College Students Mandated to Substance Use Courses: An Exploration of Age-of-Onset, Perceived Norms, and The Theory of Planned Behavior

Benjamin Neil Montemayor
University of Kentucky, ben.montemayor@uky.edu
Author ORCID Identifier: https://orcid.org/0000-0002-3330-1323
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Benjamin Neil Montemayor, Student

Dr. Melody Noland, Major Professor

Dr. Melinda Ickes, Director of Graduate Studies
COLLEGE STUDENTS MANDATED TO SUBSTANCE USE COURSES: AN EXPLORATION OF AGE-OF-ONSET, PERCEIVED NORMS, AND THE THEORY OF PLANNED BEHAVIOR

DISSERTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Education at the University of Kentucky

By
Benjamin Neil Montemayor
Lexington, Kentucky

Director: Dr. Melody Noland, Professor of Health Education
Lexington, Kentucky
2020

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https://orcid.org/0000-0002-3330-1323
ABSTRACT OF DISSERTATION

COLLEGE STUDENTS MANDATED TO SUBSTANCE USE COURSES: AN EXPLORATION OF AGE-OF-ONSET, PERCEIVED NORMS, AND THE THEORY OF PLANNED BEHAVIOR

Every year, college campuses report alcohol and other drug (AOD) policy violations as the most frequent reason students receive disciplinary referrals and, thus, are mandated to programming. This dissertation focused on exploring characteristics of students mandated to intervention programming in order to provide recommendations for future programs. This dissertation includes three studies involving students enrolled in mandated intervention programming: (1) a systematic review of the effectiveness of mandated programs in reducing cannabis or other drug use, (2) an examination of the differences between early- and late-onset alcohol and cannabis users, and (3) an exploration of perceived norms, and the Theory of Planned Behavior (TPB) to identify the best predictors of students’ intentions to reduce their alcohol or cannabis use.

Findings from the review indicated that immediate initial decreases in cannabis and other drug use are commonly reported among those participating in mandated interventions. However, the longer time elapses after an intervention, the more likely students will re-engage in drug use unless follow-up sessions are implemented. Interventions were more likely to be effective if they utilized brief motivational interviewing, personalized written feedback, and regularly scheduled post-intervention booster sessions.

Data from participants ($n = 463$) in mandatory alcohol and cannabis programming were used to examine if differences existed between early- and late-onset alcohol and cannabis users. For students enrolled in alcohol programming, significant differences were found between the two groups for the following criteria in the past 30 days: frequency of alcohol use ($p < 0.05$), binge drinking occasions ($p < 0.05$), and quantity of drinks per occasion ($p < 0.01$). For students in cannabis programming, there was a significant difference between early- and late-onset students with their frequency of cannabis use ($p < 0.01$).

 Constructs of the TPB were measured. Specifically, students were asked about their attitude towards, subjective norms surrounding, and perceived behavioral control over, a reduction in alcohol or cannabis use in order to determine if these constructs predicted their intention to reduce alcohol or cannabis use. The TPB was successful in predicting students’ intention to reduce alcohol ($p < .001$) and cannabis use ($p < .001$). Analyses of each individual construct revealed that students’ intentions are deeply rooted in their attitude about, and subjective norms regarding, a reduction in their alcohol or cannabis use.
Additionally, students in the programs perceived inflated rates of alcohol and cannabis use among peers compared to actual nationwide reports.

There is a dearth of research focusing on students mandated to AOD interventions, especially those focused on cannabis and other drug use. Examining age-of-onset of alcohol and cannabis use, the TPB, and perceived norms, allows opportunity for the advancement of mandated programming at universities. University programs should consider including correcting misperceptions of AOD use, TPB constructs that are efficient in predicting intentions and behaviors, and predictive factors of future AOD use (e.g. age-of-onset, risky behaviors). Longitudinal studies could implement these variables to further examine the effectiveness of tailored programming, and could include AOD screening assessments to provide students with supplementary specialized support if needed.

KEYWORDS: [Mandated Interventions, Age-of-Onset, Theory of Planned Behavior, Substance Use, University Students, Perceived Norms]
COLLEGE STUDENTS MANDATED TO SUBSTANCE USE COURSES: AN EXPLORATION OF AGE-OF-ONSET, PERCEIVED NORMS, AND THE THEORY OF PLANNED BEHAVIOR

By
Benjamin Neil Montemayor

Melody Noland, PhD
Director of Dissertation

Melinda Ickes, PhD
Director of Graduate Studies

07/30/2020
Date
DEDICATION

I dedicate this dissertation, and my entire journey, to my family. Six years ago, I started on this journey as a testament to myself. Along the way I grew in every way. I am sorry it took me leaving in order for me to “find myself,” but please know I did it all for you. Your selfless and altruistic sacrifices helped me succeed.
ACKNOWLEDGMENTS

This dissertation is the result of work and assistance from so many people. If I forget anyone, I apologize in advance and will thank you in person.

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Finally, my family. The rock through all this and whose support cannot be quantified. My mom always wanted a PhD in the family. Well she got one, it just took
longer than expected! Dad, I can’t put into words what you did for me and this family. I only hope I can pay it all back. Rebecca and Eric, you both are teachers and I knew I was destined to be the same, it is hard to fight that fate. As my siblings and my prior teachers, I have no doubt the impact you have on the students that you come in contact with daily, and I only hope I can do the same. I will also throw in Trixie, my 7-pound sidekick who was there sleeping by my side every late night and gave me endless love.

I took longer to write this than I should have, but if you ask any of my committee members, it is on par. I suppose it's time for the next chapter in my life. That being said, enough with my loose use of proper grammar and jargon in these acknowledgements, let’s get to academic writing. Enjoy the dissertation!
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CHAPTER ONE

Introduction

Alcohol and drug use has become synonymous with the expression “collegiate experience” (Weitzman & Kawachi, 2000). The freedom to experiment with, and ease of access to, alcohol and drugs for college students is greater now than in previous decades (Harpin et al., 2018). Studies revealed that the ease of access to alcohol or drugs has operated as a significant predictor of past month alcohol or drug use (Stanley et al., 2011; Warren et al., 2015). Alcohol and cannabis continue to present new challenges because of their accessibility and prominence. Rates of binge drinking in the last month for college students have remained between 30% and 40% for two decades. Furthermore, the rate of student use of cannabis in the last year has seen a steady incline since the 1980s (43% - 2018). Alcohol and drug use have become pervasive among college students (Lorant et al., 2013; Schulenberg et al., 2019).

There is a copious amount of documented research demonstrating the negative effects of alcohol and drug use, especially during developing years. This includes physical and psychological health disorders such as addiction or dependence (Ellickson et al., 2003; Hall & Degenhardt, 2009). A recent peer-reviewed study on alcohol's effect on mortality and morbidity among college students revealed that annually, over 1,800 deaths, nearly 600,000 injuries, 646,000 assaults, and 97,000 sexual assaults are attributed to excess alcohol use (Hingson et al., 2017). Additionally, excessive alcohol consumption is a top five preventable leading cause of premature death in the United States (Stahre et al., 2014).
Among adult cannabis users, brain development studies revealed declines in neuropsychological functioning, and development of chronic pulmonary health issues, among adults whose age of onset of cannabis was at least 16 years old (Meier et al., 2012; Tetrault et al., 2007). Data suggest that about one-third of marijuana users may qualify as having some degree of cannabis use dependence or disorder (Hasin et al., 2015). The consequences of heavy alcohol and cannabis use for college students continues to be a major concern for universities and the general public alike. An important protective factor for decreasing the consequences of alcohol or drug use is determining their age of onset, especially for those who started using at younger ages and continue to use in college (Buchmann et al., 2009; Wetherill et al., 2016).

**Onset of Alcohol and Cannabis Use**

Research investigating the longitudinal effects of early-onset alcohol and cannabis use suggests that individuals who initiate alcohol or cannabis use early, especially during important structural and functional brain developing years, have a greater likelihood of suffering chronic neuropsychological problems (Donovan & Molina, 2011; Pope et al., 2003). Research has shown that early-onset alcohol or cannabis users are at greater risk of becoming dependent on alcohol or cannabis during adulthood, and about half of those users will meet the DSM-V criteria for a substance use disorder before the age of 21 (American Psychiatric Association [APA], 2013; Maimaris & McCambridge, 2014; Zehra et al., 2019). Compared to individuals who initiated alcohol use after the age of 14, adolescents who initiated alcohol use at, or before, age 14 have an increased risk of developing a variety of biopsychosocial problems, such as engaging in delinquent behavior, frequent bouts of physical aggression, numerous academic problems, and
misusing other illicit drugs (Ellickson et al., 2003; Hingson & Zha, 2009). Research on the initiation of cannabis use revealed that those who delayed the age of onset beyond age 16 performed better in numerous neurocognitive areas later in life, including a healthier functioning memory, improved cognitive flexibility, and better inhibitory control (Dahlgren et al., 2016; Gruber et al., 2012).

**Impact on the University**

The impact of alcohol and cannabis use stems farther than the physical and psychological health concerns. There are also numerous academic concerns for college students (Arria et al., 2008). Relative to non-alcohol or cannabis using college peers, college students who frequently engage in alcohol or cannabis use experience overall less academic performance and achievement, including falling behind in school work, poorer test performance, and class absenteeism (Perkins, 2002; White & Hingson, 2013). The implications of alcohol and drug use on the institution and its students include increased legal costs and property damage, more frequent incidences of unwanted sexual activity and domestic violence, and further violence due to sexual orientation, racial, and religious differences (Harford et al., 2003; Reed et al., 2010). Additionally, independent of other risk factors, a student’s continuous enrollment in college is less likely when the student is using or abusing alcohol or cannabis (Arria et al., 2013; Perkins, 2002). Colleges and universities therefore lose thousands of dollars of potential tuition expenses and future alumni contributions with lower retention rates caused by excessive alcohol and cannabis use.

Universities are in a unique position where they oversee students during a prime transitional period. For the millions who attend universities, this transition into college
includes exposure to substantial changes in social activities, leisure time, socialization
groups, and engaging in risky behaviors (Arria et al., 2010). Currently, some universities
have implemented programs attempting to curb or intervene on a student’s alcohol and
drug use, in hopes to prevent the associated personal and academic consequences
(Chiauzzi et al., 2011). Typically, these alcohol and drug prevention programs occur on-
line during, or prior to, the student’s freshmen year of college (White et al., 2010).
Additionally, universities are mindful of the prevalence of alcohol and drug use and the
low rates of those students voluntarily seeking help (Wu et al., 2007). Thus, universities
sometimes offer services for students who actively participate in alcohol or drug use,
such as voluntary counseling, health and wellness courses, or mandated programming for
violating campus alcohol or drug use policies (Cheng et al., 2013; Lundahl et al., 2010)

**Mandated Interventions**

Mandated interventions are implemented among universities for students who
typically violate a substance use code of conduct or policy. Students mandated to
programming have a higher number of personal and academic shortcomings than students
in the general population who also participate in alcohol or drug use. Studies show that
students who have been found in violation of their institution’s alcohol and drug use
policies often report heavier use of alcohol and drugs and experience more complications
from it, compared to their non-mandated peers. (Barnett & Read, 2005; Kazemi et al.,
2013). Violations of alcohol and drug policies leave universities with the difficult task of
implementing programs to help mitigate the consequences of alcohol or drug use among
its students. Colleges commit significant resources to their mandated interventions to not
only improve on student success, retention, and graduation rates, but also to protect the
well-being of students (DeBerard et al., 2004; Hunt & Eisenberg, 2010). Numerous studies over the past few years have provided a blueprint for creating effective prevention and intervention programs (Carey et al., 2016; Tanner-Smith & Lipsey, 2015). A good foundation for planning and creating effective health-promotion programs is to start with a grounded, proven theory.

**Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) is an extension of the Theory of Reasoned Action which dates back to the early 1980’s (Ajzen, 1991; Fishbein & Ajzen, 1981). Both theoretical models postulate that if an individual has a strong intention to engage in a behavior, then there is a higher likelihood that the behavior will be performed. An individual’s intention and behavior both derive from an evaluation of three proximal predictors: 1) the attitude the individual has about the behavior, 2) the subjective norms, or perception, the individual believes that significant others have about the behavior, and 3) whether or not they believe the behavior is within their control, perceived behavioral control, see Figure 1 (Ajzen, 1991). An individual’s attitude about a behavior reflects the degree to which they evaluate the behavior as being desirable or undesirable. How others that are important to the individual (friends, parents, partners, etc.) perceive a behavior change, and whether or not they believe it is necessary, is referred to as subjective norms. Lastly, the perception of ease or difficulty that someone has over performing a behavior is known as perceived behavioral control. All three constructs are believed to directly impact intention, in addition to have roles amongst each other. The TPB has grown into one of the most influential behavioral intervention models since its inception (Ajzen, 1991).
The TPB has been successfully utilized to help understand key beliefs underlying a variety of behaviors among college students, including predicting their alcohol and drug use (Conner & Sparks, 2005; Cooke et al., 2016; Mcmillan & Conner, 2003; Rutter, 2000). Identifying key factors to help better understand relationships between attitudes, intentions, and behavior allow for these influences to be addressed in programming (Montano & Kasprzyk, 2015). Despite the literature that suggests the TPB is a prominent model to integrate in program development, far less research on the TPB has been focused on the sub-population of mandated students. Research has proven this sub-population of students to be an important group to study due to heavier use of alcohol and drugs (Barnett & Read, 2005; Kazemi et al., 2013).

**Purpose and Significance of Research**

Research on college-level alcohol and drug policies implementation suggests that disciplinary sanctions have substantially increased within universities due to heightened
efforts to oversee and curtail student participation in alcohol or drug use (Wechsler et al., 2002). Incidents like these leave universities with the difficult task of implementing programs to support the student, and to help reduce or eliminate the associated negative consequences of excessive alcohol and drug use. Mandated alcohol and drug interventions are typically implemented for a specific population of students who violated alcohol and drug policies, thus, they recently participated in alcohol or drug use (DeBerard et al., 2004; Hunt & Eisenberg, 2010). In order to create effective programs, it is important to understand the population’s current alcohol and drug use habits, and what would best guide intentions to reduce their substance use (Hasson, 2010). Knowing more characteristics about the population could help program developers provide improved and tailored programming that focuses on specific predictive factors of alcohol or drug use, provides personalized feedback of their current use, and offers screening for substance use disorders in order to provide supplementary help (Hingson & Zha, 2009; Wall et al., 2016).

This dissertation consists of three separate studies in chapters two through four, and each study’s focus is on students who were mandated to alcohol and cannabis programming. The first study is a systematic review of the effectiveness of mandated programs in reducing cannabis or other drug use. The second study focuses on investigating the association between the students’ age-of-onset of alcohol or cannabis use and their current alcohol and cannabis use behaviors. Finally, the third study focuses on utilizing the TPB to help determine which factors are salient predictors of a student’s intention to reduce their alcohol or cannabis use.

Chapter Two Overview
The study in this chapter was undertaken to provide a broad foundation of mandated substance-use programming and to identify gaps within the literature. Chapter Two summarizes the results of a systematic review of past research demonstrating the role and impact of mandated interventions on students’ cannabis use rather than their alcohol use. Previously published systematic reviews all focused on the effectiveness of mandated interventions on college students’ alcohol use (Barnett & Read, 2005; Carey et al., 2016). A review over the effectiveness of mandated interventions in reducing cannabis use among college students has yet to be written.

Based on the literature identified through the systematic review in Chapter Two, the results of mandated interventions on reducing students’ cannabis use are mixed. While studies in the review revealed consistent, short-term reductions in cannabis use, this was not always sustained long-term (Kazemi et al., 2013; White et al., 2006). Additionally, the systematic review discovered that there are few studies that exist today over this topic. Researchers have noted there is a dearth of studies focusing on students mandated for cannabis or other drug use and that additional studies are sorely needed (Buckner et al., 2018; McCambridge & Strang, 2004; Yurasek, Merrill, et al., 2017).

**Chapter Three Overview**

The systematic review of the literature provided the impetus to further explore the substance use habits, and characteristics, of students enrolled in mandated programming at the University of Kentucky. The University of Kentucky requires all students who live on or off campus to adhere to specific alcohol and drug policies while on the premises of the campus. This includes the prohibition (e.g. selling, serving, using) of alcohol use for all those under the age of 21, and no alcohol allowed on University property, including
dormitories or classrooms. Alcohol is also not allowed for University business, or at University sponsored activities, unless University regulation explicitly allows the use of alcohol. Students, faculty, and staff must adhere to a zero-tolerance drug policy on campus. Formally defined as the “unlawful possession, use, dispensation, distribution, or manufacture of drugs on University property, on University business and/or at University sponsored activities.”

The University of Kentucky’s Department of Campus Recreation and Wellness is responsible for administering mandated programming to students who violate campus alcohol or drug policies. Post-referral from an authoritative figure (e.g. campus police, residence hall directors), students must report to the Department of Campus Recreation and Wellness to enroll in their course. The researcher worked with this department to examine the responses to the mandated survey that students are responsible for taking prior to the start of the program. The Department of Campus Recreation and Wellness is interested in improving the health of students, and cultivating more effective programs for students mandated to alcohol or cannabis classes. Chapter Three describes the results of primary data analyses of these students. An anonymous survey was sent to students enrolled in two separate courses: an online alcohol education course, and an online cannabis education course. Specifically, this research utilized the survey as a way to gather information on the students’ frequency of alcohol and cannabis use, future intentions to reduce their alcohol or cannabis use, and participation in other risky behaviors. The purposes of the study, for students mandated to alcohol and cannabis interventions, were to:
1. Examine if differences existed between early- and late-onset of alcohol and cannabis users among the variables: frequency and quantity of alcohol use, frequency and quantity of cannabis use, and future intentions to reduce alcohol or cannabis use.

2. Examine if there was an association between students’ frequency of alcohol and cannabis use and their participation in other risky behaviors.

No prior studies have been conducted specifically looking at the age-of-onset of alcohol or cannabis use among students mandated to programming. Therefore, this study offers insight for a unique group of substance users. The results of this study will contribute to a better understanding of students mandated to alcohol or cannabis programs, and provide implications for program development. For students enrolled in the mandated online alcohol program, the hypotheses associated with this study were:

- Students who engaged in early-onset alcohol use will report different alcohol quantity and frequency rates in college, when compared to those who engaged in late-onset alcohol use.
- Students who engaged in early-onset alcohol use will report different intentions for future use of alcohol, when compared to those who engaged in late-onset alcohol use.
- Students’ frequency of alcohol use will be related to the frequency of participation in other risky behaviors.

The hypotheses associated with this study for students enrolled in the online cannabis education program were:
• Students who engaged in early-onset cannabis use will report different cannabis quantity and frequency rates in college, when compared to those who engaged in late-onset cannabis use.
• Students who engaged in early-onset cannabis use will report different intentions for future use of cannabis, when compared to those who engaged in late-onset cannabis use.
• Students’ frequency of cannabis use will be related to the frequency of participation in other risky behaviors.

Chapter Four Overview

Chapter Four describes the results of a primary data analysis that explored the attitude, subjective norms, perceived behavioral control, and intentions (constructs of the TPB) of students at the University of Kentucky who were mandated to an alcohol or cannabis education course due to violating the campus alcohol or drug use policy. While understanding characteristics about a population can help in program planning, research shows that theory also plays a critical role in intervention development, particularly with addictive behaviors (Webb et al., 2010). This dissertation study posited utilizing Ajzen’s (1991) TPB as a framework to gather information about the students’ attitudes, perceptions, subjective norms, and intentions related to decreasing their alcohol or cannabis use. This dissertation study utilized a survey prior to the intervention to gather information on the TPB proximal variables attitude, perceived behavioral control, and subjective norms, to see if they significantly predicted the students’ intention to reduce alcohol and cannabis use. An anonymous survey was sent to students enrolled in two
separate mandated courses: an online alcohol education program, and an online cannabis education program. The purposes of the study were:

1. Determine if associations existed among constructs of the Theory of Planned Behavior (attitude, perceived behavioral control, subjective norms, intention) related to reducing alcohol and cannabis use.

2. Determine if proximal constructs of the theory of planned behavior (attitude, perceived behavioral control, subjective norms) predicted intention to reduce alcohol and cannabis use.

3. A final purpose was to assess students’ perceived descriptive norms in regards to peer use of alcohol or cannabis.

The TPB has successfully predicted participation in alcohol and drug behaviors in numerous studies in the past (Cooke et al., 2016). The researcher found no other published studies that utilized the TPB to gauge intention to reduce alcohol or drug use among students who have participated in mandatory alcohol and drug programs. In general, this is a rarely studied population, especially in regards to theory. A literature search in Google Scholar applying the TPB among college students mandated to alcohol or drug programs revealed no results. Because there is very little guidance in the research literature regarding this topic and population, the current study was undertaken.

It would be helpful for programmers to know if the TPB constructs were useful in predicting an intention to reduce alcohol or cannabis use. If successful, future programming can focus on addressing elements of attitude, subjective norms, and perceived behavioral control in intervention development, among other predictive behaviors. Additionally, the researcher used the survey to ask students about their
perception of rates of substance use to see if correlations existed between perceptions and actual use, a common relationship found for numerous behaviors (e.g. drinking, sexual behavior) with other populations (Martens et al., 2006). The results of this study might also be of interest to other universities that mandate drug and alcohol classes for students. For students enrolled in the mandated online alcohol program, the hypotheses associated with this study were:

- Constructs of the Theory of Planned Behavior will be related to one another (attitude, perceived behavioral control, subjective norms, intention).
- There will be a relationship, individually and collectively, between predictor variables attitude, perceived behavioral control, and subjective norms with explained variable intention.
- Students’ frequency and quantity of alcohol use will be associated to perceived frequency and quantity of alcohol use among friends and other college students.

The hypotheses associated with this study for students enrolled in the online cannabis program were:

- Constructs of the Theory of Planned Behavior will be related to one another (attitude, perceived behavioral control, subjective norms, intention).
- There will be a relationship, individually and collectively, between predictor variables attitude, perceived behavioral control, and subjective norms with explained variable intention.
• Students’ frequency and quantity of cannabis use will be associated to perceived frequency and quantity of cannabis use among friends and other college students.

Chapter Five Overview

Chapter Five provides a summary of the findings from the three papers in this dissertation. Implications that this dissertation has for future research, and practice are considered. Finally, conclusions from each study are compiled and reiterated.
CHAPTER TWO
Effectiveness of College Mandated Alcohol and Other Drug Interventions on Reducing Drug Use – A Systematic Review

Introduction

College students engaging in risk-taking behaviors is a recognized concern in the social sciences, particularly when it comes to alcohol and other drug (AOD) use (Pascarella & Terenzini, 2005). Cannabis and alcohol remain the most popular drugs used among college students (Schulenberg et al., 2019). In 2018, the annual prevalence of cannabis use for full-time college students (ages 19-22) was approximately 43%, the highest prevalence rate recorded in the past four decades. Further, about a quarter (24.7%) of all college students reported using cannabis at least once in the past month (Schulenberg et al., 2019). More recently, vaping of cannabis has seen an upsurge. Increases in the past month prevalence of vaping cannabis (10.9%) among college students show a two-fold upsurge from 2017-2018, equating to one of the highest one-year percentage increases of any substance recorded in the past 40 years (Schulenberg et al., 2019).

Research suggests increased rates in the use of cannabis, particularly vaping cannabis, could be attributed to a decrease in perceived risk of harm. Since 1980, the perceived risk of harm associated with using cannabis has consistently declined among college students (Jones et al., 2016). It is also common for college students to report a simultaneous (at the same time) use of substances, particularly with cannabis and alcohol (McCabe et al., 2006). College students are significantly more likely to report the simultaneous use of alcohol and cannabis than their non-college counterparts (O’Hara et
al., 2016). Research shows an annual prevalence of co-use of alcohol and cannabis reported among 25 to 30% of college students who drank (Haas et al., 2015; Schulenberg et al., 2019; Terry-McElrath et al., 2016).

Excessive alcohol use still remains a popular behavior among college students. In 2018, a national survey revealed that more than three-quarters (77%) of college students reported having used alcohol before (Schulenberg et al., 2019). There is also considerable evidence of recent use of alcohol. Nearly 60% of college students reported drinking in the past month, and at least half of these students engaged in binge drinking (four + drinks for women and five + drinks for men on the same occasion) and heavy use drinking (binge drinking on the same occasion on each of five+ days in the past 30 days) (Schulenberg et al., 2019; Wechsler et al., 1994). Approximately 10% of college students also reported having 10+ drinks in a row at some point in the past two weeks (Schulenberg et al., 2019.) These high levels of alcohol and cannabis use, especially co-use, can act as potential risk factors for increased social and behavioral consequences and experiencing future substance use disorders (SUD) (Yurasek, Aston, et al., 2017).

In addition to the well-documented negative side effects of AOD use on young adults, colleges are seeing impacts on their institutions (Fromme & Corbin, 2004; Wong et al., 2019). Academically, college students who engage in frequent AOD use report higher rates of absenteeism, poorer test performance, and falling behind in school work (Perkins, 2002; White & Hingson, 2013). Colleges are also less likely to retain a student when they are using AODs (Arria et al., 2013; Perkins, 2002). Furthermore, AOD use with college students is associated with more property damage, an increased risk of committing and experiencing sexual assault, and higher reports of physical violence due
to race, sexual orientation, and religion (Harford et al., 2003; Murphy & Dennhardt, 2016; Reed et al., 2010). Incidences like these leave universities with the need to increase their oversight on AOD programming.

Universities all over the nation are becoming more involved with AOD prevention efforts (Chiauzzi et al., 2011). AOD prevention programs are often electronic or web-based and introduced during the first semester of college [e.g., AlcoholEDU, The Alcohol eCHECK UP TO GO (e-chug)] (White et al., 2010). Additionally, intervention programs exist to assist students who actively engage in problematic use of AODs. While most efforts involve voluntary attendance (e.g., counseling) some mandated programs exist for students who violate institutional AOD policies (Kazemi et al., 2013; White et al., 2008; Yurasek, Merrill, et al., 2017).

Numerous studies have illustrated reductions in alcohol use following mandated interventions (Fromme & Corbin, 2004; Larimer & Cronce, 2007). Barnett and Read’s (2005) review revealed that mandated alcohol interventions decreased student drinking behavior, though noted concerns with long-term sustainability. Carey and colleagues (2016) discovered that individually-focused alcohol interventions were effective in reducing alcohol use and alcohol-related problems, but recidivism increased over time. Despite the success of these alcohol-focused studies, significantly less attention has been given to students mandated to interventions due to cannabis, or other drug policy violations (O'Rourke, 2019; White et al., 2006; White et al., 2015; Yurasek, Merrill, et al., 2017).

White et al.’s (2015) systematic review consisted of studies which analyzed the secondary effectiveness of alcohol-focused interventions on reducing cannabis use. Non-
statistically significant reductions in cannabis use were discovered at short- and long-term follow-ups. Furthermore, most of the interventions were voluntarily, examined subjects that were primarily heavy drinkers, and mixed with both college and non-college individuals. No systematic review exists which analyzes the effectiveness of university mandated student-interventions on reducing cannabis, or other drug use among college students.

Continued excessive use of alcohol and an increased prevalence in cannabis use among college students is compelling universities to increase its oversight on AOD prevention/intervention programs, and overall health and well-belling efforts (Bai et al., 2019). Therefore, the purpose of this review was to (1) analyze studies of mandated college AOD intervention programs that included cannabis or other drug use outcome measures to determine effectiveness; and (2) recommend next steps for universities.

Methodology

Data Sources

A systematic literature search was conducted to encompass all studies that fit the inclusion criteria. Searches were conducted utilizing two primary sources: (1) the following databases: Academic Search Complete, Cumulative Index to Nursing and Allied Health (CINAHL), Education Resources Information Center (ERIC), MEDLINE, Psychology and Behavioral Sciences Collection, PsycINFO, Sociological Collection and SPORTDiscus, and (2) the reference list of the final included studies. Searches included combinations of the following key words: [College OR University OR Higher Education] AND [Alcohol OR Marijuana OR Cannabis OR Drug OR Substance OR Vaping] AND
[Prevention OR Intervention OR Program] AND [Mandated OR Adjudicated OR Referred OR Required OR Sanctioned] AND [Students OR Undergraduates].

**Inclusion and Exclusion Criteria**

Initially, 2,618 articles were identified utilizing the key words and reference lists. Inclusion and exclusion criteria were then utilized to reduce to only pertinent studies. Inclusion criteria for this review were: (1) primary research; (2) substance use mandated intervention courses; (3) college-based; (4) peer reviewed and published between 1 January 2000 through 15 June 2020; (5) published in the English language; (6) studies that reported outcome data. Exclusion criteria were: (1) mandated courses implemented on a population other than college students; (2) studies not available in the English language, (3) studies that did not include the measure of cannabis use or any other illicit drug, and (4) studies that only utilized cross-sectional data.

In this review, primary research is defined as studies which gathered and analyzed data firsthand. Additionally, college-based pertains to studies conducted with students enrolled in a college or university. Articles which met inclusion criteria were then scanned by their title and abstract. Data extraction included sample characteristics, study design, intervention type (implementation and duration), and treatment assignment. Outcome measures for each study were extracted at baseline and follow-up phases. Follow-up time periods varied by study.

**Results**

Studies which did not meet inclusion criteria were excluded, leaving 76 studies for a full examination. Figure 1 shows a flow diagram of the results and how the criteria were applied to results in the final six studies included in this review. It is worth noting
that only one study in this review revealed a sample of purely cannabis policy violators. The extent to which cannabis or other drug use was covered in the remaining studies was not disclosed in the respective studies. However, all demographic data are revealed in Table 1. Some of the studies stated their samples consisted of a blend of students mandated to an AOD program due to both alcohol and cannabis policy violations (White et al., 2006; White et al., 2007; White et al., 2008). Table 1 summarizes the six studies included in this review. The results will be discussed in two parts: 1) characteristics of the interventions, and 2) an analysis of the findings.

**Study Design**

The participants in the six studies were all recruited from each university’s population of students who violated their university’s AOD policy, and therefore mandated to attend programming. All studies reported measures (rates or percentages) of cannabis or drug use from the students (Buckner et al., 2018; Kazemi et al., 2013; White et al., 2006; White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). Five studies utilized a pre-test, post-test longitudinal design and self-report questionnaires (Kazemi et al., 2013; White et al., 2006; White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). The other study utilized a 30-day cannabis timeline follow-back, a valid and reliable tool used to assess cannabis use over a specific time period (Buckner et al., 2018; Robinson et al., 2014). Two-thirds of the studies utilized an experimental approach by incorporating a random assignment of mandated participants to one intervention condition or another (White et al., 2006; White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). The remaining studies involved no manipulation of
Flow Diagram of Systematic Article Selection

2,618 initial relevant articles from search terms and reference list (RL)

1,227 = Academic Search Complete  
66 = SPORTDiscus  
67 = Sociological Collection  
438 = PsycINFO  
9 = RL  
619 = Medline  
160 = CINAHL  
109 = ERIC  
172 = Psychology and Behavioral Sciences Collection

n = 1,272
Excluded for
* non-peer-review
* Non-English
* duplicated

n = 1,346
After selecting:
*Peer-reviewed and *English
* removing duplicates

n = 1,197
excluded based on title alone
(Titles pertained to pharmacy,
medical, surgical research)

n = 149
For further screening based on
abstract

n = 58 excluded by reading
abstracts, not fitting inclusion
criteria

n = 76
For further screening based on
methods and literature

n = 70
Fit Exclusion criteria
(didn’t include marijuana or any
other drug measures)

n = 6
Articles which met all criteria for
review
**Table 1**

**Summary of included interventions-Sample, Design, Intervention, and Findings**

<table>
<thead>
<tr>
<th>Author, Year, Reference #</th>
<th>Sample Size and Violation (%)</th>
<th>Research Design</th>
<th>Intervention; Dosage, Duration, Conditions</th>
<th>Cannabis Measure; Response Scale</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buckner et al. 2018</td>
<td>( n = 98 ) 100% - Cannabis</td>
<td>Exploratory</td>
<td>Sanctioning</td>
<td>30-day TLFB</td>
<td>% of cannabis use decrease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Duration between preincident and preintake assessment = 126.1 (SD = 108) days.</td>
<td>Frequency: # of times used and # of days used</td>
<td>90.9% decreased cannabis use (58% abstinent)</td>
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<td>Quantity: # of cigarette-sized joints used</td>
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<td><strong>Decrease in frequency cannabis use:</strong></td>
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<td>86.4% → 29%</td>
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<td></td>
<td></td>
<td></td>
<td><strong>Preincident frequency:</strong> times / days</td>
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<td></td>
<td></td>
<td>( \bar{x} = 29.62 / \bar{x} = 15.47 ) days</td>
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<td></td>
<td></td>
<td></td>
<td><strong>Preintake frequency:</strong> times / days</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>( \bar{x} = 7.12 / \bar{x} = 4.11 ) days</td>
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<td></td>
<td></td>
<td>Significant reduction, ( p &lt; .001 )</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Preintake quantity was significantly less than preincident quantity, ( p &lt; .001 )</td>
</tr>
<tr>
<td>Kazemi et al. 2013</td>
<td>( n = 147 ) 100% - Alcohol</td>
<td>Quasi-Experimental</td>
<td>BMI; 50 minutes, baseline and 2 weeks Boosters; 50 minutes, 3 and 6 months</td>
<td>Past month use (days); Open-ended, ranging from 0 - 31</td>
<td>Baseline → 6 months</td>
</tr>
<tr>
<td></td>
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<td>% of illicit drug users among the sample</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Baseline: 20.4% → 6 months: 10.34%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No significance test reported.</td>
</tr>
<tr>
<td>White et al. 2006</td>
<td>( n = 222 ) 88.6% - Alcohol 11% - Cannabis .4% - Both</td>
<td>Experimental</td>
<td>BMI, WF; 30 minutes, 1 week post-baseline Condition A = BMI + WF</td>
<td>Past month frequency of cannabis use; 6-point ordinal scale ranging from 0 = not in the last month to 5</td>
<td>Baseline → 3 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>Condition A: Decrease in frequency approached significance (( p = .06 )) (t-test)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>% of cannabis users</td>
</tr>
</tbody>
</table>
### Table 1 (continued)

<table>
<thead>
<tr>
<th>Author, Year, Reference #</th>
<th>Sample Size and Violation (%)</th>
<th>Research Design</th>
<th>Intervention; Dosage, Duration, Conditions</th>
<th>Cannabis Measure; Response Scale</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>White et al. 2007</td>
<td>$n = 348$</td>
<td>Experimental</td>
<td>BMI, WF; 30 minutes, 1 week post-baseline</td>
<td>Past month frequency of cannabis use; 6-point ordinal scale ranging from 0 = never to 5 = daily</td>
<td>Baseline: 24.9% → 3 months: 20.4% ($p &lt; .05$) (z test for correlated proportions) Baseline → 4 → 15 months Between-Group Differences: Non-statistically significant differences Within-Group Changes ($t$-tests): Baseline → 15 months Condition A: $\bar{x} = \ +.36$ ($p &lt; .01$) Condition B: $\bar{x} = \ +.32$ ($p &lt; .01$) Condition C: $\bar{x} = \ +.34$ ($p &lt; .01$) Within-Group Changes: Condition C: Baseline → 4 months Non-statistically significant change 4 months → 15 months $\bar{x} = \ +.22$ ($p &lt; .01$)</td>
</tr>
<tr>
<td>White et al. 2008</td>
<td>$n = 230$</td>
<td>Experimental</td>
<td>WF; Baseline and 2 months post-baseline</td>
<td>Past month frequency of cannabis use; 7-point ordinal scale ranging from 0 = never to 6 = nearly daily or daily</td>
<td>Baseline → 2 → 7 months Between-Group Differences: Non-statistically significant differences Within-Group Changes ($t$-test): Baseline → 2 → 7 months Condition A: Non-statistically significant decrease across all time points Condition B: Baseline → 2 months Non-statistically significant decrease</td>
</tr>
</tbody>
</table>
Table 1 (continued)

<table>
<thead>
<tr>
<th>Author, Year, Reference #</th>
<th>Sample Size and Violation (%)</th>
<th>Research Design</th>
<th>Intervention; Dosage, Duration, Conditions</th>
<th>Cannabis Measure; Response Scale</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Yurasek, Merrill, et al. 2017 | n = 405 100% - Alcohol  Findings reported here are only among students in the sample who admitted to at least using cannabis one day in the past month (n = 234). | Experimental | BA + AOD WF Assessment; Baseline, 10-15 minutes BMI; 1 hour, 6 weeks post baseline Condition A = BMI Condition B = Assessment only Condition C = Aggregate data | Past month frequency (# of times used); Open-ended | Condition B: 2 months → 7 months $\bar{x} = -0.11 (p < .01)$.  
Within-Group Changes:  
Condition C: Baseline → 2 months  
Non-statistically significant decrease  
2 months → 7 months $\bar{x} = -0.09 (p < .01)$.  
Baseline → 3 → 6 → 9 months  
Between-Group Differences:  
Non-statistically significant difference  
Within-Individual Changes:  
Baseline → 3 → 6 → 9 months  
Non-statistically significant increase or decrease across all time points and conditions  
Within-Group Changes:  
Condition C: Baseline → 3 → 6 → 9 mos. Significant decrease at all 3 follow-ups ($p < .01$) (no data reported) |

Note. Negative mean changes indicate decreased levels of cannabis use. Positive mean changes indicate increased levels of cannabis use. BMI = Brief Motivational Interviewing; TLFB = Timeline Follow-Back; WF = Written Feedback; BA = Brief Advice Session; HLM = Hierarchical Linear Modeling
the sample or intervention conditions and all participants received the same mediation (Buckner et al., 2018; Kazemi et al., 2013).

**Study Characteristics**

A majority (87%) of the students in this review were mandated to programming due to alcohol policy violations, followed by those who violated cannabis policies (12%), and others or both (1%). The number of participants in the included studies ranged from $n = 98$ to $n = 348$.

**Descriptions of Intervention Conditions and Practices Utilized**

*Brief Motivational Interviewing (BMI)*

Brief motivational interviewing is a method of therapy that focuses on empathy and is non-confrontational nor judgmental. Techniques like BMI are used primarily with people who have tendencies to engage in risk-taking health behaviors, including drinking and drug use (Dimeff, 1999; Rollnick & Miller, 1995). The aim of BMI is to change the students’ behavioral patterns by attempting to activate and increase an internal motivation to change. Three objectives are usually targeted: 1) a reduction or abstention from current behaviors; 2) a promotion of healthier options, and 3) providing important essential information and effective coping skills for risk reduction (Rollnick & Miller, 1995). Four studies in this review utilized BMI in their intervention (Kazemi et al., 2013; White et al., 2006; White et al., 2007; Yurasek, Merrill, et al., 2017).

*Booster Sessions*

Booster sessions are used to help maintain and promote new behaviors by rehearsing and positively reinforcing new attitudes, goals, and motivational strategies discussed previously. Typically, boosters are supplementary meetings scheduled...
periodically post-intervention (Schlup et al., 2009). Booster sessions were applied in one study in this review, particularly regarding the participants’ readiness to change (Kazemi et al., 2013).

**Personalized Written Feedback (WF) and Brief Advice (BA) Sessions**

One intervention modality known as personalized written feedback focuses on generating, and providing, a baseline assessment profile of participants’ substance use (United States Department of Health and Human Services [USDHHS], 2002). These profiles typically include subjective information on their current use of AODs in relation to their peers, a blood alcohol content analysis, a list of risk factors, and alternative coping methods. The studies in this review utilized personalized WF assessments as both a form of a control and an experimental group (White et al., 2006; White et al., 2007; White et al., 2008). Additionally, BA sessions operate as short, conversational meetings performed in both group and individual settings. Implementation of BA sessions include educating about behaviors and consequences related to AOD abuse (Yurasek, Merrill, et al., 2017). Additionally, employing open-ended questions in these sessions is common in order to learn more about the participants’ actual use of AOD.

**Timeline Follow-Back (TLFB)**

The TLFB is a clinical and research tool developed to help obtain frequency and quantity estimates of an individual’s use of AODs over a time frame (Sobell & Sobell, 1992). The method involves choosing an important date from a calendar (e.g. dates of violations, interventions), and asking an individual to retrospectively estimate their total AOD use over a time frame prior to that date (e.g. 7 days prior, 30 days prior). Most times, the TLFB is used as a supplementary practice to BMI or other intervention
approaches. The TLFB has been used numerous times (both in-person and online) in studies approximating an individual’s alcohol use, however, the TLFB has also reported high levels of reliability when applied to other behaviors as well, such as marijuanna, cocaine, and cigarette use, and sexual behavior ($\alpha$ range = .75 - .96) (Pedersen et al., 2012; Robinson et al., 2014; Weinhardt et al., 1998). In this review, one study employed a 30-day TLFB of cannabis use twice (pre- and post-sanction) in order to assess the impact of sanctions on rates of cannabis use among college students who violated a university cannabis policy (Buckner et al., 2018).

**Changes in Percentage of Cannabis and Drug Users**

White et al.’s (2006) sample reported a 19% total decline in students who used cannabis from baseline to three months among their sample of cannabis using students ($n = 55$), a significant decrease, ($p < .05$) (Table 1). Another study also revealed that half (50%) of its sample of students who were illicit drug users as baseline ($n = 30$) were no longer using at the six-month follow-up (Kazemi et al., 2013). A majority ($n = 89$, 90.9%) of the sample in Buckner et al.’s (2018) study ($n = 98$) reported some decrease in their use of cannabis at the four-month follow-up, with 58% ($n = 57$) of the students reporting complete abstinence. Further, nearly three-quarters (71%) of their frequent (using a minimum of four times in the past month) cannabis users ($n = 76$, 86.4%) reported using less than four times over the past month at their follow-up. Not all of the studies in this review reported a percentage of change in the students who used cannabis. For the three studies that reported this change, decreases were revealed (Buckner et al., 2018; Kazemi et al., 2013; White et al., 2006).

**Changes in Frequency or Quantity of Cannabis Use**
For the purposes of this review, short-term is considered outcomes reported at ≤ four months and long-term is considered outcomes reported at ≥ five months. Frequency or quantity of cannabis use was reported in five studies in this review (Buckner et al., 2018; White et al., 2006; White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). All studies, unless otherwise noted in the table, analyzed frequency utilizing paired t-tests or hierarchical linear modeling to report between-group differences or within-group changes, respectively.

**Between-Group Differences**

Despite the type of intervention or condition, differences between the groups at any short or long-term follow-up were consistently reported as non-statistically significant in all studies (White et al., 2006; White et al., 2008; Yurasek, Merrill, et al., 2017). Although multiple conditions reported a decrease in the frequency of cannabis use among its sample, the differences between conditions did not test at a level that would express one condition was more effective than the other. During analysis, analyses were conducted to look at change happening within each group, both in their individual conditions, and collectively.

**Within-Group Changes**

**Short-term Changes.** There were some variations when assessing the change in frequency or quantity of cannabis use within groups. In the short-term, conditions typically revealed decreases in cannabis use, though, most were non-statistically significant (Buckner et al., 2018; White et al., 2006; White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). In fact, only one of the five studies that assessed short-term changes saw a significant decrease in both frequency and quantity of cannabis use.
use. This study, conducted by Buckner and colleagues (2018), utilized a 30-day TLFB method assessment to examine the impact of sanctions on rates of cannabis use. This study applied the TLFB both 30 days prior to the time of the student’s infraction (pre-infraction) and 30 days prior to their intake (pre-intake) assessment. On average, the time period between violation and intake assessment was four months. A t-test was conducted between the two time points which revealed that pre-intake frequency and quantity were both significantly less than pre-infraction frequency and quantity, \( p < .001 \). When multiple follow-ups or long-term effectiveness of interventions were assessed, decreases in cannabis use were not always sustained.

**Sustainability of Change.** In addition to short-term changes, three studies also conducted longitudinal assessments to examine if decreases in cannabis use were incessant (White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). Overall, all studies revealed that students decreased their cannabis use immediately after intervention implementation. However, a statistically significant increase in cannabis use was discovered in one study the longer from baseline students were assessed (White et al., 2007). The researchers in this study conducted a longitudinal assessment of cannabis frequency starting at baseline, and extending to four and 15 months post-intervention. Following a non-statistically significant decrease in cannabis frequency from baseline to four months, a significant increase was discovered at the final 15-month follow-up, \( p < .01 \). Similar trends in use have also been displayed in studies with alcohol (Carey et al., 2016).

One study did see a significant longitudinal decrease in cannabis use frequency at seven months (White et al., 2008). Originally, students in a delayed WF group
experienced a non-statistically significant decrease in their cannabis use from baseline to two months. At two months though, the researchers implemented a delayed WF intervention that resulted in a significant decrease ($p < .01$) at a seven-month follow-up. Additionally, Yurasek, Merrill, and colleagues (2017) independently analyzed students in their sample who were cannabis users despite being there for alcohol infractions. The researchers assigned students to two conditions, BMI or BA session only, and implemented the intervention six weeks after baseline measures. Initially, the data showed no statistically significant differences existed between, nor within, conditions at any follow-ups (six weeks, three, six, and nine months). However, when collectively assessed, cannabis users significantly decreased their cannabis use over the course of the three follow-up measures. This suggests that over time, cannabis use did decrease across conditions.

**Discussion**

Rates of cannabis use, and more recently cannabis vaping, continues to increase among college students. Nearly a quarter of all college students have participated in cannabis use at least once in the last month (Schulenberg et al., 2019). An effective way universities can address the prevalence of cannabis use is through mandated interventions. No systematic review exists which analyzes the effectiveness of university mandated student-interventions on reducing cannabis, or other drug use among college students.

Results from the current review have revealed that, to date, there are limited rigorous studies which evaluate the effectiveness of cannabis-focused university-mandated interventions in reducing cannabis use among students who violate campus
drug-use policies. A number of other researchers have noted the lack of studies which focus on this topic and have also expressed that it is an area that needs to continue to expand (Buckner et al., 2018; McCambridge & Strang, 2004; White et al., 2006; White et al., 2015; Yurasek, Merrill, et al., 2017). This review was conducted in an effort to not only review the effectiveness of mandated intervention programs on reducing cannabis use and recommend next steps, but to also bring attention to the scarcity of research happening in this area.

Overall, evidence which suggests that implementing mandated interventions among college students results in decreased cannabis or other drug use is mixed. The current review discovered that there are short-term reductions in both rates of students’ cannabis use, and percentages of students participating in cannabis or other drug use following a mandated intervention (Buckner et al., 2019; Kazemi et al., 2013; White et al., 2005; White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). However, it seemed the more time that elapsed from the intervention, the more prevalent cannabis use became unless further intervening (follow-ups, boosters, delayed interventions) was employed (White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). It is perhaps not surprising that these results were somewhat inconsistent, given that most of the studies in this review were alcohol-focused, and consisted of a blend of alcohol and cannabis policy violators. Despite these limitations, there are proven methods and conditions that have resulted in successfully decreasing cannabis use both in the short- and long-term.

Findings from the review suggest that studies which utilized BMI and WF were the most consistent in reducing short-term use of cannabis (White et al., 2006; White et
al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017), albeit, non-statistically significant. The BMI approach to intervention implementation involves providing empathetic, non-judgmental therapy that focuses on changing the students’ behavioral patterns through activation and enhancement of an internal motivation to change (Dimeff, 1999; Rollnick & Miller, 1995). Another intervention modality, which can be used as a supplement to BMI, is WF. Personalized WF focuses on generating, and providing, a baseline assessment profile of a participant’s AOD use. This is usually done to raise consciousness, provide measure markers, and to provide education about their use of AODs compared to their peers (USDHHS, 2002). Although short-term reductions were evident, long-term sustainability requires further testing.

Three studies in the review tested the long-term effectiveness of interventions in decreasing cannabis use (White et al., 2007; White et al., 2008; Yurasek, Merrill, et al., 2017). White et al.’s (2007) sample was unable to sustain any long-term reductions in cannabis use. This study implemented a one-time BMI or WF intervention one week after baseline assessments. After experiencing initial reductions in cannabis use from baseline to four months, significant increases in cannabis use were revealed at the final follow up (four months to 15 months). The other two studies were able to sustain long-term reductions in cannabis use with the employment of follow-ups or delayed techniques (White et al., 2008; Yurasek, Merrill, et al., 2017).

White et al., (2008) utilized a delayed personalized WF intervention two months after original baseline measures were assessed. A non-statistically significant decrease in cannabis use was revealed between baseline and two months. However, the implementation of the delayed WF intervention resulted in a significant decrease from
two to seven months \( (p < .01) \). Likewise, Yurasek, Merrill, et al. (2017) delayed an intervention until six weeks post-baseline measures. Upon discovering no difference between, nor within, two conditions (BMI vs BA session only) at any follow-ups (six weeks, three, six, and nine months), both conditions were collectively assessed. This assessment revealed that cannabis users significantly decreased their cannabis use over the course of the four follow-up measures across conditions. A study also worth mentioning was conducted by Kazemi et al., (2013) which utilized a BMI at two weeks post-baseline and boosters at three and six months. This study saw half \((50\%)\) of its sample of students who were illicit drug users as baseline \((n = 30)\) report abstinence of illicit drug use at the final six-month follow-up.

Further investigation into the effectiveness of BMI, WF, and boosters in future cannabis and other drug mandated interventions is an area to expand upon given its long-term proven sustainability of adherence to a behavior change (Dunn et al., 2020; Kazemi et al., 2013; Schlup et al., 2009; White et al., 2008; Yurasek, Merrill, et al., 2017).

Success with BMI and WF has also been seen throughout previous studies with excessive AOD users outside of this review (Cunningham et al., 2010; DiFulvio et al., 2012; Jensen et al., 2011; Vasilaki et al., 2006). However, no studies have attempted to implement a BMI or WF intervention with cannabis or other drug users mandated to attend intervention programming for violating their university’s drug policy. In this sense, Bucker and colleagues (2018) were pioneers with their exploratory study. Although the study did not involve a BMI or WF, this study revealed that when students violate university cannabis policies, and receive sanctions, significant reductions did occur. This is the lone study to date the researchers are aware of that focuses primarily on mandated
cannabis users, in a university setting. This finding, or rather the lack thereof in finding any additional studies with the same student sample and criteria, further conveys the importance of conducting more research in the area.

From a research perspective, this review helped identify the dearth of research happening in the area of university-mandated student-interventions for students using cannabis and other drugs. Additionally, this review also identified effective intervention practices that can be utilized for future research in this area. As rates of college students participating in cannabis use continues to see upward trends, and as the on-going legalization of cannabis throughout the United States most likely continues to increase, universities are most likely going to see a continuation of cannabis using behavior (Hammond et al., 2020). The demand for the development, implementation, and evaluation of effective, sustainable interventions centered around cannabis and other drug use will also need to be addressed in the near future, if not now.

**Limitations of Reviewed Studies**

There are some methodological limitations to address in the reviewed studies. First, a limitation was the focus of the interventions. Only one study to date among college students emphasized and measured outcome data of cannabis use after being sanctioned for cannabis use (Buckner et al., 2018). The remaining studies had a collective sample comprised of both alcohol and cannabis policy violators. Literature has acknowledged the lack of cannabis or drug-only focused interventions (Buckner et al., 2018; Larimer et al., 2005; White et al., 2006). Second, no studies in this review included a no-treatment control group. Randomized controlled trial experimental designs include the utilization of control groups, increasing the generalizability of the study and helping
eliminate bias and confounding variables (Thompson, 2006). Third, all of the data were self-reported. Future studies could shift focus to include a more accurate measure of AOD use such as the TLFB method assessment (Fals-Stewart et al., 2000; Robinson et al., 2014).

Limitations of the Current Study

There are limitations within the review that should be addressed. Per qualitative review characteristics, data were examined and summarized in a narrative format and not meta-analytically and thus, all study designs were included. Furthermore, studies whose samples were not mandated students were excluded considering those with voluntary groups may already express a desire to change. In addition, only including the peer-reviewed articles within the databases could increase the probability of publication bias since unpublished articles were not reported. Finally, it should be acknowledged that three of the six studies included in this review are from the same institution with the same primary author, albeit different intervention implementation. This is a result of the systemic process and further reverberates the lack of courses, and studies, being evaluated nation-wide for cannabis use on college students. Despite these limitations, the results of the current review raises concerns and next steps regarding future implications.

Implications for Future Practice and Research

This review has some implications worth addressing in future research and practice. A key finding from the current review is the dearth of research that was discovered in the area of cannabis and other drug mandated interventions. Due to the rising trends of cannabis and other drug use, including cannabis vaping, the findings of this study should promote future research and practice to develop, implement, and
rigorously evaluate, more evidence-based mandated interventions aimed at decreasing cannabis and other drug use.

Although the curriculum contents of the programs in this review were not disclosed within the respective studies, future practice could involve the inclusion of current, evidence-informed topics focused on cannabis and other drug use, and cannabis vaping. This content should focus on relevant information, such as the neuropsychological consequences of cannabis use, including cannabis dependence and disorders, the impact of early-onset cannabis use on long-term brain development, the dangers of cannabis vaping and vaping in general, and the repercussions of frequent cannabis and other drug use on academic achievement (APA, 2013; Wetherill et al., 2016; Zehra, et al., 2019). This is a timely implication considering the on-going legalization of cannabis throughout the United States. Further, due to the novelty of cannabis vaping, it is critical to implement information that is accurate and reliable and relays the vulnerability of all populations to the dangers of cannabis vaping due to the scarcity of research on the topic (Frohe et al., 2018; Kenne et al., 2017).

In keeping with practical applications, the duration, delivery and modality of future interventions, and any follow-ups should be considered. Previous research has revealed that short-term, computer-delivered interventions can work if delivered upon infrequent users (Carey et al., 2012; Kulesza et al., 2010). However, to maintain long-term effectiveness, future programs should shift efforts to face-to-face interventions, including BMIs and PWF, and consistently follow-up with the individual post-intervention (Carey et al., 2012; Dunn et al., 2020). Additionally, further investigation into the effectiveness of boosters in future cannabis and other drug interventions is an
area to expand upon given its promise of increasing the likelihood of adherence to a behavior change long-term (Dunn et al., 2020; Kazemi et al., 2013; Schlup et al., 2009). There are implications for expanding research of these cannabis and other drug mandated interventions by utilizing randomized controlled trials during study design, diversifying the sample in race and gender, collecting biological verification or more accurate measures of cannabis use (if feasible), and measuring outcome data post-intervention (Bucker et al., 2018).

An additional future area of research could also involve more rigorous cross-sectional, and longitudinal research on the simultaneous use of cannabis and alcohol. A recent literature review suggests that the combination of using alcohol and cannabis is associated with additive impairment effects, which could increase the quantity of substances consumed (Yurasek, Aston, et al., 2017). Additionally, the risk of experiencing significant clinical outcomes, and comorbid mental health disorders and SUDs also increase as a result of co-use of alcohol and cannabis (Baggio et al., 2018; Yurasek, Aston, et al., 2017). Despite these effects of alcohol and cannabis co-use, no research on programming exists regarding the development or examination of interventions centered on reducing the co-use of alcohol and cannabis. More longitudinal research among those who co-use alcohol and cannabis would help further understand the relationship between the two substances, and how to successfully reduce it. The urgency of this research is further exacerbated given the abrupt rise in cannabis vaping in recent years, and the misperceptions, accessibility, and ease of use associated with vaping cannabis (Morean et al., 2017).
Finally, an area for both future practice and research implication is the capability for programmers and researchers to screen those who attend mandated cannabis intervention courses for further potential issues. Upwards of 70% of college students have a low harm perception of cannabis use (Schulenberg et al., 2019). Data suggest that about one-third of cannabis users may qualify as having some degree of cannabis use dependence or disorder, and it has been discovered that around 10 to 13% of samples in a study have met the criteria for cannabis dependence (Buckner et al., 2018; Hasin et al., 2015). Despite these findings and diagnoses, college students rarely seek help for these issues (Caldeira, 2009). Future protocols for mandated courses could also include the capability for programmers and researchers to employ self-screenings tools, such as the Drug Abuse Screening Test - 10 (DAST-10) (Bohn et al., 1991). Furthermore, screening for dependency issues could help reinforce collaboration efforts with other campus resources, such as counseling or health services, which are not typically mandated.

Conclusion

Alcohol and drug policy violations on campus have increased along with the prevalence of students’ cannabis and other drug use. Some universities have found success with the implementation of mandated interventions. The results of the current review revealed that these interventions were successful in reducing cannabis and drug use, at least momentarily. Although, the sustainability of these reduced rates of cannabis or drug use abated the longer time elapsed from intervention implementation. The employment of boosters and follow-up meetings for AOD users post-intervention have been proven to increase the likelihood of long-term sustainability. However, the findings must be interpreted within the context of a key limitation, there is an evident lack of
research on the effectiveness of cannabis and other drug mandated programming.
Research is needed in the field that is well designed, focuses on students who have been
mandated for cannabis or drug interventions, and directly addresses their cannabis and
drug use.
CHAPTER THREE
Examining the Difference Between Early- and Late-Onset Alcohol and Cannabis Users Among College Students Enrolled in Mandated Intervention Courses

Introduction

The prevalence of cannabis use among college students reached a new, 35-year high in 2018 (Schulenberg et al., 2019). Data from Monitoring the Future, an ongoing epidemiological and alcohol and other drug (AOD) prevalence research study, showed that annual and past month rates of cannabis use for full-time college students (ages 19-22) was 43 and 25%, respectively. More recently, a popular form of ingesting cannabis has been through handheld battery-powered vaporizers. A one-year increase (2017 – 2018) showed over a two-fold growth, from 5.2 to 10.9%, in the prevalence of past month cannabis vaping (Jones et al., 2016; Schulenberg et al., 2019). Not only does this growth represent the highest single year increase in any substance in the past four decades, but it also shows the swift adaptability of substances like cannabis to popular trends of ingestion. Researchers have hypothesized that the growing popularity of cannabis is due to the multi-modal ways of ingesting cannabis (e.g. smoke, eat, vape, wax), the ongoing legalization of cannabis throughout the United States (U.S.), and the continuing decrease in perceived risk of harm associated with cannabis (Frohe et al., 2018; Galston & Dionne Jr., 2013; Pacek et al., 2015). Cannabis and alcohol remain the most popular drugs used among college students (Schulenberg et al., 2019).

College students commonly report a co-use of cannabis and alcohol, especially in the context of social gatherings (O'Hara et al., 2016). One of the most common reasons reported why was the way alcohol and cannabis complement each other, in other words,
using alcohol heightens the effects of cannabis, and vice versa (O'Hara et al., 2016). Research shows somewhere around one-third of college alcohol drinkers actively use cannabis as well (Haas et al., 2015). This is significant because past-month trends in the prevalence of alcohol use show that almost 60% of college students are actively drinking. Over half (63%) of these students reported that they also got drunk within the last thirty days (Schulenberg et al., 2019). Research suggests that excessive use of alcohol and cannabis during college is concerning because of increased susceptibility to the negative consequences for brains still in development (Silveri, 2012; Zehra et al., 2019).

**Susceptibility and Age-of-Onset**

Research on brain development shows that the periods in which the brain is susceptible to the consequences of excessive AOD use ranges from adolescence to young adulthood (Bava & Tapert, 2010). In fact, final stages of brain maturation and refinement are happening around the age that individuals typically are in college (18-24) (Arnett, 2000; Arnett 2014). This period of life, for most, is characterized by a development of greater functional independence, substantial changes in social and personal lives, and increased competence (Silveri, 2012). For the millions who attend universities, this transition into college includes exposure to substantial changes in social activities, leisure time, socialization groups, and living arrangements.

The transition into college also acts as a risk factor for AOD use due to the increased exposure to other risky behaviors, such as peer excessive alcohol consumption, engaging in unsafe sexual behaviors, and experimentation of illicit drugs (Arria et al., 2010; Pascarella & Terenzini, 2005). Among those students who have an onset of AOD use during adolescence, being away at college can act as a catalyst for further increasing
their AOD use, and thus, increasing their susceptibility to the negative consequences associated with excessive AOD use (Buchmann et al., 2009; Wetherill et al., 2016). An important factor in predicting AOD use, and decreasing the associated consequences, is determining the age-of-onset of their AOD use (Buchmann et al., 2009; Griffin et al., 2010; Wetherill et al., 2016). Early-onset alcohol or cannabis users are at a greater risk of becoming dependent on alcohol or cannabis during adulthood and more likely to have experienced an obstruction of key stages of brain development (APA, 2013; Maimaris & McCambridge, 2014; Zehra et al., 2019).

Age-of-Onset

The positive relationship between early age-of-onset of AODs, and increased involvement with AODs as adults, including the associated negative consequences, has been demonstrated in previous studies (Griffin et al., 2010; Maimaris & McCambridge, 2014). Studies consistently find that adolescents who used alcohol prior to, or beginning at, age 14 are considered early-onset due to numerous physiological and psychological risk factors and concerns. These concerns include a delay in developing core executive functioning and self-regulation skills, and a significant increase in the chance of becoming dependent on alcohol (Donovan & Molina, 2011; Hingson et al., 2006; Kim et al., 2017).

Hingson et al. (2006) surveyed over 40,000 adults, and the data revealed that adults who had an age-of-onset of 14 or younger would most likely experience some issues with alcohol dependence within 10 years. Furthermore, these early-onset users also engaged in other risky behaviors (e.g. unprotected sex, cannabis use, physical aggression) more often and were less likely to be in better control of their impulses (Sartor et al.,
In contrast, if the age of onset was delayed until 21 or older, there was less of a chance of experiencing these issues since the brain had more time to develop. Although alcohol is the most prevalent substance used among adolescents and adults, lifetime trends in cannabis use among adolescents and young adults are also on the rise (Schulenberg et al., 2019).

Research on cannabis use is still in its infancy, but it continues to evolve. Brain development, growth in connective tissues, maturation of the endocannabinoid system, and social behaviors tend to be central factors in determining early-onset cannabis use (Bava et al., 2009; Gruber et al., 2012; Wetherill et al., 2016). The most consistent research has shown that around ages 16 - 18, cannabis use primarily impacts the connective tissue of the orbitofrontal cortex, and decreases the white matter connecting the right and left prefrontal cortex, essential regions of the brain involved in decision-making (Bava et al., 2009; Lopez-Larson et al., 2015). Studies found that a majority of young adults who started using cannabis at, or before, age 16 displayed declines in neuropsychological functioning, such as having a lower attention span, being less proficient in handling their emotions, unable to stay on task for long, and less in control of their impulses, compared to adults who delayed their age-of-onset until after 21 (Dahlgren et al., 2016; Meier et al., 2012; Wetherill et al., 2016). Adults who began using at, or before, age 16 also reported higher weekly use of cannabis as adults, including an increase in the quantity of cannabis around a rate of 4% per year from seventh grade to age 24 (Griffin et al., 2010). Additionally, these adults reported higher incidences of drug-related consequences (e.g. financial struggles, health issues, legal problems,
interpersonal problems) that are consistent with DSM criteria for being diagnosed with a SUD (APA, 2013; Griffin et al., 2010; Meier et al., 2012; Tetrault et al., 2007).

College AOD Intervention and Programming

Typically, rates of AOD use among early-onset users steadily increase from adolescence to young adulthood (Chen & Jacobson, 2012; Lee et al., 2013). Prevention programs for youth are typically designed to prevent AOD use, or delay the age of first use, thus, decreasing the likelihood of experiencing negative consequences and increased trajectory of AOD use that typically follows the individual through young adulthood (Maimaris & McCambridge, 2014). Colleges too have AOD prevention and education programs that are designed to assist students in making healthy decisions regarding AOD use in college, such as AlcoholEdu (White et al., 2010). However, for the millions of students in college who continue, or begin, to use AODs, universities are in a position to assist students in their health and well-being, especially during the first year of college which is widely seen as an important transition period (Hixenbaugh, Dewart, & Towell, 2012). Yet, identifying, understanding behaviors, and providing support for these students and their AOD use is complicated. Usually, since seeking voluntary assistance is so low among AOD using students, they are not identified until after their AOD use has led to an adverse event (e.g., violating AOD policies, underage drinking) that requires intervening or disciplinary actions from university officials or administration. These students represent an important group of the college student subpopulation (Barnett & Read, 2005; Norberg et al., 2012; Terlecki et al., 2015).

Students Mandated to Intervention Programming
Among college students, some of the highest rates of AOD use happen with students who violate AOD use policies and, as a result, are mandated to an intervention program (Barnett & Read, 2005; Carey et al., 2011; Fromme & Corbin, 2004; Terlecki et al., 2015; White et al., 2007). Studies comparing students who receive AOD disciplinary referrals to college student volunteers found that students who are referred use AODs at a higher rate (frequency and quantity), experience more negative consequences (academics, personal, physical) and are often more reticent to seek help or express that they are ready for a change (Palmer et al., 2010; Terlecki et al., 2015; White et al., 2015). Every year, campuses report AOD policy violations as the most frequent reason why students receive disciplinary referrals (Suffoletto et al., 2016). However, no prior studies have been conducted specifically looking at the onset of alcohol or cannabis use among students mandated to intervention programming. Given that early-onset users of AOD use are among the heaviest users as young adults, and because students mandated to AOD programming are among the heaviest users in the college population, it would be beneficial to study the initiation of AOD use among students mandated to programming (Maimaris & McCambridge, 2014; Terlecki et al., 2015).

Significance of Study

Early initiation of AOD use acts as a risk factor for other risk-taking behaviors, such as drinking and driving, engaging in unsafe sexual behaviors, and experimentation with non-medical use of prescription drugs (Arria et al., 2010; Bava & Tapert, 2010). Early initiation of alcohol and cannabis use are associated with decreases in executive functioning skills, including sensation seeking, impulsivity, inhibitory control, and poor self-regulation and decision-making skills (McQueeney et al., 2011; McQueeney et al.,
2009). The brain is most susceptible to the consequences of AODs from adolescence to young adulthood, therefore, allowing universities the opportunity to intervene with a population of students still undergoing executive functioning developmental skills (Arnett, 2014; Wetherill et al., 2016). Understanding the behaviors among students mandated to AOD programming could help universities provide improved, tailored programming that focuses on specific predictive factors of AOD use (e.g. age of onset, participation in other risky behaviors), and offer screening for SUDs in order to provide supplementary help (Hingson & Zha, 2009; Wall et al., 2016).

In order to create effective intervention programs for college students, it is important to understand age-of-onset, current AOD use habits, participation in other risk-taking behaviors, and factors that would influence intentions to reduce their substance use (Hasson, 2010). No prior studies have been conducted specifically looking at the age-of-onset of alcohol or cannabis use among students mandated to programming. Therefore, this study offers insight for a unique group of college students. The results of this study will contribute to a better understanding of students mandated to alcohol or cannabis programs, and provide implications for future program development.

**Purpose**

The purposes of this study, for students mandated to alcohol and cannabis interventions, were to:

1. Determine if differences existed between early- and late-onset of alcohol and cannabis users among the variables: frequency and quantity of alcohol use, frequency and quantity of cannabis use, and future intentions to reduce alcohol or cannabis use; and
2. Determine if there was an association between students’ frequency of alcohol and cannabis use and their participation in other risky behaviors.

**Hypotheses**

The hypotheses associated with this study were:

**H1a.** Students who engaged in early-onset alcohol use will report different alcohol quantity and frequency rates in college, when compared to those who engaged in late-onset alcohol use for students mandated to alcohol interventions;

**H1b.** Students who engaged in early-onset cannabis use will report different cannabis quantity and frequency rates in college, when compared to those who engaged in late-onset cannabis use for students mandated to cannabis interventions;

**H2a.** Students who engaged in early-onset alcohol use will report different intentions for future use of alcohol, when compared to those who engaged in late-onset alcohol use for students mandated to alcohol interventions;

**H2b.** Students who engaged in early-onset cannabis use will report different intentions for future use of cannabis, when compared to those who engaged in late-onset cannabis use for students mandated to cannabis interventions;

**H3a.** Students’ frequency of alcohol use will be associated to the frequency of participation in other risky behaviors for students mandated to alcohol interventions; and
H3b. Students’ frequency of cannabis use will be associated to the frequency of participation in other risky behaviors for students mandated to cannabis interventions.

**Methodology**

**Participants**

The study was conducted at a large university in the Southeast U.S. which requires all students who live on or off campus to adhere to specific AOD policies while on the premises of the campus. This includes the prohibition (e.g. selling, serving, using) of alcohol use for all those under the age of 21, and no alcohol allowed on University property for University business, or at University sponsored activities, unless University regulation explicitly allows it. Additionally, all students, faculty, and staff must adhere to a zero-tolerance drug policy on campus. The University’s Department of Campus Recreation and Wellness is responsible for administering mandated programming to students who violate campus AOD policies. Post-referral from an authoritative figure (e.g. campus police, residence hall directors, Dean of Students office), students must report to the Department of Campus Recreation and Wellness to enroll in a mandated course.

A purposive sampling method was administered for the study. The sample for this study consisted of those students who were found in violation of the university’s policies specifically surrounding alcohol and cannabis use, and therefore were mandated to attend online alcohol and cannabis education programming. Data were collected beginning October 2019 to May 2020 ($N = 463$). Four hundred and three students (87%) were adjudicated to alcohol programming for an alcohol violation, and 60 students (13%) were
adjudicated to cannabis programming for a cannabis violation. All students were placed into programs based on the number of previous violations (e.g. 1st, 2nd) and only first-time policy violators were allowed to enroll in these mandated online courses.

**Procedures**

Primary data were collected via a Qualtrics survey, that was written by the researcher in collaboration with the Department of Campus Recreation and Wellness, from students who were registered to attend mandated programming for alcohol violations \((n = 403)\) and cannabis violations \((n = 60)\) from October 2019 until May 2020. Prior to students’ starting their online alcohol or cannabis intervention course, every student is obligated to complete a mandated baseline assessment (Qualtrics survey) measuring characteristics about their onset, and rates of alcohol use (Appendix A) or cannabis use (Appendix B).

Prior to each mandated assessment, students were given a cover letter describing information about this current study, along with an opportunity to opt out of sharing their anonymous data for this study (Appendix C). If students remained in the study, they continued on to complete the survey and then they were enrolled in a drawing to win one of twenty-three, $30 Amazon e-gift cards distributed by the Department of Campus Recreation and Wellness. Participants’ data were de-identified by the Department of Campus Recreation and Wellness and sent to the researcher once a week. Students still had the opportunity to retract their data from the sample, even if they originally agreed to be a part of this study, if they contacted the Department of Campus Recreation and Wellness post-intervention. Once the data were received, the researcher included in the data analysis only the data that met the following inclusion criteria: a) being at least 18
years of age, b) 100% of the survey completed, and c) did not opt out of participating in the study.

**Waiving of Informed Consent and Documentation of Informed Consent**

Due to the anonymous nature of the study, informed consent was waived. In lieu of a consent form, each student in the primary study received an information sheet prior to completing their survey that explained the purpose of the study, information on voluntary participation, benefits to the student, etc. Any student who wished to not have their information shared with the researcher was able to opt out by clicking “I do not wish to have my data shared in this project.” Per IRB approval, documentation of informed consent was also waived. The opt-out design procedures in the study required students to manually choose not to be a part of the study. Therefore, the information sheet that preceded each survey alerted the respondent of important details of the study and served as their notice of the nature of the study and how to prevent their data from being used.

**Missing and Omitting Data**

Although some students opted out of the study, the total number of students mandated to programming was 488. Of the whole mandated student sample, 18 students (3.6%) opted out of the study. An additional seven students (1.4%) were omitted because they did not complete 100% of the survey. Protocol for the mandated courses within the university required that all students complete 100% of the survey. All items of the survey were forced responses; therefore, every question must be answered in sequential order. If any data were missing, it was a result of students not finishing the survey all the way through. If a survey was partially complete, it was omitted from this study. Since the data analysis plan involved multiple independent t-test analyses, and inter-item correlations,
incomplete surveys were omitted to avoid the impact of missing data bias and invalid conclusions. The final sample for the study consisted of 403 eligible students who had violated an alcohol policy and 60 students who violated a cannabis policy.

**Measures**

Response behavior in self-report data, particular in relation to AOD use, has been found to be both a reliable and valid way to assess students’ rates of use (Del Boca & Darkes, 2003). When settings and conditions are designed to maximize response accuracy, such as a condition of anonymity, participants’ responses are commonly found to be respectable of their AOD use patterns (Del Boca & Noll, 2000). In addition, pre-existing scales included and slightly adapted in this study were shown to have high reliability and validity for both alcohol ($\alpha = .88$) and cannabis ($\alpha = .95$) use previously (Collins et al., 1985; Cuttler & Spradlin, 2017). All reported measures are considered baseline outcomes. No follow-ups were conducted.

**Age-of-Onset**

Students reported on the age of initiation of alcohol and cannabis use. Students were asked to report the age they had their first full drink of alcohol or occasion of cannabis use, beyond just a sip and a single “puff,” respectively. Ages ranged from one $= < 14$ to nine $= \geq 21$. Based on literature, early-onset alcohol use for this study is defined as those who start drinking prior to, or beginning at, age 14 (Donovan & Molina, 2011; Hingson et al., 2006). Additionally, consistent with other cannabis-onset research, early-onset cannabis users for this study are those students who began using on, or before, age 16 (Bava et al., 2009; Dahlgren et al., 2016; Lopez-Larson et al., 2015; Wetherill et al., 2016). Regardless of which mandated intervention program students were enrolled in,
early-onset students were coded as one, and late-onset were coded as two for research purposes.

*Alcohol Use*

Unless otherwise indicated, all alcohol use measures were assessed over the past 30 days. Quantity of alcohol use was assessed using two items, one from the Daily Drinking Questionnaire-Revised (DDQ-R) ($\alpha = .88$), adapted from the original DDQ (Collins et al., 1985), and one from alcohol sub-section of the American College Health Association National College Health Assessment ($\alpha = .64$) (American College Health Association [ACHA], 2013). First, students reported on the quantity of drinks they had per drinking occasion (ACHA, 2013). Additionally, students were given a calendar to report on the amount of drinks they had per day, in any given week, over the past thirty days (Collins et al., 1985). The responses from these questions were totaled to create a variable for weekly total alcohol consumption per student.

*Cannabis Use*

Frequency of students’ alcohol use was measured using a 7-point Likert scale ranging from 0 = *not in the last month* to 6 = *daily*, adapted from the Rutgers Health and Human Development Project ($\alpha = .64$) (Pandina et al., 1984). In order to further assess their frequency of alcohol use, students also reported the total daily sum of the number of days they drank over the past month, ranging from zero to 31 days. Finally, students reported on binge drinking (4+ drinks for women and 5+ drinks for men on the same occasion) occasions over the last month (e.g. “How many times would you say you have participated in binge drinking over the last thirty days?”).
Unless otherwise indicated, all cannabis use measures were assessed over the past 30 days. Students reported on their frequency and quantity of cannabis use using seven items from the Daily Sessions, Frequency, Age of Onset, and Quantity of Cannabis Use Inventory (DFAQ-CU) (α = .95) (Cuttler & Spradlin, 2017). Frequency of cannabis use was measured using a daily count of the total number of days the student used cannabis last month, ranging from zero to 31 days. Additionally, a 7-point Likert scale ranging from 0 = not in the last month to 6 = daily was also used to further assess their frequency of cannabis use. Total daily sessions of cannabis use, on any given weekday and weekend, was also measured. Students’ quantity of cannabis use was measured over four occasions (per occasion, per day, in one week, and over a full month) on a scale ranging from 0 = 0 grams to 11 = More than 1 ounce. Students were shown a picture of varying amounts of cannabis in raw form, and rolled in cigarette papers, to help provide size perspective.

**Intention**

Students were asked about their intention to reduce their alcohol or cannabis use. Intention is a construct of the Theory of Planned Behavior (TPB). The TPB posits the notion that an individual’s intention to engage in a behavior is preceded by three proximal constructs: attitude, perceived behavioral control, and subjective norms (Ajzen, 1991). Previous research has utilized the TPB in intervening with college students and their high-risk behaviors, including AOD use. Intention measurement scales used in previous studies revealed high reliability (α = .67), and were adapted for use in this study in assessing students’ intention to reduce alcohol or cannabis use (Caron et al., 2004; Norman & Conner, 2006; Norman, 2011). Measures of intention to reduce alcohol or
cannabis use were assessed by asking two, 7-point differential semantic scale items ranging from -3 to +3 (i.e. “I…to reduce the amount of alcohol I drink over the next month,” do not intend/do intend) so that high values indicated a higher intention to reduce use. The two items were then averaged to gather a mean intention score.

**Other Risky Behaviors**

In order to better understand the behaviors of the study sample, other risky behaviors that college students typically engage in were included as variables in this study. Research shows that individuals, particularly college students, who frequently use alcohol or cannabis are also more likely to engage in other risky behaviors, such as other illicit drug use, unprotected sexual intercourse, and acting out aggressively (Groth et al., 2017; Lydon-Staley et al., 2019). Each of these additional risky behaviors was measured on a scale from 0 = *never* to 4 = *always*.

**Data Analyses**

Data were exported to SPSS (Version 26.0) for analysis. Demographic information (e.g. gender, ethnicity, age) for the student sample were calculated, see Tables 2 and 3. First, all outcomes were assessed for normality. Descriptive statistics (mean and standard deviation) and distributions of outcome variables (frequency, quantity, and intention) were assessed for non-normality issues. Outliers that fell above or below three standard deviations from the mean were re-coded into the highest non-outlying value plus one, resolving some non-normality concerns (Tabachnick & Fidell, 2012). Next, all early- and late-onset users were re-coded into a one or a two, respectively, for each sample, Multiple independent *t*-tests were then conducted to determine if differences existed within the multiple frequency and quantity behavioral
items between early- and late-onset alcohol and cannabis users (hypotheses 1a and 1b). An additional independent t-test was conducted to examine if there was difference in students’ intention to reduce their alcohol or cannabis use post-intervention (hypotheses 2a and 2b) between early- and late-onset students. Finally, Pearson’s product-moment correlations were employed, in order to examine relationships between students’ frequency of alcohol or cannabis use and participation in other risky behaviors (hypotheses 3a and 3b).

**Results**

This section presents findings and discussion on the differences between early and late-onset alcohol and cannabis users among college students enrolled in mandated intervention courses.

**Sample**

Table 2 displays descriptive demographic statistics for students enrolled in the mandatory alcohol classes. The average age of these students was 18.93 years, with a majority (90%) enrolled in their first or second year of college. Over half of the sample identified themselves as male (52.6%), and the sample consisted of predominantly White Non-Hispanic (85.1%) students. The vast majority of the students mandated to alcohol intervention programming were considered late-onset. Table 3 displays descriptive demographic statistics for students enrolled in the mandatory cannabis classes. The average age of these students was 18.7 years with nearly all (96.6%) enrolled in their first or second year of college. About two-thirds (65%) of the sample were male, and the same consisted of predominantly White Non-Hispanic (87.7%) students. There was almost an
even split between early- and late-onset students mandated to cannabis intervention programing.

Table 2

Participants Enrolled in Mandated Alcohol Course: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Early-Onset (n = 44)</th>
<th>Late-Onset (n = 359)</th>
<th>Total (n = 403)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>28</td>
<td>184</td>
<td>212</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>173</td>
<td>188</td>
</tr>
<tr>
<td>Gender Fluid</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Non-Hispanic</td>
<td>38</td>
<td>305</td>
<td>343</td>
</tr>
<tr>
<td>Black Non-Hispanic</td>
<td>3</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>2</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>1</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>American or Alaskan Native</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Age</td>
<td>19.64 (1.53)</td>
<td>18.84 (.96)</td>
<td>18.93 (1.06)</td>
</tr>
<tr>
<td>Year in school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>20</td>
<td>265</td>
<td>285</td>
</tr>
<tr>
<td>Sophomore</td>
<td>16</td>
<td>61</td>
<td>77</td>
</tr>
<tr>
<td>Junior</td>
<td>4</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>Senior</td>
<td>4</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Greek Affiliated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21</td>
<td>191</td>
<td>212</td>
</tr>
<tr>
<td>No</td>
<td>23</td>
<td>168</td>
<td>191</td>
</tr>
</tbody>
</table>

Note. All data is reported as sample size (n). *Data measured in years and reported as Mean and Standard Deviation (SD).
### Table 3

**Participants Enrolled in Mandated Cannabis Course: Descriptive Statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Early-Onset (n = 28)</th>
<th>Late-Onset (n = 32)</th>
<th>Total (n = 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>21</td>
<td>18</td>
<td>39</td>
</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Non-Hispanic</td>
<td>21</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>Black Non-Hispanic</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Age</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td>18.71 (.66)</td>
<td>18.69 (.74)</td>
<td>18.70 (.70)</td>
</tr>
<tr>
<td><strong>Year in school</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>23</td>
<td>19</td>
<td>42</td>
</tr>
<tr>
<td>Sophomore</td>
<td>4</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Junior</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Greek Affiliated</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>14</td>
<td>24</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>18</td>
<td>36</td>
</tr>
</tbody>
</table>

*Note.* All data is reported as sample size (n). *<sup>a</sup>Data measured in years and reported as Mean and SD.*

### Results of Hypotheses Tests for Students Mandated to Alcohol Programming

**Between-Group Differences**

After testing and solving for normality issues, independent *t*-tests were conducted to determine if differences existed between early- and late-onset alcohol users (Table 4).

Early-onset students reported they drank 6.20 (SD = 5.12) days on average over the past 30 days and participated in 5.11 (SD = 4.17) binge drinking occasions over the past 30 days. Results from the two-tailed, independent samples *t*-test revealed that the frequency of alcohol use among early-onset students was significantly higher than late-onset students for both the number of days *t*(401) = 2.10, *p* < .05, *d* = .34, and number of binge drinking occasions *t*(401) = 2.25, *p* < .05, *d* = .35, a small-to-moderate effect size for both variables (Cohen, 1992). Early-onset students also drank significantly more per occasion than late-onset students *t*(401) = 1.98, *p* < .05, *d* = .31, a small-to-moderate effect size.
Table 4

Early- vs Late-Onset of Alcohol Use Outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Early-Onset (n = 44)</th>
<th>Late-Onset (n = 359)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past 30 Days&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.20 (5.12)</td>
<td>4.81 (4.04)</td>
<td>2.10*</td>
<td></td>
</tr>
<tr>
<td>Binge Drinking&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.11 (4.17)</td>
<td>3.74 (3.79)</td>
<td>2.25*</td>
<td></td>
</tr>
<tr>
<td>Alcohol Quantity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinks Per Occasion&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.16 (3.21)</td>
<td>5.12 (3.37)</td>
<td>1.98*</td>
<td></td>
</tr>
<tr>
<td>Weekly&lt;sup&gt;c&lt;/sup&gt;</td>
<td>7.05 (8.15)</td>
<td>6.41 (7.24)</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td>Theory of Planned Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention to Reduce&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.80 (1.74)</td>
<td>.93 (1.77)</td>
<td>-.48</td>
<td></td>
</tr>
</tbody>
</table>

Note. <sup>a</sup>scored as total number of days used over past 30 days; <sup>b</sup>number of binge drinking occasions during the last 30 days; <sup>c</sup>computed as the number of alcohol drinks drank Monday - Sunday; <sup>d</sup>computed by adding and averaging two semantic scales ranging from -3 to 3, -3 = low intention to reduce alcohol use, 3 = higher intention to reduce alcohol use. *p < .05

The quantity of alcohol use consumed weekly, and intentions to reduce alcohol use were both non-significant between early- and late-onset students. Hypothesis 1a specified that early-onset alcohol users will report different alcohol quantity and frequency rates when compared to late-onset alcohol users. Data revealed that three of the four variables tested were significantly different, thus, hypothesis 1a was partially supported. Hypothesis 2a specified that early-onset alcohol users will report different intentions to reduce their alcohol use when compared to late-onset alcohol users. Data revealed that this hypothesis was not confirmed.

Alcohol Use and Other Risky Behaviors

Among all the students, co-use of alcohol and cannabis was reported among 21% of students mandated to alcohol programming over the last month. Twenty-eight percent also reported they participated in unprotected sexual intercourse over the last month. Percentages of other illicit drug use and aggression were reported at seven and twelve
percent, respectively. Table 5 displays correlations between frequency of alcohol use and other risky behaviors.

Results of the Pearson’s product moment correlation tests indicated that there was a positive weak to moderate association between students’ frequency of alcohol use and cannabis use, $r(401) = .28, p < .01$, and positive moderate associations between cannabis use and other drug use, $r(401) = .39, p < .01$, cannabis use and unprotected sexual intercourse, $r(401) = .35, p < .01$, and other drug use and unprotected sexual intercourse, $r(401) = .38, p < .01$. Hypothesis 3a specified that alcohol frequency will be associated with other risky behaviors for the entire alcohol program mandated student sample. Data revealed all relationships were positive, and varied in levels of strength between weak and moderate. Based on these findings, hypothesis 3a is partially supported.

**Table 5**

*Correlations Between Frequency of Alcohol Use and Other Risky Behaviors*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alcohol Frequency</td>
<td>-----</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Cannabis Use</td>
<td>.28**</td>
<td>-----</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Other Drug Use</td>
<td>.15**</td>
<td>.39**</td>
<td>-----</td>
<td>-</td>
</tr>
<tr>
<td>4. Unprotected Sex</td>
<td>.24**</td>
<td>.35**</td>
<td>.38**</td>
<td>-----</td>
</tr>
<tr>
<td>5. Aggression</td>
<td>.08</td>
<td>.20**</td>
<td>.18**</td>
<td>.23**</td>
</tr>
</tbody>
</table>

*Note.* a: scored as total number of days used over past 30 days; b: scored on a 4-point ordinal scale ranging from 0 = Never to 4 = Always; c: includes use of other stimulants, hallucinogens, narcotics, etc. **$p < .01$*

**Results of Hypotheses Tests for Students Mandated to Cannabis Programming**

**Between-Group Differences**

Table 6 displays a comparison of early- and late-onset cannabis users on cannabis outcome variables. Students who were early-onset and late-onset users of cannabis reported using cannabis 16.54 days ($SD = 8.84$) and 9.94 days ($SD = 8.95$) in the last 30
days, respectively. Results from the two-tailed, independent samples t-test revealed this was a significant difference between the two groups, \( t(58) = 2.87, p < .05, d = .74 \), a large effect size.

The remaining t-tests among the frequency and quantity of cannabis variables (hypothesis 1b), as well as the intention to reduce cannabis use (hypothesis 2b), were all non-significant. Hypothesis 1b specified that early-onset cannabis users will report different cannabis quantity and frequency rates when compared to late-onset cannabis users. Data revealed that one of the variables tested were significantly different, thus, hypothesis 1a was partially supported. Hypothesis 2b specified that early-onset cannabis users will report different intentions to reduce their cannabis use than late-onset alcohol users. Data revealed that hypothesis 2b was not confirmed.

**Table 6**

*Early- vs Late-Onset of Cannabis Use Outcomes*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Early-Onset (n = 28)</th>
<th>Late-Onset (n = 32)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past 30 Days(^a)</td>
<td>16.54 (8.84)</td>
<td>9.94 (8.95)</td>
<td>2.87**</td>
<td></td>
</tr>
<tr>
<td>Weekday(^b)</td>
<td>2.46 (2.47)</td>
<td>1.81 (1.93)</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>Weekend(^b)</td>
<td>1.86 (1.67)</td>
<td>1.41 (1.01)</td>
<td>1.28</td>
<td></td>
</tr>
<tr>
<td>Cannabis Quantity(^c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Session</td>
<td>2.21 (1.81)</td>
<td>1.94 (1.72)</td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>Per Day</td>
<td>3.11 (2.18)</td>
<td>2.47 (2.06)</td>
<td>1.16</td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
<td>2.96 (2.69)</td>
<td>2.47 (2.31)</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>Monthly</td>
<td>5.14 (3.34)</td>
<td>4.44 (3.30)</td>
<td>.82</td>
<td></td>
</tr>
<tr>
<td>Theory of Planned Behavior</td>
<td>Intention to Reduce(^d)</td>
<td>(.68 (1.98))</td>
<td>(.98 (1.61))</td>
<td>-.66</td>
</tr>
</tbody>
</table>

**Note.** \(^a\)scored as total number of days used over past 30 days; \(^b\)number of times cannabis was used on any given day; \(^c\)scored on a scale from 0 = 0 grams of cannabis to 11 = more than 28 grams of cannabis; \(^d\)computed by adding and averaging 2 semantic scales ranging from -3 to 3, -3 = low intention to reduce cannabis use, 3 = higher intention to reduce cannabis use.

**\( **p < .01**
**Cannabis Use and Other Risky Behaviors**

Co-use of cannabis and alcohol was reported among 62% of students mandated to cannabis programming in the last month. Twenty-two percent also reported using illicit drugs other than their cannabis use in the last month. Percentages of those who reported participating in unprotected sex and displaying aggression were around 42 and 19%, respectively. Table 7 shows the results from multiple Pearson’s product moment correlations between students’ frequency of cannabis use and their participation in other risky behaviors.

The correlation values revealed mostly positive weak associations between students’ frequency of cannabis use and participation in other risky behaviors. Students’ frequency of cannabis use had a positive moderate association with other drug use, \( r(58) = .30, p < .05 \). Positive moderate associations were also revealed between the students’ alcohol use and their other drug use, \( r(58) = .38, p < .01 \), as well as with alcohol use and aggression, \( r(58) = .37, p < .01 \). Hypothesis 3b specified that cannabis frequency will be associated with other risky behaviors for the entire cannabis program mandated student.

**Table 7**

**Correlations Between Frequency of Cannabis Use and Other Risky Behaviors**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1 Cannabis Frequency</th>
<th>2 Alcohol Use</th>
<th>3 Other Drug Use</th>
<th>4 Unprotected Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cannabis Frequency</td>
<td>-----</td>
<td>.20</td>
<td>.30*</td>
<td>.05</td>
</tr>
<tr>
<td>2. Alcohol Use</td>
<td></td>
<td></td>
<td>.38**</td>
<td>.07</td>
</tr>
<tr>
<td>3. Other Drug Use</td>
<td>.30*</td>
<td></td>
<td>.11</td>
<td>.01</td>
</tr>
<tr>
<td>4. Unprotected Sex</td>
<td>.05</td>
<td>.07</td>
<td>.11</td>
<td>.01</td>
</tr>
<tr>
<td>5. Aggression</td>
<td>.15</td>
<td>.37**</td>
<td>.01</td>
<td>.13</td>
</tr>
</tbody>
</table>

*Note.* 

\( ^{*} \) scored as total number of days used over past 30 days; \( ^{b} \) scored on a 4-point ordinal scale ranging from 0=Never to 4=Always; \( ^{c} \) includes use of other stimulants, hallucinogens, narcotics, etc.

\( *p < .05; **p < .01 \)
sample. Data revealed all relationships were positive, but varied in levels of strength between weak and moderate. Based on these findings, hypothesis 3b is partially supported.

**Discussion**

This study was the first to examine the age-of-onset of alcohol and cannabis use among students who were mandated to intervention programming. Further, it was also the first to examine if differences in rates of alcohol and cannabis use existed between the groups in this population. This study found that early-onset alcohol users in mandated programming drank more frequently per month, including occasions of binge drinking, and had more drinks per occasion than late-onset alcohol users. Early-onset cannabis users also displayed a significant difference from late-onset users in their frequency of cannabis use over the past month. This difference equated to early-onset cannabis users reporting an additional full week of cannabis use per month than late-onset cannabis users. Further, there were associations with students’ frequency of alcohol and cannabis use and their participation in other risky behaviors over the past month, such as other illicit drug use, bouts of aggression, and unprotected sex. Taken together, these data support that there are significant differences in rates of alcohol and cannabis use between early- and late-onset users mandated to intervention programming.

Findings from this study are consistent with other research in the field of AOD use among college students. Co-use of alcohol and cannabis was reported among the current sample of mandated students, a finding consistent with other research studies (Haas et al., 2015; O'Hara et al., 2016). Haas and colleagues (2015) discovered that in their sample of college student drinkers, around 30% reported co-use of cannabis and
alcohol, roughly consistent with the percentage reported in this study (21%). Increased exposure to risky behaviors, such as engaging in unsafe sexual behaviors, and experimentation of illicit drug use, is common for students transitioning into college (Arria et al., 2010; Pascarella & Terenzini, 2005). For those who are considered early-onset users of alcohol or cannabis, being in college can act as a catalyst for further increases in their alcohol and cannabis use (Sartor et al., 2009).

Although there are no other studies pertaining to age-of-onset among the population of students mandated to intervention courses, other studies in the area of early-onset alcohol and cannabis use do exist. Rates of AOD use typically increase as adolescents enter young adulthood (Paavola et al., 2004). Longitudinal studies among early-onset AOD users reveal that their rates of AODs are typically exacerbated if those individuals started using early in life (Chen & Jacobson, 2012; Lee et al., 2013). Additionally, early-onset AOD users are also more likely to experience some issues with AOD dependence, higher incidences of financial struggles, health issues, legal problems, and interpersonal problems later in life, all items that are consistent with DSM criteria for being diagnosed with an SUD (APA, 2013; Griffin et al., 2010; Meier et al., 2012; Tetrault et al., 2007).

The most current iteration of the Diagnostic and Statistical Manual of Mental Disorders (DSM–5) identifies SUDs as a disease that affects an individual's brain and behavior that leads to an inability to control their use of substances. Specifically, those diagnosed with a SUD most likely experience an aggregation of symptoms grouped into the following four categories: impaired control, social problems, risky use, drug effects (APA, 2013). However, diagnosing college students with a SUD is complicated because,
despite having serious issues with AOD use, college students will rarely seek help (APA, 2013; Norberg, et al., 2012). Some studies discovered that nearly half (46.8%) of their college student sample \((n = 946)\) met the criteria for a cannabis or alcohol use disorder at some point in their first three years of college, but of those, only 8% sought professional help (Caldeira et al., 2009; Knight et al., 2002). The many consequences of heavy AOD use for college students continues to be a major concern for universities and the general public alike. This is why college campuses have implemented mandated intervention programming such as the program reported in this study.

No previous studies have examined the TPB, or one of its variables (intention), among students mandated to intervention courses. Results from this study revealed that there is no significant difference between early- and late-onset of alcohol or cannabis users when it relates to their intention to reduce their alcohol or cannabis use. Although unexpected, there is no precedence or previous research to compare these outcomes to. The data did show that both early- and late-onset users for both programs responded in favor of an intention to reduce their alcohol or cannabis use prior to intervention implementation. The research literature offers some reasons why these young students in this study responded in favor of an intent to reduce their alcohol or cannabis use prior to actually being exposed to any intervention materials.

There are reported instances where students who were caught violating an AOD University policy show immediate remorse and a desire to change their habits simply because they were reprimanded (Barnett & Read, 2005; White et al., 2008). Results from White et al’s (2008) study revealed that students mandated to AOD programming, and assigned to a no-intervention control group, showed significant reductions in AOD use
two months post infraction. The results of this study can be interpreted to mean that simply getting caught was enough of an instigator to cause a change in behaviors. However, the authors from that study, and other studies involving students in intervention programming, recognize that a majority of the students will most likely not change behaviors based on the infraction alone and that interventions still provide an opportunity to capitalize on the incident (Barnett et al., 2001; Borsari & Carey, 2005; White et al., 2008). For example, it was also discovered that heavy users of AODs are less likely to be affected by the incident itself compared to light users (Barnett et al., 2006; Murphy et al., 2001). Some of the heaviest users of AODs in the college population are those mandated to AOD programming (Fromme & Corbin, 2004; Terlecki et al., 2015).

The findings in this study were relatively consistent with other research in the field. Early-onset AOD users have regularly been found to use AOD at heavier rates than late-onset users in adulthood (Bava & Tapert, 2010; Borsari & Carey, 2001; Griffin et al., 2010; Groth et al., 2017; Hingson et al., 2017; Sartor et al., 2009). The current study is a cross-sectional study, nevertheless, the results from this study does further strengthen that relationship. However, this study adds to existing literature by exploring the age-of-onset and future intentions of alcohol and cannabis use among students who were mandated to intervention programming. This is the first study to examine these factors and test for differences among early- and late-onset users with this population. Further, the involvement of students mandated cannabis intervention programming is one of only a few efforts to involve this population in research, an area that previous studies have acknowledged is severely scarce (Buckner et al., 2018; White et al., 2015; Yurasek, Merrill, et al., 2017).
Cross-sectional studies like this one offer a brief insight into characteristics of students in mandated programming. This study provides a better understanding of the behaviors among students mandated to AOD programming and could help universities provide improved, tailored programming that focuses on some predictive factors of future AOD use (e.g. age-of-onset, risky behaviors), and addresses those challenges, making room for additional longitudinal studies examining the effectiveness of tailored programming.

**Limitations**

Future work and researchers should interpret the results of this study within the context of its limitations. First, the sample was predominantly White Non-Hispanic. Although this is representative of the region of the U.S. in which the university is located, and the make-up of the university itself, literature has suggested that White Non-Hispanic college students have higher rates of AOD use compared to their counterparts, thus, possibly inflating the alcohol or cannabis frequency or quantity data (Dunn et al., 2020; Murphy et al., 2005). Second, the sample size for students in the cannabis course was small. Small sample sizes make the results of a study hard to generalize, and can both reduce the chances of detecting a true effect and reduce the likelihood that any significant findings actually reflect a true result (Murnane & Willett, 2010). Third, data were self-reported, so some reported answers could be exaggerated or underreported. Future research could utilize a more accurate measure of AOD use such as the TLFB method assessment (Fals-Stewart et al., 2000; Robinson et al., 2014). Fourth, all the data were baseline, cross-sectional data, and relied on retrospective answers, which allows room for sources of bias and confounding variables. Further, cause and effect cannot be
determined with cross-sectional studies, and in this case, it is difficult to infer that the higher rates of alcohol or cannabis in college were a result of their early-onset of alcohol or cannabis use.

**Implications for Future Practice and Research**

The findings of this study have potential future practical and research implications. As universities address future AOD prevention/intervention and education programs, there are some ways the current study can help identify methods to make programs more effective. The rate of students voluntarily seeking assistance for their AOD use is traditionally low, which is why most are unaware of their high susceptibility to the potential consequences of excessive use of AODs (Barnett & Read, 2005; Norberg et al., 2012). The results of this infrequent, help-seeking behavior can result in high AOD-using students ultimately being unidentified until their use has led to an adverse event. If these events occur on campus, intervening from university officials through mandated programming could prove to be an effective way to assist these students, with the employment of more efficient protocols (Terlecki et al., 2015).

One key implication for future practice that could improve mandated programs would be to employ self-screening assessments for students upon registration, or prior to, their intervention. The screening assessment would examine certain indicators of substance use dependence that typically go unnoticed among the students. This would allow for tailored, program-specific, steps or intervention types that to which students would be referred based on their answers. For example, prior to being enrolled in any course, the students would answer questions about key predictors of current and future AOD use, such as age-of-onset of AOD use, recent frequency and quantity of AOD use,
and their participation in other risky behaviors (Hingson & Zha, 2009; Lydon-Staley et al., 2019; Maimaris & McCambridge, 2014). Additionally, students could complete self-administered, short screening assessments to assess hazardous AOD use and dependence probability, such as the Alcohol Use Disorders Identification Test (AUDIT – C) or the Cannabis Abuse Screening Test (CAST) (Bush et al., 1998; Legleye et al., 2007).

The results of these predictive factors and screening assessments would allow tailored programming for students based on the variables and instruments listed above. Research has shown that the effectiveness of interventions varies depending on some key variables (Carey et al., 2012; Dunn et al., 2020). For instance, students who are infrequent and late-onset users of AODs, and who do not have a long history of AOD use in the family, are usually more likely to experience a reduction of AOD use after a short (usually 30 to 50 minute) single-session intervention, usually computer- or online-based (Kulesza et al., 2010; Wetherill et al., 2016). However, more frequent and early-onset AOD users, who are more prone to future use of AODs and substance use disorders, do not receive the same benefits from a single-session or computer delivered intervention. These individuals benefit more from personal, face-to-face communication, with specific harm reductions techniques, such as BMI or personalized WF reports of their own AOD use versus peers (Buchmann et al., 2009; Carey et al., 2012; Dimeff, 1999; Yurasek, Merrill, et al., 2017).

Based on these predictive factors and screening assessments, students who are late-onset AOD users, less at-risk of future dependence, and infrequently use AODs, could receive on-line intervention programming with resources to other professional help. Alternatively, students who are early-onset AOD users, more at-risk of future
dependence, and are frequent AOD users, could be required or recommended to receive more personal, face-to-face support with the option for professional counseling. Some previous approaches of student-referred professional assistance tend to be event-specific (e.g. incidences following AOD use after spring break or homecoming) or based on a tiered approach where students are allotted multiple chances and opportunities before professional help is suggested or required (Neighbors et al., 2007; Wechsler et al., 2002). These ex post facto approaches to AOD interventions endanger a student’s health and well-being (including academic well-being), and decreases the likelihood of retaining the student. The suggested practical implication from the current study would avoid that tiered and event-based approach, and assign or recommend students to interventions based on key AOD prediction variables and outcomes of the screening assessments.

Research implications based on this new tailored-programming approach could include the use of longitudinal research to examine whether it was effective in reducing AOD use (Arria et al., 2013; Yurasek, Aston, et al., 2017). Although there are multiple longitudinal studies on the impact of mandated alcohol programming on reducing alcohol use among college students, this study is the first to suggest tailored programming through the use of screening tools and predictive variables, such as early- or late-onset of AOD use. Additionally, longitudinal research could evaluate if there were differences between those students who are considered early- or late-onset during longitudinal assessments. This could help provide further evidence that those who are early-onset AOD users, more frequent AOD users, and more at-risk of future dependence benefit from a personalized programming method.
The results of the independent $t$– tests in this study revealed that early-onset cannabis users did not significantly differ than late-onset cannabis users on most variables. However, there is still a need to examine the impact of interventions on those who are cannabis and other drug users specifically, especially studies that include a larger sample size than was included in this study (Buckner et al., 2018; Yurasek, Merrill, et al., 2017). Overall, university officials should favor this future practice and research given that students are less likely to be retained when they are using AODs (Arria et al., 2013; Perkins, 2002). Future research should focus on short- and long-term effectiveness of tailored intervention programming to determine if and how sustainable the programs were in reducing AOD use.

Other areas of future practice could focus on the curricula of the programs. Specifically, curricula could take into account the association of AOD use and participation in other risky behaviors (e.g. co-use of alcohol and cannabis, unprotected sex, physical aggression, drinking and driving). Moderate associations with alcohol and cannabis use with other risky behaviors were revealed in this study, consistent with previous research (Haas et al., 2015; Hingson, 2010; Sartor et al., 2009). Providing information on all of these risky behaviors could help inform the students on the association between these behaviors, and how to make healthier choices. Further, relative to the availability of information on the dangers of excess use of alcohol, information on cannabis use, including cannabis vaping, is underrepresented (Kenne et al., 2017; Ware, 2018). Future practice should provide current, up-to-date research information on the risks associated with cannabis use and cannabis vaping, in addition to all the other risky behaviors. Along those practices, future research could examine the effectiveness of the
program in reducing participation in, or increasing overall knowledge associated with, risky behaviors.

A final practical and research implication emphasizes a shift in focus to a socio-ecological model; more specifically, the application of AOD prevention efforts within university policy. The socio-ecological model is a conceptual model that emphasizes there are both micro and macro influences on human behavior, the latter of which involves implementation of policy at multiple levels (Bronfenbrenner, 1977). A broader policy approach to university-wide AOD prevention could be the application of university-wide self-screening efforts for freshmen students enrolling in the university. The results of these screenings would provide students and their parents with supplemental information on the physical, psychological, and academic consequences of AOD use. Additionally, students whose answers reflect they have a high susceptibility to dependence or addiction, or high recent AOD use, could be asked to participate in a half-semester AOD educational course, or brief motivational intervention with a trained practitioner. Previous studies have advocated for more environmental and societal prevention approaches to AOD use among college students (DeJong & Langford, 2002; Paek, & Hove 2012).

An additional approach a university-wide AOD prevention policy application could be the expansion of more AOD concentrated content into first-year college student success courses (Peltier et al., 2000). The use of AODs are campus-wide, and these courses provide the opportunity to inform new students of the consequences associated with excessive AOD use. As a part of the course, the instructors could provide simple assessments, such as personalized feedback of their AOD use or perceived norm use of
AOD versus actual nationwide rates (Lewis & Neighbors, 2006; National Institutes of Health [NIH], 2002). A similar approach saw success in an increase in overall wellness after incorporating educational material over the five stages of the wellness wheel into a first-year college student success courses (Choate & Smith, 2003). Research could then be focused on the prevention or reduction of AOD use before and after the implementation of a college student success course that heavily emphasized AOD prevention.

**Conclusion**

College students rank as some of the most prevalent users of alcohol and cannabis in the United States. Among college students, those mandated to alcohol and cannabis programs have proven to be among the heaviest users of alcohol and cannabis. The results from the current study showed that differences existed among early- and late-onset students on important AOD use variables, such as the frequency of alcohol and cannabis use. Positive associations were also found among these students’ alcohol and cannabis use and participation in other risky behaviors. It is important that the findings of this study be considered during future implications to practice and research. Practical applications and approaches to future research should include the implementation and evaluation of interventions tailored to the students based on key predictor variables, such as age-of-onset, rates of AOD use, and outcomes of the screening assessment tools. While some students may reduce their AOD use as a result of mandated online interventions, others may require more professional assistance.
CHAPTER FOUR
Exploring the Theory of Planned Behavior and Perceived Norms with College Student Alcohol and Cannabis Users Mandated to Intervention Courses

Introduction

College students participating in alcohol and other drug (AOD) use is ubiquitous in the college culture. Patterns of heavy drinking and experimental drug use, especially with cannabis, are seen as a normalized, culturally-tolerated, behavior in college (Borsari & Carey, 2001; Quintero, 2009). For some, the transition into college produces an array of sociocultural risk factors that liberates AOD use as a way to fit in and cope with changes (Krieger et al., 2018). Some of these changes that increase the likelihood of engaging in AOD use include an overall newfound independence, the development of one’s identity, balancing new interpersonal relationships, balancing academic demands, and embracing new responsibilities (Arnett, 2014; Brougham et al., 2009; Perkins, 2002). All of these factors, combined with new normative expectations, have allowed rates of AOD use to reach a level of prevalence not observed in decades (Schulenberg et al., 2019).

Cannabis use – via smoking, eating, or vaping – and alcohol use remain the most popular substances used among college students (Schulenberg et al., 2019; Secades-Villa et al., 2015). In 2018, a quarter of all college students reported using cannabis at least once a month (Schulenberg et al., 2019). College students are also more likely to report concurrent use of cannabis and alcohol (Haas et al., 2015; Schulenberg et al., 2019). Approximately 60% of college students reported that they drank alcohol in the past month (Schulenberg et al., 2019). Of these students, half reported having participated in
binge (four + drinks for women and five + drinks for men on the same occasion) and heavy use drinking (binge drinking on the same occasion on each of five + days in the past 30 days) (Wechsler et al., 1994). College students are among the most frequent, and concurrent, users of alcohol and cannabis in the United States yet their rates of help-seeking behavior remain low (Hunt & Eisenberg, 2010; Substance Abuse and Mental Health Services Administration [SAMHSA], 2018).

**Susceptibility and Seeking Help**

Universities are in a unique position where they oversee students during a prime transitional period of life, and can allocate resources to assist students who use and abuse AODs. Increased collaboration among university organizations and administrators should encourage universities to create effective programs that target key predictors in preventing and reducing AOD use, especially for students who do not seek help (Larimer & Cronce, 2007). Help-seeking behavior among college students is not as easily understood as it is among the general population (Hunt & Eisenberg, 2010). Caldeira et al.’s (2009) study found that the most significant reason students gave for finally seeking help was due to the social pressures received from important others (family, peers, partners, etc.) to get help. Additionally, they discovered that nearly half (46.8%) of their college student sample ($n = 946$) met the criteria for being diagnosed with a SUD at some point within their first three years of college, yet only 8% sought professional help (APA, 2013). Among college students with a SUD diagnosis, another study revealed as little as five percent will continue to seek follow-up treatment for their disorder (Norberg et al., 2012). Help-seeking behavior, for some students, is stigmatized because it is perceived as an admittance of having AOD issues or mental problems (Cheng et al., 2013).
Universities are often mindful of the prevalence of AOD use among their students and the low rates of those students seeking help (Wu et al., 2007). Consequently, there are direct AOD-related impacts on the university, including low retention, higher prevalence of violence and assault on campuses, and higher reports of morbidity and mortality among students on campus (Hingson, et al., 2017; Reed et al., 2010). These impacts have encouraged some universities to create programs that target key factors to prevent or intervene their students’ AOD use (Chiauzzi et al., 2011; Hingson, 2010). Typically, to help prevent the misuse or onset of AOD use, it is common for universities to implement AOD prevention programs prior to, or during, a student’s freshmen year of college (White et al., 2010). Likewise, most universities try to offer services for students, such as voluntary counseling, health and wellness courses, and mandated programming for students who violate a campus AOD policy. These mandated programs provide an opportunity for universities and programmers to directly interact with these students regarding their AOD use (Cheng et al., 2013; Lundahl et al., 2010).

**Mandated Student Population and Interventions**

Compared to the general population of college students, students mandated to attend intervention programming report heavier use of AODs and experience more complications from their AOD use. Academically, these students fall behind in school work more often, perform poorly on exams, and attend class less often (Barnett & Read, 2005; Kazemi et al., 2013). Research shows that college students who frequently participate in AOD use are also more likely to drive drunk, have unprotected sexual intercourse, and act out aggressively (Groth et al., 2017; Lydon-Staley et al., 2019). Colleges commit significant resources to their programs to not only improve on student
success, but also to protect the well-being of the individual (DeBerard et al., 2004; Hunt & Eisenberg, 2010). Mandated intervention programs are important because students assigned to these programs are highly susceptible to physical and psychological harm due to their increased rates of AOD use (Barnett & Read, 2005; Cheng et al., 2013; Hunt & Eisenberg, 2010).

Interventions that are successful in reducing AOD use among college students are typically evidence-based, tailored to the culture of the students at the university, and focused on addressing campus, or regional-specific, challenges (Hasson, 2010; Moyer & Finney, 2004). The geographical make-up of a region, or the demographic make-up of the university, can bring with it specific factors that could hinder successful implementation of an intervention. Some of these factors include the state laws surrounding cannabis use, and high rates of perceived, or real, discrimination experienced by minorities. A socio-cultural approach to intervention development recognizes there are multiple influences on a student’s risky behavior, among those are personal values, peer pressures, and institutional, community, and public policy (Sarafino & Smith, 2014). A coordinated, theoretical model approach to prevention and intervention strategies builds a foundation for a healthier student body on campus, and maximizes a student’s potential during their enrollment at the university (Carey et al., 2016; Tanner-Smith & Lipsey, 2015). The Theory of Planned Behavior (TPB) is a theoretical model that has grown into one of the most influential behavioral models since its inception (Ajzen, 1991).

**Theory of Planned Behavior**

The TPB is an extension of the Theory of Reasoned Action which dates back to the early 1980’s (Ajzen, 1991; Fishbein & Ajzen, 1981). The TPB posits that an
individual’s intention to engage in a behavior is an immediate determinant of performing the behavior. Generally speaking, if an individual has a strong intention to engage in a behavior, then there is a higher likelihood the behavior will be performed. Intention itself is preceded by three proximal constructs; 1) an individual’s outlook (attitude) towards a behavior; 2) the perceived social pressures surrounding the behavior (subjective norms); and 3) their perception of their ability to perform the behavior (perceived behavioral control) (Ajzen, 1991). In addition, because the TPB is predicated upon using these three proximal constructs to predict intention, therein lies a fundamental issue that suggests the TPB is able to further account for the variance in an individual’s intention more so than their behavior (Ajzen, 1991; Hagger et al., 2002). According to Ajzen (1991), including additional predictors is practical, assuming the additional variables capture a significant amount of variance. The TPB is still seen as one of the most influential models in predicting intention and behavior, and has been cited over 4000 times (Nosek et al., 2010). Research has successfully applied the TPB to a wide array of behavior change interventions (Lee et al., 2010; Norman, 2011).

An individual’s attitude about a behavior reflects the degree to which they evaluate the behavior as being something desirable or undesirable. Intention to engage in a behavior is more likely if an individual has a favorable attitude towards performing it. Subjective norms about the behavior is the peer influential part of the model. How others that are important to the individual (e.g. friends, parents, partners) perceive the behavior change, and whether or not they believe a behavior change is warranted, is considered to be a fundamental construct of intention. Lastly, the perception of control over the behavior, and the ability to perform it, is known as perceived behavioral control.
Perceived behavioral control emphasizes the perception of ease or difficulty that someone has over performing a behavior (Ajzen, 1991). All three constructs are believed to directly impact intention, in addition to have roles among each other. Different studies have found different individual constructs to be the most important predictor for intention and behavior (Johe & Bhullar, 2016; Steadman & Rutter, 2004; Tolma et al., 2006).

The utility of the TPB in predicting increases and decreases in casual, heavy, or episodic alcohol use has been demonstrated repeatedly. A review containing over 40 alcohol-focused studies regularly revealed medium to large effect size values for attitude, subjective norms, and perceived behavioral control with both intention and behavior (Cooke et al., 2016). Intention to consume alcohol had a noticeably strong relationship with both attitude and normative beliefs with studies repeatedly exhibiting correlations greater than .60. Moreover, ordinary least squares regression models suggested that attitude, subjective norms, and perceived behavioral control collectively predicted an intent to use alcohol and illicit drug use, and explained as much as 60% of the variance in intention (Cooke et al., 2016; McMillan & Conner, 2003). A better understanding of the influence students’ attitude, subjective norms, and perceived behavioral control have in regards to an intention to reduce their AOD use could help provide valuable information for intervention programming (Montano & Kasprzyk, 2015).

**Significance of the Study**

There is clear evidence that the TPB is a prominent model to integrate in intervention development and evaluation (Armitage & Conner, 2001). However, despite a few dated studies, there is a dearth of recent research that focuses on the TPB and illicit drug use among college students, specifically with popular drugs like cannabis (Armitage
et al., 1999; McMillan & Conner, 2003). The lack of research, in addition to the current changing lawful status of cannabis use in the U.S., supports increased efforts in utilizing the TPB in assessing intention and behaviors with cannabis use (Ito et al., 2015; Pacek et al., 2015). Generally, far less research has been focused on using popular behavioral predictive models, such as the TPB, with a sub-population of students mandated to AOD programming. In fact, a review of manuscripts in the field resulted in zero studies that utilized the TPB among this population, for any substance. This sub-population of students proves to be an important group to study due to their reported heavier use of AODs (Barnett & Read, 2005; Kazemi et al., 2013).

Increased AOD deterrence policies from universities have resulted in an increase in disciplinary sanctions being administered to students (Suffoletto et al., 2016). In an attempt to prevent future issues with excessive AOD use among students, universities are continually adapting different programs (Moyer & Finney, 2004). The current study posits assessing the intention-proximal TPB constructs (attitude, subjective norms, and perceived behavioral control) among students mandated to alcohol and cannabis programming in order to determine if these constructs are salient predictors of their intention to reduce alcohol and cannabis use. In order to create effective programs, it is important to identify students’ current habits, their perception of substance use rates among others, and the best predictors of reducing substance use (Hasson, 2010). This study looks to deepen the literature that exists with alcohol and cannabis use and the TPB. It also looks to expand the field by applying the TPB to a unique population which could seemingly benefit from an area of research that is scarce (Fromme & Corbin,
2004). This study will examine whether the TPB will be useful in designing interventions, and if so, will offer suggestions for future programming.

**Purpose**

The purposes of this study, for students mandated to alcohol and cannabis interventions, were to:

1. Determine if associations existed among attitude, subjective norms, perceived behavioral control, and intentions regarding a reduction in their alcohol and cannabis use; and
2. Determine if attitude, subjective norms, and perceived behavioral control were predictors of intention to reduce alcohol and cannabis use.
3. A final purpose was to assess students’ perceived descriptive norms in regards to peer use of alcohol or cannabis.

**Hypotheses**

The hypotheses associated with this study were:

H1a. Attitude, subjective norms, perceived behavioral control, and intention will be associated to one another for students mandated to alcohol interventions;

H1b. Attitude, subjective norms, perceived behavioral control, and intention will be associated to one another for students mandated to cannabis interventions;

H2a. There will be a relationship, individually and collectively, between
predictor variables attitude, perceived behavioral control, and subjective norms with the explained variable of intention for students mandated to alcohol interventions;

H2b. There will be a relationship, individually and collectively, between predictor variables attitude, perceived behavioral control, and subjective norms with explained variable of intention for students mandated to cannabis interventions;

H3a. Students’ frequency and quantity of alcohol use will be associated to perceived quantity and frequency of alcohol use among friends and other college students for students mandated to alcohol interventions; and

H3b. Students’ frequency and quantity of cannabis use will be associated to perceived frequency and quantity of cannabis use among friends and other college students for students mandated to cannabis interventions.

Methodology

Participants

The study was conducted at a large university in the Southeast U.S. which requires all students who live on or off campus to adhere to specific AOD policies while on the premises of the campus. This includes the prohibition (e.g. selling, serving, using) of alcohol use for all those under the age of 21, and no alcohol allowed on University property for University business, or at University sponsored activities, unless University regulation explicitly allows it. Additionally, all students, faculty, and staff must adhere to a zero-tolerance drug policy on campus. The University’s Department of Campus
Recreation and Wellness is responsible for administering mandated programming to students who violate campus AOD policies. Post-referral from an authoritative figure (e.g. campus police, residence hall directors, Dean of Students office), students must report to the Department of Campus Recreation and Wellness to enroll in a mandated course.

A purposive sampling method was administered for the study. The sample for this study consisted of those students who were found in violation of the university’s policies specifically surrounding alcohol and cannabis use, and therefore were mandated to attend online alcohol and cannabis education programming. Data were collected beginning October 2019 to May 2020 (N = 463). Four hundred and three students (87%) were adjudicated to alcohol programming for an alcohol violation, and 60 students (13%) were adjudicated to cannabis programming for a cannabis violation. All students were placed into programs based on a tiered approach (e.g. 1st violation, 2nd violation) and only first-time policy violators were allowed to enroll in these mandated online courses.

**Procedures**

Primary data were collected via a Qualtrics survey, that was written by the researcher in collaboration with the Department of Campus Recreation and Wellness, from students who were registered to attend mandated programming for alcohol violations (n = 403) and cannabis violations (n = 60) from October 2019 until May 2020. Prior to students’ starting their online alcohol or cannabis intervention course, every student is obligated to complete a mandated baseline assessment (Qualtrics survey) measuring characteristics about their onset, and rates of alcohol use (Appendix A) or cannabis use (Appendix B).
Prior to each mandated assessment, students were given a cover letter describing information about this current study, along with an opportunity to opt out of sharing their anonymous data for this study (Appendix C). If students remained in the study, they continued on to complete the survey and then they were enrolled in a drawing to win one of twenty-three, $30 Amazon e-gift cards distributed by the Department of Campus Recreation and Wellness. Participants’ data were de-identified by the Department of Campus Recreation and Wellness and sent to the researcher once a week. Students still had the opportunity to retract their data from the sample, even if they originally agreed to be a part of this study, if they contacted the Department of Campus Recreation and Wellness post-intervention. Once the data were received, the researcher included in the data analysis only the data that met the following inclusion criteria: a) being at least 18 years of age, b) 100% of the survey completed, and c) did not opt out of participating in the study.

**Waiving of Informed Consent and Documentation of Informed Consent**

Due to the anonymous nature of the study, informed consent was waived. In lieu of a consent form, each student in the primary study received an information sheet prior to completing their survey that explained the purpose of the study, information on voluntary participation, benefits to the student, etc. Any student who wished to not have their information shared with the researcher was able to opt out by clicking “I do not wish to have my data shared in this project.” Per IRB approval, documentation of informed consent was also waived. The opt-out design procedures in the study required students to manually choose not to be a part of the study. Therefore, the information sheet that
preceded each survey alerted the respondent of important details of the study and served as their notice of the nature of the study and how to prevent their data from being used.

**Missing and Omitting Data**

Although some students opted out of the study, the total number of students mandated to programming was 488. Of the whole mandated student sample, 18 students (3.6%) opted out of the study. An additional seven students (1.4%) were omitted because they did not complete 100% of the survey. Protocol for the mandated courses within the university required that all students complete 100% of the survey. All items of the survey were forced responses; therefore, every question must be answered in sequential order. If any data were missing, it was a result of students not finishing the survey all the way through. If a survey was partially complete, it was omitted from this study. Since the data analysis plan involved multiple bivariate and multivariate regression model analyses, and inter-item correlations, incomplete surveys were omitted to avoid the impact of missing data bias and invalid conclusions. The final sample for the study consisted of 403 eligible students who had violated an alcohol policy and 60 students who violated a cannabis policy.

**Measures**

**Theory of Planned Behavior**

Although no validated questionnaires are available for assessing constructs of the TPB, a comprehensive guide to develop and test measures of TPB is explained in Ajzen (1991). Additionally, previous research has utilized TPB constructs with college students and high-risk behaviors, including AOD use, and has revealed high levels of reliability ($\alpha = .88$) (Caron et al., 2004; Norman & Conner, 2006; Norman, 2011). Scales used in these
studies were adapted to assess constructs of the TPB within the mandated student sample and their alcohol and cannabis use in this study. Constructs of the TPB were assessed using a twelve-item, semantic differential scale questionnaire. All twelve items were measured on a 7-point response scale, and each item was scored between -3 and +3 so that higher values indicated a higher level on the variable of interest. The items were added together and an average score was computed for each individual variable.

A student’s attitude towards a reduction in their alcohol or cannabis use was assessed using five items (\(\alpha = .90\); e.g., “Decreasing my alcohol use over the next month would be,” unenjoyable/enjoyable.) The subjective norms of their friends and family were measured with two semantic differential scales (\(\alpha = .72\); “My family thinks it…be a good idea to decrease my alcohol use over the next month,” would not/would.) Perceived behavioral control was assessed by using three items (\(\alpha = .84\); e.g. “How much control do you have over whether or not you reduce your alcohol use over the next month,” no control/complete control). Finally, intention was measured with two items (\(\alpha = .93\); e.g. “I…to reduce the amount of alcohol I drink over the next month,” do not intend/do intend). Tables nine and 14 reveals the reliability measures of each TPB construct within the sample, including the overall reliability of using the 12-item scale (\(\alpha = .92\)). These measures were adapted from, and are consistent with, prior research (Caron et al., 2004; Norman & Conner, 2006; Norman, 2011).

**Alcohol and Cannabis Use and Perceived Norms**

Frequency of students’ alcohol and cannabis use over the past 30 days was reported as the total daily sum of the number of days they drank over the past month, ranging from zero to 31 days. Quantity of alcohol use was assessed using an item from
the alcohol sub-section of the American College Health Association National College Health Assessment \( (\alpha = .64) \) (ACHA, 2013). Students were asked to report on the quantity of drinks they had per drinking occasion (ACHA, 2013). Students quantity of cannabis use was assessed using one item from the Daily Sessions, Frequency, Age of Onset, and Quantity of Cannabis Use Inventory (DFAQ-CU) \( (\alpha = .95) \) (Cuttler & Spradlin, 2017). Students’ quantity of cannabis use was measured per session on a scale ranging from 0 = 0 grams to 11 = More than 1 ounce.

The students were also asked about their perception (perceived norms) of alcohol and cannabis rates among their friends, and fellow University students. Specifically, students were asked to report on the percentage they believed used alcohol or cannabis, how frequently they used it, and how much they used in the last 30 days. Perceived norms frequency of alcohol and cannabis use were measured on a 7-point Likert scale ranging from 0 = not in the last month to 6 = daily, adapted from the Rutgers Health and Human Development Project \( (\alpha = .64) \) (Pandina et al., 1984). Perceived norms quantity of alcohol and cannabis use were measured using the same scales that they assessed their own personal quantity of use.

**Control Variables**

Additional variables associated with other risky behaviors were included to potentially account for more variance in the models. Research shows that college students who frequently participate in alcohol or cannabis use are also more likely to use other illicit drugs, have unprotected sexual intercourse, and act out aggressively (Groth et al., 2017; Lydon-Staley et al., 2019). Each of these additional risky behaviors was measured on a scale from 0 = never to 4 = always.
Data Analyses

Data were exported to SPSS (Version 26.0) for analysis. Demographic information (e.g. gender, ethnicity, age) for the student sample were calculated (see Table 8). First, descriptive statistics (mean and standard deviation) and distributions of outcome variables (frequency and quantity) were assessed for non-normality issues. Next, all 12 items of the TPB scale were assessed for internal reliability within each subscale. Cronbach’s alpha levels were reported per construct. Pearson’s product-moment correlations were employed to determine relationships among attitudes, perceived behavioral control, subjective norms, and intention for students mandated to both alcohol and cannabis interventions (hypotheses 1a and 1b).

Pearson’s product-moment correlations were utilized in order to examine relationships between students’ frequency of alcohol or cannabis use and participation in other risky behaviors. Moderately to highly correlated variables were then included as controls in multivariate analyses to assess the individual and collective contribution of predictor variables attitude, perceived behavioral control, and subjective norms on the explained variable of intention to reduce alcohol or cannabis use (hypotheses 2a and 2b) (Cohen et al., 2013). The control variables were used in the regression analyses to potentially account for more variance in the models and allow analysis to focus on the primary variables of interest (attitude, subjective norms, and perceived behavioral control). Finally, descriptive statistics (mean and standard deviation) were calculated and Pearson's product-moment correlations were conducted, in order to examine relationships between students’ frequency and quantity of alcohol or cannabis use and the perceived
frequency and quantity of alcohol and quantity use among their friends and other University students.

**Results**

This section presents findings and discussion related to the TPB and perceived norms among college students enrolled in mandated intervention courses.

**Sample**

Table 8 displays descriptive variables for all students enrolled in mandatory alcohol and cannabis programming courses. The average age of these students was 18.85 years, with a majority (90%) enrolled in their first or second year of college. Over half of the sample identified themselves as male (55.5%), and the sample consisted of

**Table 8**

*Participants Enrolled in Mandated Intervention Course: Descriptive Statistics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alcohol Intervention (n = 403)</th>
<th>Cannabis Intervention (n = 60)</th>
<th>Total (n = 463)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>212</td>
<td>39</td>
<td>251</td>
</tr>
<tr>
<td>Female</td>
<td>188</td>
<td>21</td>
<td>209</td>
</tr>
<tr>
<td>Gender Fluid</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Non-Hispanic</td>
<td>343</td>
<td>44</td>
<td>387</td>
</tr>
<tr>
<td>Black Non-Hispanic</td>
<td>11</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>22</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>14</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>American or Alaskan Native</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Agea</td>
<td>18.93 (1.06)</td>
<td>18.70 (.70)</td>
<td>18.85 (.90)</td>
</tr>
<tr>
<td>Year in school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>285</td>
<td>42</td>
<td>327</td>
</tr>
<tr>
<td>Sophomore</td>
<td>74</td>
<td>16</td>
<td>90</td>
</tr>
<tr>
<td>Junior</td>
<td>29</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>Senior</td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Greek Affiliated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>212</td>
<td>24</td>
<td>236</td>
</tr>
<tr>
<td>No</td>
<td>191</td>
<td>36</td>
<td>227</td>
</tr>
</tbody>
</table>

*Note. All data is reported as sample size (n)."Data measured in years and reported as Mean and Standard Deviation (SD).*
predominantly Caucasian (83.6%) students. The vast majority of the students mandated to programming were enrolled in the alcohol intervention course (87%) due to violating the University’s alcohol policy. There was almost an even split among those students who were affiliated with a Greek organization, and those who were not.

Results of Hypotheses Tests for Students Mandated to Alcohol Programming

TPB Constructs Reliability Outcomes

First, multiple coefficients of reliability (Cronbach’s alpha) were assessed within the subscales of each construct of the TPB (Santos, 1999) (Table 9). The levels of Cronbach’s alpha ranged from ($\alpha = .72$) to ($\alpha = .93$). Independently, all levels indicated that each construct’s subscale reported strong values of internal reliability. Additionally, all 12 items were assessed collectively to report a total measure of reliability (located in the last row) of the entire TPB scale. Altogether, data revealed that the 12-item TPB scale had high levels of internal reliability ($\alpha = .92$). Next, Pearson’s product moment correlations were employed to examine the associations among each construct of the TPB with one another.

Table 9

Reliability Within Each TPB Construct Scale

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude$^a$</td>
<td>.91</td>
</tr>
<tr>
<td>Subjective Norms$^b$</td>
<td>.72</td>
</tr>
<tr>
<td>Perceived Behavioral Control$^c$</td>
<td>.84</td>
</tr>
<tr>
<td>Intention$^d$</td>
<td>.93</td>
</tr>
<tr>
<td>Total$^e$</td>
<td>.92</td>
</tr>
</tbody>
</table>

Note. All items were based on a 7-point semantic scale ranging from -3 to 3. $^a$Included 5 items; $^b$included 2 items; $^c$included 3 items; $^d$included 2 items; $^e$All 12 items were tested as single scale.

Correlation Measures
Results of the correlation tests indicate all positive associations among the constructs (Table 10). Perceived behavioral control repeatedly displayed the weakest correlations among any of the other three constructs, with the weakest association discovered between perceived behavioral control and intention, $r(401) = .29$, $p < .01$. The strongest correlation was discovered to be between attitude and subjective norms, $r(401) = .76$, $p < .01$. Hypothesis 1a stated that the TPB constructs would be associated with one another. Although perceived behavioral control and intention had a positive weak to moderate relationship, the remaining values were reported to have positive moderate to high associations, thus, hypothesis 1a was confirmed.

Table 10

Correlations Among TPB Constructs

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>-----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>.76**</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>Perceived Behavioral Control</td>
<td>.48**</td>
<td>.39**</td>
<td>-----</td>
</tr>
<tr>
<td>Intention</td>
<td>.71**</td>
<td>.61**</td>
<td>.29**</td>
</tr>
</tbody>
</table>

Note. All scales within each construct were averaged to provide one measure of each construct.

**$p < .01$**

Regression Outcomes

Control Variables for Intention. Multiple regression models were conducted to determine which TPB constructs (attitude, subjective norm, or perceived behavioral control) were significant predictors of the students’ intention to reduce alcohol use. First, in order to account for more variance in the regression models, correlations were assessed among students’ frequency of alcohol use and their participation in other risky behaviors. The criteria to be included in the model was a moderate to strong correlation with at least
one other variable. Table 11 shows the results from that analysis. Aggression consistently had the weakest correlation among the variables, therefore, it was not considered as a control variable. All of the other variables (alcohol frequency, cannabis use, other illicit drug use, and unprotected sex) appeared to be moderately related to each other, and thus, were included as controls in the regression models.

A total of five models were assessed, Table 12 displays each model’s adjusted $R^2$ and standard error of regression value. Additionally, the table displays each variable’s unstandardized coefficient (beta) and associated standard error, and whether or not the variable was significant within the model. Based on the evidence generated by the

Table 11

Correlations of Risky Behaviors to Determine Control Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1 Alcohol Frequency</th>
<th>2 Cannabis Use</th>
<th>3 Other Drug Use</th>
<th>4 Unprotected Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Alcohol Frequency$^a$</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Cannabis Use$^b$</td>
<td>.28**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Other Drug Use$^b$</td>
<td>.15**</td>
<td>.39**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Unprotected Sex$^b$</td>
<td>.24**</td>
<td>.35**</td>
<td>.38**</td>
<td></td>
</tr>
<tr>
<td>5. Aggression$^b$</td>
<td>.08</td>
<td>.20**</td>
<td>.18**</td>
<td>.23**</td>
</tr>
</tbody>
</table>

Note. $^a$scored as total number of days used over past 30 days; $^b$scored on a 4-point ordinal scale ranging from 0 = Never to 4 = Always  

ordinary least squares (OLS) regression, results show that in models 1, 2, and 3, each individual TPB construct was a significant predictor of students’ intention to reduce their alcohol use. Additionally, data revealed that incorporating attitude, subjective norms, and perceived behavioral control into one model (Model 4) resulted in perceived behavioral control no longer acting as a significant predictor for intention. Yet, because Model 4 had the highest adjusted $R^2$ value, and the lowest standard error of regression value, it was explored further.
Within Model 4, data revealed that after controlling for alcohol frequency and other risky behaviors, attitude \((b = .81, t(395) = 10.69, p < .001)\) and subjective norms \((b = .22, t(395) = 3.21, p < .01)\) were the only significant predictors (within the TPB) of the students’ intention to reduce alcohol use. However, the results of the \(F\)-test for Model 4 indicate that, taken together, all TPB constructs were significant predictors of intention, \(F(7,395) = 74.86, p < .001\). Furthermore, Model 4 had an adjusted \(R^2\) value of .56, indicating that this model explained 56% of the variance in intention to reduce alcohol use.

**Table 12**

*Multivariate Models of Regression*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>.95***</td>
<td>.81***</td>
<td>.78***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.05)</td>
<td>(.08)</td>
<td>(.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>.74***</td>
<td>.22**</td>
<td>.21**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.05)</td>
<td>(.07)</td>
<td>(.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Behavioral Control</td>
<td>.47***</td>
<td></td>
<td>-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.08)</td>
<td></td>
<td>(.07)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol Frequency</td>
<td>-.08***</td>
<td>-.08***</td>
<td>-.12***</td>
<td>-.07***</td>
<td>-.07***</td>
</tr>
<tr>
<td></td>
<td>(.02)</td>
<td>(.02)</td>
<td>(.02)</td>
<td>(.02)</td>
<td>(.02)</td>
</tr>
<tr>
<td>Cannabis Use</td>
<td>-.18*</td>
<td>-.17*</td>
<td>-.25**</td>
<td>-.16*</td>
<td>-.17*</td>
</tr>
<tr>
<td></td>
<td>(.07)</td>
<td>(.08)</td>
<td>(.09)</td>
<td>(.07)</td>
<td>(.07)</td>
</tr>
<tr>
<td></td>
<td>(.13)</td>
<td>(.14)</td>
<td>(.17)</td>
<td>(.13)</td>
<td>(.13)</td>
</tr>
<tr>
<td>Unprotected Sex</td>
<td>-.08</td>
<td>-.13</td>
<td>-.01</td>
<td>-.12</td>
<td>-.09</td>
</tr>
<tr>
<td></td>
<td>(.07)</td>
<td>(.08)</td>
<td>(.09)</td>
<td>(.07)</td>
<td>(.07)</td>
</tr>
<tr>
<td>Constant</td>
<td>.34</td>
<td>.75</td>
<td>.58</td>
<td>.51</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td>(.12)</td>
<td>(.12)</td>
<td>(.22)</td>
<td>(.17)</td>
<td>(.12)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>.56</td>
<td>.44</td>
<td>.22</td>
<td>.57</td>
<td>.5</td>
</tr>
<tr>
<td>Adjusted (R^2)</td>
<td>.55</td>
<td>.43</td>
<td>.21</td>
<td>.56</td>
<td>.55</td>
</tr>
<tr>
<td>Standard Error of Regression</td>
<td>1.19</td>
<td>1.32</td>
<td>1.57</td>
<td>1.16</td>
<td>1.18</td>
</tr>
</tbody>
</table>

*Note.* Intention is the dependent variable. The independent variables of interest are listed for each model. Model 1 = attitude; model 2 = subjective norms; model 3 = perceived behavioral control; model 4 = attitude, subjective norms, and perceived behavioral control; and model 5 = attitude and subjective norms.

\(* p < .05; ** p < .01; *** p < .001\)

use, the highest among all five models. Model 4 also had the lowest standard error of regression (1.16), therefore, was the best performing model with the smallest amount of
error. OLS regression diagnostics were then conducted for Model 4 in order to determine if the model violated linear regression assumptions.

**OLS Assumptions.** Multicollinearity diagnostics revealed no variables had tolerance levels lower than .38, which is above the threshold minimum level of .20 that would indicate tolerance is an issue (Tabachnick & Fidell, 2001). Additionally, variance inflation factors (VIF) were all above one and below five, which are suggested lower and upper threshold VIF values, indicating that multicollinearity is not an issue (Hair Jr et al., 1995). Finally, a scatterplot of the residuals versus predicted values was used to test for heteroskedasticity (Glejser, 1969). The scatterplot depicted that a majority of the values below E = zero were clustered together on lower predicted values of X as well as for higher predicted values of X, indicating that heteroscedasticity was not an issue.

Hypothesis 2a stated a relationship would exist between predictor variables attitude, perceived behavioral control, and subjective norms with the explained variable intention. The results of the multivariate regression model analyses, and the successful completion of the OLS regression diagnostics confirms this hypothesis.

**Perceived Norms and Associations**

Results from perceived norm descriptive statistical analysis and Pearson’s product moment correlations are displayed in Table 13. Overall, the students believed a higher proportion of their friends participated in drinking in the last 30 days (65.33%) compared to other students enrolled in their university (50.01%). However, these students also believed that other students drank more beers per occasion than their friends did. Results from the correlation assessments revealed that there was a positive moderate association between participants’ frequency and quantity of alcohol use, and their friends perceived
frequency, \( r(401) = .41, p < .01 \), and quantity of alcohol use, \( r(401) = .49, p < .01 \).

Regarding other students enrolled in their university, a positive moderate relationship was only discovered with perceived quantity of alcohol use, \( r(401) = .36, p < .01 \).

Overall, correlations were stronger between participants use and perceived friend use. Hypothesis 3a indicated that the students’ frequency and quantity of alcohol use will be associated with perceived quantity and frequency of alcohol use among friends and other college students. Hypothesis 3a was confirmed regarding students’ use and perceived use of friends. The data partially supports the association between students’ use and perceived use of other students. Thus, hypothesis 3a is partially supported.

*Table 13*

*Alcohol Use Perceived Norm Descriptive Statistics and Correlations with Friends and Other College Students*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Friends</td>
<td>Other Students</td>
</tr>
<tr>
<td>Perceived Norms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage(^a)</td>
<td>65.33</td>
<td>50.01</td>
<td></td>
</tr>
<tr>
<td>Frequency(^b)</td>
<td>3.14 (1.29)</td>
<td>3.36 (1.12)</td>
<td></td>
</tr>
<tr>
<td>Drinks Per Occasion</td>
<td>5.32 (3.19)</td>
<td>7.73 (4.33)</td>
<td></td>
</tr>
<tr>
<td>Correlation(^c)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of Use</td>
<td>.41**</td>
<td>.14**</td>
<td></td>
</tr>
<tr>
<td>Drinks Per Occasion</td>
<td>.49**</td>
<td>.36**</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* \(^a\)Reported as a percentage of friends or students they believe drink alcohol; \(^b\)scored on a 7-point ordinal scale ranging from 0 = not in the last month to 6 = daily; \(^c\)Correlation of frequency and quantity of alcohol use between students’ actual rates and perceived norm rates of friends and other UK students.

**\(p < .01\)**

*Results of Hypotheses Tests for Students Mandated to Cannabis Programming*

**TPB Constructs Reliability Outcomes**

Items within each TPB construct were first assessed for reliability (Cronbach’s alpha) for students enrolled in the mandated cannabis course (Table 14). Measures indicated that each construct’s subscale reported medium to high values of internal
reliability. Items within the constructs of perceived behavioral control and intention both independently registered the same highest Cronbach’s alpha level, ($\alpha = .93$). The lowest Cronbach’s alpha level was found within subjective norms, ($\alpha = .58$). However, an assessment of the full 12-item scale used to measure TPB displayed high levels of internal reliability ($\alpha = .92$). Next, Pearson’s product moment correlations were employed to examine the associations among the four constructs of the TPB, hypothesis 1b.

Table 14

Reliability Within Each TPB Construct Scale

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude$^a$</td>
<td>.88</td>
</tr>
<tr>
<td>Subjective Norms$^b$</td>
<td>.58</td>
</tr>
<tr>
<td>Perceived Behavioral Control$^c$</td>
<td>.93</td>
</tr>
<tr>
<td>Intention$^d$</td>
<td>.93</td>
</tr>
<tr>
<td>Total$^e$</td>
<td>.92</td>
</tr>
</tbody>
</table>

Note. All items were based on a 7-point semantic scale ranging from -3 to 3. $^a$Included 5 items; $^b$included 2 items; $^c$included 3 items; $^d$included 2 items; $^e$All 12 items were tested as single scale.

Correlation Measures

All linear associations tested positively in the moderate to strong range (Table 15). Perceived behavioral control had the weakest correlations among the four constructs, including the weakest overall correlation with intention, $r(58) = .22$. The variables of attitude and intention shared the strongest correlation, $r(58) = .79$, $p < .01$. Hypothesis 1b stated that the TPB constructs would be associated with one another. Although all correlations were positive and comprised mainly of moderate to strong relationships, perceived behavioral control registered a weak, non-significant association with intention. Therefore, hypothesis 1b is partially supported.
Table 15

Correlations Among TPB Constructs

<table>
<thead>
<tr>
<th>Variable</th>
<th>1 Attitude</th>
<th>2 Subjective Norms</th>
<th>3 Perceived Behavioral Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attitude</td>
<td>-----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Subjective Norms</td>
<td>.69**</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>3. Perceived Behavioral Control</td>
<td></td>
<td>.43**</td>
<td>.22</td>
</tr>
<tr>
<td>4. Intention</td>
<td>.79**</td>
<td>.61**</td>
<td></td>
</tr>
</tbody>
</table>

Note. All scales within the construct were averaged to provide one measure of the construct.

**p < .01

Regression Outcomes

Control Variables for Intention. In order to determine which behaviors should be used as control variables in the multivariate regression models, correlations were first assessed with the students’ frequency of cannabis use and their participation in other risky behaviors (Table 16). Control variables were included in the regression model if they displayed a positive moderate to strong relationship with at least one other variable. Several of the correlations were non-significant, specifically with unprotected sex, which

Table 16

Correlations of Risky Behaviors to Determine Control Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1 Cannabis Frequency</th>
<th>2 Alcohol Use</th>
<th>3 Other Drug Use</th>
<th>4 Unprotected Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cannabis Frequency</td>
<td>-----</td>
<td>.20</td>
<td>.38**</td>
<td>.05</td>
</tr>
<tr>
<td>2. Alcohol Use</td>
<td>.30*</td>
<td>.11</td>
<td>.01</td>
<td>.13</td>
</tr>
<tr>
<td>3. Other Drug Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Unprotected Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Aggression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *scored as total number of days used over past 30 days; †scored on a 4-point ordinal scale ranging from 0 = Never to 4 = Always

*p < .05; **p < .01
had correlations ranging from .05 to .13. Accordingly, unprotected sexual intercourse was omitted as a control variable in the regression models.

A total of five models were assessed and each model’s adjusted $R^2$ and standard error of regression value were reported in Table 17. Additionally, the table displays each variable’s unstandardized coefficient (beta) and associated standard error, and whether or not the variable was significant within the model. Evidence from the OLS regression analyses revealed that when analyzed independently, only attitude (Model 1) and subjective norms (Model 2) were significant predictors of intention to reduce cannabis use. Perceived behavioral control (Model 3) was not a significant predictor of intention.

**Table 17**

Multivariate Models of Regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>.91***</td>
<td>.84***</td>
<td>.83***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.11)</td>
<td>(.15)</td>
<td>(.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>.78***</td>
<td>.20</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.16)</td>
<td>(.18)</td>
<td>(.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Behavioral Control</td>
<td>.34</td>
<td>-.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.18)</td>
<td>(.14)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cannabis Frequency</td>
<td>-.02</td>
<td>-.04</td>
<td>-.05*</td>
<td>-.02</td>
<td>-.02</td>
</tr>
<tr>
<td></td>
<td>(.02)</td>
<td>(.02)</td>
<td>(.02)</td>
<td>(.02)</td>
<td>(.02)</td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>-.22</td>
<td>-.03</td>
<td>-.40</td>
<td>-.13</td>
<td>-.17</td>
</tr>
<tr>
<td></td>
<td>(.17)</td>
<td>(.22)</td>
<td>(.25)</td>
<td>(.19)</td>
<td>(.18)</td>
</tr>
<tr>
<td>Other Illicit Drug Use</td>
<td>-.04</td>
<td>-.50</td>
<td>-.52</td>
<td>-.07</td>
<td>-.08</td>
</tr>
<tr>
<td></td>
<td>(.29)</td>
<td>(.35)</td>
<td>(.41)</td>
<td>(.29)</td>
<td>(.29)</td>
</tr>
<tr>
<td>Aggression</td>
<td>.50</td>
<td>.35</td>
<td>.57</td>
<td>.44</td>
<td>.47</td>
</tr>
<tr>
<td></td>
<td>(.28)</td>
<td>(.35)</td>
<td>(.41)</td>
<td>(.28)</td>
<td>(.28)</td>
</tr>
<tr>
<td>Constant</td>
<td>.58</td>
<td>.43</td>
<td>.19</td>
<td>.59</td>
<td>.43</td>
</tr>
<tr>
<td></td>
<td>(.32)</td>
<td>(.46)</td>
<td>(.55)</td>
<td>(.40)</td>
<td>(.36)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.65</td>
<td>.46</td>
<td>.26</td>
<td>.67</td>
<td>.66</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>.62</td>
<td>.41</td>
<td>.19</td>
<td>.62</td>
<td>.62</td>
</tr>
<tr>
<td>Standard Error of Regression</td>
<td>1.10</td>
<td>1.38</td>
<td>1.61</td>
<td>1.10</td>
<td>1.10</td>
</tr>
</tbody>
</table>

*Note. Intention is the dependent variable. The independent variables of interest are listed for each model. Model 1 = attitude; model 2 = subjective norms; model 3 = perceived behavioral control; model 4 = attitude, subjective norms, and perceived behavioral control; and model 5 = attitude and subjective norms.*

*p < .05, ***p < .001
A model with all TPB constructs collectively assessed, shown in Model 4, revealed that only attitude remained a significant predictor of intention. However, the data reveals that Model 4 was not performing better than Model 1 (attitude). Model 1 was able to maintain the same levels of standard error of regression and adjusted R^2 values as Models 4 and 5 while utilizing less predictor variables. Moreover, attitude was able to maintain significance throughout the other models it was incorporated into. Due to this evidence, Model 1 was explored further.

After controlling for cannabis frequency and other risky behaviors, Model 1 revealed that attitude was a significant predictor of students’ intention to reduce their cannabis use (b = .11, t(54) = 8.35, p < .001). Results from the F-test show that, taken together with its control variables, Model 1 is significant predictor of intention, F(5,54) = 20.44, p < .001. Furthermore, the adjusted R^2 value of Model 1 is .62, indicating that this model explained 62% of the variance in the dependent variable intention to reduce cannabis use. Model 1 was also tied for the lowest standard error of regression (1.16), indicating it is the best performing model with the smallest amount of error. To determine if Model 1 violated linear regression assumptions, OLS regression diagnostics were conducted.

**OLS Assumptions.** No variables in Model 1 had a tolerance level lower than .71, or VIF values that fell below one or above five, which are indicators of low multicollinearity. A residuals versus predicted values scatterplot was used to test for heteroskedasticity. The scatterplot depicted that the residuals appear to be randomly and evenly scattered across E = 0 for Model 1, which is an indication of low heteroskedasticity. Hypothesis 2b stated a relationship would exist between predictor
variables attitude, perceived behavioral control, and subjective norms with the explained variable intention. Ultimately, the results of this hypothesis test were mixed. Although attitude remained a consistent predictor of intention throughout all three models it was incorporated into, subjective norms lost significance when incorporated in other models. Additionally, perceived behavioral control was never a significant predictor of intention. Therefore, hypothesis 2b is partially supported.

**Perceived Norms and Associations**

Table 18 reveals the results of perceived norms descriptive statistics analyses and correlations. Students in cannabis-mandated programming believed that approximately 60% of their friends also participated in cannabis use over the last 30 days, around 10% higher than other students enrolled in their university (49.85%). However, these students also believed that both their friends and other students use cannabis at the same frequency and quantity per occasion.

**Table 18**

*Cannabis Use Perceived Norm Descriptive Statistics and Correlations with Friends and Other College Students*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Friends</td>
</tr>
<tr>
<td><strong>Perceived Norms</strong></td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td>59.97 (49.85)</td>
</tr>
<tr>
<td>Frequency</td>
<td>3.00 (1.89)</td>
</tr>
<tr>
<td>Quantity Per Occasion</td>
<td>3.77 (2.36)</td>
</tr>
<tr>
<td><strong>Correlation</strong></td>
<td></td>
</tr>
<tr>
<td>Frequency of Use</td>
<td>.40**</td>
</tr>
<tr>
<td>Quantity Per Session</td>
<td>.42**</td>
</tr>
</tbody>
</table>

*Note.* "Reported as a percentage of friends or students they believe use cannabis; ^b^ scored on a 7-point ordinal scale ranging from 0 = not in the last month to 6 = daily; ^c^ Correlation of frequency and quantity of cannabis use between students’ reported rates and perceived norm rates of friends and other UK students.

**p < .01**
Pearson’s product moment correlation assessments showed a positive moderate association between students’ frequency of cannabis use, and their friends perceived frequency of cannabis use, $r(58) = .40, p < .01$, and quantity of cannabis use, $r(58) = .42, p < .01$. Regarding other students enrolled in their university, students’ quantity of cannabis use and perceived quantity of other students cannabis had a positive moderate association, $r(58) = .34, p < .01$. However, no relationship was reported with the frequency of cannabis use.

Overall, correlations were stronger between participants use and perceived friend use compared to other students use. Hypothesis 3b indicated that the students’ frequency and quantity of cannabis use will be associated to perceived quantity and frequency of cannabis use among friends and other college students. Hypothesis 3b was confirmed regarding students’ use and perceived use of friends. The data partially supports the association between students’ use and perceived use of other students. Thus, hypothesis 3b is partially supported.

**Discussion**

This is the first known study to employ the TPB among students mandated to alcohol or cannabis programming due to violating their university’s AOD policy. Specifically, it is the first study to examine if proximal constructs of the TPB (attitude, perceived behavioral control, subjective norms) significantly predicted students’ intention to reduce their alcohol or cannabis use. Results indicated that the reliability levels within each construct’s adapted subscale in the current study were consistent with Cronbach’s alpha levels reported in previous studies (Caron et al., 2004; Norman, 2011; Norman & Conner, 2006). Further, correlations revealed positive moderate to high associations
among the constructs. This indicates that as one construct increased in favor of a reduction in alcohol or cannabis use, so did the other. Perceived behavioral control consistently registered the weakest correlations among the constructs for both alcohol and cannabis students.

Output from the regression analyses show that, taken together, the TPB was able to successfully predict the students’ intentions to reduce alcohol and cannabis use, shown in Model 4 in both studies. However, upon individual reflection of each TPB construct, the results were mixed. For students enrolled in cannabis programming, the only construct that was able to consistently maintain significance throughout the models was attitude. This indicates that Model 1 (attitude) was performing better for cannabis students. A common finding for students in either program were the inconsistencies in the ability of perceived behavior control to significantly predict intention. While no previous studies have looked at the TPB with this population, the current study’s findings are parallel to other studies which utilized the TPB with college students’ AOD use. These researchers, too, found attitude to be a significant predictor of intention and behavior, and discovered inconsistencies with perceived behavioral control (Armitage et al., 1999; Collins & Carey, 2007; Conner & McMillan, 1999; Conner et al., 2003; Norman, 2011).

Students in this current study recorded positive strong Cronbach’s alpha levels for perceived behavioral control. This suggests that the students believed their alcohol or cannabis use is under their control. However, results from the regression analyses suggested that intention is least likely to be influenced by how much control they believe they have, but rather what their attitudes and subjective norms are comprised of. To test this concept, a fifth model was run for students in both programs without the inclusion of
perceived behavioral control (Model 5). The adjusted R² values for Model 5 was 1% smaller than the best performing model for alcohol users (see Table 12) and tied for the best performing model for cannabis users (see Table 17). In addition, the standard error of the regression model values reflected the same minimal change.

Similar findings and inconsistencies since the inception of the TPB have other authors suggesting that a refined operationalization of perceived behavioral control as a construct is in need (Armitage & Conner, 2001; Armitage et al., 1999; Conner et al., 2003; Cooke et al., 2016; Johe & Bhullar, 2016; McCaul et al., 1993; Terry & O'Leary, 1995). Findings from the current study, along with previous studies, would suggest that in the future, the primary focus in designing, implementing, and evaluating an intervention program should be attitude and subjective norms. Specifically, an emphasis could be placed on changing or enhancing the student’s attitude and subjective norms to promote a reduction in alcohol and cannabis use (Collins & Carey, 2007; Ito et al., 2015; Norman, 2011).

Studies show that a student’s attitude towards participating in AOD use can be directly impacted by a student’s descriptive perceived norms; that is, their perceptions of others use or engagement in a behavior (Park et al., 2009; Pedersen et al., 2008; Rimal & Real, 2003). As one study convincingly found (Napper et al., 2015), heavy AOD users perceived that more students use AODs than actually do, and often view themselves as unsusceptible to the negative consequences associated with substance misuse. These misperceptions can lead to higher rates of AOD use. The current study examined the descriptive perceived norms of alcohol and cannabis use among students mandated to programming.
Data from students enrolled in alcohol programming revealed that they believed approximately two-third of their friends (65.33%) and half (50.01%) of the other students in their school drank alcohol at a rate of once or twice per week. Reports from two nationwide studies show that the actual percentage of students who reported drinking alcohol in the past month is closer to 60%, and at an average rate of around one – two days per month (ACHA, 2018; Schulenberg et al., 2019). This suggests that the students in the current study were drinking more than the average student ($\mu = 5.5$ days), and also perceived a high rate of their friends also drank.

In regards to cannabis use, students enrolled in the cannabis course believed over half (59.97%) of their friends and about half (49.85%) of the other students used cannabis at a rate of once or twice per week. These are exaggerated values from the actual percentage of students who reported using cannabis over the last month (25%), and reported using at a much slower rate (about 1-2 days a month) (American College Health Association, 2018; Schulenberg et al., 2019). This suggests that the students in the current study are using cannabis more than the average student ($\mu = 13.24$ days), and also perceived that higher rates of their friends and other students use cannabis.

Altogether, the correlations and percentages discovered in this study between students’ actual use of cannabis or alcohol and perceived norm rates reveal a cause of concern. Most of the perceived norm rates were overestimated compared to national rates. While this is already alarming, upon further inspection it was discovered that correlations with the students in this study were more aligned with perceived use of their friends. This has more of a potential to impact their behavior since it has been revealed
that perceived norm use, especially closely associated peers and friends, has the ability to influence personal use, and vice versa (Borsari & Carey, 2006; Deutsch et al., 2015).

This current study provided support for the utilization of the TPB as a predictor of an individual’s intention to reduce their alcohol or cannabis. The current study also provided further evidence that suggests attitude plays a significant role in moderating intention. Although the findings are consistent with other studies in the field, the current study also deepened the literature that existed with AOD use and the TPB. This study expanded the field by applying the TPB to a unique population of students who were mandated to programming. It was revealed that students’ perceptions of others alcohol or cannabis use, especially friends, were associated with their actual alcohol and cannabis use. This is significant because other research has provided strong evidence that descriptive perceived norms contributes to the prediction of future intention, even when controlling for subjective norms (Mcmillan & Conner, 2003; Rivis & Sheeran, 2003).

From a theoretical perspective, this study offers insight for applications in future programming, such as utilizing more principal elements of the TPB, namely attitude and subjective norms, to help increase a students’ intention to reduce their AOD. Additionally, programing can focus on fixing the discrepancy that exists in student’s perceptions of AOD use by providing a more accurate representation of AOD use around their campus, and around the nation. Tailoring programs to address efficient TPB constructs which predict intentions and behaviors, and correcting misperceptions of AOD use, could increase the probability of successfully reducing rates of AOD use among college students.

**Limitations**
A number of limitations should be addressed with the present study. First, the sample was predominantly White Non-Hispanic. While this is reflective of the demographics of the university, and the region of the U.S. in which university is located, literature has suggested that White Non-Hispanic college students have higher rates of AOD use compared to their counterparts, thus, possibly inflating the alcohol or cannabis frequency or quantity data (Dunn et al., 2020; Murphy et al., 2005). Second, the small sample size of students in the cannabis course make the results of a study hard to generalize, and can also impact the outcomes of the data by reducing the likelihood that any significant findings actually reflect a true result (Murnane & Willett, 2010). Third, data were self-reported, so some reported answers could be over- or underreported, which may impact the correlations and findings among the TPB constructs. Fourth, subjective norms were found to have the lowest internal reliability among the TPB constructs. Previous research has also found this to be true with subjective norms, and thus fear it may weaken the associations with intention or behavior (Armitage & Conner, 2001; Cooke et al., 2016). In this study however, subjective norms performed well in correlations with intention and attitude and successfully predicted intention to reduce alcohol or cannabis use. Fifth, all the data were baseline, cross-sectional data, and completed after they were reprimanded for their violation. Studies show that just the fear of getting caught creates a desire to change their habits simply because they were reprimanded (White et al., 2008).

**Implications for Future Practice and Research**

There are future practical and research implications based on the findings of the current study. A reduction in AOD use requires a multipronged approach from
universities, one of which is the implementation of an intervention that is backed by evidence and theory (Croom et al., 2009). A proven theory successful in predicting both intention and reductions in AOD use is the TPB (Cooke et al., 2016). Given the significant relationships found with some TPB variables and intention in the current study, future practical implications involve incorporating individual constructs of the TPB into program development and implementation for students mandated to AOD programming. More specifically, the focus should be on constructs which have been proven to significantly predict intention and behavior, such as attitude and subjective norms in this study.

A key practical implication for future programming is to focus more attention on trying to change or expand a student’s attitude about a reduction in their AOD use. This suggestion is also backed by previous findings that revealed attitude was the most consistent, significant predictor of intention to change a student’s AOD use behavior (Ito et al., 2015; Norman, 2011). Construct variables in this study assessed the students’ attitudes in regards to a reduction in their alcohol or cannabis use by utilizing semantic differential scales (e.g., harmful vs. beneficial, foolish vs wise, unenjoyable vs enjoyable). Moving forward, programs should focus on enhancing the affirmative attitudes of AOD reduction (e.g., beneficial, wise, enjoyable). Methods to do so include relaying the benefits of a reduction in AOD use, such as the long-term biopsychosocial consequences of excessive AOD use (e.g., dependence, legal problems), the impact of AOD use on academic achievement, and long-term costs-benefits analysis, (Arria et al., 2013; Miller & Hendrie, 2009).
Future programming could also target subjective norms. The theoretical basis of subjective norms and AOD use is based on a perception that those close to the individual would approve or disprove of a reduction in AOD use, thus, motivating said reduction (Ajzen, 1991; Liska, 1984). Independently, subjective norms were also discovered to predict a student’s intention to reduce alcohol or cannabis use in the current study. Students were asked to reflect on whether or not their friends and family would support or approve a reduction in their alcohol or cannabis use. Future programing could have students reflect on the specific perceived opinions and beliefs of those closest to the student on their AOD use, including family, friends, partners, and doctors or health professionals if applicable. Students could reiterate what those opinions mean to them and how the opinions of others might affect their behavior. The other adjacent construct to intention is perceived behavioral control, which failed to consistently predict intention.

There are practical implications that would involve giving less attention to perceived behavioral control. One example where perceived behavioral control would be play a lessor role in predicting future AOD use is among individuals who are dependent or addicted. The perception of behavioral control among AOD dependent or addicted individuals could be overestimated or undermined by a biological and psychological addiction from years of AOD use (Reiter et al., 2016). Several studies have provided future implications that include the substitution of perceived behavioral control for a more influential variable (Ajzen, 2002; Armitage & Conner, 2001; Cooke et al., 2016; de Vries et al., 1988). In the current study, removing perceived behavioral control as a predictor of intention revealed minimal change to the overall model. Future interventions or programs could include education on more influential variables, such as perceived
descriptive norms, in lieu of attempts to increase a student’s perceived behavioral control (Ajzen, 2002; Lapinski & Rimal, 2005).

Future practice centered around perceived descriptive norms could involve correcting misperceptions of AOD use. Rates of perceived norms of peer AOD use are usually inflated, especially among those students who are heavy users of AODs (Deutsch et al., 2015; Napper et al., 2015). Correcting misperceptions of AOD use may involve simple social norms interventions, such as providing personalized WF assessments of their AOD use, and their perceived descriptive norms, and comparing those rates to actual nationwide or local rates (Lewis & Neighbors, 2006). This in turn could narrow the gap that exists between what students perceive versus what is actually happening. Some universities are able to gather data surrounding AOD use of their student population, which would further benefit education around perceived norms.

Future research implications could focus on measuring the effectiveness of mandated interventions utilizing pre- and post-measures of key outcome variables. Decreases in AOD use would be the primary hypothesized outcomes. First, measures of frequency and quantity of AODs and assessing TPB constructs levels would be the primary focus area. Specifically, measures of attitudes and subjective norms would be employed at the primary TPB constructs, using differential semantic scales (e.g. harmful vs. beneficial, approve vs disapprove). Increases in the affirmative of these constructs could reveal that the intervention was successful in developing favorable attitudes and subjective norms about decreases in AOD use, thus, possibly increasing motivation to reduce AOD use.
Second, measures of perceived descriptive norms could also be gathered pre- and post-intervention to determine if changes were discovered in levels of perceptions regarding AOD use. To measure this change, descriptive norm measures could be assessed with differential semantic scales so that higher answers would indicate high perceived norms (e.g. “I believe that most of the students on my campus also use alcohol/cannabis regularly.” disagree/agree).

Third, the assessment of the students’ perceived descriptive norms would allow future research to determine if these norms are key predictors of intention or behavior, along with the other TPB constructs (Borsari & Carey, 2003). Previous research has successfully utilized perceived norms and the TPB with college students regarding their AOD use (Cooke et al., 2016; Ito et al., 2015; Tolma et al., 2006). However, no studies have applied this variable as an extension of the TPB among a group of students mandated to AOD programming. Moving forward, if further research also discovered that perceived norms and TPB constructs were significant predictors of intention and behavior among students in mandated programs, longitudinal studies can be undertaken to assess the effectiveness of these variables in reducing long-term AOD use.

Overall, researchers have expanded the TPB model in numerous ways, including substituting out key constructs, such as of subjective norms and perceived behavioral control (Cooke, et al., 2016; Johe & Bhullar, 2016). Utilizing descriptive norms, rather than subjective norms, in predictive models could be an effective way to understand intentions in future AOD use, especially among students who are highly susceptible to the influence of peers (Borsari & Carey, 2006; Deutsch et al., 2015). Perceived social norms or pressures surrounding AOD behaviors requires conscious contemplations of
their AOD use. This may be difficult at times when AOD use has lead to intoxication. Students may benefit from alternative constructs or predictive variables when they have surpassed a point in which subjective norms influences their AOD use.

These subconscious impacts of college students’ AOD use means it could be worth utilizing another theoretical approach that takes these influences into account, the socio-ecological model. The socio-ecological model emphasizes there are both micro and macro influences on human behavior, the latter of which involves policy applications at multiple levels which individuals must abide by (Bronfenbrenner, 1977). A broader approach to studying AOD use and future intentions of mandated students could be to expand the socio-ecological model among mandated students and examine which predictors are most influential in predicting or deterring students future use of AODs.

Finally, an implication for both future research and practice would be to consider the use of focus groups among college students previously mandated to AOD programming. Focus groups would allow researchers to gather detailed opinions and perspectives from the students that quantitative research cannot gather (Vaughn et al., 1996). Specifically, this research could be used to further explore how to implement constructs of the TPB, and perceived norms, into intervention programming. These data would include information shared regarding their experiences in the program, and recommendations for future practices that could appeal to other college students.

**Conclusion**

A theoretical model approach to intervention development and implementation builds a strong foundation for an effective program. Among students mandated to intervention programming at universities, these programs have the ability to impact a
population that has exhibited high rates of AOD use. The results of the current study have revealed evidence for the utilization of the TPB in programs, and provided strong implications for future research and practice. The current study discovered that associations existed among the TPB constructs of attitude and subjective norms within this sample. These two variables were able to predict a student’s intention to reduce alcohol and cannabis use. Further, positive associations were also found among students’ alcohol and cannabis use and perceived descriptive use norms of friends and other students. This finding further supports the idea of incorporating content that includes correction of students’ misperceptions of AOD use into future mandated programs aimed at decreasing AOD use.
CHAPTER FIVE

Summary

Every year, college campuses report alcohol and other drug (AOD) policy violations as the most frequent reason students receive disciplinary referrals (Suffoletto et al., 2016). Universities have the difficult task of implementing programs to help influence AOD use on campus. This dissertation focused on exploring characteristics of students mandated to intervention programming in order to provide recommendations for future programs. This dissertation includes three studies involving students enrolled in mandated intervention programming: (1) a systematic review of the effectiveness of mandated programs in reducing cannabis or other drug use, (2) an examination of the differences between early- and late-onset alcohol and cannabis users, and (3) an exploration of perceived norms, and the Theory of Planned Behavior (TPB) to identify the best predictors of students’ intentions to reduce their alcohol or cannabis use.

Study One Summary

The focus of this review was to summarize the results of a systematic review of past research demonstrating the role and impact of mandated interventions on students’ future cannabis and other drug use, rather than their alcohol use. The researcher conducted searches on eight relevant databases: Academic Search Complete, Cumulative Index to Nursing and Allied Health (CINAHL), Education Resources Information Center (ERIC), MEDLINE, Psychology and Behavioral Sciences Collection, PsycINFO, Sociological Collection and SPORTDiscus. From these databases, articles were identified using the keywords or phrases: College OR University OR Higher Education] AND [Alcohol OR Marijuana OR Cannabis OR Drug OR Substance OR Vaping] AND
Articles were included if they were based on primary research that examined college-based AOD use mandated intervention courses, and reported cannabis or other drug use outcome data. Additionally, studies had to be peer reviewed, in English, and published between 1 January 2000 through 1 June 2020.

A total of six research articles qualified for the review based on these criteria. Findings from the review indicated immediate initial decreases in short-term cannabis and other drug use were commonly reported among those participating in mandated interventions. Further, interventions were more likely to be effective in reducing cannabis or other drug use if they utilized brief motivational interviewing and personalized written feedback. However, the longer time elapsed after an intervention, the more likely students would re-engage in cannabis or other drug use, unless some follow-up or regularly scheduled booster procedures are implemented. Most importantly though, the systematic review discovered that there are few studies that exist today over this topic. This has been a common recent theme among AOD researchers in the field (Buckner et al., 2018; White et al., 2015; Yurasek, Merrill, et al., 2017). This review was the first to comprise all studies which have attempted to assess the effectiveness of mandated interventions in reducing cannabis or other drug use among college students.

**Study Two Summary**

The purposes of Study Two for students mandated to alcohol and cannabis interventions were two-fold. First, the study examined if differences existed between early- and late-onset alcohol and cannabis users among the variables: frequency and
quantity of alcohol use, frequency and quantity of cannabis use, and future intentions to reduce alcohol or cannabis use. Secondly, the study sought to determine if there was an association between students’ frequency of alcohol and cannabis use and their participation in other risky behaviors. This study was completed in partnership with the University of Kentucky’s Department of Campus Recreation and Wellness, who is responsible for administering mandated programming to students who violate campus alcohol or drug policies. No prior studies have been conducted specifically looking at these variables with this population.

The researcher examined the responses of 463 students who were mandated to attend either alcohol \((n = 403)\) or cannabis \((n = 60)\) intervention programming. Significant differences were found between early- and late-onset alcohol and cannabis users. For students enrolled in alcohol programming, significant differences were found between the two groups for the following criteria in the past 30 days: frequency of alcohol use \((p < 0.05)\), binge drinking occasions \((p < 0.05)\), and quantity of drinks per occasion \((p < 0.01)\). For students in cannabis programming, there was a significant difference between early- and late-onset students with their frequency of cannabis use \((p < 0.01)\). Additionally, although students’ intentions were not significantly different between those who were early- or late-onset alcohol or cannabis users, the students still reported positive intentions to reduce alcohol or cannabis use. Finally, there were positive moderate associations with students’ participation in alcohol or cannabis use and participation in other risky behaviors.

This study offers insight for a unique group of substance users. By examining these variables among college students mandated to intervention programming, there is
now a better understanding of students enrolled in these programs, and suggestions for the advancement of mandated programming at universities. Some of these suggestions include implications for future programming and practice, such as the use of screening tools and predictor variables of future AOD dependence (e.g. age-of-onset, recent high rates of alcohol and cannabis use) to be used to tailor intervention types to student characteristics.

**Study Three Summary**

The researcher found no other published studies that utilized the TPB to gauge intention to reduce alcohol or cannabis use among students who had participated in mandatory AOD programs. In general, this is a rarely studied population, especially in regards to theory. Because there is very little guidance in the research literature regarding this topic and population, the current study was undertaken.

The purposes of Study Three were focused on the constructs of the TPB (Ajzen, 1991). While understanding characteristics about a population can help in program planning, research shows that theory also plays a critical role in intervention development (Carey et al., 2016; Tanner-Smith & Lipsey, 2015). First, this study wanted to determine if associations existed among the constructs attitude, perceived behavioral control, subjective norms, and intention, related to reducing alcohol and cannabis use. Also, the current study wanted to determine if proximal constructs of the TPB attitude, perceived behavioral control and subjective norms, predicted intention to reduce alcohol and cannabis use. Additionally, the purpose was to examine the perceived descriptive norms of students enrolled in alcohol or cannabis mandated programming regarding peer use of alcohol or cannabis. Finally, the study examined whether there was a correlation between
their actual rates of alcohol and cannabis use and perceived rates of others alcohol and cannabis use.

Study Three was comprised of the same sample of 463 students who were mandated to attend either alcohol ($n = 403$) or cannabis ($n = 60$) intervention programming. The TPB was successful in predicting students’ intentions to reduce alcohol ($p < .001$) and cannabis use ($p < .001$). Analyses of each individual construct revealed that students’ intentions were more deeply rooted in their attitude about, and subjective norms regarding, a reduction in alcohol or cannabis use as opposed to their perceived behavioral control over it. Additionally, students in the programs perceived inflated rates of alcohol and cannabis use among peers compared to actual nationwide reports. These students were also more likely to have positive moderate relationships of their actual alcohol and cannabis use compared to their friends’ descriptive norms use.

Overall, the study offers theoretical implications for future programming. The current study established that the TPB was useful in predicting the students’ intentions to reduce alcohol or cannabis use. More specifically, the results were able to specify that attitude and subjective norms were the most consistent in predicting intention. The results of this study might also be of interest to other universities that mandate AOD classes for students. University programs should consider incorporating constructs of the TPB, and correcting misperceptions of perceived descriptive norms, in the development, implementation, and evaluation of future mandated programs.

It is important that the findings of these studies be considered for future implications for practice and research. Practical applications and approaches to future research are discussed below.
Implications for Future Practice and Research Summary

Future practical implications primarily focus on the implementation of specific curricula in the development of programs moving forward. These curricula focused items for Studies One, Two, and Three are listed below.

- Future curricula could involve the inclusion of current, evidence-informed topics, specifically centered on cannabis and other drug use, and cannabis vaping. Relative to the availability of information on the dangers of excess use of alcohol, information on cannabis use, including cannabis vaping, is underrepresented (Kenne et al., 2017; Ware, 2018). This content could focus on relevant information, such as the neuropsychological consequences of cannabis use, including cannabis dependence and disorders, the impact of early-onset cannabis use on long-term brain development, the dangers of cannabis vaping and vaping in general, and the repercussions of frequent cannabis and other drug use on academic achievement (APA, 2013; Wetherill et al., 2016; Zehra, et al., 2019).

- Based on the significant relationships found with some TPB variables and intention in the current study, future practical implications could involve incorporating individual constructs of the TPB into program curricula development and implementation for students mandated to AOD programming. More specifically, the focus should be on constructs which have been proven to significantly predict intention and behavior, such as attitude and subjective norms in this study.

- Future curricula could dedicate more attention on trying to change or expand a student’s attitude about a reduction in their AOD use. This suggestion is also
backed by previous findings that revealed attitude was the most consistent, significant predictor of intention to change a student’s AOD use behavior (Ito et al., 2015; Norman, 2011). Moving forward, programs should focus on enhancing the affirmative attitudes of AOD reduction (e.g., beneficial, wise, enjoyable). Methods to do so include relaying the benefits of a reduction in AOD use, such as the long-term biopsychosocial consequences of excessive AOD use (e.g., dependence, legal problems), the impact of AOD use on academic achievement, and long-term costs-benefits analysis, (Arria et al., 2013; Miller & Hendrie, 2009).

➢ Future programming could also target subjective norms. Independently, subjective norms were also discovered to predict a student’s intention to reduce alcohol or cannabis use in the current study. Some components of future programs and curricula could have students reflect on the specific perceived opinions and beliefs of those closest to the student on their AOD use, including family, friends, partners, and doctors or health professionals if applicable. Students could reiterate what those opinions mean to them and how the opinions of others might affect their behavior.

➢ Another practical implication regarding the TPB in intervention programming would involve giving less attention to perceived behavioral control. In the current study, removing perceived behavioral control as a predictor of intention revealed minimal change to the overall model. Future programs could include curricula focused on more influential variables, such as perceived descriptive norms, in lieu
of attempts to increase a student’s perceived behavioral control (Ajzen, 2002; Lapinski & Rimal, 2005).

- Future practices involving perceived descriptive norms may include correcting misperceptions of AOD use. Rates of perceived descriptive norms of peer AOD use are usually inflated, especially among those students who are heavy users of AODs (Deutsch et al., 2015; Napper et al., 2015).

- Future practice in AOD mandated program curricula development could also take into account the association of AOD use and participation in other risky behaviors (e.g. co-use of alcohol and cannabis, unprotected sex, physical aggression, drinking and driving). The co-use of cannabis and alcohol can lead to experiencing significant clinical outcomes, and comorbid mental health disorders and SUDs (Baggio et al., 2018; Yurasek, Aston, et al., 2017). Providing information on all of these risky behaviors could help inform the students on the association between these behaviors, and how to make healthier choices.

Further areas of future practice include suggestions on a different method to incorporate a tailored intervention approach into new and existing programs based on the students’ likelihood of experiencing issues with AOD use. These implications are listed below.

- An area for both future practice and research implications is the capability for programmers and researchers to screen those who attend mandated AOD intervention courses for further potential issues. College students rarely seek help for issues surrounding AOD use. Future protocols for mandated courses could include the capability for programmers and researchers to employ self-screenings
tools, such as the Alcohol Use Disorders Identification Test (AUDIT – C), the Drug Abuse Screening Test - 10 (DAST-10), or the Cannabis Abuse Screening Test (CAST) (Bohn, Babor, & Kranzler, 1991; Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998; Larimer, Cronce, Lee, & Kilmer, 2004; Legleye, Karila, Beck, & Reynaud, 2007). The screening assessments, in addition to the students’ self-reported answers of key predictors of current and future AOD use, such as age-of-onset of AOD use, recent frequency and quantity of AOD use, and their participation in other risky behaviors would examine certain indicators of future substance use dependence that typically go unnoticed among the students. This would allow for tailored, program-specific, steps or intervention types that to which students would be referred based on their answers. Furthermore, screening for dependency issues could help reinforce collaboration efforts with other campus resources, such as counseling or health services, which are not typically mandated for students.

- The results of the student’s screening assessments could identify people, such as early-onset AOD users and more frequency AOD users, for more intensive programming or counseling.

- Students who are less at-risk of future dependence, or infrequently use AODs, could receive on-line intervention programming with resources to other professional help. Students who are more at-risk, early-onset AOD users, and are frequent AOD users, could be required or recommended to receive more personal, face-to-face support with the option for professional counseling. The suggested
practical implication would avoid more traditional tiered and event-based approached (Neighbors et al., 2007; Wechsler et al., 2002).

- Research has shown that the effectiveness of interventions varies depending on some key variables, including duration, delivery, and modality (Carey et al., 2012; Dunn et al., 2020). The duration, delivery and modality of future AOD mandated interventions, and any follow-ups should be considered in future practices and research. Previous research has revealed that short-term, computer-delivered interventions can work for students who are infrequent AOD users (Carey et al., 2012; Kulesza et al., 2010). However, to maintain long-term effectiveness, future programs should shift efforts to face-to-face interventions, including BMIs and WF assessments, and consistently follow-up with the individual post-intervention (Carey et al., 2012; Dunn et al., 2020).

Future research implications for Studies One, Two, and Three are suggested below.

- A key research implication based on these suggested practical applications includes the use of longitudinal studies to examine if tailored, mandated intervention programs would be effective in reducing AOD use, and if so, to determine how sustainable that reduction would be. There are implications for expanding research of these AOD mandated interventions including utilizing randomized controlled trials during study design, diversifying the sample in race and gender, collecting biological verification or more accurate measures of cannabis use such as the TLFB method (if feasible), and measuring outcome data post-intervention (Bucker et al., 2018).
Longitudinal research could evaluate if there were differences between those students who are considered early- or late-onset during longitudinal assessments. This could help provide further evidence that those who are early-onset AOD users, more frequent AOD users, and more at-risk of future dependence benefit from a personalized programming method.

Further research into the effectiveness of boosters in AOD interventions is an area to expand upon given its promise of increasing the likelihood of adherence to a behavior change long-term (Dunn et al., 2020; Kazemi et al., 2013; Schlup et al., 2009).

Future research could examine the effectiveness of the program in reducing participation in AOD use and other risky behaviors, and increasing overall knowledge associated with perceived descriptive norms. By targeting perceived descriptive norms, this allows future research to determine if these norms are key predictors of intention or behavior, along with the other TPB constructs. If further research also discovers that perceived norms and the TPB constructs were significant predictors of intention and behavior among students in mandated programs, longitudinal studies can be undertaken to assess the effectiveness of these variables in predicting future long-term AOD use.

Given the dearth of studies involving students mandated to cannabis or other drug interventions for violating campus drug policies, there is still a need to examine the impact of interventions on those who are cannabis and other drug users specifically. (Buckner et al., 2018; Yurasek, Aston, et al., 2017). These future
studies should include a larger sample size than was included in Study Two and Three.

- An additional future area of research could also involve more rigorous cross-sectional, and longitudinal research on the simultaneous use of cannabis and alcohol. Despite these effects of alcohol and cannabis co-use, no research on programming exists regarding the development or examination of interventions centered on reducing the co-use of alcohol and cannabis. More longitudinal research among those who co-use alcohol and cannabis would help further understand the relationship between the two substances, and how to successfully reduce their use.

- An implication for both future research and practice would be to consider the use of focus groups among college students previously mandated to AOD programming. Specifically, this research could be used to further explore how to implement new curricula, including constructs of the TPB and perceived descriptive norms, into intervention programming. These data would include information shared regarding students’ experiences in the program, and recommendations for future practices.

- Another practical and research implication emphasizes a shift in focus to a socio-ecological model; more specifically, the application of AOD prevention efforts within university policy. A broader policy approach to university-wide AOD prevention could be the application of university wide self-screening efforts for freshmen students enrolling in the university. The results of these screenings would provide students and their parents with supplemental information on the
physical, psychological, and academic consequences of AOD use. Additionally, students whose answers reflect they have a high susceptibility to dependence or addiction, or high recent AOD use, could be asked to participate in a half-semester AOD educational course, or brief motivational intervention with a trained practitioner.

- A final practical and research implication could be the expansion of more AOD concentrated content into first-year college student success courses (Peltier et al., 2000). The use of AODs are campus-wide, and these courses provide the opportunity to inform new students of the consequences associated with excessive AOD use. As a part of the course, the instructors could provide simple assessments, such as personalized feedback of their AOD use or perceived norm use of AOD versus actual nationwide rates (Lewis & Neighbors, 2006; NIH, 2002). Research could then be focused on the prevention or reduction of AOD use before and after the implementation of a college student success course that heavily emphasized AOD prevention.

These future implications for practice and research are all timely implications considering the on-going legalization of cannabis throughout the United States (Morean et al., 2017). Further, due to the abrupt rise in cannabis vaping in recent years, and the misperceptions, accessibility, and ease of use associated with vaping cannabis, it is critical to implement information that is accurate and reliable, and relays the vulnerability of all populations to the dangers of cannabis vaping (Frohe et al., 2018; Kenne et al., 2017). University officials should also favor these recommendations for practice and
research given that students are less likely to be retained when they are using AODs (Arria et al., 2013; Perkins, 2002).

**Conclusions**

- Along with the increase in the prevalence of college students’ cannabis and other drug use, AOD policy violations on campus have also increased. Some universities have found success with the implementation of mandated interventions.

- There is an evident lack of research on the effectiveness of cannabis and other drug mandated programming among students who are mandated to attend due to violating their university’s cannabis or other drug policy.

- Due to the rising trends of cannabis and other drug use, including cannabis vaping, the findings of this dissertation should promote future research and practice to develop, implement, and rigorously evaluate, more evidence-based mandated interventions aimed at decreasing cannabis and other drug use.

- Based on the studies in the review, it was evident that mandated interventions were successful in reducing short-term cannabis and drug use. However, if follow-up methods are not implemented (e.g. delayed interventions, boosters), the sustainability of these reduced rates will most likely abate the longer time elapses from intervention implementation.

- The employment of boosters and follow-up meetings post-intervention have been proven to increase the likelihood of long-term sustainability.
➢ Research is needed in the field that is well designed, focuses on students who have been mandated for cannabis or drug interventions, and directly addresses their cannabis and drug use.

➢ Among students enrolled in mandated programming, differences were reported among early- and late-onset students on important AOD use variables, such as the frequency of alcohol and cannabis use.

➢ Among students enrolled in mandated programming, positive associations were discovered among their alcohol and cannabis use, and their participation in other risky behaviors.

➢ Practical applications and approaches to future research should include the implementation and evaluation of intervention types tailored to the students based on key predictor variables, such as age-of-onset, rates of AOD use, and outcomes of screening assessment tools. While some students may reduce their AOD use as a result of mandated online interventions, others may require more professional assistance.

➢ A reduction in AOD use requires a multipronged approach from universities, one of which is the implementation of an intervention that is backed by evidence and theory. A theoretical model approach to intervention development and implementation builds a strong foundation for an effective program.

➢ Positive moderate associations were found among students’ alcohol and cannabis use and perceived descriptive use norms of friends and other students.

➢ There is evidence for the utilization of the TPB in programs. The current study discovered that associations existed among most of the TPB constructs. In
addition, regression analyses discover that attitude and subjective norms were able to predict students’ intentions to reduce alcohol and cannabis use.
Appendix A

Mandated Alcohol Survey

Start of Block: Alcohol Frequency and Quantity

Welcome,
Please take some time to answer this survey to the best of your ability before you begin your course. This survey should take approximately 10-15 minutes to complete.

At the end of this you will be provided with the link to begin and complete your training for your violation and thank you in advance for your cooperation in creating a better experience for all students.

You may now begin.

Page Break
The following questions ask about how much you have to drink on the occasions when you drink alcoholic beverages. For these questions, a "drink" means any of the following:

Q1 Not counting sips, how old were you the very first time you had a drink of beer, wine, or liquor?

____
Q2 Approximately how many days of the past month did you drink alcohol? (Click on the list for more options.)

▼ 0 days ... More than 30 days

Q3 In the past 30 days, think of any typical occasion/s in which you did drink alcohol. How many drinks did you have in those occasions? (Ex: if you drank 7 drinks typically each time, please enter a 7 in the space provided) Click on the list for more options.

▼ 0 drinks ... More than 30

Q4 How often did you drink during the last 30 days?

○ I did not drink at all
○ About once a month
○ 2-3 times a month
○ Once or twice a week
○ 3-4 times a week
○ 5-6 times a week
○ Daily

Q5 When you hear the term binge drinking, how many (quantity) drinks during a drinking occasion do you think qualify as binge drinking for those...

Biologically male? (Click on the list for more options)

▼ 1 drink ... 20 or more drinks
Q5b Biologically female? (Click on the list for more options)

- 1 drink ... 20 or more drinks

P Professional agencies describe Binge drinking as a pattern of drinking 5 or more drinks (biologically male), or 4 or more drinks (biologically female) during a drinking occasion. How many times would you say you have participated in binge drinking in:

Q6 The last 30 days?

- 0 times ... 31 or more times

Q7 In any typical week during the last 30 days, please think of what days you used alcohol and how many drinks you had on each of those days and write them in accordingly:

Monday : _______
Tuesday : _______
Wednesday : _______
Thursday : _______
Friday : _______
Saturday : _______
Sunday : _______

Total : _______

Q8 How would you best describe yourself in terms of your current use of alcohol right now?

- Infrequent drinker
- Light drinker
- Moderate drinker
- Heavy drinker
- Problem drinker
Q9 Do you think you will be drinking alcoholic beverages five years from now?

- Definitely yes
- Probably yes
- Probably not
- Definitely not

Q9b Do you think you will be drinking alcoholic beverages at the same rate in 5 years that you are now?

- Definitely yes
- Probably yes
- Probably not
- Definitely not
Q10 Within the **last 30 days**, how often did you:

<table>
<thead>
<tr>
<th>Use Cannabis (marijuana) (1)</th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use any other drugs other than cannabis (stimulants, depressants, etc.) (2)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Participate in unprotected sexual intercourse. (7)</td>
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<tr>
<td>Become physically or verbally aggressive with anyone? (5)</td>
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</tbody>
</table>

End of Block: Alcohol Frequency and Quantity

Start of Block: Descriptive Alcohol Questions and Perceived Risk

Q11 On how many occasions have you been drunk from drinking alcoholic beverages?...(Mark one circle for each line).

<table>
<thead>
<tr>
<th></th>
<th>0 Occasions</th>
<th>1-2 Occasions</th>
<th>3-5 Occasions</th>
<th>6-9 Occasions</th>
<th>10-19 Occasions</th>
<th>20-30 Occasions</th>
<th>31 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the last 30 days? (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

133
Q12 When you used alcohol during the last year, how often did you use it in each of the following situations?...(Mark one circle for each line).

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A few of the times</th>
<th>Some of the times</th>
<th>Most of the times</th>
<th>Every time</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you were alone. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At a party. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When your date or spouse/partner was present. (4)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>At your home (or apartment or dorm). (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At school. (7)</td>
<td></td>
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<td></td>
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<tr>
<td>In a car. (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At a bar or restaurant. (9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before or during a UK sporting event you were watching on television. (10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before or during a UK sporting event taking place in Lexington (tailgate, pregame, etc.) (11)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q13 What have been the most important reasons for your drinking alcoholic beverages?...(Click yes OR no for each item).

<table>
<thead>
<tr>
<th>Reason</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>To experiment-to see what it's like (1)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To relax or relieve tension (2)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To feel good or get high (3)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To have a good time with my friends (5)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To fit in with a group I like (6)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To get away from my problems or troubles (7)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Because of boredom, nothing else to do (8)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Because of anger or frustration (9)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To get through the day (10)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To increase the effects of some other drug(s) (11)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To get to sleep (13)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Because it tastes good (14)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Because I am &quot;hooked&quot;-I feel I have to drink (15)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (16)</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Q13b If you selected "Other" for important reasons that you drink, please explain further in the box below. If you don't feel comfortable answering this you may put NA as your reason. Please do not include names.

________________________________________________________________

Q14 Has alcohol affected your academics in any of the following ways within the last school year?...(Mark all that apply).

☐ None.

☐ Skipped a class due to drinking or a hangover.

☐ Received a lower grade on an exam or important project.

☐ Received a lower grade in a course.

☐ Received an incomplete or dropped a course.

Q15 How much do you think people risk harming themselves (physical or in other ways) if they:....(Mark one circle for each line).

<table>
<thead>
<tr>
<th></th>
<th>No Risk</th>
<th>Slight Risk</th>
<th>Moderate Risk</th>
<th>Great Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tried alcohol once or twice</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Drink alcohol occasionally</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Drink alcohol regularly</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Drink enough alcohol to get drunk</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
P Over half-way done.

The next set of questions will measure your opinion of your alcohol using behavior. Please answer honestly.

For each item below, the closer your bubble is to either adjective (e.g. bad/good, foolish/wise) the more you agree with that option choice.

Q16 Reducing my alcohol use over the next month would be...

<table>
<thead>
<tr>
<th>Bad</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q17 A reduction in my alcohol use for the next month would most likely be...

<table>
<thead>
<tr>
<th>Harmful</th>
<th>Beneficial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q18 It is (choose below) to decrease my alcohol use over the next month.

<table>
<thead>
<tr>
<th>Foolish</th>
<th>Wise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q19 Decreasing my alcohol use over the next month would be...

<table>
<thead>
<tr>
<th>Unenjoyable</th>
<th>Enjoyable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q20 I believe it would be (choose below) if over the next month my alcohol intake decreased.

<table>
<thead>
<tr>
<th>Unhealthy</th>
<th>Healthy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q21 My friends would (choose below) of a reduction in my alcohol over the next month.

<table>
<thead>
<tr>
<th>Disapprove</th>
<th>Approve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q22 My family thinks it (choose below) be a good idea to decrease my alcohol use over the next month.

<table>
<thead>
<tr>
<th>Would Not</th>
<th>Would</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page Break

Q23 It is up to me whether or not I decrease my alcohol use over the next month.

<table>
<thead>
<tr>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q24 How much control do you have over whether or not you reduce your alcohol use over the next month?

<table>
<thead>
<tr>
<th>No Control</th>
<th>Complete Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q25 For me to reduce my alcohol use over the next month would be.

<table>
<thead>
<tr>
<th>Impossible</th>
<th>Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q26 Over the next month, how likely is it that you will reduce your alcohol consumption?

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ]</td>
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<td>[ ]</td>
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<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

Q27 I (choose below) to reduce the amount of alcohol I drink over the next month.

<table>
<thead>
<tr>
<th>Do Not Intend</th>
<th>Do Intend</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>[ ]</td>
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<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

End of Block: Theory of Planned Behavior

Start of Block: Perceived Norms

P The final set of questions will ask your perception (viewpoint) of your friends alcohol use, if any.

Q28 Within the last 30 days what percent of YOUR FRIENDS do you think used alcohol? State your best estimate by sliding on the scale where you think fits best.

Percent

<table>
<thead>
<tr>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
</table>

% of friends ()
Q29 How often do you think YOUR FRIENDS drank during the last 30 days?

- None at all
- About once a month
- 2-3 times a month
- Once or twice a week
- 3-4 times a week
- 5-6 times a week
- Daily

Q30 In the past 30 days, think of any typical occasion/s in which YOUR FRIENDS drank alcohol, how many drinks do you think they had in those occasions?

▼ 0 drinks ... more than 30 drinks

P The next set of questions will ask your perception (viewpoint) of your fellow University of Kentucky students alcohol use, if any.

Q31 Within the last 30 days what percent of the TYPICAL STUDENT at UK do you think used alcohol? State your best estimate by sliding on the scale where you think fits best.

0 10 20 30 40 50 60 70 80 90 100

% of students ()
Q32 How often do you think the **TYPICAL STUDENT at UK** drank during the last 30 days?

- None at all
- About once a month
- 2-3 times a month
- Once or twice a week
- 3-4 times a week
- 5-6 times a week
- Daily

Q33 In the past 30 days, think of any typical occasion/s in which the **TYPICAL STUDENT at UK** drank alcohol, how many drinks do you think they had in those occasions?

- ▼ 0 drinks ... more than 30 drinks

---

End of Block: Perceived Norms

Start of Block: Demographics

P The remaining questions refer to general information about yourself.

Q34 What is your gender identity?

- Woman
- Man
- Gender fluid or non-binary
- Other

Page Break
Q35 Does your gender identity match the sex you were assigned at birth?

- Yes
- No
- I'm not sure

Q36 How do you usually describe yourself? (Mark all that apply)

- White - Not Hispanic
- Black - Not Hispanic
- Hispanic or Latino
- Asian or Pacific Islander
- American or Alaskan Native
- Other

Display This Question:

If How do you usually describe yourself? (Mark all that apply) = Other

Q36b If you selected the option "Other" in the previous question, please list how you describe yourself in the following space.

________________________

Q37 How old are you in years?

<table>
<thead>
<tr>
<th>Age ()</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 10 20 30 40 50 60 70 80 90 100</td>
</tr>
</tbody>
</table>

142
Q38 What year are you in school:

- ○ 1st year undergraduate
- ○ 2nd year undergraduate
- ○ 3rd year undergraduate
- ○ 4th year undergraduate
- ○ 5th year undergraduate
- ○ Graduate or Professional
- ○ Other

Q39 Are you a member of a social fraternity or sorority or in the process of joining one? (National Interfraternity Conference, National Panhellenic Conference, or National Pan-Hellenic Council) This answer will NOT be reported to any greek organization on campus or nationwide and will be kept completely confidential.

- ○ Yes
- ○ No

Q40 Are you a member of a collegiate athletic team? This answer will NOT be reported to any school organization on campus or nationwide and will be kept completely confidential.

- ○ Yes
- ○ No

Thank you for taking the time to fill out this survey.

As a reminder, none of the responses will be used to further mandate any punishment from the University nor will your participation in this survey be shared with any other organizations. Your participation will remain confidential and used for the purposes of bettering the program.

Please hit the next button record your response and to find the link to your online course.

End of Block: Demographics
Appendix B

Mandated Cannabis Survey

Welcome,
Please take some time to answer this survey to the best of your ability before you begin your course. This survey should take approximately 10 minutes to complete.

At the end of this you will be provided with the link to begin and complete your training for your violation and thank you in advance for your cooperation in creating a better experience for all students.

You may now begin.

---

P Some highlights to keep in mind as you take this section of the survey:
Note that the term cannabis is being used to refer to marijuana, cannabis concentrates (wax, oil, sap, etc.) and cannabis-infused edibles.
The following questions ask about your own use of cannabis.

---
Q1 Not counting puffs, how old were you the very first time you tried cannabis?

Q2 Approximately how many days of the PAST MONTH did you use cannabis?

0 days ... 31 days

Q3 Which of the following best captures your pattern of cannabis use throughout the week?

- I do not use cannabis at all
- I only use cannabis on weekends
- I only use cannabis on weekdays
- I use cannabis on weekends and weekdays

Q4 How many times a day, on a typical WEEKDAY, do you use cannabis? (Click the dropdown list for more options)

0 times ... 10+ times

Q5 How many times a day, on a typical WEEKEND, do you use cannabis? (Click the dropdown list for more options)

0 times ... 10+ times

P Please use the image below to refer to various quantities of marijuana. The image is not to scale; the dollar bill is included to help provide size perspective.
P For the questions below, clearly indicate the number of grams of marijuana you use by selecting a number from the list. DO NOT include other forms of cannabis you may use (such as concentrates). Please refer to the pic above to see various quantities of marijuana.
Q6 Approximately how much **total** marijuana (quantity) have you used during...(Mark one)

<table>
<thead>
<tr>
<th>Grams</th>
<th>0 grams</th>
<th>0.125 grams</th>
<th>0.25 grams</th>
<th>0.5 grams</th>
<th>0.75 grams</th>
<th>1 gram</th>
<th>2 grams</th>
<th>1/8 of an ounce = 3.5 grams</th>
<th>1/4 of an ounce = 7 grams</th>
<th>1/2 of an ounce = 14 grams</th>
<th>1 ounce = 28 grams</th>
<th>More than 1 ounce</th>
</tr>
</thead>
<tbody>
<tr>
<td>The last 30 days (1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The last 7 days (4)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Q7 In the past 30 days, think of any typical **session or occasion** in which you did use marijuana. Approximately how much (quantity) marijuana did you personally use in that session? (Click the drop down list for more options).

▼ 0 grams ... More than 1 ounce

Q8 In the past 30 days, think of any typical **day** in which you did use marijuana. Approximately how much (quantity) marijuana did you personally use that whole day? (Click the drop down list for more options).

▼ 0 grams ... More than 1 ounce
Q9 How often did you use cannabis the last 30 days?

- None
- About once a month
- 2-3 times a month
- Once or twice a week
- 3-4 times a week
- 5-6 times a week
- Daily

Q10 In the last 30 days, did you use cannabis concentrates (Oil, Wax, Shatter, Butane Hash Oil, Dabs) at any point?

- Yes
- No

Skip To: Q14 If In the last 30 days, did you use cannabis concentrates (Oil, Wax, Shatter, Butane Hash Oil, Dabs)... = No

Q11 Approximately, how many hits of cannabis concentrates have you taken during the last 30 days? Please ONLY insert numbers in the space below. (For example, if you know you have taken 16 hits during the past month from cannabis concentrates insert 16 in the space provided).

- Number of hits ________________________________

Q12 In the past 30 days, think of any typical session or occasion in which you did use cannabis concentrates. Approximately how many hits did you personally take in that session? (Please ONLY insert numbers in the space below.)

- Number of hits ________________________________
Q13 In the past 30 days, think of any typical day in which you did use cannabis concentrates. Approximately how many hits did you personally take in that day? (Please ONLY insert numbers in the space below.)

   ○ Number of hits ________________________________

Q14 How many hours after waking up do you typically first use cannabis?

   ○ I do not use cannabis at all
   ○ 12-18 hours after waking up
   ○ 9-12 hours after waking up
   ○ 6-9 hours after waking up
   ○ 3-6 hours after waking up
   ○ 1-3 hours after waking up
   ○ within 1 hour of waking up
   ○ within 1/2 an hour of waking up
   ○ immediately after waking up

Q15 How would you best describe yourself in terms of your current use of cannabis right now?

   ○ Infrequent user
   ○ Light user
   ○ Moderate user
   ○ Heavy user
   ○ Problem user
Q16 Do you think you will be using cannabis five years from now?

- Definitely yes
- Probably yes
- Probably not
- Definitely not

Q16b Do you think you will be using cannabis at the same rate in 5 years that you are now?

- Definitely yes
- Probably yes
- Probably not
- Definitely not
Q17 Within the **last 30 days**, how often did you:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drink (1)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Use any drugs other than cannabis (2)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Participate in unprotected sexual intercourse. (7)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Become physically or verbally aggressive with anyone? (5)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

End of Block: Cannabis Frequency and Quantity

Start of Block: Descriptive Cannabis Questions and Perceived Risk
Q18 When you used Cannabis during the last year, how often did you use it in each of the following situations?...(Mark one circle for each line).

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A few of the times</th>
<th>Some of the times</th>
<th>Most of the times</th>
<th>Every time</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you were alone. (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At a party or gathering. (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When your date or spouse/partner was present. (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At your home (or apartment or dorm). (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At school. (7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In a car. (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before or during a UK sporting event you were watching on television. (9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before or during a UK sporting event taking place in Lexington (tailgate, pregame, etc.) (10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q19 What has been the most important reasons for your cannabis use?...(Click yes OR no for each item).

<table>
<thead>
<tr>
<th>Reason</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>To experiment-to see what it's like</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To relax or relieve tension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To feel good or get high</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To seek deeper insights and understanding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To have a good time with my friends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To fit in with a group I like</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To get away from my problems or troubles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Because of boredom, nothing else to do</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Because of anger or frustration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To get through the day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To increase the effects of some other drug(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To decrease (offset) the effects of some other drug(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To get to sleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Because I am &quot;hooked&quot;-I feel I have to use cannabis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q19b If you selected the option "Other" in the previous question please explain further. Please do not include names.

________________________________________________________________

Q20 Has Cannabis affected your academics in any of the following ways within the last school year?...(Mark all that apply).

☐ None.

☐ Skipped a class.

☐ Received a lower grade on an exam or important project.

☐ Received a lower grade in a course.

☐ Received an incomplete or dropped a course.
Q21 How much do you think people risk harming themselves (physical or in other ways) if they:...(Mark one circle for each line).

<table>
<thead>
<tr>
<th>Activity</th>
<th>No Risk</th>
<th>Slight Risk</th>
<th>Moderate Risk</th>
<th>Great Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Try cannabis once or twice (1)</td>
<td></td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Use cannabis occasionally (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Use cannabis regularly (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Use enough cannabis to get high (4)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

End of Block: Descriptive Cannabis Questions and Perceived Risk

Start of Block: Theory of Planned behavior

P Over half-way done.

The next set of questions will measure your opinion of your cannabis using behavior. Please answer honestly.

For each item below, the closer your bubble is to either adjective (e.g. bad/good, foolish/wise) the more you agree with that option choice.

Q22 Reducing my cannabis use over the next month would be...

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Bad</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
Q23 A reduction in my cannabis use for the next month would most likely be...

<table>
<thead>
<tr>
<th>Harmful</th>
<th>Beneficial</th>
</tr>
</thead>
</table>

Q24 It is (choose below) to decrease my cannabis use over the next month.

<table>
<thead>
<tr>
<th>Foolish</th>
<th>Wise</th>
</tr>
</thead>
</table>

Q25 Decreasing my cannabis use over the next month would be...

<table>
<thead>
<tr>
<th>Unenjoyable</th>
<th>Enjoyable</th>
</tr>
</thead>
</table>

Q26 I believe it would be (choose below) if over the next month my cannabis intake decreased.

<table>
<thead>
<tr>
<th>Unhealthy</th>
<th>Healthy</th>
</tr>
</thead>
</table>

Q27 My friends would (choose below) of a reduction in my cannabis over the next month.

<table>
<thead>
<tr>
<th>Disapprove</th>
<th>Approve</th>
</tr>
</thead>
</table>

Q28 My family thinks it (choose below) be a good idea to decrease my cannabis use over the next month.

<table>
<thead>
<tr>
<th>Would Not</th>
<th>Would</th>
</tr>
</thead>
</table>

Q29 It is up to me whether or not I decrease my cannabis use over the next month.

<table>
<thead>
<tr>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
</table>
Q30 How much control do you have over whether or not you reduce your cannabis use over the next month?

<table>
<thead>
<tr>
<th>No Control</th>
<th>Complete Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q31 For me to reduce my cannabis use over the next month would be.

<table>
<thead>
<tr>
<th>Impossible</th>
<th>Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q32 Over the next month, how likely is it that you will reduce your cannabis consumption?

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q33 I (choose below) to reduce the amount of cannabis I use over the next month.

<table>
<thead>
<tr>
<th>Do Not Intend</th>
<th>Do Intend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

End of Block: Theory of Planned behavior

Start of Block: Perceived Norm Block

The final set of questions will ask your perception (viewpoint) of your friends cannabis use, if any.

Q34 Within the last 30 days what percent of YOUR FRIENDS do you think used cannabis? State your best estimate by sliding on the scale where you think fits best.

<table>
<thead>
<tr>
<th>Percent</th>
<th>0 10 20 30 40 50 60 70 80 90 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of friends ()</td>
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</table>
Q35 How often do you think YOUR FRIENDS use cannabis during the last 30 days?

- None at all
- About once a month
- 2-3 times a month
- Once or twice a week
- 3-4 times a week
- 5-6 times a week
- Daily

Q36 Think of any one typical session in which YOUR FRIENDS used marijuana in the last 30 days, approximately how much (quantity) marijuana do you think they personally used in that session? (Click the drop down list for more options).

▼ 0 grams ... More than 1 ounce

The final set of questions will ask your perception (viewpoint) of your fellow University of Kentucky students alcohol use, if any.

Q37 Within the last 30 days what percent of the TYPICAL STUDENT at UK do you think used cannabis? State your best estimate by sliding on the scale where you think fits best.

0 10 20 30 40 50 60 70 80 90 100

% of students ()
Q38 How often do you think the TYPICAL STUDENT at UK used cannabis during the last 30 days?

○ None at all
○ About once a month
○ 2-3 times a month
○ Once or twice a week
○ 3-4 times a week
○ 5-6 times a week
○ Daily

Q39 Think of any one typical session in which the TYPICAL STUDENT at UK used marijuana in the last 30 days, approximately how much (quantity) marijuana do you think they personally used in that session? (Click the drop down list for more options).

▼ 0 grams ... More than 1 ounce

End of Block: Perceived Norm Block

Start of Block: Demographics

The remaining questions refer to general information about yourself.

Q40 What is your gender identity?

○ Woman
○ Man
○ Gender fluid or non-binary
○ Other

Q41 Does your gender identity match the sex you were assigned at birth?
Q42 How do you usually describe yourself? (Mark all that apply)

- White - Not Hispanic
- Black - Not Hispanic
- Hispanic or Latino
- Asian or Pacific Islander
- American or Alaskan Native
- Other

Display This Question:
If How do you usually describe yourself? (Mark all that apply) = Other

Q42b If you selected the option "Other" in the previous question, please list how you describe yourself in the following space.

________________________________________________________________

Q43 How old are you in years?

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</tbody>
</table>

Age ()

Age ()
Q44 What year are you in school:

- [ ] 1st year undergraduate
- [ ] 2nd year undergraduate
- [ ] 3rd year undergraduate
- [ ] 4th year undergraduate
- [ ] 5th year undergraduate
- [ ] Graduate or Professional
- [ ] Other

Q45 Are you a member of a social fraternity or sorority or in the process of joining one? (National Interfraternity Conference, National Panhellenic Conference, or National Pan-Hellenic Council) This answer will not be reported to any greek organization on campus or nationwide and will be kept completely confidential.

- [ ] Yes
- [ ] No

Q46 Are you a member of a collegiate athletic team? This answer will not be reported to any school organization on campus or nationwide and will be kept completely confidential.

- [ ] Yes
- [ ] No

Q47
Thank you for taking the time to fill out this survey.

As a reminder, none of the responses will be used to further mandate any punishment from the University nor will your participation in this survey be shared with any other organizations. Your participation will remain confidential and used for the purposes of bettering the program. Please hit the next button record your response and to find the link to your online course.

End of Block: Demographics
Appendix C

Survey Cover Letter

KEY INFORMATION FOR
Examining the Rates of Alcohol and Cannabis Use Among Students Enrolled in Mandated Substance Use Programming

My name is Benjamin Montemayor, PhD candidate. I am contacting you from the University of Kentucky, on behalf of the Department of Kinesiology and Health Promotion.

Researchers at the University of Kentucky are inviting you to take part in a study examining the rates of alcohol use of students enrolled in substance use programming. You are receiving this survey because you are a student who was mandated to substance use programming recently.

UK Campus Recreation and Wellness is cooperating with Ben Montemayor, doctoral student in the Department of Kinesiology and Health Promotion, to analyze anonymous data from these surveys to improve this course. Although you may not get personal benefit from taking part in this research study, your responses may help us understand more about mandated programming and this course.

NO identifying information will be recorded. Nothing you say is connected to your name and EVERYTHING will remain anonymous. You will NOT be required to do anything else other than your original course. Being a part of this study is not required. Your participation in this study is voluntary.

If you volunteer to take part in this study, you will be one of 450 people to do so at the University of Kentucky. As a reward for allowing us to use the data, you will be enrolled in a drawing to win one of twenty, $30 amazon e-gift cards. The odds of you winning one of these $30 e-gift cards are approximately 1 in 23. The winners will be chosen at random by the Department of Campus Recreation and Wellness and your gift card will be emailed to you.

If you do not wish to have your answers be a part of this study, you can click the button below that says “I do not wish to have my answers be a part of this study.” There are no known risks to participating in this study. If you do not click the box, the researcher will be provided with your anonymous responses.

Your response to the survey is anonymous which means no names will appear or be used on research documents or be used in presentations or publications. The research team will never be able to associate your responses with your name, nor know that any information you provided came from you, nor even whether you participated in the study.
Your information collected for this study will NOT be used or shared for future research studies.

Your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

Thank you in advance for your assistance with this important project.

Sincerely,
Benjamin Montemayor
Department of Kinesiology and Health Promotion, College of Education
University of Kentucky
PHONE: 806-292-7650
E-MAIL: ben.montemayor@uky.edu

o By clicking this button, I am indicating that I DO NOT wish to share my anonymous data and I understand I am no longer eligible for a $30 e-gift card.
REFERENCES


sessions for binge eating disorder. *Behaviour Research and Therapy, 47*(7), 628-635.


### VITA

Benjamin Neil Montemayor

#### Education

<table>
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<tr>
<th>Degree</th>
<th>Institution</th>
<th>Location</th>
<th>Dates</th>
<th>Major/Concentration</th>
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<td>M.S.</td>
<td>Oklahoma State University</td>
<td>Stillwater, OK</td>
<td>2011 – 2013</td>
<td>Health and Human Performance, Health Promotion</td>
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<tr>
<td>B.S.</td>
<td>West Texas A&amp;M University</td>
<td>Canyon, TX</td>
<td>2007 – 2011</td>
<td>Sports and Exercise Science, All levels Health and P.E.</td>
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</table>

#### Professional Experiences

- **Virginia Commonwealth University** (February 2019 – present) Richmond, VA  
  *Project Coordinator for VCU School of Social Work and Innovation in Child and Family Wellness Research Group*

- **University of Kentucky** (June 2017 – December 2018) Lexington, KY  
  *Advanced Research Methods Teaching Assistant for Department of Educational Policy Studies and Evaluation and Department of Educational, School and Counseling Psychology*

- **University of Kentucky** (January 2015 – May 2018) Lexington, KY  
  *Substance Education and Responsibility Instructor for the Department of Campus Recreation and Wellness*

- **University of Kentucky** (January 2015 – May 2017) Lexington, KY  
  *Course Instructor for the Department of Kinesiology and Health Promotion*

- **University of Kentucky** (August 2016 – May 2017) Lexington, KY  
  *Physical Education Instructor for The Montessori School*

- **University of Kentucky** (August 2014 – May 2017) Lexington, KY  
  *Graduate Assistant for the Department of Kinesiology and Health Promotion Living Learning Center*

- **West Texas A&M University** (August 2013 – July 2014) Canyon, TX  
  *Instructor for the Sports and Exercise Sciences Department*

- **Oklahoma State University** (August 2012 – May 2013) Stillwater, OK  
  *Graduate Assistant for the Health and Human Performance Department*
University of Kentucky (January 2016 – May 2017)  
Lexington, KY  
Research Assistant for Dr. Melinda Ickes and Dr. Joseph Ferrare

Scholastic and Professional Honors

Funds

Research Award - Arvle and Ellen Thacker Turner Research Fund, University of Kentucky ($1,000). Effectiveness of Mandated Alcohol, Marijuana, and Drug Intervention Programs for College Students

Scholarship - John Edwin Partington and Gwendolyn Gray Partington Scholarship, University of Kentucky College of Education (2017 – 2018)

Leadership roles

Professional
Mid-Western Regional Educational Research Association (MWERA)  
School Mental Health Screening, Oral Presentation - Session Chair (2018)

College
University of Kentucky College of Education, Student Ambassador (2015 – 2016)

University
University of Kentucky Graduate School, Graduate Assistant Orientation  
Microteaching Group Leader (2018)

Oklahoma State University Graduate School, Co-founder & Historian of the Hispanic Graduate Student Association (2012 – 2013)

Department
University of Kentucky Department of Kinesiology and Health Promotion, Department Chair Search Committee (2018)

University of Kentucky Deans’ Interprofessional Honors Colloquium and Center for Interprofessional Health Education, Department of Kinesiology and Health Promotion Student Nominee and Affiliate (2017)

Oklahoma State University Health and Human Performance Department, Led Multiple Seminars for HHP 5030 Theoretical Application in Health Behavior Guest Lecture Series (2013)

Community
Community Coalitions of Virginia (CCoVA) Member (October 2019 – present)

Henrico Too Smart 2 Start Coalition Member (June 2019 – present)
**Trauma-Informed Community Network** Member (*February 2019 – present*)

*Professional Affiliations*
American College Health Association (ACHA) (*2018 – present*)

Mid-Western Educational Research Association (MWERA) (*2018*)

South-Eastern Educational Research Association (SERA) (*2019*)

*Certifications*
Graduate Certificate in Research Methods in Education (*Received 2017*)

---

**Publications and Research**

**Manuscripts**


**Presentations**

*National*


*State/Regional*


Invited


Shin, S., & Montemayor, B. (October 2019). The Impact of Adverse Childhood Experiences (ACEs) On Substance-Use and The United In Building Evidence Together (U-BET) Prevention Program: What Have We Learned From Focus Groups Thus Far? Henrico Too Smart 2 Start Coalition. Henrico, VA.