THE MMPI-3 AND PERSONALITY CORRELATES OF MALADAPTIVE SUBSTANCE USE

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By

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ABSTRACT

THE MMPI-3 AND PERSONALITY CORRELATES OF MALADAPTIVE SUBSTANCE USE

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Maladaptive substance use is a serious, prevalent concern, with especially high prevalence rates found in the male and young adult populations. Research shows certain personality and psychopathology traits are strongly correlated with externalizing behaviors, including maladaptive substance use. Insight into the relationship between trait characteristics and substance use patterns may have implications for treatment outcomes. The current study is one of the first to examine associations between Minnesota Multiphasic Personality Inventory-3 (MMPI-3) traits and substance use on the Comprehensive Addictions and Psychological Evaluation, Fifth Edition (CAAPE-5). This study expands upon literature on the relationship between personality and psychopathology traits and use of alcohol and marijuana through correlational analysis of the MMPI-3 scales and CAAPE-5 data. Over two hundred college students participated, with findings demonstrating high rates of maladaptive substance use. The rate of overall substance use reported was lower than statistics from a nation-wide survey, but the current study sample displayed much higher rates of alcohol and cannabis use than seen in a nation-wide sample. Correlational analysis of MMPI-3 traits within the Behavioral/Externalizing Dysfunction domain revealed moderate to strong correlations with overall substance use and alcohol use. Aside from Demoralization, traits within the Emotional/Internalizing Dysfunction domain were insignificantly correlated with overall substance use and marijuana use. Gender

was not found to be a moderating effect on the association between Disconstraint and alcohol use. The findings from this study emphasize personality and psychopathology trait considerations when examining substance misuse among college students. Strong correlations between traits and substance misuse indicate treatment interventions that address individual characteristics that can influence substance misuse and vice versa may be beneficial. Additionally, this study highlights the value of using the MMPI-3 in research on substance misuse.

CHAPTER ONE: INTRODUCTION

Maladaptive substance use, referring to use of substances that has reached a level of concern as indicated by a probable substance use disorder, is a pervasive issue experienced at both individual and societal levels. A national survey conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA) in 2019 revealed 20.4 million individuals in the United States met criteria for a substance use disorder (SAMHSA, 2020). This equates to nearly 7.5% of the population. Approximately 21.6 million, or about 1 in 13 individuals, needed treatment for their substance misuse. Unfortunately, only 2.1 million individuals received treatment related to their substance misuse. Current rates of substance use disorders vary based on age, but have remained stable when compared to rates in 2015 and 2019 (SAMHSA, 2020).

Maladaptive substance use impacts individuals of all racial/ethnic backgrounds, socioeconomic statuses, education levels, and ages, but for some populations the risk is relatively higher. Perhaps most concerning are the high prevalence rates within the young adult (ages 18-25) population. SAMHSA (2020) revealed approximately 14% of young adults met criteria for a substance use disorder within the past year. Some studies show even higher rates, such as 39.6% for college students and 44.5% for young adults not enrolled in college (Arterberry, 2019). Disconcertingly, the young adult population is the least likely to seek treatment for their maladaptive substance use despite these inordinate rates. This is a major concern, as individuals who engage in maladaptive substance use but do not perceive the need for treatment are at an increased risk level for negative outcomes (Arterberry, 2019).

Alcohol and marijuana are among the substances with the highest rates of misuse among young adults. The prevalence of alcohol use disorder in individuals aged 18 to 25 has decreased from nearly 18% in 2002 to 9.3% in 2019 but alcohol-related problems remain a source of

concern. Binge-drinking is especially rife for this age group, with the highest prevalence for males age 22 at 53% and for females age 22 at 34% (Evans-Polce et al., 2018). Cannabis use disorder in the young adult age group was 5.8% in 2019 which is similar to rates in the past decade, but rates of marijuana use are climbing (SAMHSA, 2019).

Gender and sex differences are important to examine when conducting research on substance use disorders but remain understudied (McHugh et al., 2018). Historically men have had higher rates of substance use disorders, but this gap in prevalence is closing. There is a rise in women's substance misuse, perhaps due to the increased economic and social opportunities women are involved in today (Seedat et al., 2009). Men participate in substance misuse earlier than women, and more often display riskier behaviors such as binge drinking and illicit drug use (McHugh et al., 2018). Women tend to begin using substances later in life than men but are generally at higher risk for developing substance use-related problems. Increased impairment in daily functioning is reported by women receiving treatment for substance use disorders, yet adult females are less likely to receive treatment. Women are also less likely than males to receive specialized substance use disorder treatment (McHugh et al., 2018).

Paradigm Shift

The field of psychology has largely employed a categorical approach towards classifying and diagnosing psychopathology. The rationale for this is understandable; it allows for simplicity, clarity, and satisfies the innate human appreciation for categorization. Objective dichotomous criteria can allow for a more straight-forward depiction of mental illness (Witkiewitz et al., 2013). In the past couple of decades, however, the flaws of the categorical approach have raised concern and invited scrutiny of our current classification system.

Limitations of the categorical approach include the low interrater reliability between

diagnoses in the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5). Nearly half do not have acceptable levels of interrater reliability (Regier et al., 2013). Treatment for symptomatology can be hard to distinguish due to the high comorbidity between diagnoses (Mitchell et al., 2020). When considering the characteristics of mental disorders, it becomes clear that individuals experience symptoms along a continuum rather than in distinct boxes set by certain criteria (Widiger & Mullins-Sweatt, 2007).

Research shows that dimensional measures of psychopathology are more reliable and valid than categorical measures. This holds true for substance use disorders as well. Individuals who have a substance use disorder are more susceptible to exhibiting externalizing behaviors. This vulnerability is best represented on a dimensional spectrum (Witkiewitz et al., 2013). Since individuals vary significantly on levels of self-control, there is no clear criterion cut-off for constructs related to externalizing behaviors such as maladaptive substance use. Therefore, externalizing dysfunction in general is best captured when using a dimensional approach (Widiger & Mullins-Sweatt, 2007)

For current diagnostic purposes, the categorical coding approach is necessary for various reimbursement and program eligibility objectives. However, in the near future the need for more accurate discernment of psychiatric symptomatology and psychopathology may warrant replacement of the categorical system. For the present, categorically-based and dimensionally-focused assessments can be used in tandem to provide a comprehensive understanding of the client conceptualization.

The MMPI Instruments

The Minnesota Multiphasic Personality Inventory (MMPI) instruments have long been considered primary measures of personality characteristics and psychopathology. They have

been widely used in mental health, medical, and forensic settings, as well as for personnel selection and promotion purposes. Hathaway and McKinley's (1943) intention behind the development of the MMPI was to clarify the diagnostic process for physicians working in a clinical setting. Ideally, their empirical keying approach would result in elevations on empirically-derived scales that would then lead to one of 10 specific diagnostic groups. Although the assessment failed in this aspect, it proved a useful tool and established itself among the most frequently-used personality inventories. A resulting wealth of research also stemmed from the creation of the MMPI, leading to increased understanding of personality and psychopathology (Sellbom, 2019).

To address the original MMPI's outdated and homogenous normative sample, restandardization based upon 2,600 protocols produced the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) in 1989. New Content Scales provided the ability to measure additional constructs, but the original validity and clinical scales remained fairly unaltered, much to the relief of those who did not wish for the MMPI to be modified (Ben-Porath, 2012). However, this meant the issue of extensive item overlap was not attended to until 2003, with the development of the Restructured Clinical (RC) Scales. The culprit behind the significant overlap was the underlying factor of Demoralization. Once Demoralization was separated from each scale and made a core component, more focused forms of each scale were constructed targeting the major distinctive core construct. Factor analysis was used to create the final scales (McCord, 2018).

The most recent version of the MMPI instruments is the Minnesota Multiphasic Personality Inventory-3 (MMPI-3; Ben-Porath & Tellegen, 2020), consisting of 335 items and 52 scales. The MMPI-3 was released in fall 2020 and features a new normative sample of 1,620 individuals that aligns with the 2020 U.S. Census. Along with addressing the need to update the

norms, a goal of developing the MMPI-3 was to enhance the content. This is reflected in scale refinements, including the addition of several new scales and deletions and modification of some of the existing MMPI-2-RF scales. A normative sample of 550 Spanish-speaking individuals was also collected for development of the first Spanish translation. With the updated normative sample, there are a few differences in the norms resulting in lower T-scores for some validity scales and the Somatization scales (Pearson Assessments, 2020).

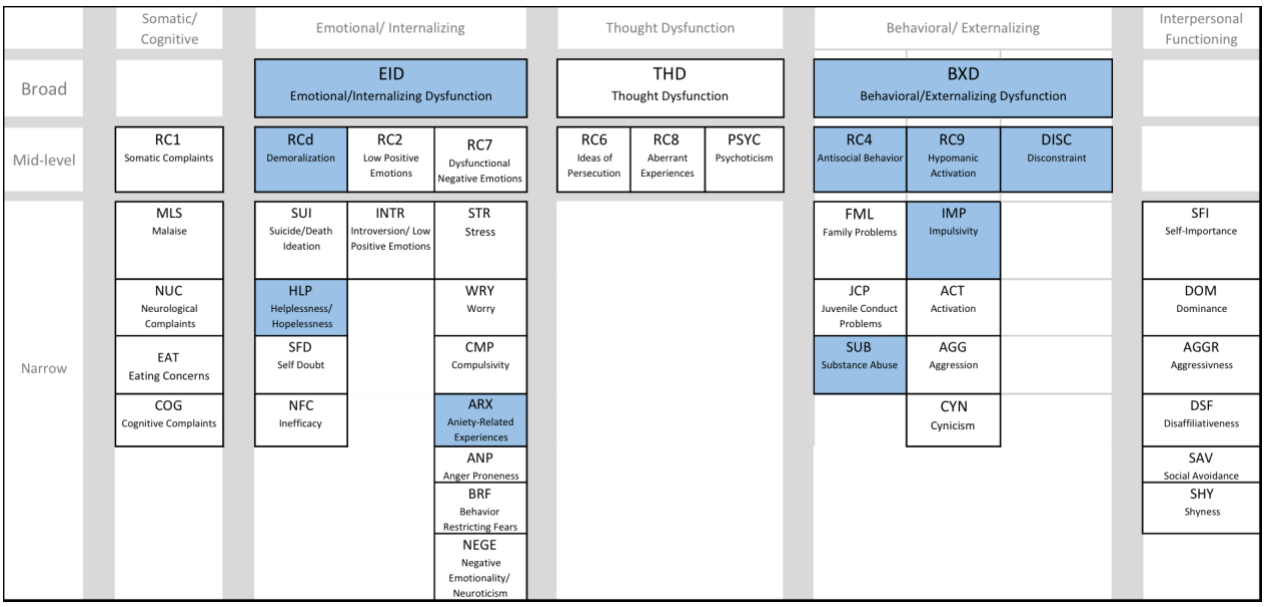
The hierarchical model of the MMPI-3 offers a coherent depiction of the personality and psychopathology constructs it assesses (see Figure 1 below). The tiered structure of scales is in order from least to most specific. At the top of the model are five domains (in order from left to right): Somatic/Cognitive, Emotionalizing/Internalizing, Thought Dysfunction, Behavioral/Externalizing, and Interpersonal Functioning. Within the Emotionalizing/Internalizing, Thought Dysfunction, and Behavioral/Externalizing domains are the broad Higher-Order scales with the same respective names. (Pearson Assessments, 2020).

The Somatic/Cognitive Domain includes the Somatic Complaints (RC1) Scale and the more specific Malaise, Neurological Complaints, Eating Concerns, and Cognitive Complaint scales. The next domain, Emotional/Internalizing Dysfunction, includes three RC scales: Demoralization (RCd), Low Positive Emotions (RC2), and Dysfunctional Negative Emotions (RC7). These scales under RCd are: Suicide/Death Ideation, Helplessness/Hopelessness, Self-Doubt, and Inefficacy. Under RC2 is Introversion/Low Positive Emotions, and below RC7 are the Stress, Worry, Compulsivity, Anxiety-Related Experiences, Anger Proneness, Behavior Restricting Fears, and Multiple Specific Fears. Behavioral/Externalizing Dysfunction represents several types of externalizing behaviors; the more specific scales under this parent scale include many of the ones of interest in the current study. At the mid-level, the RC scales under this

parent scale are Antisocial Behavior (RC4), Hypomanic Activation (RC9), and Disconstraint. Under RC4 are the facet scales Family Problems, Juvenile Conduct, and Substance Abuse. Below RC9 is Impulsivity, Activation, Aggression, and Cynicism. The Interpersonal Functional domain houses the Self-Importance, Dominance, Aggressiveness, Disaffiliativeness, Social Avoidance, and Shyness scales (Ben-Porath & Tellegen, 2020).

Figure 1

MMPI-3 Model of Psychopathology.



Note. Scales of interest highlighted in blue.

Association between Personality/Psychopathology and Maladaptive Substance Use

Previous research investigating personality traits of individuals diagnosed with a substance use disorder has found disinhibition to be a highly heritable underlying factor of substance misuse (Joyner et al., 2019; Kotov et al., 2010). Disinhibition is a broad dimension that appears in several personality models. Tellegen (1985) considered low agreeableness and low conscientiousness to be key components of disinhibition (Mullins-Sweatt et al., 2019). The DSM-5 explains that individuals who exhibit disinhibition may be predisposed to substance use

disorders due to impaired inhibitory mechanisms (American Psychiatric Association, 2013). In the DSM-5's proposed Alternative Model of Personality Disorders (AMPD), a model reflecting both dimensional and categorical characteristics, disinhibition encompasses impulsivity, irresponsibility, risk-taking, distractibility, and a lack of perfectionism (Mullins-Sweatt et al., 2019). High levels of disinhibition and impulsivity are seen in individuals who exhibit antisocial behavior, perhaps due to overarching externalizing dysfunction. Unsurprisingly, antisocial behavior has been shown to be associated with substance use disorders (Brennan et al., 2017) and the interaction of those conditions should be examined and addressed in treatment.

On the MMPI-3, the Personality Psychopathology Five (PSY-5) Scales assess cognitive reality, such as psychoticism, and dynamic emotion (Harkness et al., 2013). The Disconstraint Scale captures lack of self-control and sensation and excitement-seeking behaviors, the predominant characteristics of disinhibition (McCord, 2018). Bryant and McNulty (2017) found Disconstraint to be the strongest predictor of substance misuse out of the PSY-5 scales.

Personality traits have also been linked to specific substance misuse-related problems. Disconstraint has been found to correlate with maladaptive use of alcohol, marijuana, cocaine, and heroin (Harkness et al., 2013). Traits encapsulating impulsive and disinhibiting behaviors tend to be associated with certain substance-use related behaviors. Research finds that response inhibition deficits in individuals who act impulsively are linked to a tendency to misuse alcohol and stimulants (Conrod, 2016; Littlefield & Sher, 2016). Sensation-seeking is associated with alcohol and marijuana use (Mullins-Sweatt et al., 2019). Individuals who display sensation-seeking behaviors are motivated to engage in substance use through incentive reward and demonstrate an increased sensitivity to the pharmacological effects of alcohol (Conrod, 2016). Internalizing traits and behaviors are also important to consider in regard to misuse of particular

substances. Individuals who struggle with feelings of hopelessness have been found to use marijuana (Pearson et al., 2018). Other research has found high rates of co-occurrence between anxiety disorders and cannabis use (e.g., Kedzior & Laeber, 2014; Pasche, 2012). There is evidence for a bidirectional effect of marijuana use on symptoms of anxiety, but little is known about the directionality of this relationship. The prevalence of marijuana use and anxiety disorders among young adults warrants further research on this association.

Knowledge of personality and how it affects individuals' substance misuse and related behaviors could be crucial in identifying effective and lasting interventions. Although it may be futile to attempt changes to individuals' personality characteristics as a way to reduce or eliminate substance misuse, information of traits and affiliated motives could be advantageous for successful treatment. Generally, these motives are coping strategies that can be successfully targeted through empirically-based transdiagnostic approaches (Helle et al., 2016; Littlefield & Sher, 2016).

Research shows treatment interventions that are matched to personality characteristics or specifically address personality factors that affect substance use patterns may improve treatment outcomes (Staiger et al., 2007). For example, treatment-seeking behaviors and outcomes for individuals who only have symptomatology of alcohol use disorder can look very different from that of individuals diagnosed with alcohol use disorder and another psychiatric disorder (Helle et al., 2019). Therefore, treatment approaches may necessitate special consideration for individuals who require interventions for co-occurring conditions. Measures that assess narrow facets of personality and psychopathology, such as the MMPI-3, could be useful in both research and treatment contexts to further distinguish the underlying motives of individuals' problematic substance use.

Current Study

The upcoming release of the MMPI-3 allows the opportunity to compare it with an external criterion measure of substance use to determine patterns of convergent and divergent correlations. As previous research has shown, information of individuals' personality and psychopathology characteristics, especially related to disinhibition, may be a valuable tool in tackling problematic substance misuse. The MMPI-3 is used to examine the association between personality and psychopathology traits and maladaptive substance use. Expressly, behavioral/externalizing dysfunction and emotional/internalizing dysfunction are compared to patterns of substance use. This study expands upon the literature on the association between specific personality and psychopathology traits and misuse of particular substances. Due to the high rates of alcohol and marijuana use among college students, these two substances were focused upon for this study. Given prior research on gender differences regarding the link between disinhibition and externalizing disorders (Hicks et al., 2007), the moderating effect of gender on the MMPI-3 Disconstraint scale and alcohol use was also examined.

Hypotheses

Hypothesis 1. It is hypothesized that MMPI-3 Behavioral/Externalizing Dysfunction domain scores will be correlated with substance use risk as indicated by the CAAPE-5.

1a. There will be a significant positive correlation between the MMPI-3 Behavioral/Externalizing Dysfunction scale (BXD) and substance use risk as indicated by the CAAPE-5.

1b. There will be a significant positive correlation between the MMPI-3 Antisocial Behavior scale (RC4) and substance use risk as indicated by the CAAPE-5.

1c. There will be a significant positive correlation between the MMPI-3 Hypomanic Activation scale (RC9) and substance use risk as indicated by the CAAPE-5.

1d. There will be a significant positive correlation between the MMPI-3 Substance Abuse scale (SUB) and substance use risk as indicated by the CAAPE-5.

Hypothesis 2. It is hypothesized that CAAPE-5 substance use scores will be positively correlated with MMPI-3 scores within the Emotional/Internalizing Dysfunction domain.

2a. There will be a significant positive correlation between the MMPI-3 Emotional/Internalizing Dysfunction scale (EID) and substance use risk as indicated by the CAAPE-5.

2b. There will be a significant positive correlation between the MMPI-3 Demoralization scale (RCd) and marijuana use as indicated by the CAAPE-5.

2c. There will be a significant positive correlation between the MMPI-3 Anxiety-Related Experiences scale (ARX) and marijuana use as indicated by the CAAPE-5.

2d. There will be a significant positive correlation between the MMPI-3 Helplessness/Hopelessness scale (HLP) and marijuana use as indicated by the CAAPE-5.

Hypothesis 3. It is hypothesized that correlations with specific MMPI-3 externalizing scales will be higher with alcohol use as indicated by the CAAPE-5.

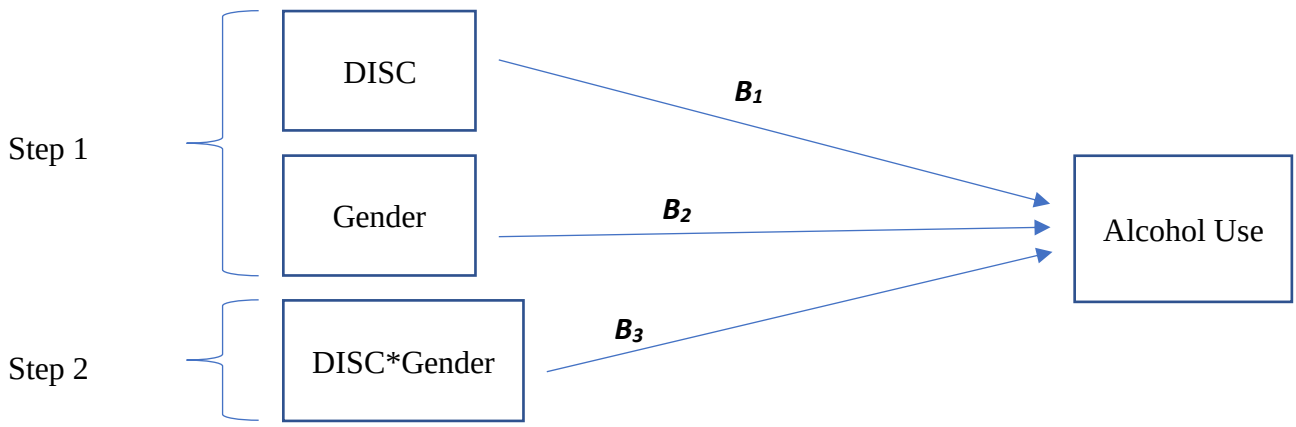
3a. There will be a significant positive correlation between the MMPI-3 Disconstraint scale (DISC) and alcohol use as indicated by the CAAPE-5.

3b. There will be a significant positive correlation between the MMPI-3 Impulsivity scale (IMP) and alcohol use as indicated by the CAAPE-5.

Hypothesis 4. Gender will have a moderating effect between Disconstraint and alcohol use, with a greater impact of this association on males. A statistical diagram of this moderation is shown below in Figure 2.

Figure 2

Statistical Diagram of Moderating Effect of Gender on Alcohol and Disconstraint.



Note. DISC = MMPI-3 Disconstraint scale

CHAPTER TWO: METHOD

Participants

The sample consists of 210 undergraduate students from a medium-sized state comprehensive university in a rural, southeastern region of the United States. Students were recruited through the university psychology research pool and required to be 18 or older to participate. They received course credit for participating in this study. After excluding invalid MMPI-3 profiles (see Analyses section), the final sample was 205 participants. The majority were female (62.4%, n =128), age 18 (50.7%, n = 104), and unmarried (97.6%, n = 200). Over 98% of the sample was between the ages of 18 and 25. Demographic information can be found in Table 2.

Measures

Two empirically supported assessments within their respective areas of focus were used to ascertain a comprehensive conceptualization of the participants' personality characteristics, psychological functioning, and substance use patterns. These measures are the MMPI-3 and the Comprehensive Addictions and Psychological Evaluation, Fifth Edition (CAAPE-5).

Comprehensive Addictions and Psychological Evaluation, Fifth Edition

The CAAPE-5 (Hoffmann, 2013; See Appendix A) is a structured diagnostic interview made up of 150 items that assess substance use and common psychological disorders as defined by the DSM-5 (American Psychiatric Association, 2013). The CAAPE-5 demonstrates content validity by aligning with DSM-5 criteria and high reliability with the diagnostic subscales for substance use disorders featuring Cronbach's alphas in the .90s (Procter & Hoffmann, 2012). The CAAPE-5's extensive 39-item section on substance use goes above and beyond the majority of other measures of substance misuse by providing a complete picture of respondents' substance

use history and current patterns. For the purposes of this study, only the substance use items of the interview were administered.

Benefits of the CAAPE-5 include the ability to obtain a comprehensive behavioral health conceptualization of the respondent within about 30 minutes. The CAAPE-5 also provides information regarding the severity of substance misuse, with items categorized by DSM-5 criteria. Test-takers receive higher scores for more items answered positively, reflecting higher reports of symptomatology. Scores obtained on the CAAPE-5 may translate to a DSM-5 categorical diagnosis of a substance use disorder number of positive criteria met, with raw scores of at least two indicating a probable diagnosis of a substance use disorder (American Psychiatric Association, 2013). If risk is determined, levels of severity are classified as Mild, Moderate, and Severe, consistent with the DSM-5.

Minnesota Multiphasic Personality Inventory – 3

The norm-updated MMPI-3 is the latest of the MMPI instruments, assessing personality and psychopathology. The measure consists of 335 items, with test-takers responding in a dichotomous true/false fashion. Completion time ranges from 25 to 50 minutes, based on online or paper-and-pencil administration. The internal consistencies of the MMPI-3 traits examined in this study show substantial reliability. A list of Cronbach's alphas for these traits can be found in Table 1.

These data were collected in a combined effort that also included additional measures not utilized in the current study. These include an experimental version of the Multidimensional Behavioral Health Screen 2.0 (MBHS), Interpersonal Needs Questionnaire (INQ), Fearlessness About Death Scale, and Depressive Symptoms Inventory – Suicide Subscale (DSI-SS). Additional measures administered were the Childhood Trauma Questionnaire (CTQ), Eating

Disorder Examination (EDE-Q), an experimental version of an item set similar to the CTQ, an adult attachment questionnaire, and a structured interview regarding suicide risk assessment.

Analytic Strategy

An a priori power analysis was conducted via G*Power (Faul et al., 2009) to ensure a suitable sample size; this indicated a sample size of 193 participants would yield 80% power assuming small-medium effects. Internal consistency among the MMPI-3 scales of interest in this study was examined using Cronbach's alpha, with a value of >.8 determined to be sufficient. Correlational analysis via SPSS (IBM Corp., 2017) was used to examine associations with substance use as indicated by the CAAPE-5. Since severity classifications for probable substance use disorders as indicated by the CAAPE-5 were considered ordinal, Spearman's correlation coefficients were computed. Participants were placed in one of the following severity classifications: No risk, Mild, Moderate, and Severe based on number of positive criteria met on the CAAPE-5. All substance use reported by participants was recorded, but only misuse of alcohol and marijuana was involved in the analyses. Rates of alcohol and marijuana use obtained from the study sample included data from the small number of participants who met criteria for both an alcohol use disorder and a cannabis use disorder.

Since multiple correlation coefficients were calculated from the same dataset, the Bonferroni correction was applied resulting in an adjusted alpha level of $p < .005$ (0.05/10) for determining statistical significance. For the purposes of clinical significance, a minimum effect size of .30 was established for interpretation of correlation coefficients.

A moderation was examined using hierarchical multiple regression analysis in SPSS to assess the moderating variable of gender on alcohol misuse and Disconstraint. Descriptive statistics were examined to observe prevalence of overall elevated substance use, elevated

alcohol use, and elevated marijuana use between males and females. This allowed for exploratory observations of gender differences in level of severity.

Procedure

Data collection commenced with an in-person format during the Spring 2020 semester. Upon arrival, participants were given a brief verbal explanation of the study procedure and risks involved and provided the informed consent form (see Appendix B) to read. Participants were offered a copy of the consent form to keep, along with a sheet of local psychological and medical services. Once consent was obtained, participants were administered the survey measures via Qualtrics, an online survey program. Once the survey was completed, the CAAPE-5 and Joiner Suicide Risk structured interviews were conducted. The study was concluded after any suicide-related emergency was identified and addressed. If a participant was deemed high risk for suicide, a protocol outlined with the Western Carolina University Internal Review Board was followed. This included involving the Western Carolina University Counseling and Psychological Services, Issue Alert System, and local emergency services if necessary.

After data were collected from 31 participants in this format, the procedure was shifted to an online video conferencing platform Zoom due restrictions associated with the COVID-19 pandemic. The remainder of the data were obtained through this modified remote data collection. Participants were emailed 24 hours prior to the session time with a copy of the informed consent document, local psychological and medical care resource document, and a HIPAA-compliant Zoom link specific for each participant. A brief verbal explanation of the study and overview of the consent form was provided. Once consent was obtained, participants completed the measures via Qualtrics, an online data collection platform. Upon completion, participants were interviewed based on the CAAPE-5 substance use-related items. Following the Joiner Suicide Interview,

participants at risk for suicide were connected with safety services as outlined in the protocol above.

CHAPTER THREE: RESULTS

At the time data were extracted for the purposes of this research, a total of 210 participants had completed the study. Five participants were excluded from the sample due to invalid MMPI-3 profiles as based on previously-determined cut-off scores. Analyses were run on the final sample of 205 participants.

Descriptive Statistics

The CAAPE-5 interview provided information on the prevalence of substance use disorders among participants as determined by number of positive criteria met. Data were also collected on number of criteria met for an alcohol use disorder and/or cannabis use disorder. Over 28% (n = 58) of the participants met criteria for a substance use disorder as determined by the CAAPE-5. Approximately 25% (n = 51) of the sample reported maladaptive alcohol use that would suggest a likely alcohol use disorder and slightly over 14% (n = 29) reported a level of cannabis use that would indicate a probable cannabis use disorder. A complete list of severity classifications for participants who would likely meet criteria for a substance use disorder can be found in Table 3.

Elevated substance use among participants based on gender was also examined (see Table 4). Over 16% of the female participants and over 11% of the male participants reported elevated substance use. Of the sample, just over 14% of the female participants and nearly 11% of the male participants had a probable alcohol use disorder. Percentages were lower for participants with an anticipated cannabis use disorder, with approximately 8% of females and 6% of males reporting elevated marijuana use.

Hypothesis I

Correlational analysis of MMPI-3 trait correlations in the Behavioral/Externalizing Dysfunction domain and substance use yielded moderate correlations (see Table 5). Strong correlations were found between overall substance use and the Behavioral/Externalizing Dysfunction ($r = .561$, $p < .001$) and Antisocial Behavior scales ($r = .531$, $p < .001$). The Substance Abuse Scale was also strongly correlated with substance use, $r = .539$, $p < .001$. Hypomanic Activation and overall substance use were moderately correlated, $r = .435$, $p < .001$.

Hypothesis II

Correlational analysis of MMPI-3 traits within the Emotional/Internalizing Dysfunction domain and substance use as determined by the CAAPE-5 revealed some significant but weak correlations (see Table 6). Demoralization and marijuana use were weakly correlated, $r = .200$, $p = .004$. With the conservative Bonferroni correction, Emotional/Internalizing Dysfunction and overall substance use were not significantly correlated, $r = .144$, $p = .039$. Marijuana use was not significantly correlated with the Anxiety-Related Experiences ($r = .148$ $p = .034$) and Helplessness/Hopelessness ($r = .116$, $p = .099$) scales.

Hypothesis III

Two traits within the Behavioral/Externalizing Dysfunction domain were correlated with alcohol use. Disconstraint and alcohol use were strongly correlated, $r = .545$, $p < .001$ and Impulsivity and alcohol use were moderately correlated, $r = .390$, $p < .001$. These results can be found in Table 7.

Hypothesis IV

In order to examine if the MMPI-3 Disconstraint scale predict elevated alcohol use, and if gender acts as a moderating variable, alcohol misuse was regressed onto Disconstraint, gender,

and the interaction between Disconstraint and gender (see Table 8). Semi-partial Pearson's r (r_{sp}) were reported as a measure of effect size for regression coefficients (Dudgeon, 2016). Disconstraint and gender were entered in the first step of the model, and the interaction term (Disconstraint x Gender) was entered into the second step. The first step of the model accounted for 34% of the variance, $R^2 = 0.34$, $F(2, 202) = 51.925$, $p < .001$. In this first step, Disconstraint was positively and significantly associated with elevated alcohol use, $B = .34$, $\beta = 0.59$, $t(202) = 10.14$, $p < .001$, 95% CI [0.27, 0.40], $r_{sp} = .58$. Gender was not significantly associated with alcohol use, $B = .09$, $\beta = 0.02$, $t(202) = 0.40$, $p = .687$, 95% CI [-0.36, 0.54], $r_{sp} = .02$. Adding the interaction term to the second step of the model accounted for no change in the variance, $\Delta R^2 = 0.00$, $F(1, 201) = 0.14$, $p = .714$. In this second step, the interaction term was not significantly associated with alcohol use, $B = -.03$, $\beta = -0.07$, $t(201) = -0.37$, $p = .714$, 95% CI [-0.16, 0.11], $r_{sp} = -.02$.

CHAPTER FOUR: DISCUSSION

The data obtained from the CAAPE-5 interviews revealed a substance use disorder prevalence rate of just over 28%, which is within the range of prevalence rates found in the literature. This number is lower than what has been reported for college students, but is nevertheless alarmingly high. This lower rate could be due to limited access to substances due to several factors. The sample was composed of a large percentage of freshmen, who may not have the means to access substances for reasons such as underage status, reduced transportation opportunity, or residential housing guidelines. These postulations are not meant to minimize the prevalence of substance misuse in the sample, however; this rate confirms the extent of maladaptive substance use among the college student population. Results also reveal higher rates of alcohol use disorder and cannabis use disorder than is reported for a 2019 national survey of substance use (SAMHSA, 2020). Participants in this sample reported rates of elevated alcohol and marijuana use that are nearly double what the national rates are.

Traits within the Behavioral/Externalizing Dysfunction domain were significantly correlated with overall substance use. A strong correlation was found between the MMPI Substance Abuse scale and overall substance use as determined by the CAAPE-5, which suggests good criterion-related validity of the Substance Abuse scale. Moderate to strong correlations between alcohol use and the Disconstraint and Impulsivity scales corroborate the literature on disinhibition and impulsivity as risk factors for maladaptive alcohol use. These findings are consistent with research indicating young adults with externalizing trait characteristics are more likely to engage in maladaptive substance use.

For traits within the Emotional/Internalizing Dysfunction domain, only Demoralization was significantly correlated with marijuana use. Given the dearth of research on the association between internalizing symptomatology and marijuana misuse, these findings are useful in further understanding associations between trait characteristics and marijuana use, which is becoming more prevalent. The hypothesis that Disconstraint predicts alcohol use was supported but there was no effect of gender on that relationship. In other words, individuals who are more disinhibited report increased alcohol use. This finding does not differ between men and women, which is inconsistent with research showing men are at higher risk for externalizing disorders (Hicks et al., 2007). Given the risk factors associated with substance misuse, especially among disinhibited individuals, research on sex differences in patterns of alcohol consumption is needed

Limitations

This study contributes to the understanding of associations between personality and psychopathology traits and substance use through the use of two empirically supported measures. However, it is not without its limitations. The sample was predominantly composed of individuals identifying as White and is therefore not representative of minority populations. Participants were college students, which is a crucial population to examine in regard to patterns of substance misuse but means findings do not lend generalizability to the general population. Future research should involve more diverse samples to generalize these findings to other populations.

While this study provides some of the first correlations of substance use with the MMPI-3, the multiple correlation coefficients that were simultaneously calculated in the process of testing these hypotheses resulted in increased chances of Type I error. In an attempt to counteract

this, a *p* level of .001 was established for determining significance and a threshold effect size of .30 was set for interpretation of the correlation coefficient.

Clinical Implications

This study highlights the high rates of maladaptive substance use seen among the young adult population. These findings, combined with research showing increased efficacy of early interventions for treatment of substance use disorders, warrant an increased understanding of the impact individual differences in personality and psychopathology have on treatment outcomes. Previous research on the associations between personality and psychopathology traits and maladaptive substance use has outlined the importance of incorporating this knowledge into treatment of substance use disorders. Identification of correlations between certain traits and misuse of specific substances could assist in providing more targeted treatment interventions for individuals with substance use disorders. Research on trait associations in regard to substance misuse can inform treatment and assist with the development or modification of approaches that could result in increased treatment efficacy. Additionally, this research could prove useful in modification of treatment approaches and programs with the goal of increased treatment retention.

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APPENDIX A: PREVIEW OF CAAPE-5

10. When did you last use [name substance]?

Name each substance group including local terminology where appropriate.

Code according to the most recent use:
0 = Never used
1 = Not used for more than 12 months
2 = Used within the past 12 months, but not during past 6 months
3 = Used within the past 6 months, but not during past month
4 = Used in past month
5 = Used within the past week
6 = Used within the past 24 hours

For each substance used in the past month, record number of days used. __

Tobacco
0 1 2 3 4 5 6 __ __ days

Alcohol
0 1 2 3 4 5 6 __ __ days

Marijuana
0 1 2 3 4 5 6 __ __ days

Cocaine (powder or crack)
0 1 2 3 4 5 6 __ __ days

Amphetamines / stimulants
0 1 2 3 4 5 6 __ __ days

Sedatives / tranquilizers
0 1 2 3 4 5 6 __ __ days

Heroin / opioids
0 1 2 3 4 5 6 __ __ days

Hallucinogens / PCP
0 1 2 3 4 5 6 __ __ days

Inhalants
0 1 2 3 4 5 6 __ __ days

Other substance (specify) _____
0 1 2 3 4 5 6 __ __ days

If no substance use is reported go to Item 48.

One problem with multiple substances is that if one or two substances are used, the probes for problems in the past 12 months can be asked for each substance.

Alternative option: If multiple substances are used, the general question can be asked without naming a substance. Circle "no" or "yes" above the left column, and ask the next question. Once all the questions in this section are covered, return to the first "yes" question and do the probes for specific substances.

11. **[U]** - Have you ever spent more time using [name substance] than you intended to?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

12. **[N]** - Have you ever neglected or omitted your usual responsibilities because of [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

13. **[O]** - Have you ever wanted to cut down on your use of [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

14. **[O]** - Has anyone ever objected to your use of [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

15. **[P]** - Have you ever found yourself thinking a lot about using [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

16. **[E]** - Have you ever used [name substance] to relieve emotional discomfort, such as sadness, anger, or boredom?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

If no positive responses to Items 11-16, skip to Item 48.

Any positive response to the UNCOPE (Items 11-16) suggests a possible problem. Two or more positive responses to Items 11-15 indicates at least a mild substance use disorder, and two or more at least a moderate use disorder if the UNCOPE findings pertain to the same substance. A positive response on Item 16 may indicate self-medication.

Continuation of the interview is required to cover content necessary to confirm a diagnosis.

Criterion 1: Unplanned use, more use, or longer time using (includes Item 11)

17. Have you ever drunk or used drugs more than you had intended?

If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 2: Desire and/or attempts to restrict use (includes Item 13)

18. Have you ever set rules to control your drinking or drug use? **If no to all, skip the next item**

If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

19. Have you ever failed to follow rules to control your drinking or drug use?

If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 3: Spending a great deal of time using

20. **A.** On a typical Friday, or last day of work for the week, how many hours do you spend drinking or using drugs and getting over the effects of use? __ __

B. For a typical Saturday and Sunday, or two days when you don't work, how many total hours do you spend drinking or using and recovering from use? __ __

C. When you drink or use during a typical work day, such as Monday through Thursday, how many hours would you typically spend drinking or using and recovering from use. __ __

D. During a typical week, on how many weekdays do you drink or use drugs? ___

Estimated hours of use during a typical week equals A + B + (C x D). __ __

Hours of use can be calculated after the interview.

21. Have you ever found yourself planning your activities around being able to drink or use drugs?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

22. Have you ever stayed intoxicated on alcohol or high from drugs for more than a day at a time?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 4: Craving or strong compulsion
(Includes Item 15)

23. Have you ever had a strong craving to [illegible] or use drugs?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

24. Has the desire to drink or use a drug ever been so strong that you couldn't resist drinking or using?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion [illegible] fulfil[illegible] failure
([illegible] Item[illegible]

25. Have you [illegible] school because of your drinking [illegible] use?
If yes, [illegible] Does t[illegible] apply to [name substance]?

no	yes		times in past 12 mo.
0	1	[illegible]	0 1 2 3+
0	1	Marijuana	0 1 2 3+
[illegible]	1	Cocaine	0 1 2 3+
[illegible]	1	Amphetamines / stimulants	0 1 2 3+
[illegible]	[illegible]	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

26. Have you ever had any work or school problems related to your drinking or drug use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

27. Have you ever had any financial problems related to drinking or drug use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 6: Social or interpersonal problems
(Includes Item 14)

28. Have you ever been violent or hit anyone while drinking or using drugs?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

29. Has your drinking or drug use ever [illegible] relationship with someone you [illegible] abo[illegible]
If yes, ask: Does that apply to [n[illegible] substa[illegible]

no	yes		[illegible]s in pa[illegible] 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocain[illegible]	0 1 2 3+
0	1	Amp[illegible] stim[illegible]nts	0 1 2 3+
0	1	S[illegible]tives [illegible]rs	0 1 2 3+
0	1	[illegible] / opi[illegible]	0 1 2 3+
0	[illegible]	H[illegible]ens / PCP	0 1 2 3+
0	[illegible]	[illegible]	0 1 2 3+
[illegible]	1	[illegible] drug _____	0 1 2 3+

30. Have you ever had conflicts with anyone over matters that might have been related to your drinking or drug use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 1[illegible] mo.
0	1	Alcohol	0 1 [illegible] 3+
0	1	Marijuana	0 1 [illegible]
0	1	Cocaine	[illegible]
0	1	Amphetamines / stimulants	0 1 2 [illegible]
0	1	Sedatives / tranquilizers	0 1 2 3
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 7: Sacr[illegible] because of use

31. Have yo[illegible] skipped a[illegible] family or social functions becaus[illegible] your dri[illegible]g or drug use?
If yes, [illegible] Does t[illegible]pply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alc[illegible]	0 1 2 3+
[illegible]	1	Marijuana	0 1 2 3+
[illegible]	1	Cocaine	0 1 2 3+
[illegible]	[illegible]	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

32. Have you ever given up or reduced any activities so that you could drink or use drugs?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

33. Has you ever missed any work opportunities or work related activities because of alcohol or drug use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 8: Dangerous behaviors

34. Have you ever injected a drug to get high?
If the response is yes, ask:
Did you inject [name substance]?

no	yes		times in past 12 mo.
0	1	Cocaine	0 1 2 3+
0	1	Heroin or other opioids	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Other drugs _____	0 1 2 3+

35. Have you ever driven any type of motor vehicle when you may have been intoxicated or under the influence?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other _____	0 1 2 3+

36. Have you done things while drinking or using other drugs that you were under the influence was dangerous?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 9: Medical or psychological contraindication

37. Have you ever had any physical problems that might have been caused by drinking or drug use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

38. Have you ever continued to drink or use drugs when you had a physical problem that might be made worse by use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
	1	Cocaine	0 1 2 3+
	1	Amphetamines / stimulants	0 1 2 3+
		Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

39. A. Have you ever not remembered things you said or did while drinking or after drinking?

no	yes		times in past 12 mo.
0	1		0 1 2 3+

39. B. Have you ever not remembered things you said or did when using other drugs?

no	yes		times in past 12 mo.
0	1		0 1 2 3+

40. Have you ever drunk or used despite experiencing emotional or psychological problems that might have been caused by or made worse by drinking or drug use?
If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Criterion 10: Tolerance

If no alcohol use is reported in past year, skip to Item 43.

41. When you drink, how many standard drinks do you usually have? A standard drink would be 12 oz. of beer, glass of wine or 1.5 oz. of liquor.
    - ___ (1) 9 or more
    - ___ (2) 7 or 8
    - ___ (3) 5 or 6
    - ___ (4) 3 or 4
    - ___ (5) 1 or 2

42. Have you ever been able to drink about a fifth of liquor or 20 beers or 3 bottles of wine in a day?

no	yes		times in past 12 mo.
0	1		0 1 2 3+

43. Have you ever found that you could drink or use more than you once did? That is, did it take more to get intoxicated or high?
    If yes, ask: Does that apply to [name substance]?

ever			in the past 12 mo.	
no	yes		no	yes
0	1	Alcohol	0	1
0	1	Marijuana	0	1
0	1	Cocaine	0	1
0	1	Amphetamines / stimulants	0	1
0	1	Sedatives / tranquilizers	0	1
0	1	Heroin / opioids	0	1
0	1	Hallucinogens / PCP	0	1
0	1	Inhalants	0	1
0	1	Other drug _____	0	1

44. Have you ever found that [illegible] the same effect with the same amount of alc[illegible]
    If yes, ask: Does [illegible] apply to [name substance]?

ever			in the past 12 mo.	
no	yes		no	yes
0	1	Alcohol	0	1
0	1	[illegible]ana	0	1
0	[illegible]	Co[illegible]	0	1
0	[illegible]	[illegible]es / stimulants	0	1
[illegible]	1	[illegible]ives / tranquilizers	0	1
[illegible]	1	He[illegible]in / opioids	0	1
[illegible]	1	Hallucinogens / PCP	0	1
[illegible]	1	Inhalants	0	1
[illegible]	1	Other drug _____	0	1

Criterion 11: Withdrawal

45. Have you ever had shakes, sweating, nausea, fatigue, runny nose, insomnia, or any other ill effects after stopping or cutting down on drinking or drug use?
    If yes, ask: Does that apply to [name substance]?

no	yes		times in past [illegible] mo.
0	1	Alcohol	0 1 [illegible]
0	1	Marijuana	[illegible]
0	1	Cocaine	0 1 2 [illegible]
0	1	Amphetamines / stimul[illegible]	[illegible] 1 2 3+
0	1	Sedatives / tranquili[illegible]	[illegible] 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogen[illegible]	[illegible] 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

46. Have you [illegible]d a d[illegible]ed drugs to ease a hangov[illegible] reduce other ill effects of use?
    If yes, [illegible] Does [illegible]pply to [name substance]?

no	yes		times in past 12 mo.
0	1	A[illegible]	0 1 2 3+
[illegible]	1	Marijuana	0 1 2 3+
[illegible]	1	Cocaine	0 1 2 3+
[illegible]	[illegible]	Amphetamines / stimulants	0 1 2 3+
[illegible]	[illegible]	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Legal problems: Not a DSM-5 criterion

47. Have you ever been arrested, ticketed, or detained by any law officers for any reason related to your alcohol or drug use?
    If yes, ask: Does that apply to [name substance]?

no	yes		times in past 12 mo.
0	1	Alcohol	0 1 2 3+
0	1	Marijuana	0 1 2 3+
0	1	Cocaine	0 1 2 3+
0	1	Amphetamines / stimulants	0 1 2 3+
0	1	Sedatives / tranquilizers	0 1 2 3+
0	1	Heroin / opioids	0 1 2 3+
0	1	Hallucinogens / PCP	0 1 2 3+
0	1	Inhalants	0 1 2 3+
0	1	Other drug _____	0 1 2 3+

Comments:

APPENDIX B: CONSENT FORM

Western Carolina University
Consent Form to Participate in a Research Study

Thank you for volunteering to participate in this study. This document describes the purposes of the study and what will be expected from you, along with some important issues regarding your safety, privacy, and confidentiality. These issues will be reviewed with you at the time of your participation, but we wanted to provide this information ahead of time as well so that you are fully prepared and know exactly what to expect.

Project Title: Improving Prediction of Mental Health Issues in Primary Medical Care Settings

This study is being conducted by: Dr. David McCord and graduate students in his research group. (Please note that if your PSY 150 instructor is Ms. Annabel Franz you will not be allowed to participate due to conflict of interest.)

Description and Purpose of the Research: You are invited to participate in a research study about the development of a brief psychological screening instrument that is designed for routine use in primary medical care settings. The current study is intended to explore possible improvements in our ability to predict emerging problems in key areas of mental health. The overall goal of this long-term project is to create a quick screening test that can help to identify mental health problems very early, so that earlier intervention can occur before problems worsen.

What you will be asked to do: You will be asked to complete a long series of psychological questionnaires on a laptop computer. There are eight different questionnaires, one very long, and seven much shorter ones. There are no right or wrong answers; you are just asked to answer honestly about your thoughts and feelings. Generally, this should take about an hour. Following the questionnaire phase you will participate in two different structured interviews, one focused on substance use patterns and the other on suicide-related thoughts and feelings. Each of these interviews can take between 5 and 20 minutes. You are getting 2 full credits in SONA to allow for the time it takes to sign in, get started, complete the questionnaires, and then the two interviews.

Risks and Discomforts: We anticipate that your participation in this survey presents no greater risk than everyday use of the Internet. However, some of the questions we will ask you as part of this study may make you feel uncomfortable. You may refuse to answer any of the questions, take a break or stop your participation in this study at any time.

We want to emphasize that many of the items on these questionnaires focus on negative emotions such as depression, and a fairly large number of items deal more or less directly with suicide-related content. If you anticipate that this might cause you too much distress, you should consider declining participation in this study.

Benefits: There are probably no direct benefits to you for participating in this research study. The study is intended to help us better understand the performance of our screening test items and scales so that we can continue to improve them. The instrument we are creating can potentially help large numbers of people get help sooner for psychological problems.

Privacy/Confidentiality/Data Security: The data collected in this research study will be kept confidential. Participation in research may involve some loss of privacy. We will do our best to make sure that the information about you is kept confidential, but we cannot guarantee total confidentiality. You should note, though, that the only "personal" information that will be stored with your test data is your Date of Birth, which is not unique to you. Your personal information may be viewed by individuals involved in the research and may be seen by people including those collaborating, funding, and regulating the study. We will share only the minimum necessary information in order to conduct the research. While the information and data resulting from this study may be presented at scientific meetings or published in a scientific journal, your name or other personal information will not be revealed.

We will collect much of the research information through Qualtrics, an online survey and data collection system. Your participant number allows us to link the completed surveys together, but the only personal information included in the Qualtrics data set is Date of Birth. As noted above, following the questionnaire part of the study, you will participate in two fairly short face-to-face (on Zoom) interviews. The first focuses on substance use history and current patterns, which may take from 5 to 20 minutes. The second and final step of the study is a suicide risk interview. Because we are collecting data remotely, and because we are very focused on the safety and welfare of our student participants, in order to participate you will need to provide us with some personal information in case of an emergency. This information will be entered into a shared OneDrive Excel file. OneDrive has more privacy protections and is a safer storage method than email or even phone conversations. This Excel file will only be accessible to the researcher conducting the initial Zoom session, the researcher conducting the suicide risk assessment, and the Principle Investigator on this study (Dr. McCord). Once you have completed the study, if there are no emergency or high-risk factors noted, then all your personal information will be deleted. If there is an emergency or high-risk factors noted, such as concern that you have a high likelihood that you would attempt suicide imminently, then your personal information will be used to get you help. Once this has been done, your personal information will be deleted. At that point, there will be no way to connect any of your personal information with any of the information you provided during the study – again, you will not be asked to provide any personal information, apart from some basic demographic information (e.g., birth date, gender, ethnicity), on any of the Qualtrics forms that produce the final data set.

Voluntary Participation: Participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. If you choose not to participate or decide to withdraw, there will be no impact on your course credit.

Compensation for Participation: There is no compensation for your volunteer participation apart from the SONA credit.

Contact Information: For questions about this study, please contact Mr. Adam Hicks by email: hicksa@wcu.edu. You may also contact Dr. David McCord the principal investigator and faculty advisor for this project, at 828-506-0097 or mccord@wcu.edu.

If you have questions or concerns about your treatment as a participant in this study, you may contact the Western Carolina University Institutional Review Board through the Office of Research Administration by calling 828-227-7212 or emailing irb@wcu.edu. All reports or correspondence will be kept confidential to the extent possible.

Please retain this document for your records in case you have questions in the future.

APPENDIX C: PARTICIPANT RESOURCE SHEET

Psychological/Medical Care Services

Your participation in this survey presents no greater risk than everyday use of the Internet. However, some of the questions we asked you as part of this study dealt with sensitive subjects such as suicidal ideation and substance use. If you feel distress related to questions asked in this study or are experiencing distress in your personal life, we encourage you to contact one of the resources listed below.

WCU Counseling and Psychological Services (CAPS)
Location: 225 Bird Building
Phone:

- M-F 8am-5pm: 828.227.7469
- Crisis clinician on duty weekends and after hours: 828.227.8911

Local Resources

- Western NC 24-hour crisis line: 888.315.2880
- Appalachian Community Resources: 888.315.2880
- Meridian Behavioral Health
    - Address: 44 Bonnie Lane, Sylva, NC 28779 (other locations in Waynesville and Franklin)
    - Phone: 828.631.3973

National Emergency Resources

- National Suicide Prevention Lifeline: 800.273.8255
- REACH (Sexual Violence Resources) - 828.369.5544
- Trevor Project (LGBTQ Crisis support) - 866.488.7386

Medical Care

Harris Regional Hospital

- Address: 68 Hospital Road, Sylva, NC 28779
- Phone: 828.586.7000

Harris Regional Hospital Urgent Care (non-emergency care)

- Address: 176 Walmart Plaza, Sylva, NC 28779
- Phone: 828.631.9462
- 7 days a week – 8am-6:30pm

APPENDIX D: TABLES

Table 1

Cronbach's Alphas for MMPI-3 Trait Scales

Scale	α
Emotional/Internalizing Dysfunction (EID)	.940
Behavioral/Externalizing Dysfunction (BXD)	.927
Demoralization (RCd)	.923
Antisocial Behavior (RC4)	.886
Hypomanic Activation (RC9)	.859
Helplessness/Hopelessness (HLP)	.863
Anxiety-Related Experiences (ARX)	.918
Substance Abuse (SUB)	.891
Impulsivity (IMP)	.840
Disconstraint (DISC)	.918

Table 2

Sample Demographic Information

	n	%
Gender		
Male	77	37.6
Female	128	62.4
Other	0	0
Age		
18	104	50.7
19	56	27.3
20	17	8.3
21-25	17	8.3
26-51	3	1.5
Marital Status		
Never Married	200	97.6
Married	5	2.4
Ethnicity		
White/Caucasian	175	85.4
Black/African American	18	8.8
Hispanic/Latinx	18	8.8
American Indian/Alaska Native	9	4.4
Asian/Asian American	3	1.5
Native Hawaiian/Pacific Islander	1	0.5
Other	1	0.5

Table 3

CAAPE-5 Substance Use Severity Classifications for Total Sample

Substance Use Severity Classification	Overall Elevated Substance Use		Elevated Alcohol Use		Elevated Marijuana Use	
	n	%	*n*	%	*n*	%
Mild	27	13.2	40	13.7	10	4.9
Moderate	9	4.4	13	6.4	6	3.0
Severe	22	10.7	10	4.9	13	6.4
Total	58	28.3	51	24.8	29	14.1

Note. N = 205. Mild = 2 – 3 DSM-5 criteria met. Moderate = 4 – 5 DSM-5 criteria met. Severe = 6+ DSM-5 criteria met.

Table 4

CAAPE-5 Elevated Substance Use by Gender

	Overall Elevated Substance Use		Elevated Alcohol Use		Elevated Marijuana Use	
	n	%	*n*	%	*n*	%
Females	34	16.6	29	14.1	16	7.8
Males	24	11.7	22	10.7	13	6.3
Total	58	28.3	51	24.8	29	14.1

Note. N = 205. % number out of 205. Data were reported for participants who had both elevated alcohol and marijuana use.

Table 5

MMPI-3 Trait Correlations with Overall Substance Use on CAAPE-5

Scale	Overall Substance Use	
	r	*p*
Emotional/Internalizing Dysfunction (EID)	.132	.060
Behavioral/Externalizing Dysfunction (BXD)	.561*	< .001
Antisocial Behavior (RC4)	.531*	< .001
Hypomanic Activation (RC9)	.435*	< .001
Substance Abuse (SUB)	.596*	< .001

Note. *N* = 205. * p < .001.

Table 6

MMPI-3 Trait Correlations with Marijuana Use

Scale	Marijuana Use	
	r	*p*
Demoralization (RCd)	.200**	.004
Anxiety-Related Experiences (ARX)	.148*	.034
Helplessness/Hopelessness (HLP)	.116	.099

Note. *N* = 205. *p < .05. **p < .01.

Table 7

MMPI-3 Trait Correlations with Alcohol Use

Scale	Alcohol Use	
	r	*p*
Disconstraint (DISC)	.545*	< .001
Impulsivity (IMP)	.390*	< .001

Note. *N* = 205. *p < .001.

Table 8

Regression Analysis Predicting Alcohol Use from Disconstraint and Gender

						95% CI for *B*		Effect Size
	B	*SE*	β	*t*	*p*	Lower	Upper	r_{sp}
Step 1								
Disconstraint	.337	0.033	0.586	10.138	< .001	0.271	0.402	0.580
Gender	.092	0.229	0.023	0.404	.687	-0.359	0.543	0.023
Step 2								
Disconstraint	.376	0.111	0.653	3.398	.001	0.158	0.593	0.195
Gender	.182	0.334	0.046	0.543	.587	-0.478	0.841	0.031
Gender X DISC	-.025	0.067	-0.071	-0.367	.714	-0.157	0.108	-0.021

Note. *N* = 205. CI = confidence interval. Effect size r_{sp} is the semi-partial Pearson correlation.