

Spring 5-31-2024

Depressive Symptoms and Substance Use Behaviors Among Young Adults Before and During COVID-19

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Depressive Symptoms and Substance Use Behaviors Among Young Adults Before and During
COVID-19

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A dissertation submitted in partial fulfillment

Of the requirements for the degree of

Doctor of Philosophy

In

Clinical Psychology

Seattle Pacific University

School of Psychology, Family & Community

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ACKNOWLEDGMENTS

To my amazing family, my dearest friends and coven, my cohort of “The Happiest Few,” my mentor and committee members, without whom I would not be where I am today. Thank you for your undying support, encouragement, and love throughout this journey.

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ABSTRACT

Sarah K. Chun

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Exposure to previous public health disasters have been found to have a significant negative impact on young adult mental health. Thus, it is important to examine the effect that COVID-19 had on young adult mental health. The current study examined differences in depressive symptoms as well as frequency and impairment of substance use in two cross-sectional samples of undergraduate students, one before COVID-19 and one during COVID-19. This study also examined the moderating effects of religiosity on the association between COVID-19 status and both depressive symptoms and substance use behaviors. Participants were 898 young adults ($M_{age} = 19.83$, $SD = 1.68$; 80.2% female) who were recruited from a private university in the Pacific Northwest. Consistent with hypotheses, young adults in the during COVID-19 group reported greater depressive symptoms ($\beta = .15$, $SE = .93$, $p < .01$), greater frequency of alcohol use ($\beta = -.09$, $SE = .07$, $p = .02$) and greater level of impairment from alcohol use ($\beta = -.10$, $SE = .30$, $p = .02$) compared to the before COVID-19 group. However, the impact of COVID-19 status on young adult frequency and impairment of marijuana use was non-significant. Additionally, strength of religiosity did not have a statistically significant moderation effect on the relationship between COVID-19 status and young adult depressive symptoms or substance use behaviors. Overall, results provide important contributions to the growing body of research on the impact of COVID-19 on young adult mental health. Findings should be interpreted in light of methodological limitations related to the cross-sectional design of the study and substance use measures.

CHAPTER 1 – INTRODUCTION AND LITERATURE REVIEW

By March of 2020, the coronavirus disease (COVID-19) had evolved into a global pandemic, causing U.S. government officials to issue a stay-at-home order for Americans to shelter in place to protect public safety. During this time, individuals were faced with significant physical and emotional stressors that led to widespread concern about the impact of the pandemic on individual mental health. Previous studies examining mental health outcomes following wide-scale public health disasters suggest that exposure to this type of stressor is associated with a range of negative mental health outcomes, such as increases in depression, anxiety, posttraumatic-stress disorder and substance use behaviors (Ettman et al., 2020; Goldmann & Galea, 2014). This is especially true for young adults, who have been found to be at an elevated risk for substance use and mental health symptoms compared to other age groups (Meredith et al., 2019). Thus, it is important to better understand the impact of COVID-19 on young adult mental health. Specifically, the current study aims to replicate and build upon recent studies by investigating the impact of COVID-19 on young adult depressive symptoms and substance use behaviors, as well as examining the moderating role of religiosity as a protective factor.

Theory and data on the effects of public health disasters have suggested that events of this scale often predict increases in adverse mental health consequences. For example, there has been substantial research following the SARS outbreak that has found that depressive symptoms and frequency of substance use (e.g., alcohol) increased among adults (e.g., Hawryluck et al., 2004; Wu et al., 2008). Studies are just beginning to emerge examining the mental health impacts of the COVID-19 pandemic. This study seeks to examine before COVID-19 and during COVID-19 rates of depression and substance use among young adults. Furthermore, it will also

examine the moderating effect of religiosity on before COVID-19 and during COVID-19 symptoms.

Depression Among Young Adults

Young adulthood is a distinct period of life characterized by independence, greater responsibilities, and identity exploration. The significant changes faced by young adults during this transitional period increases their vulnerability to stressors and the risk of developing mental health disorders (Singh & Mishra, 2020). A 2021 report on mental health trends in the United States indicates that mental illness among adults 18 to 25-years-old is rising faster than that of the total adult population (The National Institute for Health Care Management, 2021). Specifically, depression is one of the leading mental health concerns impacting this age group (Liu et al., 2020).

Major Depressive Disorder (MDD) is outlined in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013) as a disorder characterized by a period of predominantly low or depressed mood or loss of interest or pleasure. These symptoms are further accompanied by weight gain or loss, changes in appetite, sleep difficulties (i.e., insomnia or hypersomnia), psychomotor agitation or retardation, fatigue or loss of energy, feelings of guilt or worthlessness, difficulty concentrating and/or suicidal ideation. In order to meet diagnostic criteria for MDD, an individual must experience at least five total symptoms most of the time for at least a two-week period and experience either clinically significant distress or impairment in functioning. Depressive symptoms can also be experienced on a spectrum of severity and duration, which may not meet criteria for MDD diagnosis. Research indicates that subsyndromal depression (i.e., symptoms that do not meet full criteria for

a major depressive episode) still poses significant risk factors for an individual's overall well-being, and thus, is important to examine (Ayuso-Mateos et al., 2010).

In 2020, the prevalence of having had a major depressive episode within the past year was estimated to be 17% among young adults ages 18 to 25 (National Institute of Mental Health, 2022). This prevalence has been found to be even greater among college students, with approximately 30% of college students reporting symptoms of depression within the last year (Mayo Clinic, 2021). Extensive research has revealed a significant gender gap in depression symptoms, emerging as early as age 12 and persisting through adulthood (Salk et al., 2017). These findings indicate that females are almost twice as likely to meet criteria for MDD than males (Centers for Disease Control, 2017). Depression during young adulthood is associated with significant negative consequences, such as impaired social functioning, lower academic performance, increased risk for substance use disorders and suicidal behaviors (Gutman & Sameroff, 2004; Pardini et al., 2007, Breslau et al., 2008). Given the significance of these outcomes, it is important to understand factors that may contribute to these symptoms.

Alcohol and Marijuana Use Among Young Adults

Substance use disorders (SUDs) are another pervasive health problem amongst young adults, with alcohol and marijuana being two of the most misused substances (Schulenberg et al., 2019). While DSM-5 criteria for SUDs vary slightly based on the substance, SUDs are generally characterized into four basic groupings: (1) Impaired control over substance use (i.e., taking the substance in larger amounts, having a desire to cut down on usage, spending significant time obtaining, using or recovering from the substance, and craving the substance), (2) social impairment (i.e., failing to fulfill major role obligations, continued use despite interpersonal problems that arise, or giving up or reducing important activities), (3) risky use (i.e., recurrent

use in physically hazardous situations or continued use despite knowing that a physical or psychological issue has been caused or worsened by the substance) and (4) pharmacological criteria (i.e., tolerance or withdrawal). In 2019, a study found that nearly half of college students met criteria for a substance use disorder between their freshman and junior year (Welsh et al., 2019). Substance use during young adulthood poses greater risk for negative physical and mental health consequences, including lower academic performance, injury, physical and sexual assault, SUDs, certain cancers, overdose, and death (Welsh et al., 2019).

Alcohol use is especially prevalent during young adulthood, with approximately 47.1% of adults ages 18 to 22 reporting engagement in alcohol use within the past month (SAMHSA, 2019). According to the SAMHSA 2020 National Survey on Drug Use and Health, binge alcohol use (i.e., females consuming 4 or more drinks or males consuming 5 or more drinks in a 2-hour period) is highest among young adults ages 18 to 25 compared to any other age group, with approximately 31.4% engaging in binge drinking in the past month. Within this age group, college students have been found to demonstrate greater rates of binge drinking and alcohol use disorder compared to non-college students (Carter et al., 2010; McCabe, 2021). Alcohol use has been associated with many short-term consequences, including hangovers, physical injury, risky sexual behaviors, and academic difficulties (Windle, 2003; World Health Organization, 2018). Additional long-term consequences of continued alcohol use include the increased risk of developing significant health and psychiatric problems in adulthood, such as alcohol use disorders, depression, sleep disorders, liver disease, cancers of the throat (World Health Organization, 2018).

Marijuana use has been found to be the highest among young adults ages 18 to 24 compared to any other age group (SAMHSA, 2019). According to the 2019 National Survey on

Drug Use and Health (NSDUH), approximately 43% of young adults not attending college and 44% of college students reported engaging in marijuana use within the past year (SAMHSA, 2019). The survey indicated that the rate of marijuana use among college students has increased significantly over the past five years, rising by 9% since 2015. Daily marijuana use was found to be greater among young adults not attending college compared to college students, with rates of 15% compared to 6%, respectively. Frequent marijuana use in young adulthood has been found to be associated with future impairments in cognitive functioning (e.g., memory and learning) and an increased risk for marijuana dependence (Levine et al., 2017). Additionally, some studies suggest that long-term or consistent marijuana use may be associated with an increased risk of developing psychotic symptoms or schizophrenia (Di Forti et al., 2015).

Given that young adults have already shown to be at greater risk for mental health problems such as depression and increased alcohol and marijuana use, it is important to investigate how the ongoing significant public health disaster of COVID-19 may impact this unique population.

Theoretical Foundation

Effect of Public Health Disasters on Mental Health

Public health disaster is a relatively novel term within disaster bioethics research that refers to sudden, large-scale events resulting in devastating social consequences (Afolabi, 2018). Although there has not been a consensus on one formal definition of public health disasters, three distinct phenomena are considered to fall within this framework: (1) public health issues of pandemic proportions such as infectious disease outbreaks, (2) public health issues resulting from natural or man-made disasters, and (3) silent public health disasters such as atypical drug-resistant tuberculosis (Afolabi, 2018). Pandemics fall under the categorization of public health

disasters and are most simply defined as an infectious disease impacting several geographic areas (Pitlik, 2020). Pandemics pose a unique threat compared to other types of natural disasters (e.g., hurricanes or earthquakes) due to the increasing risks and stressors that follow the initial event. Multiple infectious disease outbreaks have occurred over the last several decades, which have had a significant impact on community mental health. Some of the most notable being the severe acute respiratory syndrome (SARS) in 2002, the Middle East Respiratory Syndrome (MERS) in 2012, and most recently, the coronavirus disease (COVID-19) in 2019.

Public health disasters are associated with significant changes to individuals' daily lives, social circumstances, support networks, and stress exposures (e.g., loss of financial security, loss of loved ones; Hisham et al., 2021; Perrin et al., 2009; Ro et al., 2017 via Usher et al., 2020). These changes may in turn produce significant negative mental health outcomes. Two common mental health outcomes resulting from these changes include depression and substance use.

Theoretical Models of Depressive Symptoms During Public Health Disasters

Depressive symptoms have been found to be one of the primary negative consequences that individuals face following a public health disaster (Goldmann & Galea, 2014). For instance, a study by Hawryluck et al., (2004) found that adults demonstrated higher levels of depression during the SARS outbreak in Canada, and that these changes were associated with the length and uncertainty of the lockdown. Another study by Um and colleagues (2010) found that 26.6% of doctors involved in MERS care demonstrated significantly elevated symptoms of depression. Preliminary research suggests that these findings remain true following the outbreak of COVID-19, as studies have found that adults self-reported depression symptoms were significantly higher during the pandemic than before (Ettman et al., 2020; Daly et al., 2021; Wu et al., 2021). A meta-analysis by Bueno-Notivol et al., (2021) revealed that 12 different studies from across the

world (e.g., China, India, and Europe) estimated that rates of depression (i.e., dysthymia and major depressive disorder) were up to seven times greater during the COVID-19 outbreak than before. While there is not one predominating theory explaining this phenomenon, previous studies have identified several significant factors contributing to increases in depressive symptoms during public health disasters. During the SARS epidemic, exposure to traumatic events, such as perceived risk of getting the disease and being quarantined was associated with increased depressive symptoms among adults (Liu et al., 2012). Unemployment and uncertainty about future job prospects has been associated with a higher likelihood of depressive symptoms following natural disasters (Tang et al., 2014).

Preliminary studies examining the impact of COVID-19 on young adult depressive symptoms provide further support for these contributing factors and point to a few others. A study by Lee et al., (2020) provides support for loneliness as a significant factor contributing to increased depressive symptoms during COVID-19. Another study by Narita et al., (2023) similarly found that self-isolation was a significant risk factor for depression during the pandemic. Additionally, younger age groups, such as adolescents and young adults, are hypothesized to be especially susceptible to higher rates of depression in response to public health disasters due to greater uncertainty around future job prospects (Kazmi et al., 2020). Changes in sleep health have also been identified as a risk factor for depressive symptoms. A study by Knickerbocker et al., (2022) found that young adults in a university setting reported worsening sleep health during COVID-19, which were positively associated with changes in depressive symptoms. Taken together, it appears that a combination of several factors such as loneliness and social isolation, unemployment, exposure to traumatic events, and poor sleep

health may all contribute to increases in depressive symptoms among young adults during public health disasters such as COVID-19.

Self-Medication Hypothesis

Exposure to large-scale traumatic events, such as public health disasters, are also associated with changes in substance use behaviors, especially among young adults (Meredith et al., 2019). There are several theoretical frameworks that may explain the relationship between exposure to public health disasters and changes in substance use behaviors. One of the most common theories is the self-medication hypothesis (Khantzian et al., 1974). The self-medication hypothesis (SMH) posits that individuals use substances as a means to decrease negative emotions, and thus, relieve psychological suffering (Khantzian, 1997). Studies have shown that both alcohol and marijuana have been used as a mechanism by which individuals cope with adverse situations in the absence of more adaptive strategies (Haller & Shassin, 2014; Sarvet et al., 2018). Preliminary research has begun to examine this theory within the context of traumatic experiences (Alexander & Ward, 2018). Post-public health disaster substance use can be conceptualized as a coping strategy that involves using substances to reduce psychological distress triggered by one's exposure to a disaster.

Prior research following wide-spread public health disasters provides some support for this theory. For instance, a study of 549 hospital employees in Beijing, China following the 2003 SARS outbreak found that symptoms of alcohol abuse and alcohol dependence were significantly higher following the outbreak and were positively associated with having been quarantined or working in high-risk locations (Wu et al., 2008). Similar findings emerged from studies following other types of disasters. For example, increased alcohol use was reported among adults in New York City followed Hurricane Sandy (Lowe et al., 2017 cited in Kopak &

Brown, 2020). Initial research examining the effect of COVID-19 on young adults' substance use behaviors have found that college students experienced greater frequency and problematic alcohol use during the pandemic compared to pre-pandemic (Schepis et al., 2021; Busse et al., 2021).

In regard to marijuana use, there is very little research on changes in marijuana use among young adults in response to previous public health disasters prior to COVID-19. This may be due to its limited accessibility and ethical barriers in research given its previous illegal status. Preliminary research examining the impact of COVID-19 on the frequency and impairment of marijuana use among young adults suggests that college-age students have demonstrated an increase in marijuana use during the pandemic (Schepis et al., 2021; Papp & Kouros, 2021). However, there have been some mixed findings. A study by Busse et al., (2021) found that frequency of marijuana use among college-aged students did not change during the pandemic. Additionally, a study by Tang et al., 2023 found that problematic behaviors associated with marijuana use (e.g., driving while under the influence of marijuana) declined among college-aged students during COVID-19, perhaps due to reduced access to marijuana as many students moved home during the quarantine. Exploring changes in marijuana use among young adults is particularly important in light of the respiratory impact of the recent pandemic.

Exposure to public health disasters has been consistently associated with changes in individual mental health outcomes, such as depressive symptoms and substance use behaviors. Theory and past research have demonstrated that young adults who experience a public health disaster are faced with a series of stressors and changes to social circumstances that contribute to low mood. Furthermore, in response to the cascade of stressors that are triggered by a public health disaster, young adults may often turn to substance use as a self-medication strategy for

coping with negative emotions. However, research in the context of the COVID pandemic has been mixed, particularly regarding changes in substance use behaviors (e.g., marijuana use). Thus, it is important to investigate the impact of the most recent COVID-19 pandemic among a young adult population to further build upon previous findings.

Moderating Effects of Religiosity

While extant research suggests that public health disasters have adverse effects on young adult mental health, less is known about specific factors that make some individuals more susceptible to these negative impacts than others. An additional purpose of this research is to examine the moderating effect of religiosity on the relationship between COVID-19 status and depression and substance use behaviors among this age group.

Religiosity, or one's commitment to religious faith, has been widely studied as a protective factor against a variety of mental health concerns (e.g., Leondari & Gialamas, 2009). An extensive body of research provides support for higher levels of religiosity as protective factor against depressive symptoms (e.g., Miller et al., 2012) and both alcohol and marijuana use (Wills et al., 2003). The buffering impact of religiosity on mental health issues has been found following stressful life events (e.g., Smith et al., 2003) and large-scale stressors (e.g., Thomas & Barbato, 2020). For instance, McIntosh et al., (2011) found that religiosity was associated with higher levels of positive affect as well as decreased anxiety and depression symptoms following the 9/11 terrorist attacks. Research indicates that religious faith serves as an effective strategy for coping with severe stress. For example, prayer is a common religious coping strategy that has been associated with improved stress-management (Hechanova et al., 2021). The resources and social support offered by religious institutions have also been associated with increased positive affect following a collective trauma (McIntosh et al., 2011). Furthermore, religiosity has been

associated with increased hope and higher self-esteem (Plante & Boccaccini, 1997). To date, only a few studies have examined the protective role of religiosity in the context of the COVID-19 pandemic. For example, a cross-sectional study of Muslim and Christian adults found that positive religious coping was associated with less depressive symptoms (Thomas & Barbato, 2020). Another cross-sectional study of adults in the United States also revealed that religious coping was associated with less symptoms of anxiety and depression (Okafor et al., 2022). However, no studies have examined strength of religiosity as a protective factor against problematic substance use behaviors in the context of COVID-19. Given the limited research on the moderating effects of religiosity during the pandemic, additional research is needed to substantiate and expand upon these findings among a young adult population.

The Current Study

The current study aimed to investigate differences in average levels of depressive symptoms and substance use behaviors in two cross-sectional samples of undergraduate students, one before COVID-19 and one during COVID-19. Furthermore, this study examined the moderating effects of religiosity on the association between COVID-19 and both depressive symptoms and substance use behaviors. Given prior research, I hypothesized the following:

Hypothesis 1. Young adults will report higher average levels of depressive symptoms during COVID-19 compared to before COVID-19.

Hypothesis 2: Young adults will report greater frequency and impairment of alcohol use during COVID-19 compared to before COVID-19.

Hypothesis 3: Young adults will report greater frequency and impairment of marijuana use during COVID-19 compared to before COVID-19.

Hypothesis 4: The effects of COVID-19 on both depressive symptoms and substance use behaviors will be moderated by religiosity, such that the adverse impact of COVID-19 on depression and substance use will be stronger for individuals with low religiosity.

CHAPTER II – METHOD

Participants

Depressive symptoms and substance use behaviors were assessed in two cross-sectional samples of college students who were recruited from a private Christian university in the Pacific Northwest. The original sample included 1018 participants. Participants in the before COVID-19 cohort ($N = 472$) ranged from 18 to 26 years old ($M_{\text{age}} = 20.02$, $SD = 1.66$) and were predominantly female (80.2%). In the before COVID-19 sample, approximately 69.0% of participants identified as Caucasian, 14.8% Asian, 8.8% “Other,” 3.7% Black or African American, 2.8% Native Hawaiian or Other Pacific Islander, and 0.9% American Indian/Alaskan Native/First Nations. The majority of participants reported identifying as non-Hispanic (89.0%). Religion identification of the sample was 64.9% Christian, 8.0% Agnostic, 7.3% Roman Catholic, 6.7% Spiritual, 4.0% Atheist, 2.5% “Other,” 0.9% Muslim, 0.6% Buddhist, 0.2% Hindu, and 0.2% Jewish, with 4.5% reporting that they “don’t give religious things much thought.” In regard to substance use, 69.5% of before COVID-19 participants responded “yes” when asked if they currently or have ever drunk alcohol, while 31.6% responded “yes” when asked if they have currently or have ever smoked marijuana.

Participants in the during COVID-19 cohort ($N = 546$) ranged from 18 to 26 years old ($M_{\text{age}} = 19.69$, $SD = 1.69$), and were predominantly female (78.0%). In the during COVID-19 sample, approximately 57.1% of participants identified as Caucasian, 22.2 % Asian, 11.3% “Other,” 4.9% Black or African American, 3.2% Native Hawaiian or Other Pacific Islander, and 1.1% American Indian/Alaskan Native/First Nations. The majority of participants reported identifying as non-Hispanic (85.3%). Religious identification of the sample was 55.3% Christian, 12.0% Spiritual, 10.0% Roman Catholic, 7.1% Agnostic, 3.6% “Other,” 2.6% Atheist, 2.4%

Buddhist, 1.7% Muslim, 0.2% Hindu and 0.2% Jewish, with 5.1% reporting that they “don’t give religious things much thought.” In regard to substance use, 52.1% of participants in the during COVID-19 group responded “yes” when asked if they currently or have ever drunk alcohol, while 25.6% responded “yes” when asked if they have currently or have ever smoked marijuana.

Sampling Procedures

Both cross-sectional samples of data were collected via the same online questionnaire through the Qualtrics survey platform, which consisted of a battery of measures assessing substance use behaviors and mood symptoms of undergraduate students. Before COVID-19 data were collected between September 2017 and June 2018, prior to the COVID-19 outbreak in the United States. During COVID-19 data were collected between April 2020 and June 2021, following the official stay-at-home order. An anonymous link was emailed to all undergraduate students up to three times per quarter. Consent was obtained prior to survey completion. Participants were given the option to enter into a raffle for one of two \$50 Amazon gift cards by submitting their email address at the end of the survey. Procedures were approved by the university’s Institutional Review Board.

Measures

Demographic variables. Participant age, biological sex, race, ethnicity, and religious affiliation were collected by self-report questionnaire.

Depressive symptoms. Young adults’ depressive symptoms were assessed using the 20-item Center for Epidemiologic Studies Depression Scale: Revised (CESD-R; Eaton et al., 2004). Responses on the CESD-R ranged from 0 (*Not at all or less than 1 day*) to 4 (*Nearly every day for 2 weeks*). Example items include “I felt depressed” and “I lost interest in my usual activities.” To reflect the range of responses of the original version, all scores of 4 were converted to 3 and

then a total score was calculated by summing all the items. Scores ranged from 0 to 60, with higher scores demonstrating greater depressive symptoms. The CESD-R has demonstrated adequate psychometric properties in adolescent samples in the United States (Haroz et al., 2014). In the current study, the CESD-R demonstrated strong internal consistency in both the before COVID-19 sample ($\alpha = .95$) and the during COVID-19 sample ($\alpha = .94$).

Substance Use Frequency. Young adult's frequency of alcohol and marijuana use was assessed using one item from the Customary Drinking and Drug Use Record CDDR; Brown et al., 1998). Participants were shown a table that depicted standard drink volumes (e.g., 12 oz. of beer equals one drink) and a table of standard marijuana amounts (e.g., 0.5g = 1 joint) and then asked, "On average during the last year, how often did you drink alcohol?" Participants responded on a 5-point scale ranging from 1 (*never*) to 5 (*daily or almost daily*). The CDDR has demonstrated adequate convergent, discriminant and construct validity (Brown et al., 1998).

Substance Use Impairment. Alcohol and marijuana-related impairment was assessed using the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) and the Rutgers Marijuana Problem Index (RMPI, White et al., 2005), respectively. The RAPI is an 18-item self-report measure that assesses adolescent and young adult problem drinking. Participants were asked how often they have experienced various consequences while drinking or as a result of drinking within the past year (e.g., "neglected your responsibilities") on a 4-point scale ranging from 0 (*none*) to 3 (*more than 5 times*). The RMPI is an 18-item self-report measure that uses the same scale as the RAPI uses to assess adolescent and young adult problem marijuana use. For both measures, higher scores indicate greater negative consequences. In the current study, the RAPI demonstrated good internal consistency in both the before COVID-19 sample ($\alpha = .87$)

and the during COVID-19 sample ($\alpha = .81$). The RMPI demonstrated strong internal consistency in both the before COVID-19 sample ($\alpha = .93$) and the during COVID-19 sample ($\alpha = .93$).

Religiosity. Young adults' religiosity was assessed using four items from the strength of faith subscale of the 10-item Santa Clara Strength of Religious Faith Questionnaire (SCSORF; Plante & Boccaccini, 1997). Responses ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Example items include: "My religious faith is extremely important to me" and "I look to my faith as providing meaning and purpose in my life." Scores ranged from 4-16, with higher scores indicating greater degree of religiosity. The SCSORF has demonstrated adequate psychometric properties in previous research (Wnuk, 2017). In the current study, the SCSORF demonstrated strong internal consistency in both the before COVID-19 sample ($\alpha = .95$) and the during COVID-19 sample ($\alpha = .94$).

CHAPTER III – RESULTS

Data Preparation and Descriptive Analyses

Data were examined using SPSS version 29.0 prior to testing the main hypotheses. These included analyses examining missingness, outliers, normality of data, descriptive statistics and correlations between study variables. Data were collected across several academic quarters and merged into two cross-sectional samples to reflect timepoints before the onset of COVID-19 and during COVID-19. All hypotheses were analyzed as linear regression models in SPSS.

Missingness. Item-level missing data ranged from 0.5% to 7.6% across study variables. Of the cases where participants responded to less than 80% of items for a given variable, Little's MCAR test was utilized to test the null hypothesis that the missing data is missing completely at random (Little, 1988). Results of Little's MCAR test suggested that the data was missing completely at random ($\chi^2[365] = 363.65, p = .51$). Measure scale totals were computed by calculating the mean sums for participants who responded to at least 80% of the items for a given variable. A total of 85 cases with less than 80% of data completed for each variable were removed from the dataset.

Normality. The assumption of normality was tested by running the Shapiro-Wilk test and examining the skew and kurtosis of each study variable. As expected, the assumption of normality was violated ($p < .001$) and skew and kurtosis were above normal ranges for the variables of age, depression symptoms, and substance use impairment. The majority of participants reported experiencing low to moderate levels of depression symptoms and impairment from using alcohol and marijuana, which is likely explained by the fact that data was collected from a non-clinical, undergraduate population. Age is skewed as the majority of participants fell between average college ages of 18-22 years old, with a few outliers ranging

between 16 to 77 years old. A total of 48 cases were removed to reflect a young adult population. The final dataset included a total sample size of 898, with 453 participants in the before COVID-19 group and 445 participants in the during COVID-19 group. Transformation methods were not utilized, as non-normality was expected for these variables and transformation has the potential to fundamentally alter the variable (Kline, 2016).

Homoscedasticity. Homoscedasticity is an assumption of equal levels of variances between the dependent variable across all values of the independent variable (Osborne & Waters, 2019). The assumption of homoscedasticity was tested by examining a scatterplot of the standardized residuals of the independent and dependent variables. The scatterplot depicted a slightly inequal disbursement of residuals, which suggest that the assumption of homoscedasticity was violated. Given that violations of homoscedasticity are typically associated with normality violations (Osborne & Waters, 2019), this outcome was expected.

Multicollinearity. Multicollinearity occurs when there are more than one independent variables in the regression model that are highly correlated with one another (Field, 2013). This can pose an issue as it can be difficult to determine the unique effect of each predictor on the outcome variable. Multicollinearity was assessed using the Variance Inflation Factor (VIF) method. Multicollinearity is considered to be present when VIF values are greater than 5 to 10 (Kim, 2019). VIF values for each of the study variables ranged from 1.00 to 1.03, which indicates that the assumption has been met and multicollinearity is not present.

Descriptive Statistics

Variable means and standard deviations for primary study variables are presented in Table 2. Bivariate correlations are presented in Table 3. Of note, age was significantly, positively correlated with alcohol use frequency ($r = .33, p < .01$) and depressive symptoms ($r = .10, p$

$< .01$). Sex was significantly negatively correlated with marijuana use impairment ($r = -.23, p < .01$), such that being a female was associated with less marijuana impairment than males. Additionally, strength of religiosity was significantly negatively correlated alcohol use frequency ($r = -.13, p < .01$), alcohol use impairment ($r = -.13, p < .01$) and marijuana use frequency ($r = -.16, p < .05$).

Between-group differences of categorical variables (i.e., race, ethnicity, religious affiliation, sex) were examined using Chi-Squared tests. There was a statistically significant difference in race between the before COVID-19 and during COVID-19 groups ($\chi^2[5] = 14.61, p = .01$), such that a significantly greater number of participants self-identified as White in the before COVID-19 sample compared to the during COVID-19 sample, while a significantly greater number of participants self-identified as Asian in the during COVID-19 sample compared to the before COVID-19 sample. There was a statistically significant difference in religious affiliation between groups ($\chi^2[10] = 21.11, p = .02$). Specifically, a significantly greater number of participants self-identified as Muslim, Buddhist and Roman Catholic in the during COVID-19 group compared to the before COVID-19 group, while a greater number of participants self-identified as Christian in the before COVID-19 group compared to the during COVID-19 group. Between-group differences in religious affiliation remained true after the variable was dummy coded into three groups for regression analyses (i.e., non-faith identified, Christian faith identified, and non-Christian faith identified). There was a statistically significant difference in religious affiliation between the before COVID-19 and during COVID-19 groups ($\chi^2[2] = 7.11, p = .03$), such that a significant greater number of participants self-identified as non-Christian faith identified in the during COVID-19 group compared to the before COVID-19 group. There were no systemic differences between groups for ethnicity or sex. Despite non-significance

found between sex and COVID-19 status, sex was included in analyses due to its known association with depressive symptoms in the context of stressful events (Aksaray et al., 2021; Liu et al., 2022, Goldmam & Galea, 2014). In order to compare differences between the before COVID-19 and during COVID-19 groups on continuous variables (age and religiosity), an independent samples t-test was conducted. There was a statistically significant difference in age between groups, $t(924) = 3.13, p = .002$. Between-group differences in religiosity were not statistically significant.

Primary Analyses

A series of five linear regression models were run to examine the effect of COVID-19 status on young adult depression and substance use behaviors. The outcomes of depressive symptoms, frequency of alcohol use, impairment of alcohol use, frequency of marijuana use, and impairment of marijuana use were regressed into COVID-19 status (before COVID-19 vs. during COVID-19). Substance use impairment was examined in users only. Age, sex, race and religion were included as control variables in all linear regression analyses. Next, for each outcome variable, a series of five moderation analyses were conducted with religiosity added as both a main effect as well as an interaction term with COVID-19 status. Depressive symptoms, substance use frequency and impairment, and religiosity were assessed continuously and presented as means, while before- versus during COVID-19 status and gender were assessed categorically.

Consistent with hypotheses, COVID-19 status had a statistically significant effect on young adult depressive symptoms when controlling for age, sex, race and religious affiliation. Specifically, young adults in the during COVID-19 group reported greater depressive symptoms compared to the before COVID-19 group ($\beta = .15, SE = .93, p < .001$). These values signify a

small effect size ($f^2 = 0.06$). However, results from the study were inconsistent with hypotheses regarding the impact of COVID-19 status on substance use behaviors among young adults. Finding demonstrated that COVID-19 status had a statistically significant effect on young adult frequency of alcohol use ($\beta = -.15$, $SE = .06$, $p < .001$) as well as level of impairment from alcohol use ($\beta = -.10$, $SE = .30$, $p = .02$), such that young adults reported less frequency and impairment of alcohol use in the during COVID-19 group compared to the before COVID-19 group. These values signify a small to medium effect size for alcohol frequency ($f^2 = 0.13$) and a small effect size for alcohol impairment ($f^2 = 0.05$). Further contradictory to hypotheses, COVID-19 status was not found to have a statistically significant impact on young adults' frequency of marijuana use ($\beta = -.03$, $SE = .06$, $p = .44$) or level of impairment from marijuana use ($\beta = .00$, $SE = .82$, $p = .99$).

This study also examined the moderating effects of religiosity on the relationship between COVID-19-status and young adult depression and substance use behaviors. Inconsistent with hypotheses, strength of faith did not have a statistically significant moderation effect on the relationship between COVID-19 status and young adult depression symptoms ($\beta = -.08$, $SE = .92$, $p = .06$), alcohol use frequency ($\beta = -.04$, $SE = .06$, $p = .56$), alcohol use impairment ($\beta = .08$, $SE = .30$, $p = .16$), marijuana use frequency ($\beta = .03$, $SE = .06$, $p = .44$) or marijuana use impairment ($\beta = .09$, $SE = .83$, $p = .24$).

CHAPTER IV – DISCUSSION

Exposure to public health disasters have been found to have a significant negative impact on young adult mental health. Young adults are at an elevated risk of experiencing poor mental health compared to other age groups (Bojórquez-Chapela et al., 2023), and thus, may be uniquely vulnerable to the negative impacts of COVID-19. Initial studies have shown that the COVID-19 pandemic and consequent stressors are associated with an increase in depressive symptoms and problematic substance use behaviors. Theories proposed to explain the increase in depressive symptoms among young adults during pandemics like COVID-19 revolve around the impact of social isolation, loneliness, financial strain, job uncertainty, poor sleep health and increased exposure to stressors (Kazmi et al., 2020; Knickerbocker et al., 2022; Lee et al., 2020; Narita et al., 2023). Additionally, theories such as the self-medication hypothesis suggest that individuals may use substances to reduce psychological suffering associated with the stress of the pandemic (Alexander & Ward, 2018). These factors have been found to contribute to reduced mental well-being among young adults, which highlights the importance of increasing our understanding of their mental health risks associated with the pandemic.

The purpose of this study was to build upon existing research to further understand the impact of public health disasters on young adult mental health. Specifically, the current study investigated whether COVID-19 had an impact on young adult depressive symptoms and substance use behaviors. I hypothesized that young adults would report greater depressive symptoms during COVID-19 compared to before COVID-19. I further hypothesized that young adults would report greater frequency and impairment of alcohol and marijuana use during COVID-19 compared to before COVID-19. Additionally, I hypothesized that the effects of COVID-19 on both depressive symptoms and substance use behaviors (i.e., frequency and

impairment) would be moderated by religiosity, such that young adults who reported greater religiosity would report lower depressive symptoms and less frequency and impairment of alcohol and marijuana use.

Overall, results were only partially supportive of the proposed hypotheses. As expected, young adults in the during COVID-19 group reported greater depressive symptoms compared to the before COVID-19 group. This is consistent with studies that have been published since the onset of COVID-19 that indicate an increase in depressive symptoms among young adults during the pandemic (Hawes et al., 2021; Lee et al., 2020). A longitudinal study of by Hawes et al., (2021) found that increases in depressive symptoms among young adults were uniquely associated with fears of contracting COVID-19, school-related concerns (e.g., concerns about passing classes, poor quality of online classes) and concerns about being confined at home. Another study by Lee et al., (2020) found that loneliness was a significant predictor of increased depressive symptoms during the COVID-19 pandemic. Future studies should further explore these pandemic-specific factors that lead to greater depressive symptoms among young adults to best understand how to support this vulnerable population throughout this ongoing pandemic.

Contrary to hypotheses, young adults reported less frequency and impairment of alcohol use during COVID-19 compared to before COVID-19. This is inconsistent with previous research that has found an increase in problematic drinking behaviors among young adults since the onset of COVID-19 (Schepis et al., 2021; Busse et al., 2021). Discrepancies in findings may be attributed to a variety of contextual factors that were particularly salient for this sample. For instance, during quarantine, many college students were forced to move home and take classes virtually, which dramatically reduced opportunities for in-person socialization and social events involving drinking. Moving home may also have limited young adults' freedom and their

accessibility to engage in alcohol use, as the majority of the sample fell below the legal drinking age. Previous research has demonstrated an association between college attendance and increased alcohol consumption due to contextual factors such as increased exposure to social activities based around alcohol use, peer influence, and reduced parent oversight (Merill & Carey, 2016). This is supported by a study by Vera et al., (2021) that found that college students demonstrated a significant decrease in alcohol use frequency during COVID-19, while their non-college peers did not. Another study by Bramness et al., (2021) found that participants cited fewer social occasions as a reason for drinking less during the pandemic. Taken together, these findings suggest that there may be environmental and social factors influencing the degree to which young adults use alcohol to cope with stress.

Additionally, there was not a statistically significant difference in frequency or impairment of marijuana use during COVID-19 compared to before COVID-19. Previous research on the impact of COVID-19 on adult marijuana use has been mixed, with some studies reporting a decrease in marijuana use (e.g., Starks et al., 2020) and others reporting an increase in marijuana use among young adults (e.g., Patrick et al., 2022). Yet, another study by Busse et al., (2021) found that marijuana use behaviors among university students remained stable. There have been several factors cited for influencing marijuana use behaviors during the COVID-19 pandemic. Increases in marijuana use have been associated with increased self-isolation (Bartel et al., 2020), increased free time (Ramirez et al., 2022), boredom (Case et al., 2022) and higher levels of stress (Clendennen et al., 2021), with participants reporting using marijuana as a coping strategy for managing negative emotions associated with these pandemic-specific factors (Patrick et al., 2022). On the other hand, decreases in marijuana use have been associated with reduced socialization (among primarily social users; Case et al., 2022) as well as reduced freedom and

accessibility to marijuana, particularly among young adults who moved home during the pandemic (Case et al., 2022). Furthermore, a study by Ramirez et al., (2022) found that adolescents who were “irregular or light users” had greater odds of decreasing marijuana use during the pandemic compared to moderate or heavy users who had greater odds of maintaining or increasing amount of marijuana use during the pandemic. In regard to the current study, it is possible that the unique characteristics of the sample may partially explain the overall pattern of findings. Given the discrepancies in findings on the impact of the COVID-19 pandemic on marijuana use behaviors, future research should aim to focus on how specific factors contribute to changes in marijuana use, such as type of user (i.e., light vs. heavy user), gender, barriers to access, and social isolation. Future research may further aim to replicate analyses in a sample of current users only, instead of a general sample of both users and non-users.

Additionally, inconsistent with hypotheses, strength of religiosity did not have a statistically significant moderation effect on the relationship between COVID-19 status and depressive symptoms, nor on the relationship between COVID-19 status and substance use behaviors. In other words, average levels of depressive symptoms and substance use behaviors (i.e., frequency and impairment) reported before the pandemic versus during the pandemic did not significantly differ based on one’s strength of religious faith. These findings deviate from previous research which suggests that religiosity is a protective factor against the adverse effects of stress (e.g., Smith et al., 2003; Thomas & Barbato, 2020). There may be several explanations for these findings. For one, it is important to note that the relationship between religiosity and mental health is complex and may differ based on several factors that were not accounted for in this study. These may include the specific type of faith group one belongs to (Dein, 2018) or engagement in faith-specific coping strategies (Thomas & Barbata, 2020). Additionally, a meta-

analysis by Hackney & Sanders (2003) found that the strength of association between religiosity and mental health outcomes were inconsistent across studies and partially dependent on the definition of religiosity that was utilized in the study. The authors suggest that examining the ways in which individuals practice religion may yield more meaningful, consistent results examining one's strength of religiosity (Hackney & Sanders, 2003). In regard to substance use, a study by Walker et al., (2007) found that social support significantly mediated the relationship between religiosity and alcohol use, such that religiosity was associated with greater social support, which was in turn, positively associated with alcohol use. It may be interesting to explore whether specific factors, such as social support, mediate the relationship between religiosity and mental health outcomes such as depression and problematic substance use behaviors in the context of COVID-19.

Limitations and Future Directions

The results of this study should be interpreted considering several methodological limitations. For one, the cross-sectional design of the study prevents us from establishing a causal relationship between study variables. Future research should prospectively examine the impact of COVID-status on young adult depressive symptoms and alcohol use behaviors. Additionally, all study variables were collected via self-report measures, which introduces the risk of potential biases such as under-reporting. Considering that there is often stigma associated with underage substance use, especially on a “dry campus” (i.e., alcohol is banned on campus regardless of age), risk of under-reporting cannot be ruled out. Another methodological limitation is the use of a relatively homogeneous, majority White, non-clinical sample, which restricts the results from being generalizable to a clinical, primarily non-White population. Future studies should examine the impact of COVID-19 on a more diverse and clinical sample of

young adults. The study also had a sex imbalance, such that the majority of participants reported being biologically female. While sex was included as a control variable in the study to account for its' potential effects on depressive symptoms and substance use behaviors, future research may further examine the impact of sex on young adult mental health and substance use behaviors during the pandemic. Finally, it is important to note that participant reports of substance use frequency were based on one question from the CDDR that asked participants to report how often they engaged in alcohol and marijuana use within the last year. Depending on what quarter the survey was completed, some participant responses in the during COVID-19 group may overlap with substance use behaviors that occurred prior to the pandemic.

In conclusion, the present study found evidence that depressive symptoms were higher following the onset of COVID-19 compared to before the pandemic, while alcohol use frequency and impairment decreased among young adults. Future research should continue to build upon these findings by examining how specific factors, such as type of user (i.e., light vs. heavy user), gender, barriers to access, and social isolation contribute to changes in substance use and further explore the moderating role of religiosity during the pandemic. Future research should also prioritize exploring these relationships in both clinical and diverse samples, to whom these findings may have even greater consequences.

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TABLE 1.

Sociodemographic Characteristics of Participants

Characteristic	Before COVID-19 (<i>N</i> = 453)		During COVID-19 (<i>N</i> = 445)		Full Sample (<i>N</i> = 898)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Sex						
Female	367	81.0	353	79.3	720	80.2
Male	81	17.9	92	20.7	173	19.3
Race						
American Indian/Alaskan Native/First Nations	4	.9	3	.7	7	.8
Asian	68	15.0	96	21.6	164	18.3
Black or African American	16	3.5	22	4.9	38	4.2
Native Hawaiian/Other Pacific Islander	11	2.4	15	3.4	26	2.9
White	314	69.3	255	57.3	569	63.4
Other	40	8.8	53	11.9	93	10.4
Ethnicity						
Hispanic	46	10.2	68	15.3	114	12.7
Non-Hispanic	407	88.7	377	84.7	784	87.3
Religious Affiliation						
Christian	302	66.7	256	57.5	558	62.1
Muslim	4	.9	8	1.8	12	1.3
Jewish	1	.2	0	.0	1	.1
Roman Catholic	34	7.5	47	10.6	81	9.0
Buddhist	3	.7	11	2.5	14	1.6
Hindu	1	.2	1	.2	2	.2
Agnostic	37	8.2	33	7.4	70	7.8
Atheist	19	4.2	12	2.7	31	3.5
Spiritual	31	6.8	53	11.9	84	9.4

“Don’t give religious things much thought.”	21	4.6	24	5.4	45	5.0
Alcohol Use						
Yes	312	68.9	232	52.1	544	60.6
No	141	31.1	213	47.9	354	39.4
Marijuana Use						
Yes	139	30.7	112	25.2	251	28.0
No	314	69.3	333	74.8	647	72.0

Note. Alcohol Use = Participants were asked “Do you currently or have you ever drunk alcohol?” Marijuana Use = Participants were asked “Do you currently or have you ever smoked marijuana (including edibles)?”

TABLE 2.

Descriptive statistics for primary study variables.

Variable	Before COVID-19 (<i>N</i> = 453)		During COVID-19 (<i>N</i> = 445)		Full Sample (<i>N</i> = 898)	
	<i>n</i> (%)	<i>M</i> (SD)	<i>n</i> (%)	<i>M</i> (SD)	<i>n</i> (%)	<i>M</i> (SD)
Age	453 (100)	19.98 (1.64)	445 (100)	19.68 (1.70)	898 (100)	19.83 (1.67)
Depressive Symptoms	453 (100)	13.24 (13.69)	445 (100)	17.42 (14.36)	898 (100)	15.31 (14.17)
Alcohol Use Frequency	453 (100)	1.65 (.89)	445 (100)	1.44 (.89)	898 (100)	1.56 (.89)
Alcohol Use Impairment	312 (68.9)	1.88 (3.88)	232 (52.1)	1.32 (2.96)	544 (61.69)	1.64 (3.53)
Marijuana Use Frequency	453 (100)	1.54 (1.21)	445 (100)	1.71 (1.33)	898 (100)	1.62 (1.27)
Marijuana Use Impairment	139 (30.7)	2.79 (6.38)	112 (25.2)	3.03 (6.95)	251 (27.95)	2.90 (6.63)
Religiosity	453 (100)	11.27 (4.04)	445 (100)	10.95 (3.55)	898 (100)	11.11 (3.80)

Note. % = Percent of sample, Depressive Symptoms = CESDR, Alcohol Use Frequency = CDDR, Alcohol Use Impairment = RAPI, Marijuana Use Frequency = CDDRM, Marijuana Use Impairment = RMPI, Religiosity = SCSORF.

TABLE 3.

Correlations between study variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Status	—											
2. Age	-.09**	—										
3. Sex	-.05	-.04	—									
4. Race	-.12**	.02	.10**	—								
5. Ethnicity	.08*	-.10**	.02	-.16**	—							
6. Religious Affiliation	-.01	.03	-.04	-.04	-.08*	—						
7. Religiosity	-.04	.05	-.01	.06	-.12**	.56**	—					
8. Alcohol Frequency	-.11**	.33**	.04	.12**	-.03	-.17**	-.13**	—				
9. Alcohol Impairment	-.08	.08	-.02	-.07	.02	-.09*	-.13**	.37**	—			
10. Marijuana Frequency	.07	.05	-.07	.00	.01	-.16**	-.16*	.15*	.25**	—		
11. Marijuana Impairment	.02	.06	-.22**	.02	-.06	-.04	.01	.10	.51**	.53**	—	
12. Depressive Symptoms	.15**	.10**	.03	-.03	.01	-.14**	-.17**	.13**	.22**	.09	.20**	—

Note. Sex is a dummy coded variable (0 = Male, 1 = Female). Race is a dummy coded variable (Non-White = 0, White = 1). Religious Affiliation is a dummy-coded variable (Atheist/Agnostic = 0, Christian faith identified = 1, non-Christian faith identified = 2).

* $p < .05$. ** $p < .01$.

TABLE 4.

Regression Coefficients of COVID-Status on Depression and Substance Use Behaviors in College Students

Variables	<i>Model 1</i>			<i>Model 2</i>		
	<i>B</i>	β	<i>SE</i>	<i>B</i>	β	<i>SE</i>
Depressive Symptoms						5.96
Constant	-.87		5.80	-2.02		0.28
Age	.86	.10**	.28	0.95	0.11**	1.14
Sex	1.24	.04	1.14	1.21	0.04	0.97
Race	-.06	-.00	.10	0.02	0.00	1.38
Religious Affiliation_D1	-5.4	-.17**	1.06	-2.96	-0.10*	2.79
Religious Affiliation_D2	-1.10	-.03	2.76	-0.54	-0.01	0.93
Status	4.10	.15**	.93	4.13	0.15**	0.19
Religiosity	—	—	—	-0.22	-0.06	0.92
Status*Religiosity	—	—	—	-1.74	-0.08	5.96
Alcohol Use Frequency						
Constant	-1.59		0.44	-1.64		0.45
Age	0.16	0.31**	0.02	0.17	0.32**	0.02
Sex	0.10	0.05	0.09	0.10	0.05	0.09
Race	0.19	0.10*	0.08	0.19	0.10*	0.08
Religious Affiliation_D1	-0.36	-0.19**	0.08	-0.29	-0.15**	0.11
Religious Affiliation_D2	-0.24	-0.04	0.23	-0.23	-0.04	0.23
Status	-0.16	-0.09*	0.07	-0.17	-0.09*	0.07

Religiosity	—	—	—	-0.01	-0.03	0.01
Status*Religiosity	—	—	—	-0.05	-0.04	0.07
Alcohol Use Impairment						
Constant	0.85		1.84	1.54		1.90
Age	0.11	0.05	0.09	0.10	0.05	0.09
Sex	-0.07	-0.01	0.38	-0.09	-0.01	0.38
Race	-0.39	-0.05	0.32	-0.39	-0.05	0.32
Religious Affiliation_D1	-1.22	-0.16	0.33**	-1.12	-0.15*	0.45
Religious Affiliation_D2	1.73	0.08	0.96	1.85	0.09	0.96
Status	-0.72	-0.10	0.30*	-0.68	-0.10*	0.31
Religiosity	—	—	—	-0.06	-0.07	0.06
Status*Religiosity	—	—	—	0.42	0.08	0.30
Marijuana Use Frequency						
Constant	1.70		0.93	1.90		0.96
Age	0.01	0.02	0.05	0.01	0.02	0.05
Sex	-0.15	-0.05	0.21	-0.16	-0.05	0.21
Race	0.00	0.00	0.17	0.00	0.00	0.17
Religious Affiliation_D1	-0.57	-0.23	0.16**	-0.56	-0.22*	0.22
Religious Affiliation_D2	0.13	0.02	0.45	0.14	0.02	0.45
Status	0.14	0.05	0.16	0.20	0.08	0.18
Religiosity	—	—	—	-0.02	-0.05	0.03
Status*Religiosity	—	—	—	0.14	0.07	0.16
Marijuana Use Impairment						

Constant	3.92		4.80	4.34		4.93
Age	0.12	0.03	0.24	0.04	0.01	0.24
Sex	-3.48	-0.20	1.06**	-3.35	-0.20**	1.06
Race	0.45	0.03	0.88	0.50	0.04	0.87
Religious Affiliation_D1	-1.51	-0.11	0.84	-3.17	-0.24**	1.13
Religious Affiliation_D2	3.79	0.11	2.31	3.63	0.10	2.30
Status	-0.01	0.00	0.82	0.35	0.03	0.90
Religiosity	—	—	—	0.21	0.12	0.17
Status*Religiosity	—	—	—	0.98	0.10	0.83

Note. Sex is a dummy coded variable (0 = Male, 1 = Female). Race is a dummy coded variable (Non-White = 0, White = 1). Religious Affiliation is a dummy-coded variable (Atheist/Agnostic = 0, Christian faith identified = 1, non-Christian faith identified = 2). COVID-19 Status is a dummy coded variable (0 = Before COVID-19, 1 = During COVID-19). Status*Religiosity = the interaction term.

* $p < .05$. ** $p < .01$.