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The Relation Between ADHD Symptoms and Alcohol and Marijuana Use Outcomes Among College Students: The Mediating Role of Experiential Avoidance

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THE RELATION BETWEEN ADHD SYMPTOMS AND ALCOHOL AND MARIJUANA USE OUTCOMES AMONG COLLEGE STUDENTS: THE MEDIATING ROLE OF EXPERIENTIAL AVOIDANCE

by

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ABSTRACT

Individuals with attention-deficit/hyperactivity disorder (ADHD) are at significantly greater risk for alcohol and marijuana misuse and abuse compared to their peers. College students with ADHD may be particularly vulnerable to problematic alcohol and marijuana use, given the widespread use and abuse of these substances by college students generally and liability associated with ADHD specifically. Experiential avoidance, or avoidance of unwanted thoughts, feelings, and other internal experiences, is positively associated with ADHD symptoms and substance use problems. However, it is unclear what role experiential avoidance plays in the relation between ADHD and alcohol and marijuana use. This study examined whether experiential avoidance mediates the relation between ADHD symptoms and (1) alcohol and marijuana use frequency, (2) alcohol- and marijuana-related problems (e.g., driving while intoxicated), and (3) heavy alcohol use. In addition, this study examined two exploratory aims: (1) whether mediation effects differ by sexual/gender minority status (SGM; e.g., lesbian, bisexual, transgender, gender non-conforming) and (2) whether mediation effects differ by ADHD symptom dimension (i.e., hyperactive/impulsive, inattentive). Participants (N = 2,158; M age = 19.72) were college students with and without ADHD in the United States who reported past month alcohol or marijuana use. Participants completed online, self-report questionnaires that assessed ADHD symptoms, experiential avoidance, alcohol and marijuana use, and alcohol- and marijuana-related problems. Experiential avoidance was found to mediate the relation between ADHD symptoms and alcohol- and marijuana-

related problems. Moderated mediation analyses showed that conditional indirect effects of mediation models did not differ according to SGM status; however, SGM status moderated the relation between ADHD symptoms and experiential avoidance, such that the relation was more robust for non-SGMs compared to SGMs. Finally, analyses revealed that indirect effects were larger when inattentive symptoms were entered in mediation models compared to hyperactive/impulsive symptoms. Implications of these findings for future research and clinical practice are discussed.

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LIST OF ABBREVIATIONS

ACT..Acceptance and Commitment Therapy

ADHD..Attention-Deficit/Hyperactivity Disorder

CD...Conduct Disorder

ODD..Oppositional Defiant Disorder

PTSD... Post-Traumatic Stress Disorder

SGM..Sexual/Gender Minority

CHAPTER 1

INTRODUCTION

Individuals with attention-deficit/hyperactivity disorder (ADHD) are at increased

risk for heavy alcohol and marijuana use and the development of substance use disorders

(Elkins et al., 2007; Glass & Flory, 2012; Lee et al., 2011; Levy et al., 2014; Molina et

al., 2018; Sibley et al., 2014). College students with ADHD may be particularly

vulnerable to alcohol- and marijuana-related problems, given the elevated risk presented

by ADHD as well as higher rates of alcohol and marijuana use among college students

compared to the general population (O'Malley & Johnston, 2002; White & Hingson,

2013; Slutske, 2005). Experiential avoidance, or avoidance of unwanted thoughts,

feelings, and other internal experiences, is higher among individuals with ADHD and is

associated with greater substance use and abuse (Bodalski et al., 2019; Levin et al., 2012;

Luoma et al., 2020). However, it remains unclear whether experiential avoidance plays a

role in the relation between ADHD and alcohol and marijuana use outcomes. Thus, the

current study examined whether experiential avoidance mediates the relation between

ADHD symptoms and alcohol and marijuana use outcomes in a sample of college

students.

ADHD and Alcohol and Marijuana Use

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental

disorder characterized by two primary symptom features, including

hyperactivity/impulsivity (e.g., physical restlessness, engagement in risky behaviors) and

inattention (e.g., difficulty with organization, easily distracted; American Psychiatric Association, 2013). ADHD is most common among children and adolescents, with 9.4% of youth ages 2-17 in the United States having received a diagnosis for the disorder (Danielson et al., 2018). However, ADHD persists into adulthood for many, with an estimated 2-8% of college students and 4.4% of adults in the general population meeting criteria for ADHD (DuPaul et al., 2009; Kessler et al., 2006).

ADHD is associated with a myriad of impairments and negative outcomes. Children with the disorder fare worse than their peers academically (e.g., poorer grades, lower graduation rates, worse performance on standardized tests) and socially (e.g., peer rejection, fewer friends; DuPaul & Langberg, 2015; Hoza, 2007). In addition, individuals with ADHD are at increased risk for developing comorbid mental disorders, such as oppositional defiant disorder (ODD) and conduct disorder (CD), which can confer even greater functional impairment than ADHD alone (Biederman et al., 1996; Mannuza et al., 2004). Adults with ADHD experience greater social and relationship difficulties (Canu & Carlson, 2007; Knies et al., 2021), financial problems (Bangma et al., 2019), engagement in risky behaviors (e.g., unprotected sex, reckless driving; Flory et al., 2006; Merkel et al., 2016), and lower educational and occupational attainment (Kuriyan et al., 2013) compared to those without the disorder.

A robust evidence base of longitudinal (Elkins et al., 2007; Lee et al., 2011; Levy et al., 2014; Molina et al., 2018; Sibley et al., 2014) and cross-sectional studies (Glass & Flory, 2012; Gudjonsson et al., 2012; Notzon et al., 2020) have demonstrated that ADHD is associated with increased risk for substance use and abuse. A longitudinal study by Molina and colleagues (2018) prospectively followed school-aged youth with and

without ADHD into early adulthood and assessed the initiation and frequency of substance use. Adults with ADHD were significantly more likely to use marijuana and cigarettes on a weekly basis compared to their peers. In addition, individuals with ADHD were found to initiate use of alcohol, cigarettes, marijuana, and other illicit drugs (e.g., cocaine, stimulant misuse) earlier than non-ADHD controls. This is concerning in light of research demonstrating that earlier initiation of substance use is associated with increased risk for substance dependence in adulthood (King & Chassin, 2007). Lee and colleagues (2011) conducted a meta-analysis summarizing 27 studies that examined the prospective link between childhood ADHD and subsequent substance use and abuse. Youth with ADHD were found to be significantly more likely to experience subsequent substance use disorder than youth without ADHD, including being approximately two times more likely to develop alcohol and marijuana use disorder in adolescence or adulthood. This finding was not moderated by any demographic or methodological characteristics (e.g., race/ethnicity, clinic vs. community sample), suggesting that this finding is likely generalizable across methodological approaches and populations.

College students with ADHD are particularly vulnerable to alcohol and marijuana use problems, given the increased liability associated with ADHD as well as substantially higher rates of alcohol and marijuana use among college students compared to the general population and same-aged peers who do not attend college (O'Malley & Johnston, 2002; White & Hingson, 2013; Slutske, 2005). Alcohol and marijuana are by far the most widely used substances among college students; 63.1% of students report past month alcohol use and 20.8% report past month marijuana use (Skidmore et al., 2016). Approximately 30-40% of college students report engaging in binge drinking,

with prevalence estimates varying based on the time interval and number of drinks used to define binge drinking (Krieger et al., 2018). Further, an estimated 20.6% of college students meet criteria for alcohol use disorder and 9.4% meet criteria for cannabis use disorder, which is higher than the prevalence of these disorders in the general population (Caldeira et al., 2008; Wu et al., 2007). Given alcohol and marijuana are the most widely used and abused substances by college students, the current study focuses on outcomes associated with these substances.

Individuals with ADHD who engage in more frequent alcohol and marijuana use may experience greater functional impairment compared to those without ADHD who use, as research demonstrates that ADHD and more frequent alcohol and marijuana use are both uniquely associated with negative academic (e.g., lower GPA, lower matriculation/graduation rate) and cognitive (e.g., executive function) outcomes (Advokat et al., 2011; Barkley & Murphy, 2011; Fernandez-Serrano et al., 2010; Meda et al., 2017). Moreover, prior research has shown that college students with ADHD or significant symptoms report more excessive alcohol and marijuana use compared to college students without ADHD (Mochrie et al., 2020; Rooney et al., 2012). This may contribute to even greater functional impairments for those with ADHD. Given the significant risk present for alcohol and marijuana use problems among college students with ADHD, as well as the myriad of negative outcomes associated specifically with alcohol and marijuana use, there is a critical need to examine mechanisms that may explain the relation between ADHD and alcohol and marijuana use outcomes. Furthermore, identifying mechanisms in this relation may provide insight regarding

fruitful targets for prevention of and treatment for comorbid substance use problems and ADHD.

ADHD and Experiential Avoidance

Experiential avoidance represents a lack of willingness to engage with aversive internal experiences, including thoughts, feelings, bodily sensations, memories, and behavioral predispositions, along with engaging cognitive and behavioral processes to avoid these experiences, such as thought suppression and substance use (Hayes et al., 1996; Hayes et al., 2004). Hayes and colleagues (1996) have posited that experiential avoidance is a transdiagnostic phenomenon that serves as a general liability for the development of psychopathology. Research has demonstrated that experiential avoidance is elevated across many psychological disorders, including depression, anxiety, eating disorders, ADHD, and substance use disorder, as well as general psychological distress (Bodalski et al., 2019; Den Ouden et al., 2020; Kashdan et al., 2006; Levin et al., 2014).

Prior research has documented a positive relation between ADHD and experiential avoidance. In a study of 159 adults with and without ADHD, individuals with ADHD reported significantly greater patterns of experiential avoidance and behavioral avoidance compared to those without ADHD (Bodalski et al., 2019). In addition, experiential avoidance mediated the relation between ADHD symptoms and emotion regulation deficits and depression, and behavioral avoidance mediated the relation between ADHD symptoms and emotional regulation deficits, generalized anxiety, depression, and functional impairment. In a study by Young (2005) that compared coping strategies used by adults with and without ADHD, those with ADHD reported engaging in significantly more cognitive and behavioral avoidance (e.g., wishing

a situation would go away, avoiding specific situations) and less problem solving (e.g.,

approaching problem and implementing a solution to address it) compared to those

without the disorder. Taken together, these findings indicate that those with ADHD tend

to engage in more pervasive patterns of avoidance.

In addition, some of the hallmark features of ADHD reflect persistent avoidance,

supporting a theoretical link between ADHD and experiential avoidance. For example,

procrastination, which is the tendency to delay completion of a task that has a deadline

(Steel, 2007), involves a pattern of avoiding discomfort associated with working on a

given task (e.g., studying for a test). Difficulty with procrastination is very common

among those diagnosed with ADHD and is associated with ADHD symptoms (Ferrari &

Sanders, 2006; Niermann & Scheres, 2014). Given its ubiquity among those with ADHD

and its associated negative consequences (e.g., lower grades, academic failure),

psychosocial interventions for ADHD often target procrastination and other patterns of

avoidance as part of treatment (Hartung et al., 2020; Knouse & Fleming, 2016).

Another feature of ADHD that overlaps with experiential avoidance is the

negative urgency domain of impulsivity. Negative urgency refers to a tendency to engage

in rash and reckless behavior in response to intense negative affect, such as using

substances, binge eating, and making regrettable statements to others (Whiteside &

Lynam, 2001). Individuals with ADHD report greater negative urgency compared to their

peers (Egan et al., 2017). Negative urgency can be conceptualized as a predisposition to

engage in impulsive behaviors, such as substance use, to avoid distressing internal

experiences (e.g., negative affect). Whiteside and Lynam (2001) posited that, among

those high in negative urgency, the function of impulsive behavior may often be to

alleviate negative emotions, despite the long-term negative consequences associated with these behaviors. This conceptualization appears to align closely with the theoretical framework of experiential avoidance (Hayes et al., 1996).

Evidence suggests that individuals with ADHD are indeed more likely to experience negative valence emotions. Prior research has shown that inattentive ADHD symptoms are positively associated with negative affect among youth and adults (Knouse et al., 2008). It may be the case that individuals with attention difficulties are less attuned to early indicators of stress due to difficulties attending to the present moment and with frequently being distracted, and as a result, may be less likely to identify the need for and enact proactive coping strategies before the problem becomes more substantial (e.g., seeking out support, making a proactive plan to complete the assignment). Greater stress associated with the problem may in turn lead to greater negative affect. Individuals with ADHD report having greater difficulty with regulating their emotions, and emotion dysregulation is a core feature of ADHD (Bodalski et al., 2019; Corbisiero et al., 2013; Hirsch et al., 2018). Further, ADHD is associated with greater risk for the development of comorbid disorders, including internalizing disorders such as depression and anxiety, for which negative affect is a core feature (Kessler et al., 2006). Because individuals with ADHD are more likely to experience negative affective states, there may be more "opportunities" to engage in experiential avoidance, and due to negative reinforcement, avoidance might become used more frequently as a coping strategy.

Alcohol and Marijuana Use and Experiential Avoidance

Prior research has demonstrated a positive relation between experiential avoidance and engagement in alcohol and marijuana use and abuse in both college

students and the general adult population (Buckner et al., 2014; Levin et al., 2012; Luoma et al., 2020; Serowik & Orsillo, 2019). In a study of 240 first year college students conducted by Levin and colleagues (2012), students who met diagnostic criteria on a structured clinical interview for prior or current alcohol use disorder reported significantly higher experiential avoidance compared to their peers. In addition, experiential avoidance was found to mediate the relation between psychological distress and alcohol-related problems, such as getting in frequent fights and going to school or work drunk. A daily diary study with a sample of 206 adult drinkers found that experiential avoidance was associated with more frequent solitary drinking over the course of the 21-day study period (Luoma et al., 2020). Interestingly, among participants who were high in trait negative affect, experiential avoidance was predictive of drinking more units of alcohol alone compared to those low in negative affect. Similar findings have also been demonstrated for marijuana use and abuse. Bordieri and colleagues (2014) found that experiential avoidance moderated the relation between post-traumatic stress disorder (PTSD) symptoms and marijuana dependence, such that individuals with greater PTSD symptoms and experiential avoidance were more likely to be dependent on marijuana.

Across studies examining the link between experiential avoidance and alcohol and marijuana use and abuse, experiential avoidance appears to play a more significant role in increasing risk for use and abuse when individuals report greater psychological distress and more frequent negative affective states (e.g., more PTSD symptoms of greater intensity, negative affect). This may be because individuals experiencing greater distress have more occasions to engage in experiential avoidance and, in turn, may be more likely

to use substances. Hayes and colleagues (1996) consider substance abuse to be a manifestation of experiential avoidance, in that it serves the function of avoiding aversive internal experiences (e.g., negative affect, distressing thoughts) temporarily.

The Current Study

The current study sought to examine the mediating role of experiential avoidance in the relation between ADHD symptoms and frequency of alcohol and marijuana use, alcohol- and marijuana-related problems, and heavy alcohol use in a sample of college students. Given the increased risk for heavy alcohol and marijuana use and abuse present among individuals with ADHD, as well as high rates of alcohol and marijuana use more broadly among college students, there is a need to identify and understand factors that may contribute to problematic use of these substances among college students with ADHD and elevated ADHD symptoms. This study provides insight about whether experiential avoidance may be a fruitful target for prevention of and intervention for alcohol and marijuana use and abuse among those presenting with ADHD. The current study addressed the following aims:

Aim 1: Determine whether experiential avoidance mediates the relation between ADHD symptoms and alcohol use outcomes.

    Aim 1A: Determine whether experiential avoidance mediates the relation between ADHD symptoms and typical number of standard alcoholic drinks consumed per week.

Aim 1B: Determine whether experiential avoidance mediates the relation between ADHD symptoms and heavy alcohol use (i.e., dichotomous outcome based on National Institute on Alcohol and Alcoholism heavy drinking definition).

Aim 1C: Determine whether experiential avoidance mediates the relation between ADHD symptoms and alcohol-related problems (e.g., academic impairment, driving drunk, experiencing hangovers).

Aim 2: Determine whether experiential avoidance mediates the relation between ADHD symptoms and marijuana use outcomes.

Aim 2A: Determine whether experiential avoidance mediates the relation between ADHD symptoms and typical weekly frequency of marijuana use.

Aim 2B: Determine whether experiential avoidance mediates the relation between ADHD symptoms and marijuana-related problems (e.g., driving while high, neglecting self-care due to marijuana use, feeling guilty about marijuana use).

Based on prior research demonstrating associations between ADHD and experiential avoidance, as well as between experiential avoidance and engagement in more frequent substance use, it was hypothesized that experiential avoidance will partially mediate the relation between ADHD symptoms and all substance use outcomes. In addition to the above a priori aims, this study examined two exploratory research aims:

Exploratory Aim 1: Assess whether the mediating role of experiential avoidance in the relation between ADHD symptoms and alcohol and marijuana use outcomes is moderated by sexual and gender minority (SGM) status.

Exploratory Aim 2: For statistically significant a priori findings, determine whether the significance of findings differs based on hyperactive/impulsive and inattentive ADHD symptom dimensions.

Prior research has shown that sexual and gender minorities (SGM; e.g., lesbian/gay, bisexual, transgender, queer) are more likely to experience mental health and substance use problems compared to non-SGMs (Hughes & Eliason, 2002; Su et al., 2016). Thus, it is possible that mechanisms that explain risk for substance use and abuse differ for SGMs due to experiences specific to this population, such as SGM victimization and discrimination (Mereish et al., 2014). In addition, research has clearly established that ADHD symptom dimensions can be uniquely associated with certain outcomes (Knouse et al., 2008; Sobanski et al., 2008). Thus, examining ADHD symptom dimensions in separate analyses may further clarify processes that are contributing to experiential avoidance and alcohol and marijuana use. There were no a priori hypotheses for the exploratory analyses.

CHAPTER 2

METHOD

Participants

Data were drawn from the Undergraduate Learning, Emotion, and Attention

Research Network (U-LEARN) Study, a survey-based study conducted at six universities

that examined the emotional, behavioral, and academic functioning of college students,

including those with ADHD. Individuals who were 18 years or older and a student at a

participating university were eligible for inclusion in the U-LEARN study. Data used in

the current study were collected during the 2020-2021 academic year. In total, 3,839

students participated in the U-LEARN study during this time period. Of those, 2,158

participants were included in this study because they reported past month alcohol and/or

marijuana use and correctly answered at least 75% of attention check questions

(described in Procedure below).

In the current study sample, participants ranged in age from 18 to 26 ($M = 19.72$,

$SD = 1.74$). Participants were 72.0% White, 5.0% Black or African-American, 8.7%

Latinx or Hispanic, 6.4% Asian-American or Pacific Islander, 0.2% Native American or

Indigenous, and 6.9% multiracial; 0.8% identified with another racial/ethnic identity. For

gender identity, participants identified as 71.4% female, 27.1% male, 0.3% transgender

male or female, 0.5% gender non-conforming or nonbinary, and 0.7% other gender

identity. For biological sex, participants were 72.6% female and 27.2% male. Participants

identified as 83.2% heterosexual, 2.4% gay or lesbian, 8.4% bisexual, 1.2% pansexual,

0.9% queer, and 3.9% other sexual identity. Participants who reported a gender identity that did not align with the biological sex assigned at birth (e.g., transgender, gender non-conforming/non-binary) or a non-heterosexual sexual orientation (e.g., gay/lesbian, bisexual, pansexual, etc.) were considered a sexual/gender minority (SGM) in exploratory analyses (coded dichotomously). In total, 13.7% (n = 296) of the sample were identified as SGMs.

For annual family income, 5.8% reported an income < $23,000, 11.7% from $23,000-$49,999, 21.3% from $50,000-$99,999, 17.7% from $100,000-$149,999, and 24.3% greater than or equal to $150,000; 19.2% indicated they did not know their family income or declined to answer. A total of 11.9% of participants reported receipt of a prior diagnosis of ADHD. The vast majority of the sample (95.6%; n = 2062) reported past month alcohol use and were included in alcohol-specific analyses. Approximately 39.9% of participants (n = 861) reported past month marijuana use and were included in analyses related to marijuana use.

Procedure

Data used in the current study were collected from students attending universities located in the United States, including Appalachian State University, University of Northern Iowa, University of Wyoming, University of South Carolina, University of Illinois Chicago, and Syracuse University. Data were collected via Qualtrics, a widely used, online survey platform. Participants were recruited through flyers distributed on college campuses; emails sent to university listservs, department chairs, and university administrators; and psychology department study participant pools. Prior to participation, study participants provided informed consent for the study by reading a consent statement

and clicking a button to indicate their consent. Individuals were able to exit the survey

and discontinue participation prior to providing consent or at any time during survey

administration without penalty. Participants completed a battery of measures that took

approximately one hour. Four questions were interspersed throughout the battery that

served as attention checks. For example, for the attention check item "A puppy refers

to…," the correct response would be "a dog." If participants answered two or more of

these questions incorrectly, the individual's survey data was considered invalid and

removed from the dataset (11 eliminated). The current study used select measures from

the larger battery (described in Measures section). Participants were eligible to receive

course extra credit for participating when applicable and were entered into a raffle to win

a $100 gift card at their respective university.

Measures

Demographic Information

Participants provided information about their age, race/ethnicity, biological sex,

gender identity, sexual orientation, and annual family income.

ADHD Symptoms

The DSM-5 ADHD Symptoms Checklist is an 18-item measure that was used to

assess inattentive (e.g., "Is often easily distracted") and hyperactive/impulsive (e.g.,

Blurts out an answer before a question has been completed") ADHD symptoms. Items are

phrased according to the DSM-5 ADHD symptom criteria (American Psychiatric

Association, 2013). Participants rated how often each symptom was experienced while

not taking ADHD medication on a 4-point Likert scale, ranging from Never to Very

Often. A symptom was considered present if the participant indicated it occurred Often or

Very Often. Symptom counts were used in study analyses. Internal consistency for the inattentive ($\alpha = 0.93$) and hyperactive/impulsive ($\alpha = 0.88$) symptom dimensions were excellent.

Alcohol Use

The Daily Drinking Questionnaire (DDQ; Collins et al., 1985) was used to assess the number of standard alcoholic drinks consumed in a typical week. Participants were asked to indicate how many standard alcoholic drinks they consumed in a typical week in the past month using a grid that included the days of the week (i.e., from Monday to Sunday). Participants were presented with information that defined a standard drink (i.e., 12 oz. of beer, 5 oz. of wine, and a 1.5 oz. shot of liquor are all considered a standard drink). The number of drinks consumed in a typical week were summed and used in analyses examining frequency of alcohol use. The DDQ is a widely-used measure of alcohol use and exhibits adequate test-retest reliability (Neighbors et al., 2006).

Based on the reported number of drinks consumed in a typical week on the DDQ, participants were determined to be engaged in heavy alcohol use or not based on the National Institute of Alcohol Abuse and Alcoholism definition of heavy drinking (NIAAA, 2016). Biological males who reported having 14 or more drinks and biological females who reported having seven or more drinks in a typical week were considered heavy drinkers. Heavy drinking status was coded dichotomously (i.e., yes vs. no) based on this criterion and used in analyses examining heavy drinking as an outcome.

Marijuana Use

A modified version of the DDQ was used to assess frequency of marijuana use (Collins et al., 1985). The format and question used to assess frequency was identical to

the DDQ, except participants were asked to report the number of days and times they used marijuana in a typical week in the past month. The number of days marijuana was consumed in a typical week was used in analyses examining frequency of marijuana use.

Alcohol-Related Problems

The Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler et al., 2005) is a 24-item measure that was used to assess problems associated with alcohol use. Participants responded "yes" or "no" to each item to indicate whether they experienced the problem in the past 30 days. Examples of problems assessed by the B-YAACQ include passing out from heavy drinking, engaging in risky or reckless behaviors (e.g., driving drunk, risky sexual encounters), and social and occupational impairment (e.g., negative impacts to school, family responsibilities). The B-YAACQ has been demonstrated to have adequate construct validity, internal consistency, and predictive validity (Kahler et al., 2005; Kahler et al., 2008). The measure yields a one-factor score of alcohol-related problems that is calculated by summing problems endorsed. In the current study, internal consistency was excellent ($\alpha = 0.90$).

Marijuana-Related Problems

The Brief Marijuana Consequences Questionnaire (B-MACQ; Simons et al., 2012) is a 21-item measure that was used to assess impairment and problems associated with marijuana use. Participants responded "yes" or "no" to each problem to indicate whether they experienced it in the past 30 days. Example items include "I have driven a car when I was high" and "When using marijuana, I have done impulsive things that I regretted later." The number of problems reported on the measure was summed and used in analyses examining marijuana-related problems. Prior research has demonstrated that

the B-MACQ has adequate construct validity, internal consistency, and predictive validity (Bravo et al., 2019; Simons et al., 2012). Internal consistency was excellent (α = 0.90) in the current study.

Experiential Avoidance

The second edition of the Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011) is a 7-item measure that was used to assess experiential avoidance. Participants rated items on a 7-point Likert scale, with response options ranging from Never True to Always True. Example items from the measure include "I'm afraid of my feelings" and "My painful memories prevent me from having a fulfilling life." Item responses were summed to yield a one-factor score of experiential avoidance, with a higher score being indicative of greater experiential avoidance. The AAQ-II has been demonstrated to have adequate construct validity, test-retest reliability, predictive validity, internal consistency, and discriminant validity (Bond et al., 2011; Fledderus et al., 2012). Internal consistency was excellent (α = 0.94) in the current study.

Analytic Plan

Statistical analyses were conducted using SPSS software (v. 27) and the PROCESS Macro for SPSS (Hayes, 2013). Missing data were handled using listwise deletion due to the low proportion of missing data in the dataset (1.6% missing). Assumptions for regression were assessed to ensure that data were appropriate for mediation analysis, including homoscedasticity (i.e., consistent error distribution across values of independent variable), linearity (i.e., linear relation between independent and dependent variables), and normality (i.e., for any given value of the independent variable, residuals of the dependent variable are normally distributed). To determine whether

model data were homoscedastic, scatterplots of predicted values and residuals were examined. The scatterplots revealed that data were largely heteroscedastic for all models with continuous dependent variables. To evaluate linearity of models, scatterplots of the relations between independent and dependent variables were examined. Observation of these scatterplots indicated that the relations between variables were linear. Finally, to assess for normality of residuals, probability-probability plots were examined. These plots revealed non-normality of residuals for all statistical models. Given two assumptions for regression were violated (i.e., homoscedasticity, normality of residuals), all continuously distributed dependent variables were log transformed. Following transformation of these variables, assumptions were reassessed and determined to be met.

Simple and moderated mediation models were utilized in the current study. In all models assessing primary study aims, total DSM-5 ADHD symptoms were entered as the independent variable and experiential avoidance was entered as the mediating variable. For the mediation model examining heavy drinking as a dependent variable, a binary logistic model was estimated as this variable was dichotomous. Simple mediation models with ordinary least squares estimation were used to assess the remaining primary aims, given the dependent variables were continuous (i.e., alcohol/marijuana use frequency, alcohol/marijuana problems). Figure 2.1 presents an example of a simple mediation model conducted in the current study. To determine whether indirect effects differed according to SGM status (Exploratory Aim 1), moderated mediation models were estimated that tested SGM moderation effects for paths A and B of the mediation model (Hayes, 2018). Figure 2.2 depicts an example of a moderated mediation model. To assess whether mediation effects differed based on ADHD symptom dimension (i.e., inattentive,

hyperactive/impulsive; Exploratory Aim 2), simple mediation models were estimated for significant a priori models, with inattentive and hyperactive/impulsive symptoms entered as independent variables in separate models. The Sobel test was used to determine whether a significant mediation effect was present. This test assesses whether the strength of the relation between an independent and dependent variable is significantly reduced after inclusion of a mediating variable (Sobel, 1982). Full mediation was considered present if the association between an independent and dependent variable was no longer significant after inclusion of the mediator. Partial mediation was considered present if the relation between the independent and dependent variable remained significant after inclusion of the mediating variable and a statistically significant indirect effect was found.

A post-hoc power analysis was conducted using GPOWER to determine whether there was adequate power to detect effects in the current study sample (Erdfeder et al., 1996). Separate power analyses were carried out for alcohol- and marijuana-related outcomes, given the difference in the size of these subsamples. For alcohol outcomes, given a sample size of 2,062 participants and an alpha level of 0.05, the power to detect a small effect (B = 0.10) was 1.00. For marijuana outcomes, given a sample size of 861 participants and an alpha level of 0.05, the power to detect a small effect (B = 0.10) was 1.00. Thus, the current study was adequately powered to detect small effects.
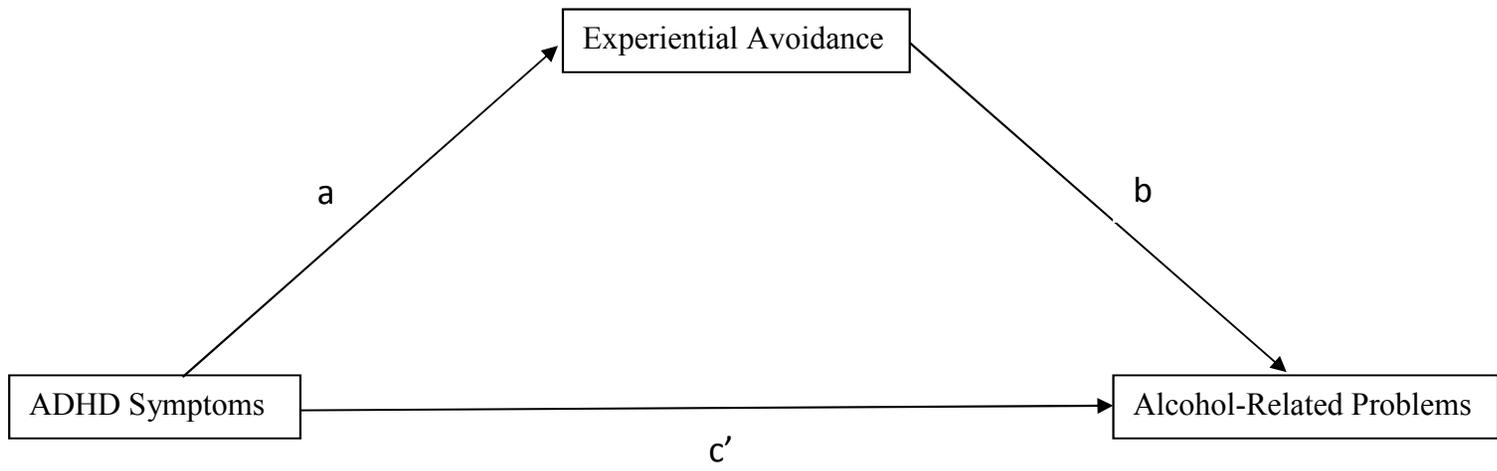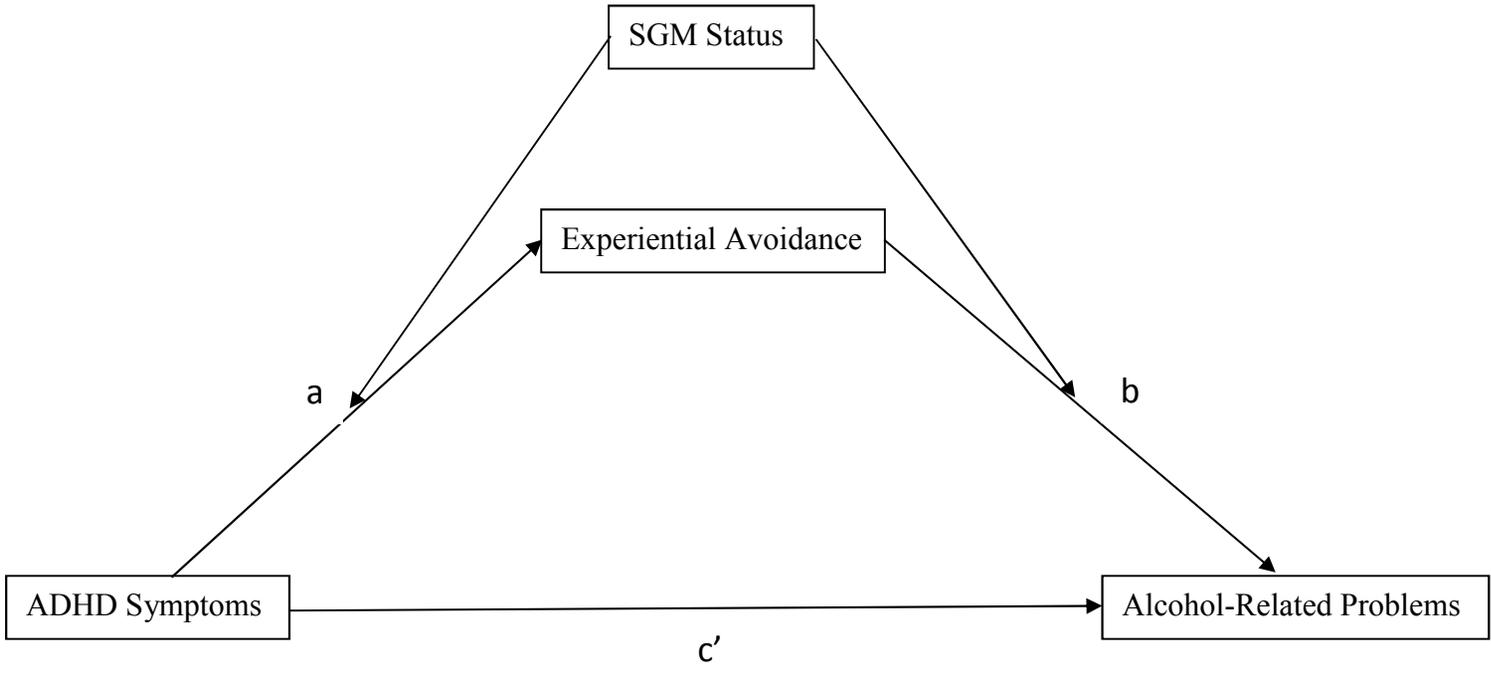
Figure 2.1. Example of Simple Mediation Model

Figure 2.2. Example of Moderated Mediation Model

CHAPTER 3

RESULTS

Table 3.1 presents bivariate correlations among study variables. Bivariate

correlations were computed using the entire study sample. Total ADHD symptoms,

inattentive symptoms, hyperactive/impulsive symptoms, experiential avoidance, and

alcohol use frequency were associated with all other study variables.

Assessing the Mediating Role of Experiential Avoidance in the Relation Between

ADHD Symptoms and Alcohol Use Outcomes

Three simple mediation models were conducted to evaluate hypotheses related to

Aim 1. First, a simple mediation model was conducted to determine whether experiential

avoidance mediated the relation between total ADHD symptoms and typical number of

standard alcoholic drinks consumed per week. Significant relations were found between

total ADHD symptoms and typical number of drinks consumed per week ($\beta = 0.115$, $p <$

0.001, c' path) and between total ADHD symptoms and experiential avoidance ($\beta =$

0.534, $p < 0.001$, a path). However, the relation between experiential avoidance and

typical number of drinks consumed per week was not significant ($\beta = 0.008$, $p = 0.764$, b

path). Sobel's test was not significant ($p = 0.764$), so it was determined that no mediation

effect was present.

Second, a model was conducted to determine whether experiential avoidance

mediated the relation between total ADHD symptoms and heavy drinking status.

Significant relations were detected between total ADHD symptoms and heavy drinking

status (β = 0.047, p < 0.001, c' path) and between total ADHD symptoms and experiential avoidance (β = 1.328, p < 0.001, a path). The relation between experiential avoidance and heavy drinking status was not significant (β = 0.002, p = 0.748, b path). Sobel's test was not significant (p = 0.748), which indicated that no mediation effect was present.

Third, a model was conducted to evaluate whether experiential avoidance mediated the relation between total ADHD symptoms and alcohol-related problems (see Figure 3.1). In this model, significant relations were found for all paths, including between total ADHD symptoms and alcohol-related problems (β = 0.097, p < 0.001, c' path), total ADHD symptoms and experiential avoidance (β = 0.517, p < 0.001, a path), and experiential avoidance and alcohol-related problems (β = 0.175, p < 0.001, b path). Sobel's test revealed that the total indirect effect of total ADHD symptoms on alcohol-related problems via experiential avoidance was statistically significant (β = 0.090, p < 0.001). Given that the association between total ADHD symptoms and alcohol-related problems remained significant after inclusion of the mediator, it was determined that partial mediation was present.

Assessing the Mediating Role of Experiential Avoidance in the Relation Between ADHD Symptoms and Marijuana Use Outcomes

Two simple mediation models were used to assess hypotheses related to Aim 2. First, a simple mediation model was conducted to determine whether experiential avoidance mediated the relation between total ADHD symptoms and typical weekly frequency of marijuana use. Significant associations were found between ADHD symptoms and typical weekly frequency of marijuana use (β = 0.122, p = 0.004, c' path)

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and total ADHD symptoms and experiential avoidance ($\beta = 0.560$, $p < 0.001$, a path).

However, the relation between experiential avoidance and typical weekly frequency of

marijuana use was not significant ($\beta = 0.070$, $p = 0.101$, b path). In addition, Sobel's test

was not significant ($p = 0.102$), which indicated that no mediation effect was present.

Second, a simple mediation model was used to assess whether experiential

avoidance mediated the relation between total ADHD symptoms and marijuana-related

problems. In the model, the relations among total ADHD symptoms and experiential

avoidance ($\beta = 0.525$, $p < 0.001$, a path) and experiential avoidance and marijuana-related

problems ($\beta = 0.217$, $p < 0.001$, b path) were statistically significant (see Figure 3.2). The

relation between total ADHD symptoms and marijuana-related problems was no longer

significant after inclusion of the mediator ($\beta = 0.050$, $p = 0.307$, c' path). Sobel's test

indicated that a statistically significant indirect effect of total ADHD symptoms on

marijuana-related problems via experiential avoidance was present ($\beta = 0.114$, $p <$

0.001). The association between total ADHD symptoms and marijuana-related problems

was no longer significant after inclusion of the mediator; thus, it was determined that a

full mediation effect was present.

Evaluation of Moderated-Mediation Effects According to SGM Status

Moderated mediation analyses were carried out to assess for differences in

indirect effects according to SGM status for significant mediation models from Aims 1

and 2. First, a model was conducted in which total ADHD symptoms was the

independent variable, alcohol-related problems was the dependent variable, experiential

avoidance was the mediator, and SGM status was the moderator (for both paths a and b).

The model revealed a significant moderation effect of SGM status in the relation between

total ADHD symptoms (independent variable) and experiential avoidance (mediator) (p = 0.010; path a), such that there was a stronger association between total ADHD symptoms and experiential avoidance among non-SGM (B = 1.260, p < 0.001) compared to SGM (B = 0.901, p < 0.001). However, there was not a significant moderation effect for SGM status in the relation between experiential avoidance (mediator) and alcohol-related problems (dependent variable) (p = 0.966; path b). In addition, there was not a significant conditional indirect effect, indicating that the overall mediation effect did not differ according to SGM status (p > 0.05).

Second, an identical model was evaluated for marijuana-related problems as the dependent variable. A significant moderation effect of SGM status was present in the relation between total ADHD symptoms (independent variable) and experiential avoidance (mediator) (p < 0.001, path a), with a more robust association found among non-SGM (B = 1.36, p < 0.001) compared to SGM (B = 0.640, p < 0.001). There was no significant difference found according to SGM status in the association between experiential avoidance (mediator) and marijuana-related problems (dependent variable) (p = 0.975, path b). Further, no significant conditional indirect was present (p > 0.05).

Evaluation of Mediation Effects According to ADHD Symptom Dimensions

Given two mediation models were significant in analyses examining Aims 1 and 2, a total of four simple mediation models were conducted to determine whether any differences found were attributable to a specific ADHD symptom dimension (i.e., inattentive, hyperactive/impulsive). First, a model was estimated to determine whether experiential avoidance mediated the relation between inattentive symptoms and alcohol-related problems. All associations in the model were significant, including the relation

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between inattentive symptoms and alcohol-related problems (β = 0.084, p = 0.003, c' path), inattentive symptoms and experiential avoidance (β = 0.521, p < 0.001, a path), and experiential avoidance and alcohol-related problems (β = 0.180, p < 0.001, b path) (see Figure 3.3). Sobel's test indicated that a statistically significant mediation effect was present (β = 0.094, p < 0.001). Because the relation between inattentive symptoms and alcohol-related problems remained significant after addition of the mediator, it was concluded that partial mediation was present.

Second, a model was conducted to determine whether experiential avoidance mediated the relation between hyperactive/impulsive symptoms and alcohol-related problems. In the model, all paths were statistically significant, including associations between hyperactive/impulsive symptoms and alcohol-related problems (β = 0.085, p = 0.002, c' path), hyperactive/impulsive symptoms and experiential avoidance (β = 0.412, p < 0.001, a path), and experiential avoidance and alcohol-related problems (β = 0.190, p < 0.001, b path) (see Figure 3.4). Sobel's test was significant and the association between hyperactive/impulsive symptoms and alcohol-related problems remained significant after inclusion of the mediator, which indicated that a statistically significant partial mediation effect was present (β = 0.078, p < 0.001).

Next, a model evaluated whether the association between inattentive symptoms and marijuana-related problems was mediated by experiential avoidance. The relations between inattentive symptoms and experiential avoidance (β = 0.534, p < 0.001, a path) and experiential avoidance and marijuana-related problems (β = 0.224, p < 0.001, b path) were significant (see Figure 3.5). The relation between inattentive symptoms and marijuana-related problems was no longer significant after inclusion of the mediator (β =

0.035, p = 0.474, c' path) and Sobel's test was significant, which indicated that a full mediation effect was present (β = 0.120, p < 0.001).

       Finally, a model was evaluated that examined whether experiential avoidance mediated the relation between hyperactive/impulsive symptoms and marijuana-related problems. Associations between hyperactive/impulsive symptoms and experiential avoidance (β = 0.385, p < 0.001, a path) and experiential avoidance and marijuana-related problems (β = 0.224, p < 0.001, b path) were statistically significant (see Figure 3.6). The relation between hyperactive/impulsive symptoms and marijuana-related problems was not significant after inclusion of experiential avoidance as a mediator (β = 0.050, p = 0.267, c' path). Further, Sobel's test revealed a statistically significant indirect effect (β = 0.086, p < 0.001). Thus, it was determined that full mediation was present.

Table 3.1 Bivariate Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Total ADHD Symptoms	-									
2. Inattentive Symptoms	.94**	-								
3. HI Symptoms	.88**	.66*	-							
4. Experiential Avoidance	.53**	.54**	.42**	-						
5. SGM Status	.22**	.25**	.14**	.23**	-					
6. Alcohol Use Frequency	.12**	.10**	.13**	.07**	-.06*	-				
7. Heavy Drinking Status	.11**	.09**	.11**	.06**	-.02	.74**	-			
8. Alcohol-Related Problems	.19**	.18**	.16**	.23**	-.04	.46**	.36**	-		
9. Marijuana Use Frequency	.16**	.16**	.13**	.14**	.04	.12**	.07	.15**	-	
10. Marijuana-Related Problems	.16**	.16**	.14**	.24**	-.03	.15**	.10*	.34**	.42**	-

Note. SGM = sexual/gender minority, HI = hyperactive/impulsive. * $p < 0.05$, ** $p < 0.01$
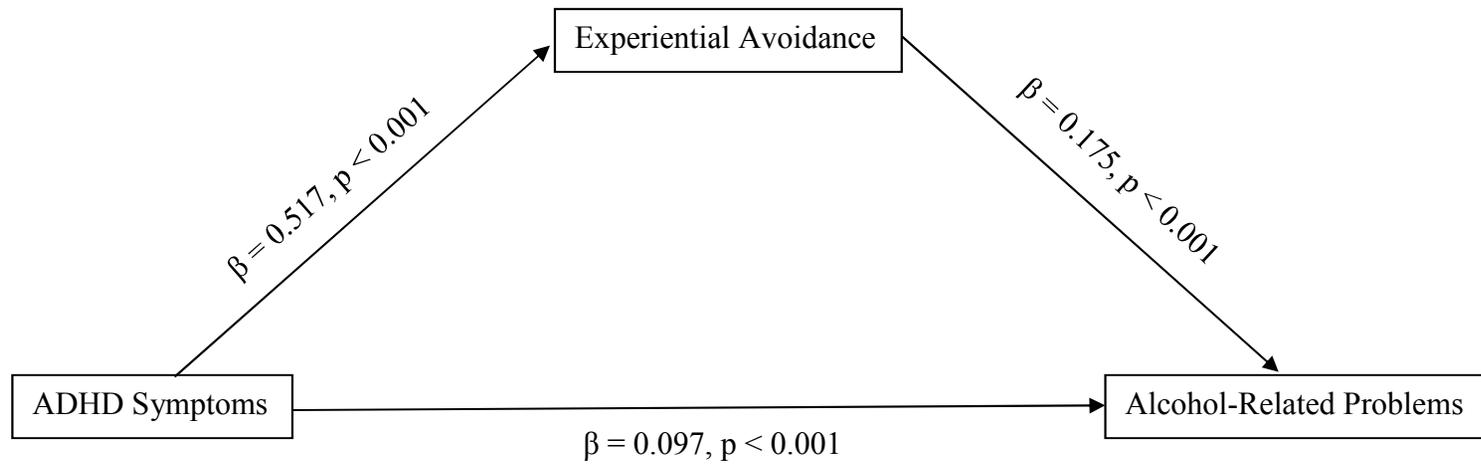
Figure 3.1. Partial Mediation of the Relation between ADHD Symptoms and Alcohol-Related Problems Via Experiential Avoidance

Figure 3.2. Full Mediation of the Relation between ADHD Symptoms and Marijuana-Related Problems
Via Experiential Avoidance

Figure 3.3. Partial Mediation of the Relation between Inattentive Symptoms and Alcohol-Related Problems Via Experiential Avoidance

Experiential Avoidance

$\beta = 0.412, p < 0.001$

$\beta = 0.190, p < 0.001$

HI Symptoms

Alcohol-Related Problems

$\beta = 0.085, p = 0.002$

Figure 3.4. Partial Mediation of the Relation between Hyperactive/Impulsive Symptoms and Alcohol-Related Problems Via Experiential Avoidance

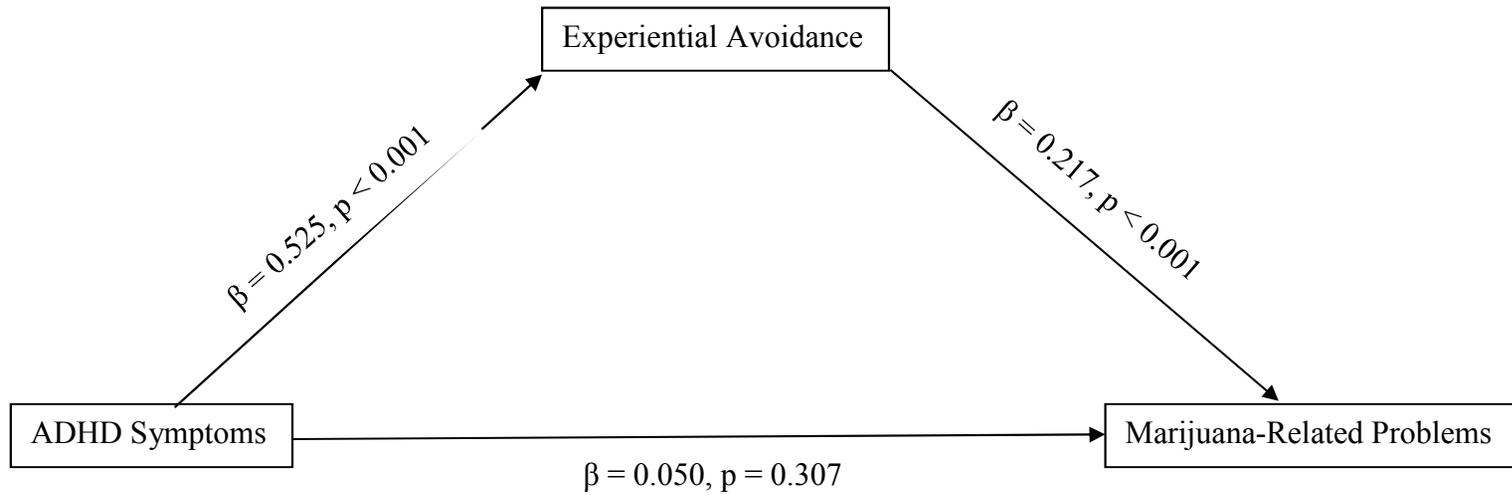*Note.* HI = hyperactive/impulsive.

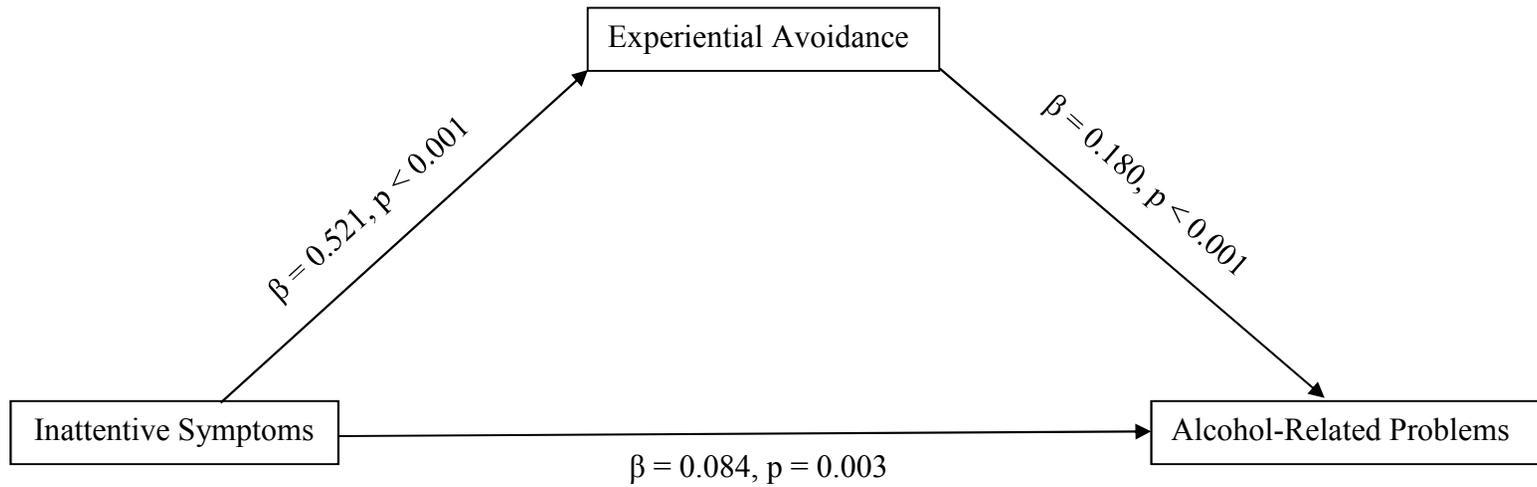Figure 3.5. Full Mediation of the Relation between Inattentive Symptoms and Marijuana-Related Problems Via Experiential Avoidance
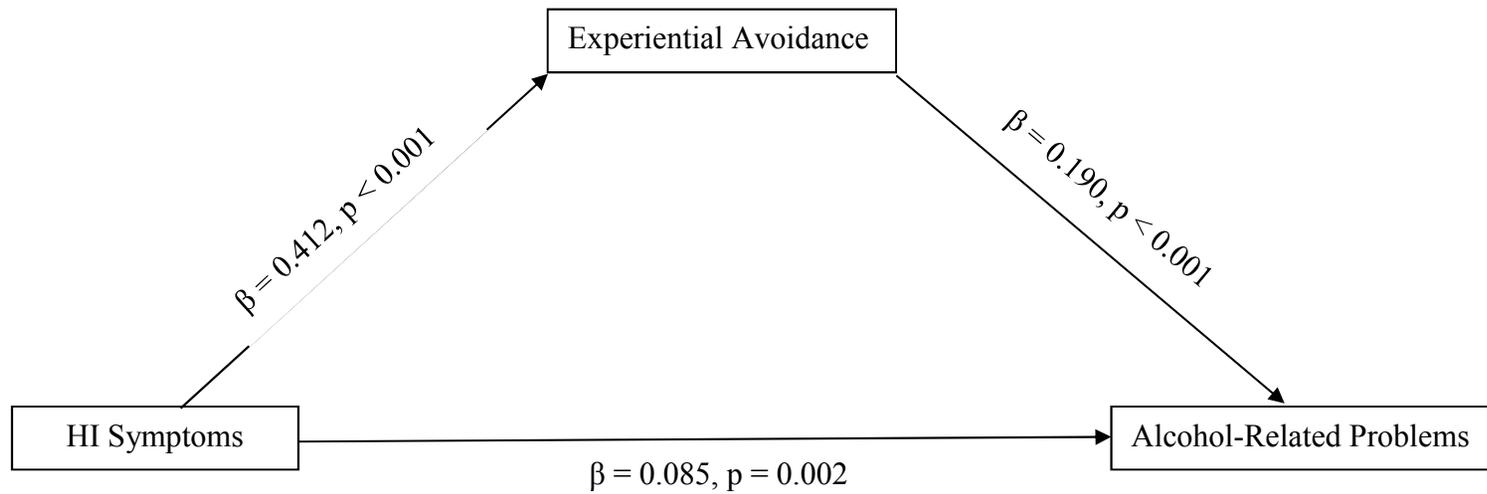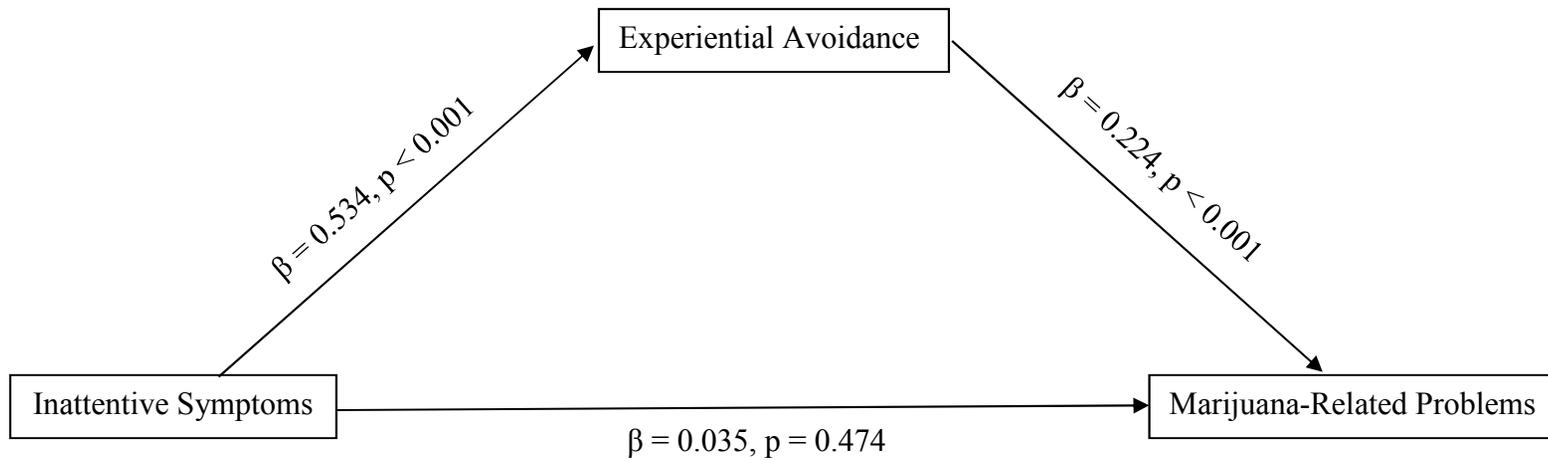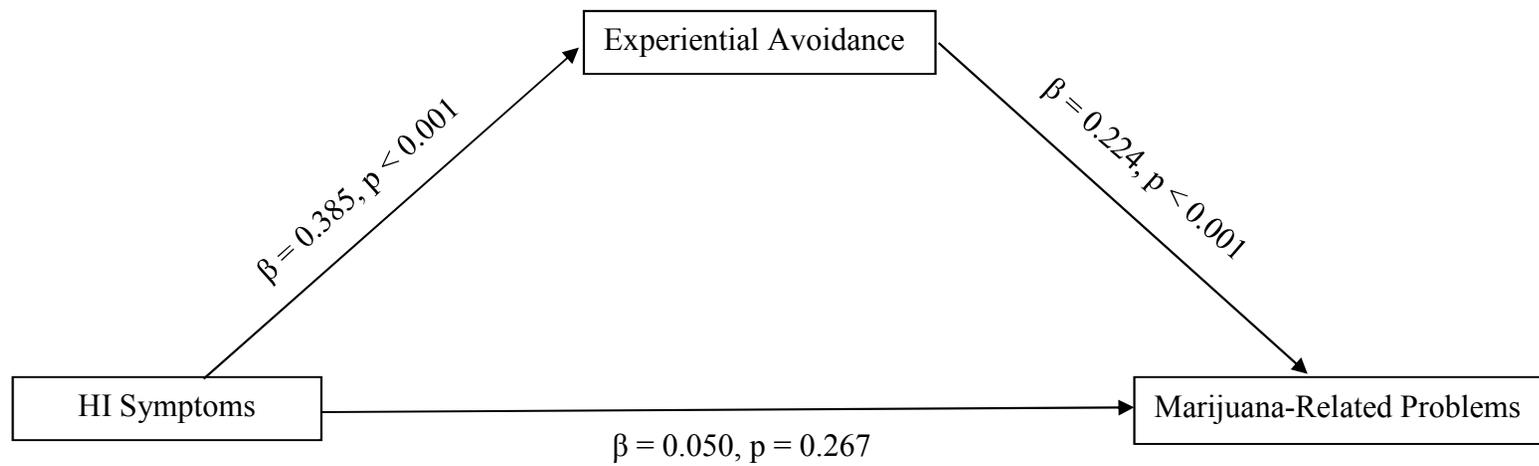
Figure 3.6. Full Mediation of the Relation between Hyperactive/Impulsive Symptoms and Marijuana-Related Problems Via Experiential Avoidance

Note. HI = hyperactive/impulsive.

CHAPTER 4

DISCUSSION

This study examined whether experiential avoidance mediates the relation between ADHD symptoms and alcohol and marijuana use outcomes in a sample of college students. In addition, this study explored whether the mediating role of experiential avoidance in this relation is moderated by sexual and gender minority (SGM) status. Finally, this study sought to clarify whether the statistical significance and effect size of indirect effects differed based on hyperactive/impulsive or inattentive ADHD symptom dimensions considered as the independent variable.

The first aim examined whether experiential avoidance mediates the relation between ADHD symptoms and alcohol use outcomes. Experiential avoidance did not mediate the relation between ADHD symptoms and typical number of standard drinks consumed per week or heavy drinking status. However, experiential avoidance was found to partially mediate the relation between ADHD symptoms and alcohol-related problems, such as driving while intoxicated or missing school or work due to alcohol use, which provides some support for the study hypothesis. It is possible that this discrepancy in alcohol-related findings is due to differences in the sensitivity of these outcome measures capturing dysfunction associated with alcohol use. Endorsement of problems experienced due to excessive alcohol use may reflect a more proximal indicator of alcohol-related dysfunction that is more robustly linked with experiential avoidance, whereas the quantity of alcohol consumed may be a less sensitive measure of alcohol-related

dysfunction due to other factors involved that may impact intoxication, such as differences in tolerance due to genetics or body composition (O'Malley & Maisto, 1984; Suwaki et al., 2001). Further, it is possible that the lack of significant findings for alcohol use are attributable to the current study using a college student sample. A significant proportion of college students (approximately 30-40%) endorse heavy alcohol use, which is substantially higher than the general population (Krieger et al., 2018). The social context of colleges and universities is tied to pervasive alcohol use (Carey, 2005), and college students report social motives, such as drinking alcohol with peers, as the most common reason for using alcohol (LaBrie et al., 2007; Simons et al., 2000). Thus, it is possible that college students consume alcohol more often and in greater quantities for social reasons rather than with the primary intent to engage in experiential avoidance.

The second aim evaluated whether experiential avoidance mediates the relation between ADHD symptoms and marijuana use outcomes. Analyses revealed that experiential avoidance did not mediate the relation between ADHD symptoms and typical weekly frequency use of marijuana. However, experiential avoidance did fully mediate the relation between ADHD symptoms and marijuana-related problems. This pattern of findings mirrors findings examining alcohol-related outcomes, as a significant mediation effect was not found for outcomes assessing frequency of use but was present for outcomes assessing problems and dysfunction stemming from heavy use. It is possible that marijuana-related problems represent a more sensitive indicator of dysfunctional use and impairment that might be more strongly associated with experiential avoidance compared to frequency of marijuana use. Prior research has found that marijuana use frequency is more robustly associated with the perception that other

college students use marijuana regularly (i.e., social motive), while marijuana-related problems are more strongly associated with using marijuana to cope (i.e., coping motive; Buckner, 2013). Though the current study did not examine social motives for substance use, experiential avoidance in the context of substance use can be conceptualized as a form of avoidant coping, as it serves the function of reducing contact with aversive internal stimuli (e.g., emotions, thoughts, memories, bodily sensations, etc.; Hayes et al., 1996).

The first exploratory aim examined whether the mediating role of experiential avoidance in the relation between ADHD symptoms and alcohol and marijuana use outcomes was moderated by sexual and gender minority (SGM) status. Findings indicated that there was not a significant conditional indirect effect according to SGM status, indicating that the significant mediation effects of experiential avoidance were comparable for both SGM and non-SGM participants. However, significant moderation effects were found for both models in the relation between ADHD symptoms and experiential avoidance (path a), such that the strength of this association was greater among non-SGMs compared to SGMs. This difference in the strength of association suggests that other factors besides ADHD symptoms may account for a proportion of the variance in experiential avoidance among SGMs compared to non-SGMs. SGMs report experiencing significantly more victimization and discrimination experiences compared to non-SGMs and these experiences are often unique to their minoritized status (Mereish et al., 2014). Stress associated with these experiences contribute to SGMs being at greater risk for developing mental health and substance use problems compared to non-SGMs (Hughes & Eliason, 2002; Su et al., 2016). It is possible that these unique stressors may

contribute to SGM having more "occasions" to engage in experiential avoidance, which may lead to more pervasive avoidance over time via negative reinforcement. If this were the case, it would be expected that ADHD symptoms would account for less variance in experiential avoidance among SGMs, since these unique stressors would likely account for some of the variance in experiential avoidance.

The second exploratory aim assessed whether significance of findings for mediation models from Aims 1 and 2 differ based on hyperactive/impulsive and inattentive ADHD symptom dimensions. All simple mediation models assessed were statistically significant, indicating that results remained consistent regardless of whether hyperactive/impulsive or inattentive symptoms were entered as the independent variable. However, the strength of indirect effects differed according to whether hyperactive/impulsive or inattentive symptoms were entered into the model. The conditional effect of inattentive symptoms on both alcohol- and marijuana-related problems via experiential avoidance was more robust compared to models in which hyperactive/impulsive symptoms were entered as the independent variable. This difference appears to be primarily driven by a stronger association between inattentive symptoms and experiential avoidance than between hyperactive/impulsive symptoms and experiential avoidance.

Individuals with greater inattentive symptoms may be less likely to be aware of and attend to early indicators of stress that might alert them to engage in proactive coping strategies. Present-moment or "mindful" awareness, which involves attending to stimuli in the "here and now" and is associated with greater psychological well-being (Stawarczyk et al., 2012), can be conceptualized as contrary to inattention, which reflects

difficulty orienting attention to the present moment. As a result of failing to attend to early indicators of stress, the scope of the problem may become more significant, and it may increase the likelihood that the individual engages in experiential avoidance. Further, it is possible that hyperactive/impulsive symptoms are associated with a broader range of substance use motives other than avoidant coping, such as sensation seeking, which describes an individual's perceived need for excitement and stimulation. Previous research has found that hyperactive/impulsive symptoms are more strongly associated with sensation seeking than inattentive symptoms and that sensation seeking is positively associated with more frequent alcohol and marijuana use (Lopez et al., 2015; Meil et al., 2016). More research is needed to understand whether and how unique liabilities associated with inattentive and hyperactive/impulsive symptoms lead to greater experiential avoidance.

This study has several strengths that warrant mention. First, this study utilized a large and relatively diverse sample of college students, which included a substantial subsample of students who identified as SGMs (13.7%; n = 296). The size of this study's SGM subsample permitted nuanced analyses that examined differences in mediation effects according to SGM status to be adequately powered. Second, data used in this study were collected from six universities that were geographically dispersed across the United States in both rural and urban settings. This further bolsters the external validity of this study and minimizes the likelihood that findings obtained in this study are attributable to a specific region or sub-population. Third, this study utilized widely used, psychometrically validated measures to assess constructs of interest, and all measures exhibited excellent internal consistency in the current study sample. Finally, this study

used a series of four questions that served as attention checks to ensure that participants thoughtfully responded to survey questions. If a participant incorrectly answered two or more of these questions, their data was not included in study analyses. This strategy likely improved the quality of the data used for analyses in this study. Similar attention check approaches are recommended for use in large scale online survey research (Abbey & Meloy, 2017).

Findings from this study should be considered within the context of several limitations. First, this study utilized cross-sectional data that was collected at a single time point. Accordingly, it is not possible to draw causal inferences regarding experiential avoidance as a mediator in the relation between ADHD symptoms and alcohol and marijuana use outcomes. Future longitudinal research is needed to clarify whether experiential avoidance serves as a causal mechanism in this relation. Second, this study relied exclusively on participants' self-report of symptoms, functioning, and marijuana and alcohol use. It is possible that use of an evaluator that could examine ADHD symptoms in the context of possible comorbid disorders may have improved the accuracy and validity of ADHD symptom count data used in this study. For example, difficulty with attention is a feature of several disorders in addition to ADHD, including major depressive disorder and generalized anxiety disorder (American Psychiatric Association, 2013). Thus, it is possible that ADHD symptoms counts for participants with comorbid disorders were inflated. Further, reliance on self-report for assessing alcohol and marijuana is a limitation of this study. Though self-report is widely used in substance use research and has been demonstrated to generally provide a reliable and valid estimate of substance use, research indicates that accuracy of self-report can be

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affected by other factors, such as the context in which the data were collected (e.g., treatment facility, online survey) or respondent characteristics (e.g., race/ethnicity, age, level of substance dependence; Del Boca & Darkes, 2003). Given that the current study utilized data collected from an online survey in which participants were assured of their anonymity, it is unlikely that a substantive number of participants intentionally provided inaccurate estimates of their alcohol and marijuana use (e.g., due to social desirability bias).

Evidence yielded from this study has practical clinical implications. First, this research suggests that experiential avoidance may be a fruitful target for prevention of and intervention for problematic use of alcohol and marijuana among college-aged adults with ADHD. Future research might examine whether targeting experiential avoidance in the treatment of ADHD without current comorbid alcohol or marijuana use problems results in meaningful reductions in future misuse and abuse. In addition, future research might explore whether interventions designed for comorbid ADHD and marijuana and alcohol use problems that target experiential avoidance are more effective compared to other approaches that treat these problems in a more piecemeal manner. Acceptance and Commitment Therapy (ACT) is a third-wave cognitive behavioral psychotherapy that targets experiential avoidance as a core mechanism of change in the treatment of psychological disorders (Hayes et al., 2009). ACT may be well-suited to address these comorbid problems given the target of treatment is experiential avoidance, which is a transdiagnostic factor that is elevated in both ADHD and substance use disorders (Bodalski et al., 2019; Buckner et al., 2014; Levin et al., 2012). According to the ACT logic model, it would be expected that developing increased psychological flexibility

would result in reduced impairment and greater capacity to cope, which would likely lead to reduced symptoms. Previous research has identified ACT as an efficacious treatment for substance use problems, and preliminary research suggests that ACT may also be efficacious in the treatment of ADHD (Lee et al., 2015; Munawar et al., 2021). However, there remains a need for research examining the efficacy of ACT, as well as other treatment approaches, in the treatment of comorbid ADHD and substance use problems. This research is warranted in light of prior research demonstrating that substance use problems attenuate treatment effectiveness for ADHD and vice versa (Wilens et al., 1998; Wilens & Fusillo, 2007).

Given the increased risk for substance use problems among individuals with ADHD and the widespread use of alcohol, marijuana, and other substances by college students (O'Malley & Johnston, 2002; White & Hingson, 2013; Slutske, 2005), it is necessary to identify and understand factors that contribute to risk for substance use problems for college students with ADHD. Findings from the current study suggest that experiential avoidance contributes to this risk in part. However, more research is needed to clarify whether experiential avoidance serves as a causal mechanism in the relation between ADHD and substance use problems. In addition, future research should examine other mechanisms that may explain risk for substance use problems in college students with ADHD. Such research might identify more proximal mechanisms to target, which may in turn inform the development of more effective prevention and intervention approaches for comorbid ADHD and substance use problems.

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