discrimination with race to observe if *gendered* racial discrimination may differentially impact males and females. Finally, it is of note that I chose to represent binary genders in the present analysis due to low endorsement rates of non-binary gender identification in the full survey (n=2). Thus, future studies may aim to evaluate these relationships within non-binary populations of Black adults.

Vocation

With respect to vocation, there was not a significant interaction between any of the three vocation paths and racial discrimination distress on marijuana behaviors. Yet, the effect among military and college students was approaching significance for marijuana use, which could indicate a moderating effect. If significant findings were found within these subgroups, it could have added to the presumptions of the present project that within the Black community, college may serve as a protective factor of the impact of racial discrimination distress on marijuana behaviors. However, null effects indicate no significant difference in the association of racial discrimination distress and marijuana behaviors by vocation. A plausible explanation could be the disproportionate sample size between groups, with the military group being the smallest subset ($n=91$, compared to college with $n=175$ and community with $n=125$). It is plausible that there was not enough power to detect a difference between groups if they were present. Given the lack of studies published evaluating marijuana use among service members and its association with race-based trauma, and the trending moderating effect observed in the current study, there is a need to continue to evaluate marijuana use among service members and the association between racial discrimination distress and trauma.

Although overall moderating effects were not significant across outcomes, there were some interesting findings observed within the conditional effects. Specifically, conditional effects revealed a significant association between racial discrimination and marijuana use, not problem use, within the community and military samples. While not statistically different from each other or college students, these results could warrant further exploration about the differential impact of these variables on vocation subgroups, as the lack of significance could be due to power constraints. If moderating effects are found on the relationship between racial discrimination distress and marijuana outcomes by vocation, such that effects are more pronounced among military and community Black young adults compared to college young adults, this could suggest that studies that only include college students may be missing a riskier subset of adults. Based on previous studies, Black young adults who were less educated were more likely to be adversely affected by trauma and racial discrimination experiences (Borrell et al., 2007; Ford, 2012; Marcenko et al., 2000). As such, more research is needed in this area to confirm this relationship. Given the lack of research about college age adults not currently

enrolled, future studies should continue to capture a broader spectrum of Black individuals when evaluating behavior patterns.

In addition to more research examining vocation as a moderator, there were also some interesting findings that emerged within the military subgroup in particular that warrants discussion. Within the present findings, the military group had the lowest average reported trauma and racial discrimination scores compared to the college and community groups. When examining this further, perhaps the present study could reflect that some aspects of military culture may act as a protective factor. Previous studies have found trauma exposure to be greater among service members of color, even when controlling for combat exposure (Carlson et al., 2018), finding that race-specific experiences (e.g., racial discrimination) play a prominent role in poorer health outcomes among minority service members (Carlson et al., 2018; Dohrenwend et al., 2008), and greater risk for substance use compared to their White counterparts (Hruby et al., 2018; Williams et al., 2016). It is of note that these previous studies have not looked exclusively among Black service members. What is known is that military culture in many ways is an insulated environment such that individuals from various walks of life are organized together into interdisciplinary teams where trust and interdependence could be critical to survival (Carlson et al., 2018). As such, I can speculate that when discrimination incidents arise, it could be that more avenues for affirming social support are readily available through the close proximity of other service members of color. Service members are also likely to spend much of their time interacting with other service members, as opposed to civilians. Given emphasis on authority and respect, it could be that racial discrimination experiences are more covert and less likely to be comparable to the experiences listed in the measure used in the present study.

Based on this assessment, it is suggested that additional studies are warranted that utilize qualitative methods to discern overt experiences of racism specific to the military, that can then be used to empirically evaluate their prevalence across groups. With respect to trauma, I assumed the experience of combat unique to the military would be correlated with several traumatic experiences. However, it could be that given that service members are aware of the possibility of combat from the time they enlist, they could have a desensitized view on the interpretation of experiences as traumatic. These results could reflect the propensity of service members, relative to other groups, to be conditioned to not perceive events as traumatic. Notwithstanding that those who may not have combat experience would endorse similar events as traumatic. Given that

recruitment material targeted toward service members specifically indicated trauma, it could be that they were conditioned to dismantle beliefs about events of their past as negative. Overall, the unique experiences of Black service members are significantly understudied. While many of the aforementioned factors could have played a role in the presented findings, there is not enough information known currently about these relationships within this group to garner concrete conclusions.

Finally, sensitivity analyses revealed that the association between racial discrimination distress and marijuana use were similar for those currently serving and veterans, indicating that despite veteran status or college status the association between racial discrimination and marijuana use behaviors are similar within these groups. It is of note that neither trauma exposure nor racial discrimination distress asked about military-specific experiences in the present study. Thus, results may be variable with this taken into consideration. Given this evidence, it is suggested that those invested in the health of military service members should first replicate present findings with a larger sample to confirm whether the relationship between racial discrimination distress and marijuana use does vary based on veteran versus active duty status. Second, if results hold indicating no differences, stakeholders should consider allocating more resources to education around allyship and discrimination for service members, but also how to mend relationships ruptured by discrimination, to decrease vulnerability for maladaptive behavior consequently. Recently, race-based stress and trauma group interventions have been implemented across Department of Veteran Affairs to help combat the negative effects of racial discrimination on veterans of color (Bryant-Davis & Ocampo, 2006; Carlson et al., 2018). By continuing research among Black service members, these findings are in line with the goals of these interventions, which would be to decrease negative health behaviors, including marijuana use, by way of addressing the distress associated with race-based discrimination experienced during military service.

Limitations

The present study was conducted with considerable effort to extend current knowledge, but there are some notable limitations to disclose. The first limitation is the nature of data collection, which was exclusively online. I was explicit about issues that arose in the data collection process and was relatively conservative in my discernment of which, if any, responses

could be kept. While I stand behind the validity of the data included, there is always a risk of deception with computer-based methods of recruitment. I do believe it would have been difficult to obtain as many participants as possible in the timeframe allotted if the test were administered in person. However, online recruitment remains a limitation as we are less likely to be able to control if real people are completing the survey and completing it accurately. Relatedly, perhaps including terminology indicating substance use evaluation may have promoted more comfortability disclosing use or enticed marijuana users to engage in the study. Human subject studies are often limited by the type of people who are motivated to complete them. In the present study, the SONA recruitment, where most college students were obtained, and MTurk recruitment sources were comprised of individuals who are highly motivated to complete surveys. You could argue they would be more likely to complete surveys and perhaps more often intrinsic about their own patterns of behaviors or perspectives. This could have an impact on their results as they may not be a truly representative sample. Even further, MTurk users may be more skilled in deception of online studies for monetary gain (Redmiles et al., 2019). Less is known about other recruitment sources. While the social media group obtained the largest proportion of participants for this study, it could be that the advertisement itself may influence reporting or motivations to report accurately. While these are limits of the present study, I can stand firm in the attempts that I made to ensure accuracy of reporting. These are also very common methods of recruitment (Redmiles et al., 2019), therefore this might be an appropriate limitation for most studies.

Second, while the present study aims to examine the relationship between racial discrimination distress and marijuana use above and beyond trauma, these constructs were examined through a cross-sectional design, thus I was unable to make inferences on causal relationships. Although causal effects cannot be definitively drawn from these findings, I do believe this study is a good starting point to further evaluate not only racial discrimination on marijuana use, but how these occurrences may be different across groups.

Thirdly, considerations should be made to consider potential response bias of constructs that may be influenced by region. Previous studies have found that Black adults living in the south are less likely to perceive innocuous events as racist due to “status quo,” despite findings of an increase prevalence of racist events (Kim et al., 2017). These areas are also largely comprised of Black individuals which often act as a buffer to distress of racist experiences.

Conversely, Black individuals in the western region are more likely to report distress associated with racism as they are more likely to be educated and there is a smaller proportion of Black individuals in these areas (Kim et al., 2017). Perhaps a limitation of the present findings as it pertains to racial discrimination is relative to some degree of response bias. My data collection location is in a predominantly White area in the Midwest which could influence interpretation of racist events (Kim et al., 2017). However, I am limited by not having gathered information regarding the region of each participant, which is increasingly important in online studies.

Fourth, the project was approved assuming a medium effect size ($f^2 = 0.15$), where a total sample of 166 would provide necessary power. However, the final sample of 391 yielded small effect sizes. Thus, when small effects are taken into consideration, $f^2 = 0.02$, an adequate sample size would be 1,188. Thus, in order to observe an effect if one were present, I would have needed about 800 more participants. This limitation is particularly important relative to the moderator variables where individual effects were observed but not interaction effects. Therefore, the present results are limited by power. With power in consideration, the small effects observed limits the replicability and implications made. While this could be a function of power, it could also be that trauma and racial discrimination are only small parts of the big picture of marijuana use behaviors among Black young adults. I believe racial discrimination is an important factor to consider, but these small effects indicate that it is likely other factors may also be impacting use. For example, areas of exploration could include perception of normality of use, motivations of use, and neighborhood distress.

A fifth limitation is that all study variables except racial discrimination were not normally distributed. As stated previously, less than half (42.3%) of the present sample reported marijuana use in the past 6 months. Given that recreational marijuana use is decriminalized but not legal in the state of data collection, it could be that the present sample may not have felt confident accurately reporting use. Going further, recruitment materials did not disclose explicit evaluation of substance use, consistent with the parent study, which may have also skewed reporting. While there may have been issues in the recruitment process, it could also be plausible that the present sample were honest in their report and are not a nationally representative sample of marijuana users. Additionally, 91.6% of the sample endorsed ever experiencing a traumatic event yet this variable was also not normally distributed. These ultimately may have contributed to study findings and are thus limitations of the presented results.

Finally, my construct of racial discrimination measures the distress associated with multiple experiences of racial discrimination. Thus, I am limited in my conclusions to discern between those who endorsed feeling minimally distressed across multiple discrimination experiences, and those who experience significant levels of distress as a consequence of a couple of discrimination experiences. It is possible that if similar constructs were used (both frequency or both distress), different results could have been yielded on the incremental impact of racial discrimination above trauma. However, I was bound by the constructs included in the parent study. Future studies may evaluate this relationship separately for distress and frequency of experiences.

CONCLUSIONS

The current study aimed to extend existing literature by examining the relationship between trauma, racial discrimination distress, and marijuana use behaviors among Black young adults. Several results were in line with the stated hypotheses, providing support for including racial discrimination within the context of traumatic events, particularly when evaluating engagement in health risk behaviors, such as, marijuana use within this population. Additionally, as marijuana use increases in normality, the present findings add to the literature of factors that may be accounting for marijuana use among Black young adults. As such, the biopsychosocial model of discrimination helped to illustrate the process by which racism impacts health outcomes relative to maladaptive coping strategies. The present findings are important for those invested in decreasing the likelihood of problem marijuana use in later adulthood among Black adults, as well as those invested in examining how distress associated with racial discrimination impacts the lives of the Black community. Ultimately, the present results support that when examining psychological and health outcomes among Black young adults, it is integral to include an evaluation of racial discrimination distress.

Moreover, examining subgroups revealed that the association between racial discrimination and marijuana use were not statistically different by subgroup. However, this was the first known study to examine these relationships among Black young adults. Thus, despite null findings in the presented moderators by binary gender and vocation, future studies should continue to evaluate these subgroups in larger representative samples, to garner more definitive conclusions. It is also integral to evaluate not just endorsement of marijuana consumption but also problem levels of use to potentially decrease downstream negative outcomes associated with problem marijuana use. The significance in this study is the necessity to continue to quantify the impact of racism on various health outcomes. I hope this study continues to move the field forward in assessment of race-specific traumatic events on the everyday lives and health of Black people. While racial discrimination is not easily eliminated in American culture, the present study provides further evidence of how these experiences negatively impact health above and beyond non-race specific traumatic events, particularly within young adulthood. Therefore, more research is needed in this area to continue to inform more inclusive and representative community-based research.

TABLES

Table 1. Demographics for First the Full Sample, Then Gender, and Vocation Subgroups.

| | Full sample | Male | Female | College | Comm. | Military |
|------------------|--------------------|-----------------|-----------------|-----------------|--------------|-----------------|
| | N (%) | n (%) | n (%) | n (%) | n (%) | n (%) |
| Age ⁺ | 24.9 (5.05) | 26.26 (4.49) | 23.85 (5.19) | 21.23 (3.95) | 27.9 (4.14) | 27.7 (3.14) |
| Gender | | | | | | |
| Male | 166 (42.5) | | | 40 (22.9) | 58 (46.4) | 68 (74.7) |
| Female | 225 (57.5) | | | 135 (77.1) | 67 (53.6) | 23 (25.3) |
| Income | | | | | | |
| <\$25000 | 161 (41.2) | 40 (24.1) | 121 (53.8) | 133 (76.4) | 28 (22.6) | 0 |
| \$25000-34999 | 57 (14.6) | 31 (18.7) | 26 (11.6) | 13 (7.5) | 19 (15.3) | 25 (27.5) |
| \$35000-49999 | 79 (20.2) | 45 (27.1) | 34 (15.1) | 10 (5.7) | 19 (15.3) | 50 (55) |
| \$50000-74999 | 30 (7.7) | 14 (8.4) | 16 (7.1) | 8 (4.6) | 17 (13.7) | 5 (5.5) |
| \$75000-99999 | 23 (5.9) | 15 (9) | 8 (3.6) | 4 (2.3) | 18 (14.5) | 1 (1.1) |
| \$100000-149999 | 31 (7.9) | 15 (9) | 16 (7.1) | 5 (2.9) | 18 (14.5) | 8 (8.8) |
| >\$150,000 | 8 (2.0) | 5 (3) | 3 (1.3) | 1 (.6) | 5 (4) | 2 (2.2) |
| Vocation | | | | | | |
| College | 175 (44.8) | 40 (24.1) | 135 (60) | | | |
| Community | 125 (32.0) | 58 (34.9) | 67 (29.8) | | | |
| Military | 91 (23.3) | 68 (41) | 23 (10.2) | | | |

Note. N=391 for the full sample. Income included in analysis as an integer, age restricted to 18-35.

Table 2. Descriptive Statistics for Study Variables Stratified by Subgroup.

| Mean (<i>sd</i>) | Full Sample | Gender | | Vocation | | |
|----------------------------------|----------------|-----------------|-----------------|------------------------------|------------------------------|------------------------------|
| | | Male | Female | College | Community | Military |
| Trauma | 15.2 (19.7) | 14.9 (20.4) | 15.5 (19.2) | 13.7 ^{ab} (16.0) | 22.8 ^{ac} (24.2) | 7.79 ^{bc} (15.3) |
| Racial discrimination | 55.6 (23.6) | 47.4* (22.6) | 61.6* (22.5) | 63.4 ^b (21.5) | 61.2 ^c (20.0) | 32.9 ^{bc} (16.7) |
| Marijuana use | 1.21 (1.87) | 1.39 (2.01) | 1.07 (1.76) | .914 ^a (1.60) | 1.81 ^{ac} (2.21) | .945 ^c (1.69) |
| Problem marijuana | 2.99 (4.98) | 3.85* (5.25) | 2.36* (4.69) | 1.86 ^{ab} (3.98) | 4.46 ^a (1.01) | 3.15 ^b (4.83) |

Note. *sd*= standard deviation. Mean values represent raw average scores. In the analysis trauma and both marijuana outcomes were transformed.

* Indicates a significant difference between values by gender

^a Indicates a significant difference between college and community

^b indicates a significant difference between college and military

^c indicates a significant difference between military and community

Table 3. Pearson's Correlation for Study Variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------|---|----------|----------|---------|---------|---------|----------|
| 1. Age | | -.237*** | .449*** | .109* | -.148** | .059 | .104 |
| 2. Gender⁺ | | | -.222*** | .079 | .299*** | -.093 | -.171*** |
| 3. Income | | | | .386*** | -.017 | .303*** | .434*** |
| 4. Trauma | | | | | .419*** | .420*** | .418*** |
| 5. Racial Discrim | | | | | | .244*** | .121* |
| 6. Marijuana Use | | | | | | | .811*** |
| 7. Problem Marijuana | | | | | | | — |

Note. Racial Discrim= Racial discrimination; Gender: male=0 female=1. ⁺ = Correlation by gender is a point-biserial correlation.

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 4. Hierarchical Linear Regression of Trauma and Racial Discrimination on Marijuana Use.

| Variable | B | SE B | p-value | ΔR^2 |
|--------------------------|---------|------|---------|--------------|
| Step one | | | | |
| Age | -.005 | .004 | .145 | .246*** |
| Income | .042*** | .010 | <.001 | |
| Gender | -.053 | .030 | .080 | |
| Vocation (Community) | .049 | .041 | .240 | |
| Vocation (Military) | .002 | .046 | .961 | |
| Trauma | .211*** | .029 | <.001 | |
| Step two | | | | |
| Trauma | .183*** | .030 | <.001 | .016** |
| Racial Discrimination | .002** | .001 | .004 | |

Note. Gender: male=0 female=1. Vocation variable represents dummy coding with college as the reference group.

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 5. Hierarchical Linear Regression Trauma and Racial Discrimination on Problem Marijuana Use.

| Variable | B | SE B | p-value | ΔR^2 |
|--------------------------|---------|------|---------|--------------|
| Step one | | | | |
| Age | -.009 | .005 | .100 | .311*** |
| Income | .090*** | .014 | <.001 | |
| Gender | -.113** | .043 | .010 | |
| Vocation (Community) | .031 | .060 | .607 | |
| Vocation (Military) | .066 | .067 | .328 | |
| Trauma | .321*** | .042 | <.001 | |
| Step two | | | | |
| Trauma | .310*** | .044 | <.001 | .001 |
| Racial Discrimination | .001 | .001 | .419 | |

Note. Gender: male=0 female=1. Vocation variable represents dummy coding with college as the reference group.

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 6. Regression Analysis Examining the Association Between Racial Discrimination and Marijuana Behaviors, Moderated by Gender.

| | Marijuana Use | | | | Problem Marijuana Use | | | |
|----------------------------|---------------|-------------|-------------|-----------------|-----------------------|-------------|--------------|-----------------|
| | <i>b</i> | <i>se b</i> | <i>t</i> | <i>p-value</i> | <i>b</i> | <i>se b</i> | <i>t</i> | <i>p-value</i> |
| Racial Discrimination | .001 | .002 | .458 | .647 | -.002 | .003 | -.709 | .479 |
| Gender | -.100 | .073 | -1.37 | .172 | -.219 | .107 | -2.04 | .042 |
| RD x Gender | .001 | .001 | .532 | .595 | .002 | .002 | 1.04 | .301 |
| Age | -.006 | .004 | -1.61 | .109 | -.009 | .005 | -1.69 | .093 |
| Income | .041 | .010 | 4.29 | <.001 | .091 | .014 | 6.48 | <.001 |
| Vocation Community | .062 | .041 | 1.50 | .134 | .039 | .060 | .643 | .521 |
| Vocation Military | .054 | .050 | 1.07 | .284 | .078 | .074 | 1.06 | .288 |
| Trauma | .185 | .031 | 6.06 | .000 | .314 | .045 | 7.04 | <.001 |
| Conditional Effects | | | | | | | | |
| Male | .002 | .001 | 1.531 | .127 | -.001 | .002 | -.234 | .815 |
| Female | .002 | .001 | 2.76 | .006 | .002 | .001 | 1.23 | .220 |

Note. Vocation Community and Vocation Military labels denote dummy coded pairing with listed group as the target and college as the reference. RD=racial discrimination. RD x Gender indicates interaction term. All models controlled for age, income, vocation dummy coding (2), and trauma.

Bolding indicates significance <.05.

Table 7. Regression Analysis Examining the Association Between Racial Discrimination and Marijuana Behaviors, Moderated by Vocation with College as the Reference Group.

| | Marijuana Use | | | | Problem Marijuana Use | | | |
|------------------------------|---------------|-------------|--------------|-----------------|-----------------------|-------------|--------------|-----------------|
| | <i>b</i> | <i>se b</i> | <i>t</i> | <i>p-value</i> | <i>b</i> | <i>se b</i> | <i>t</i> | <i>p-value</i> |
| Racial Discrimination | .001 | .001 | 1.09 | .275 | -.001 | .001 | -.169 | .866 |
| Community | -.031 | .103 | -.306 | .760 | -.040 | .151 | -.267 | .789 |
| Military | -.094 | .091 | -1.03 | .302 | -.095 | .134 | -.707 | .480 |
| RD x Community | .002 | .002 | 1.03 | .306 | .001 | .002 | .592 | .554 |
| RD x Military | .004 | .002 | 1.92 | .055 | .005 | .003 | 1.64 | .102 |
| Age | -.005 | .004 | -1.52 | .129 | -.008 | .005 | -1.63 | .105 |
| Gender | -.061 | .030 | -2.05 | .041 | -.114 | .044 | -2.59 | .010 |
| Income | .038 | .010 | 3.97 | <.001 | .086 | .014 | 6.11 | <.001 |
| Trauma | .178 | .030 | 5.85 | <.001 | .303 | .045 | 6.77 | <.001 |
| Conditional Effects | | | | | | | | |
| College | .001 | .001 | 1.09 | .275 | -.001 | .001 | -.169 | .866 |
| Community | .003 | .001 | 2.16 | .031 | .001 | .002 | .608 | .544 |
| Military | .005 | .002 | 2.74 | .007 | .004 | .003 | 1.73 | .085 |

Note. Community and Military labels denote dummy coded pairing with listed group as the target group and college as the reference. RD x dummy coded variables indicates interaction terms. RD=racial discrimination All models controlled for age, gender, income, and trauma. Bolding indicates significance <.05

Table 8. Regression Analysis Examining the Association Between Racial Discrimination and Marijuana Behaviors, Moderated by Vocation with Military as the Reference Group.

| | Marijuana Use | | | | Problem Marijuana Use | | | |
|------------------------------|---------------|-------------|--------------|-----------------|-----------------------|-------------|--------------|-----------------|
| | <i>b</i> | <i>se b</i> | <i>t</i> | <i>p-value</i> | <i>b</i> | <i>se b</i> | <i>t</i> | <i>p-value</i> |
| Racial Discrimination | .005 | .002 | 2.74 | .007 | .004 | .003 | 1.729 | .085 |
| D Community | .063 | .099 | .635 | .526 | .055 | .146 | .375 | .708 |
| D College | -.094 | .091 | -1.03 | .302 | -.095 | .134 | -.707 | .480 |
| RD x D Community | -.002 | .002 | 1.059 | .290 | -.003 | .003 | -1.11 | .269 |
| RD x D College | .004 | .002 | 1.923 | .055 | .005 | .003 | 1.64 | .102 |
| Age | -.005 | .004 | -1.522 | .129 | -.008 | .005 | -1.63 | .105 |
| Gender | -.061 | .030 | -2.05 | .041 | -.114 | .044 | -2.59 | .010 |
| Income | .038 | .010 | 3.97 | <.001 | .086 | .014 | 6.11 | <.001 |
| Trauma | .178 | .030 | 5.85 | <.001 | .303 | .045 | 6.77 | <.001 |
| Conditional Effects | | | | | | | | |
| Military | .005 | .002 | 2.74 | .007 | .004 | .003 | 1.73 | .085 |
| Community | .003 | .001 | 2.16 | .031 | .001 | .002 | .608 | .544 |
| College | .001 | .001 | 1.09 | .275 | -.001 | .001 | -.169 | .866 |

Note. Community and College labels denote dummy coded pairing with listed group as the target group and military as the reference. RD x dummy coded variables indicates interaction terms. RD=racial discrimination. All models controlled for age, gender, income, and trauma. Bold indicates significance <.05

Table 9. Sensitivity Analyses Examining the Association Between Racial Discrimination and Marijuana Behaviors, Moderated by Duty Status.

| | Marijuana Use | | | | Problem Marijuana Use | | | |
|------------------------------|---------------|-------------|-------------|-----------------|-----------------------|-------------|--------------|-------------|
| | <i>b</i> | <i>se b</i> | <i>t</i> | p-value | <i>b</i> | <i>se b</i> | <i>t</i> | p-value |
| Racial Discrimination | .003 | .007 | .393 | .696 | .005 | .012 | .417 | .678 |
| Veteran status | -1.66 | .127 | -1.31 | .194 | -.123 | .220 | -.561 | .577 |
| RD x Veteran status | .003 | .004 | .785 | .435 | .002 | .007 | .246 | .806 |
| Age | .010 | .008 | 1.17 | .247 | .015 | .015 | 1.06 | .293 |
| Gender | -.091 | .054 | -1.70 | .093 | -.256 | .093 | -2.75 | .007 |
| Income | .069 | .023 | 2.98 | .004 | .160 | .040 | 3.96 | .001 |
| Trauma | -.089 | .069 | -1.29 | .199 | -.103 | .119 | -.867 | .389 |
| Conditional Effect | | | | | | | | |
| Active Duty | .006 | .004 | 1.603 | .113 | .007 | .006 | 1.08 | .283 |
| Veteran | .009 | .002 | 4.05 | <.001 | .008 | .004 | 2.23 | .029 |

Note. Active duty n= 45, Veteran n=46. All models controlled for age, gender, income, and trauma.

“RD x Veteran status” indicates interaction term.

Bolding indicates significance <.05

Table 10. Sensitivity Analyses Examining the Association Between Racial Discrimination and Marijuana Behaviors, Moderated by College Enrollment.

| | Marijuana Use | | | | Problem Marijuana Use | | | |
|------------------------------|---------------|-------------|--------------|-----------------|-----------------------|-------------|--------------|-----------------|
| | <i>b</i> | <i>se b</i> | <i>t</i> | p-value | <i>b</i> | <i>se b</i> | <i>t</i> | p-value |
| Racial Discrimination | .008 | .002 | 3.92 | <.001 | .008 | .003 | 2.27 | .026 |
| Enrollment status | -0.986 | .603 | -1.64 | .106 | -2.01 | 1.03 | -1.96 | .053 |
| RD x Enrollment | .015 | .011 | 1.36 | .179 | .033 | .019 | 1.72 | .089 |
| Age | .006 | .008 | .723 | .472 | .014 | .013 | 1.08 | .281 |
| Gender | -.108 | .054 | -2.02 | .047 | -.277 | .091 | -3.03 | .003 |
| Income | .069 | .023 | 3.01 | .004 | .156 | .039 | 4.00 | <.001 |
| Trauma | -0.076 | .069 | -1.09 | .277 | -0.087 | .118 | -0.733 | .466 |
| Conditional Effect | | | | | | | | |
| Current College | .023 | .011 | 2.04 | .045 | .008 | .003 | 2.27 | .026 |
| Not Current College | .008 | .002 | 3.92 | <.001 | .040 | .019 | 2.11 | .038 |

Note. Current college enrollment n= 4, Not current college students n=87. All models controlled for age, gender, income, and trauma.

Bolding indicates significance <.0

FIGURES

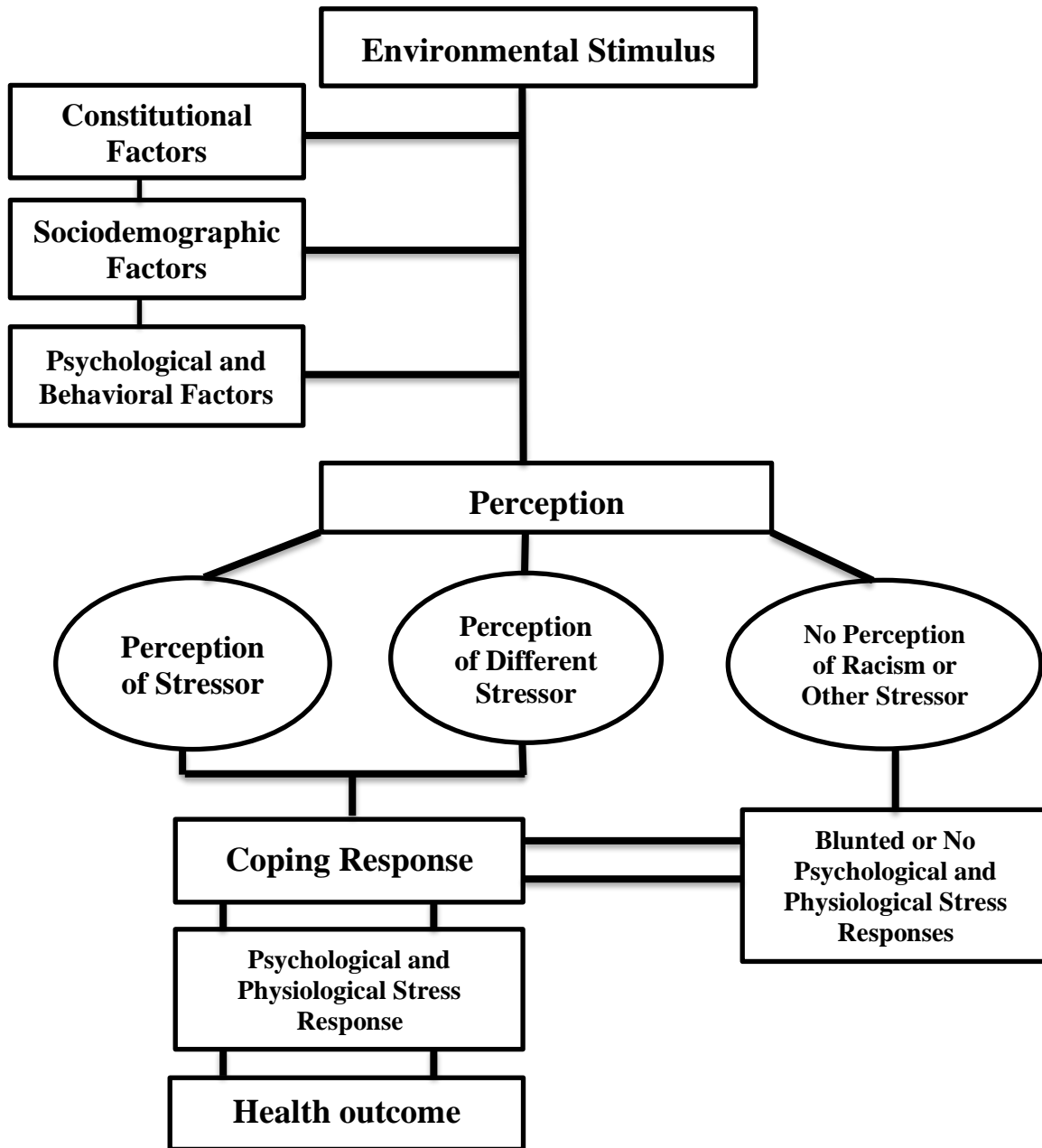


Figure 1. Clark and Colleagues (1999) Biopsychosocial Model of Perceived Racism

Notes: From "Racism as a stressor for African Americans: A biopsychosocial model" by R. Clark, N.B. Anderson, V.R. Clark, and D.R. Williams, 1999, *American Psychologist*, 54 (10), p. 805.

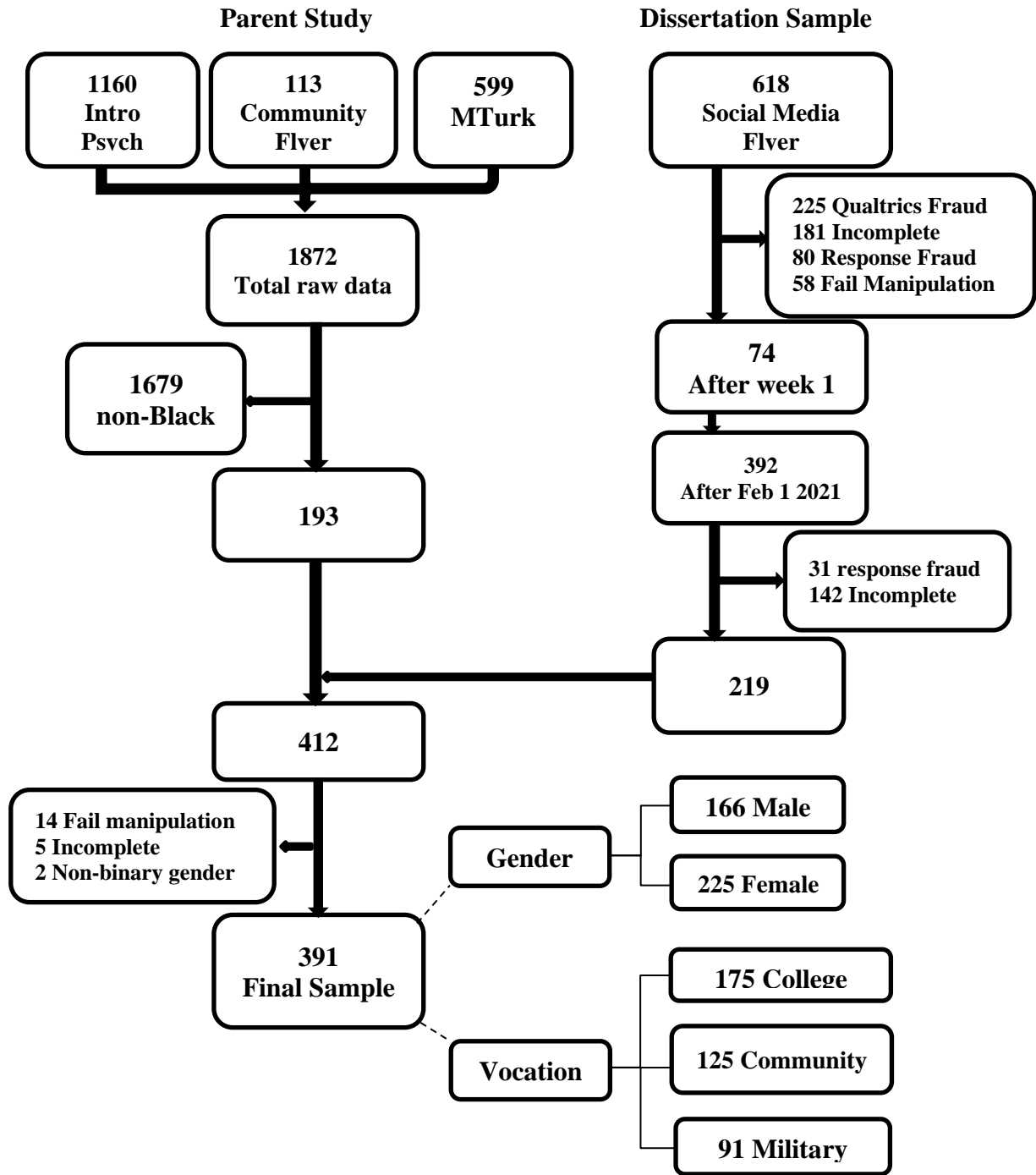


Figure 2. Data Collection and Cleaning Decision Tree

Note. Qualtrics fraud= Failed Qualtrics metrics embedded in the program. Incomplete= Study not complete greater than 25%. Response fraud= Duplicate responses, nonsensical responses in text entries, responses that included characters not available in qwerty keypads. Fail manipulation= Failed embedded manipulation checks within survey measures

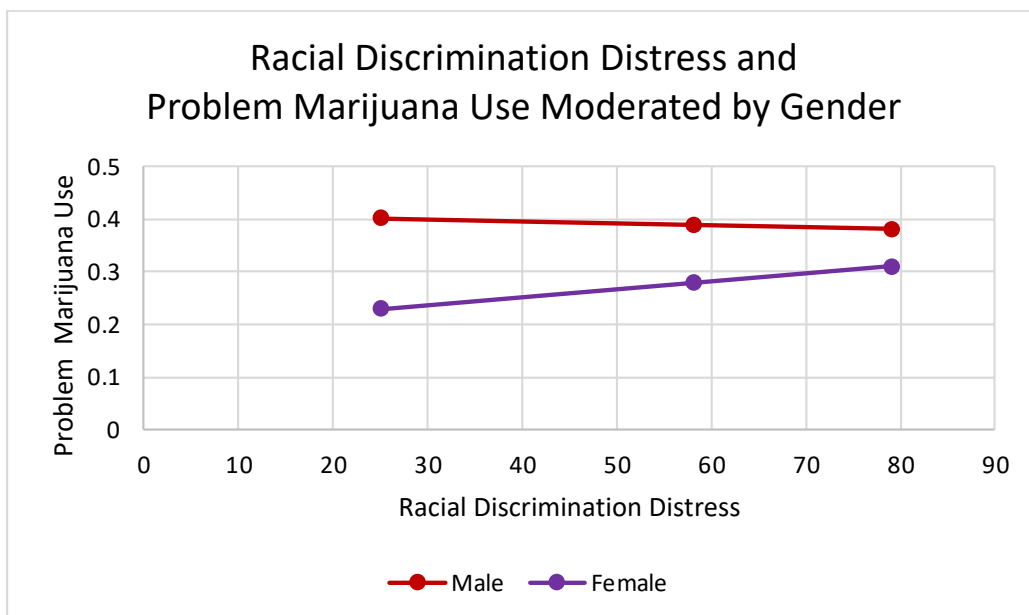
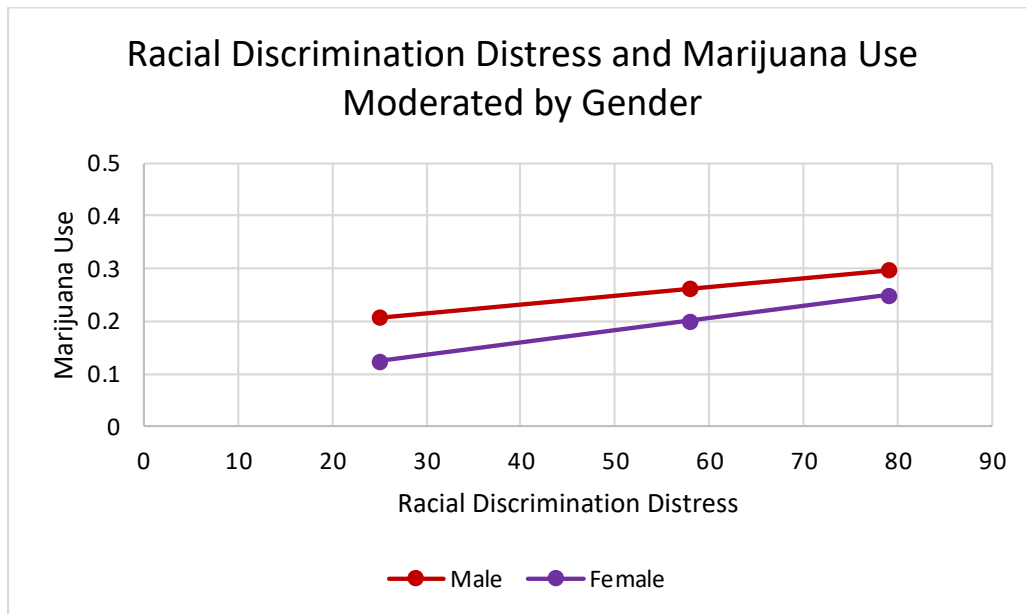


Figure 3. Conditional Effects of Racial Discrimination Distress on Marijuana Use Outcomes by Gender

Note. Male n= 166, Female n= 225. All groups are independent.

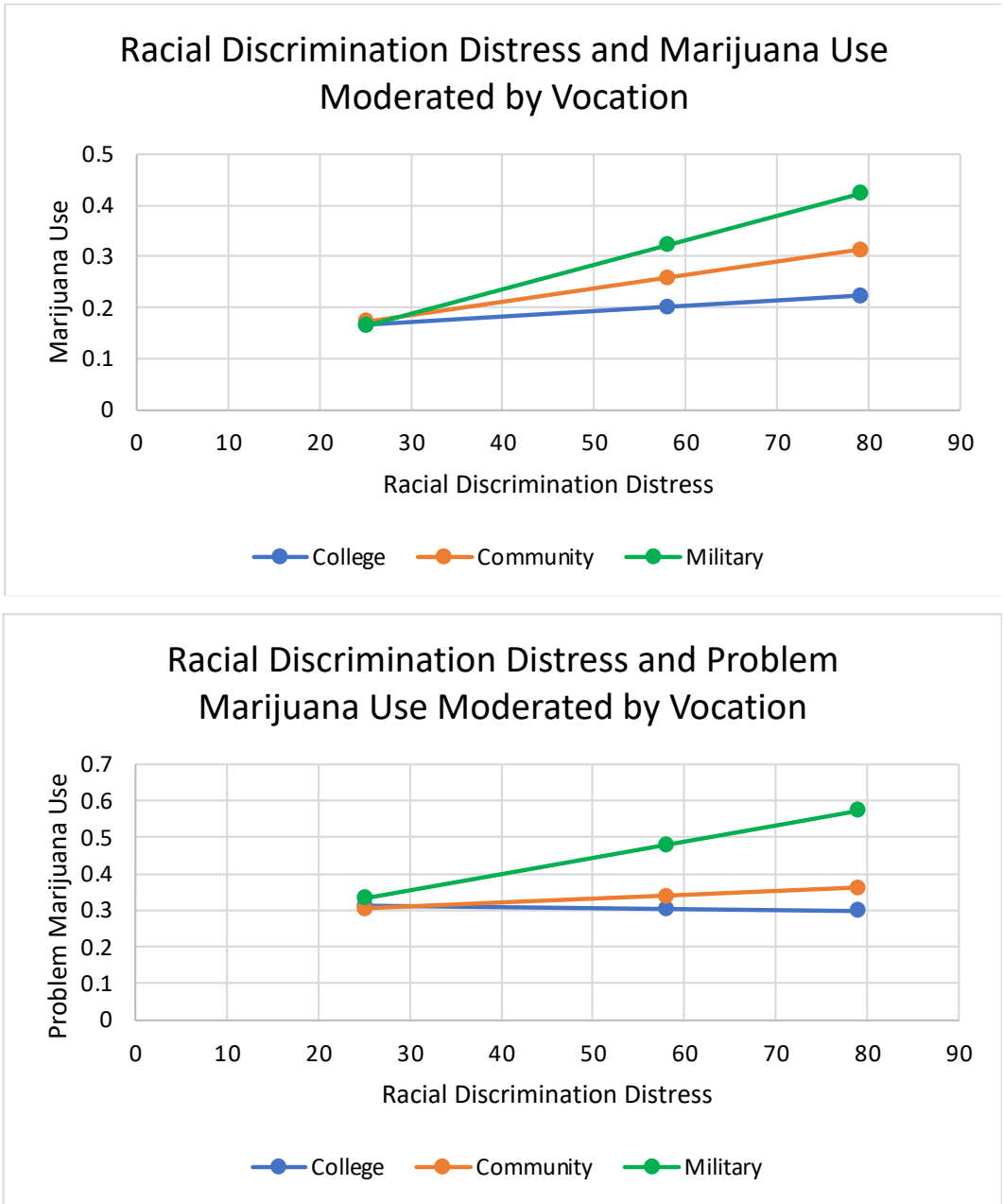


Figure 4. Conditional Effects of Racial Discrimination Distress on Marijuana Use Outcomes by Vocation

Note. College n= 175, Community n= 125, Military n= 91. All groups are independent.

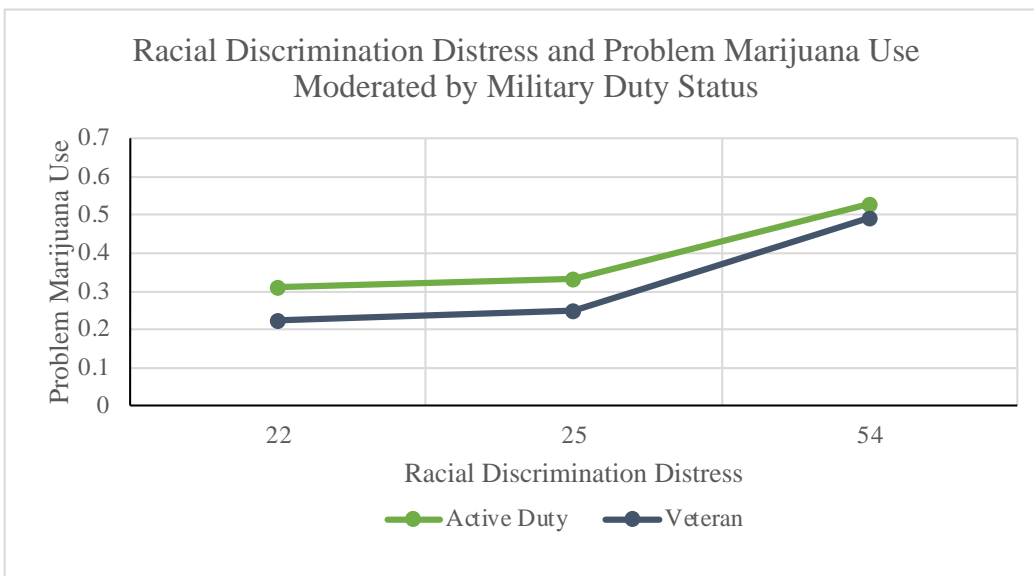
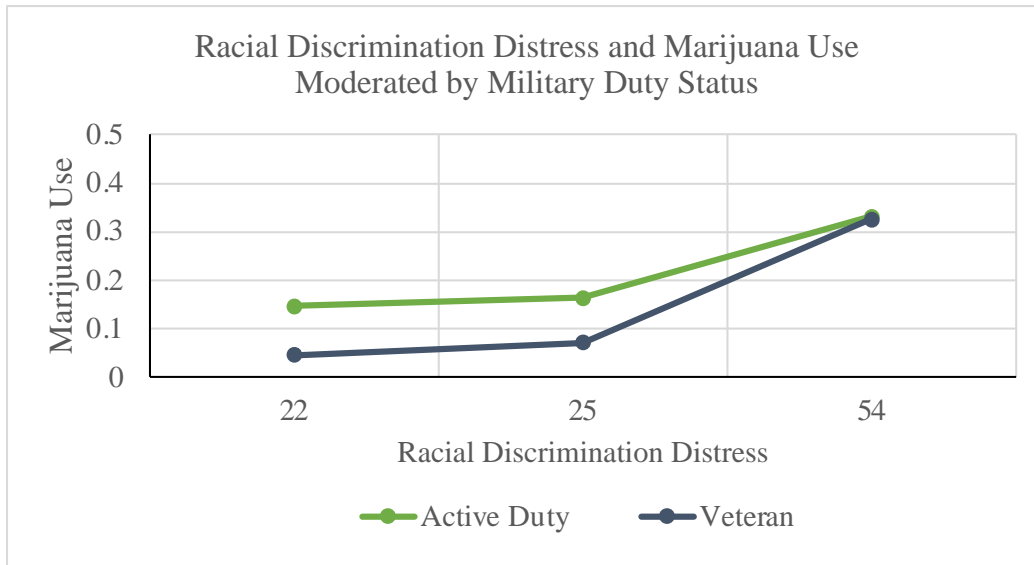


Figure 5. Sensitivity Analysis of Conditional Effects on Racial Discrimination Distress on Marijuana Use Outcomes Within Military Group by Duty Status

Note. Active duty n= 45, Veteran n=46. All groups are independent.

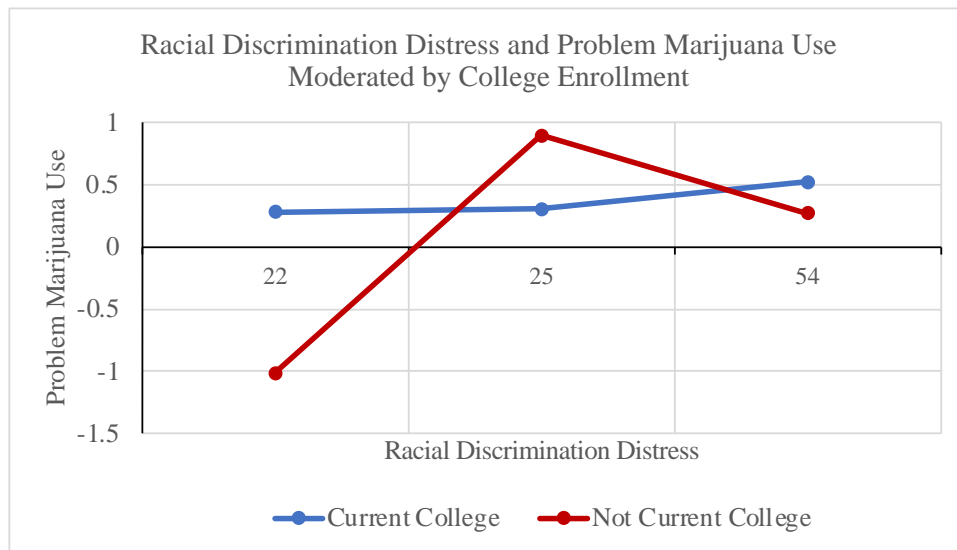
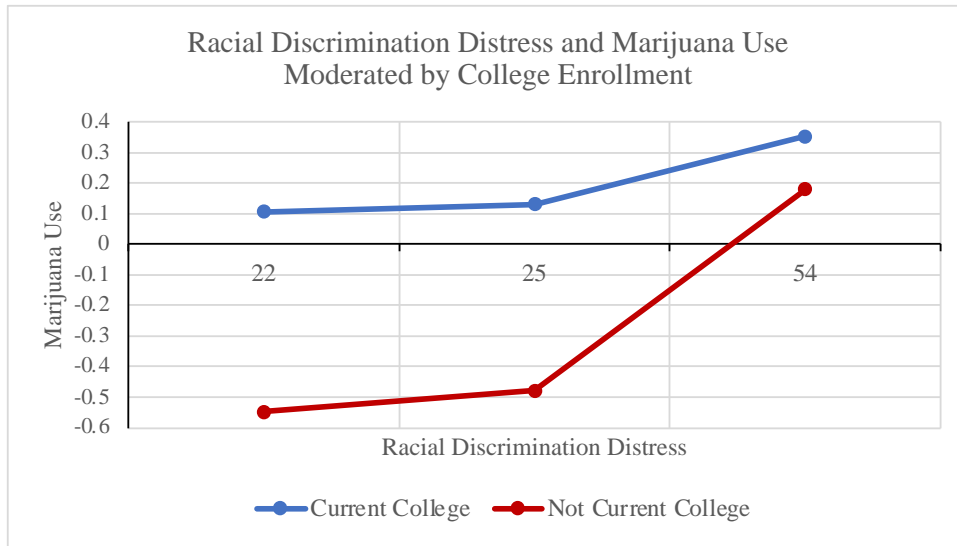


Figure 6. Sensitivity Analysis of Conditional Effects of Racial Discrimination Distress on Marijuana Use Behaviors Within Military Group by College Enrollment Status

Note. Current college enrollment n= 4, Not current college students n=87. All groups are independent.

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