The Relationship Between College Students' Level of Alcohol Use and Their Grit, Personal Growth Initiatives, and Emotion Regulation Scores Using Structure Equation Modeling

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THE RELATIONSHIP BETWEEN COLLEGE STUDENTS’ LEVEL OF ALCOHOL USE
AND THEIR GRIT, PERSONAL GROWTH INITIATIVES, AND EMOTION REGULATION
SCORES USING STRUCTURE EQUATION MODELING

by

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ABSTRACT

The purpose of this study was to examine the directional relationship between college students’ level of grit, personal growth initiative, cognitive reappraisal emotion regulation strategy, and their level of harmful alcohol consumption and related problems. This study tested the theoretical structure model that college students’ (N = 356) level of grit (as measured by the Grit Short Scale [Grit-S; Duckworth & Quinn, 2009]), personal growth initiative (PGI; as measured by the Personal Growth Initiative Scale-II [PGIS-II; Robitschek et al., 2012]), and cognitive reappraisal emotion regulation strategy (as measured by the Emotion Regulation Questionnaire [ERQ; Gross & John, 2003]) contribute to decreased hazardous alcohol consumption and related consequences (as measured by the Alcohol Use Disorder Identification Test [AUDIT]; Saunders et al., 1993). Specifically, the researcher tested the theorized directional relationship that college students with (a) high level of grit, (b) high levels of personal growth initiative, and (c) high level of cognitive reappraisal ER strategy would have low levels of alcohol consumption and related problems. The results of the structural equation model (SEM) analyses identified that college students’ high grit scores had a strong negative relationship with their alcohol consumption and related problems scores. While college students’ PGI and alcohol consumption and related problem had a positive relationship with a large effect size. Implications from the findings of this investigation include (a) increased understanding of the contribution of college students’ grit, personal growth initiative, and cognitive reappraisal scores to their levels of harmful alcohol use and related problems; (b) greater knowledge relating to the constructs of interesting to inform counselors, counselor educators and researchers; and (c) more evidence of validity and reliability for the AUDIT, Grit-S, PGIS-II, and ERQ scores with college students.
Keywords: alcohol consumption and related problems, cognitive reappraisal, college students, grit, personal growth initiative, and structural equation modeling.
Dedicated to Dr. Joel Shulman and Ann Shulman
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CHAPTER ONE: INTRODUCTION

The focus of this study was to investigate the directional relationship between college students’ \( N = 356 \) problematic alcohol use (as measured by the *Alcohol Use Disorder Identification Test* [AUDIT]; Saunders et al., 1993) and their level grit (as measured by the *Grit Short Scale* [Grit-S; Duckworth & Quinn, 2009]), emotion regulation (ER; as measured by the *Emotion Regulation Questionnaire* [ERQ; Gross & John, 2003]), and personal growth initiative (PGI; as measured by the *Personal Growth Initiative Scale-II* [PGIS-II; Robitschek et al., 2012]) scores using structural equation modeling (SEM). Specifically, this study examined the hypothesized relationship that college students with lower levels of alcohol use will have higher appraisal emotion regulation strategies, grit, and PGI scores. The results from this study may inform researchers and practitioners about the role of the variables under investigation in college students’ functionality. Moreover, the study results may also offer college counselors and administrators additional insight into variables relating to college students’ alcohol use and related problems.

**Statement of Problem**

In fall 2020, the National Center for Education Statistics (NCES) estimated that 19.9 million young adults attended colleges and universities; about 12.1 million of these students were full-time and nearly 7.8-million part-time. Most college and university students were enrolled in undergraduate degree programs (16.9 million; NCES, 2020). Most college students in America enroll in college at the start of emerging adulthood, which is from 18-29 years old (Johnson et al., 2010). Emerging adulthood is a developmental stage characterized by uncertainty, exploration, and creativity (Arnett, 2000; Arnett, 2007a; Arnett et al., 2014).
Emerging adulthood brings numerous challenges and opportunities to college students. As students transition to their college environment, the challenges and opportunities grow. Young adults in this transition period go through changes, including their brain’s ability to consolidate new responsibilities, and adapting to these changes accommodates a wide variety of changes (Taber-Thomas & Perez-Edgar, 2016). Powered by the developing brain, individuals in emerging adulthood strive to acquire knowledge and skills necessary to lay a foundation for pursuing future careers, exploring meaningful romantic relationships, and increasing sensation and novelty (Wood et al., 2017). It is important to note that these changes during emerging adulthood do not occur homogeneously, but rather the change is heterogeneous due to multiple factors (Arnett, 2000; 2006). While individuals in emerging adulthood strive to prepare to take on new adult obligations, the period is also known for risky behavior, impulsivity, and increased substance use. Specifically, the culture and prevalence of alcohol use in college students are strong (Schulenberg et al., 2019).

As noted, most college students are at a developmental stage that can lead to heightened substance use (Davis et al., 2018). While some individuals have a history of substance use prior to starting college, some emerging adults start to experiment during college (Arria et al., 2017). Despite the timing of first initiation, alcohol use increases during emerging adulthood. Researchers have identified multiple reasons for the pervasiveness of substance use in college students (Arria et al., 2017). Specifically, college students have easy access to different substances (e.g., alcohol, prescription stimulants, marijuana; Arria et al., 2008; Garnier-Dykstra et al., 2012) and an unchecked new sense of freedom and identity exploration without authority figures’ (i.e., parents or caregivers) direct and close supervision (Kaynak et al., 2013; Sessa, 2005). Further contributing to increased substance use is the college drinking culture and
individual perceptions and positive attitudes towards substance use (Bravo et al., 2017; Bravo et al., 2018). Therefore, college students perceive a low risk of various substances, contributing to their pervasive substance use (Schulenberg et al., 2019).

The most prevalent substance used by college students is alcohol (Meda et al., 2017). Research findings identify significant consequences related to harmful alcohol abuse in college students, including (a) death (Hingson et al., 2017); (b) poor academic performance (Tembo et al., 2017); (c) injuries, blackouts, and hangovers (Boekeloo et al., 2011; Caamaño-Isorna et al., 2017; Perry et al., 2006; Valenstein-Mah et al., 2015); (d) legal problems (Thompson et al., 2006); (e) unsafe sex, sexually transmitted diseases, and sexual violence (Rehm et al., 2012); (f) changes in brain structure (Medina et al., 2008; Squeglia et al., 2012); and (g) costs related to emergency department visits (Mundt & Zakletskaia, 2012). Therefore, institutions of higher education necessitate knowledge regarding alcohol use and abuse within the student population.

Given the range of negative personal and systemic consequences of alcohol abuse in college students, alcohol abuse has received considerable attention. A growing body of literature has examined variables that serve as protective factors against alcohol abuse. Brechting and colleagues (2010) identified that increased college religious practice (i.e., engaging in prayer, attending services) relates to decreased alcohol use. Likewise, Bodford and Hussong (2013) investigate the impact of religiosity on alcohol consumption and found that college students (N = 230) who practice their religiosity in public tend to drink less alcohol than those who practice privately. In addition, Palamar et al. (2014) investigated the role of college students’ religiosity (N = 962) and their exposure to individuals who use substances and found that religious practices (e.g., attending services) were a protective factor for recent marijuana and cocaine use. Further, Cole et al. (2018) assessed the effect of college students’ religious beliefs and behavior (N = 288)
and found higher scores in both religious beliefs and behavior had a decreased level of alcohol use.

Another protective factor against substance use (i.e., alcohol and marijuana), as identified by White et al. (2006), was increased parental supervision. Further, when examining undergraduate students’ \( N = 643 \) different self-regulation and protective strategies, Blanchard et al. (2019) reported that reappraisal emotion-regulation strategy was a protective factor from excess drinking for females. Most importantly, these authors noted the complexity of investigating alcohol use and its related consequences in college students. Nevertheless, scholars have put a concerted effort to identify the pervasiveness, predictive, protective factors, and associated consequences of the use of substances such as alcohol by college students. Although scholars have examined the role of different variables in college students’ excessive alcohol use (defined by The National Institute on Alcohol Abuse and Alcoholism, NIAAA, 2009; guidelines as five drinks for men and four for women), alcohol abuse continues to impact college students negatively.

While scholars have investigated possible protective factors relating to college students’ alcohol abuse, this researcher identified no published studies that investigated the relationship between college students’ levels of hazardous alcohol use and their passion and ability to persevere for long term goals (i.e., grit) and their awareness, planfulness, resourcefulness, and their active and deliberate desire to change (i.e., PGI) scores. On the other hand, researchers have investigated the correlation between college students’ substance use and ER scores (Dvorak et al., 2014; Wong et al., 2013). Nevertheless, no investigations were identified that examined the relationship between college students’ level of alcohol use and their grit, PGI, and ER scores using SEM. Although this researcher found no study examining the correlation between various
human developmental stages and the expected level of grit, PGI, and ER, these constructs further delineated in chapter two provide preliminary results indicating various positive benefits such as promoting healthy behavior, psychological well-being, a protective factor against suicidal ideation, decrease depressive symptoms, positive academic engagement across cultures, and mitigate gambling problems in college students and other population. Therefore, because of the negative consequences of alcohol abuse in college students, the potential positive role these constructs in mitigating alcohol abuse, and the limited research identified, this investigation was warranted to examine the contribution of college students’ levels of grit, PGI, and ER to their hazardous alcohol use and related problems scores.

**Significance of the Study**

This study contributes to alcohol use and the counseling literature in a unique way. Specifically, the findings from this study add to the existing literature by (a) understanding the relationship between the constructs of alcohol use, grit, ER, and PGI; (b) providing insight into the directionality of the relationship between these four constructs; and (c) testing the factor structure of the four assessment measures with a large sample of college students, contributing to the measurement literature. In addition, gaining an increased understanding of the relationship between the four constructs under investigation, and the directionality of the relationship may inform practitioners to develop potential interventions that enhance college students’ ER strategies and PGI and grit behaviors to mitigate the negative impact of alcohol abuse in college students.
Significance for Counselors

Counselors have conceptualized and utilized numerous approaches in therapeutic interventions, including strengths-based strategies to support their clients (Welfare et al., 2013). As an illustration, the counseling process often entails supporting, challenging, and empowering clients to live their authentic lives. These therapeutic processes of stabilizing, mitigating, regaining, and thriving sometimes require counselors to focus on the clients’ non-cognitive traits such as (a) individuals’ persistence for long-term goals (i.e., grit); (b) individuals’ ability to recognize and understand emotions they have when they have them (i.e., ER); and (c) individuals’ readiness, planfulness, intentionality, and resourcefulness (i.e., PGI). The findings of this study may contribute to counselors’ understanding of the protecting role of the variables under investigation as factors in college students’ harmful alcohol use. In addition, counselors who work in college settings may benefit from the findings of this proposed study in their work with their clients.

Significance for Counselor Educators

Counselor educators have a unique responsibility to prepare the next generation of counselors with contemporary therapeutic interventions that are evidence-based. The findings from this study provide insight for counselor educators to better understand variables that may serve as predictive or protective factors in college students’ alcohol use, offering their students greater understanding to serve their future clients better. In addition, the findings from the study support counselor educators in their roles as researchers, as this study investigated the factorial structure of the four assessment measures with a large sample of college students.
Theoretical Framework

The theoretical framework for this study is Positive Psychology (Seligman, 2011). Positive Psychology is dedicated to studying positive attributes of individuals to sustain optimal mental wellbeing or overcome mental health issues and living an optimal life (Duckworth et al., 2005). Positive Psychology has evolved since its first conception (Seligman, 2011). Initially, Seligman (2002) conceptualized positive psychology encompassing positive emotions (i.e., what individuals feel), engagement (i.e., the state of experiencing flow), and happiness. After almost a decade, Seligman (2011) revised his initial theory to focus on well-being that encompasses five elements: (a) positive emotions, (b) engagement, (c) meaning, (d) positive relationship, and (e) accomplishment. The theory aims to help individuals flourish by enhancing their positive emotions, engagement, meaning, positive relationship, and accomplishment.

In contrast, the medical model of health care focuses on managing symptoms, stabilizing, repairing, and bringing individuals to their previous level of functioning. In other words, the medical model of therapeutic interventions focuses on individuals’ deficits as compared to their potential to thrive (Ruini, 2017; Seligman & Csikszentmihalyi, 2000). While identifying risk factors for alcohol abuse is vital to mitigating the impact, identifying individuals’ protective factors (i.e., a person’s strengths) can serve as a buffer against alcohol use disorders (Duckworth et al., 2005). Therefore, this study was ground in the theoretical tenets of Positive Psychology, contributing to a growing body of knowledge that emphasizes a strength-based approach to mitigate the consequences of alcohol abuse.
Operational Definitions

Emerging Adulthood

For the purpose of this study, emerging adulthood is defined as a developmental stage that covers the period between ages 18 to 29 (Arnett, 2000; Arnett, 2007a; Arnett et al., 2014).

Emotion Regulation

For the purpose of this study, ER (as measured by the Emotion Regulation Questionnaire [ERQ; Gross & John, 2003]) is defined as “the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross, 1998, p. 275).

Grit

For the purpose of this study, Grit (as measured by the Grit Short Scale [Grit-S; Duckworth & Quinn, 2009]) is defined as individuals’ “perseverance and passion for long-term goals” (Duckworth et al., 2007. p. 1087).

Level of Alcohol Use

For the purpose of this study, harmful alcohol use and related problems (as measured by the Alcohol Use Disorder Identification Test [AUDIT]; Saunders et al., 1993) refer to the consumption of alcohol (frequency and quantity) and related problems.
**Personal Growth Initiative**

For the purpose of this study, PGI (as measured by the *Personal Growth Initiative Scale-II* [PGIS-II; Robitschek et al., 2012]) “refers to a person’s active and purposeful desire to grow in salient areas” (Weigold et al., 2018, p. 259).

**Undergraduate College Students**

For the purpose of this study, college students are students that are enrolled in community colleges (i.e., two-year institutions), four-year colleges, and universities as part-time (6 credit hours or less than 12 credit hours) or full-time students (12 credit hours or more).

**Research Design**

The researcher utilized a correlational research design to examine the research question and hypothesis. The purposes of the correlational research design are (a) to investigate the degree of relationships (e.g., positive or negative) between multiple variables without manipulating the independent variable (Creswell, 2014; Johnson & Christensen, 2019); and (b) to determine the level and direction of relationships (Gall et al., 2007), or explain the complex relationship of observed and unobserved variables under investigation (Crockett, 2012; Hahs-Vaughn, 2017). However, correlational research methods cannot establish causation (Graziano & Raulin, 2013). Correlational research is used in the counseling literature, and a more advanced analysis such as SEM is recommended to examine an intricate relationship between the constructs under investigation (Bloom, 2016; Kline, 2016; Tabet, 2019; Tabachnick & Fidell, 2013). Chapter three offers greater delineation of the research design and methods employed in this investigation.
Population and Sampling

There are about 16.9 million undergraduate college students in the U.S. (NCES, 2020). To determine the sample size necessary for this study, it is essential to achieve population representation to increase the generalizability of the findings, statistical power to reduce a Type II error, and response rates (Balkin & Sheperis, 2011). Moreover, calculating a priori sample size in SEM is recommended to identify the minimum sample size needed to detect model structure and achieve both an acceptable effect size and desired statistical power.

Schumacker and Lomax (2016) recommend utilizing the www.danielsoper.com (Soper, 2018) website to calculate a priori sample size for SEM. Based on a priori sample size calculations, a minimum sample of 288 is required to detect a specific effect and identify a model structure with a large effect size (.5) at high power (.8) with four latent variables (i.e., Grit, PGI, ER, and alcohol use) and ten observed variables (i.e., drinking quantity/frequency, alcohol-related consequences, interest, perseverance, readiness for change, planfulness, using resources, intentional behavior, reappraisal, and suppression) at the probability of $p < .01$.

Although a minimum sample of 288 is required, following SEM best practices for sample size, the researcher aimed to reach an acceptable model structure and large effect at a high statistical power in this SEM investigation. To achieve this goal, the researcher collected 520 completed data packets. After accounting for the removal of missing items, the final sample was 356. The researcher deemed 356 participants who identified as consuming alcohol adequate to serve as a sound representative of the population of college students in the United States and offer stronger statistical power (Kline, 2016; Tabet, 2019; Wolf et al., 2013).
**Sampling Procedure**

The population under investigation was undergraduate college students. All participants were 18 years old and must be enrolled in a college or university as a part-time or full-time student in the United States. Given the difficulty to access and survey the entire population, a sampling technique such as the convenient sampling methods was utilized (Johnson & Christensen, 2019; Paolacci & Chandler, 2014; Walters et al., 2018). Although this convenient sampling method is not a gold standard for data collection, it was the logical methodology to use considering the limited time the researcher had to complete the study with a sufficiently large sample size. Therefore, the researcher used personal and professional contacts to invite the participation of students from throughout the United States.

**Data Collection**

The researcher received approval from his university’s Institutional Review Board (IRB) before any recruitment or data collection. Once approval was obtained (see Appendix A for IRB approval letter), the researcher utilized the *Tailored Design Method* (TDM; Dillman et al., 2014) for survey research to collect data from students at universities around the nation, using online data collection method, specifically a web-based survey using Qualtrics. For each completed survey, a donation of $0.50 was made to an organization that focuses on helping college students overcome addiction (see Appendix L for donation receipt). To achieve a minimal sample size of 288 completed data packets, the researcher anticipated completed response rates online at 10% (Pike, 2008; Van Mol, 2017). Specifically, a total of approximately 3,000 potential participants were invited through personal and professional connections with the goal of collecting 500 completed research packets. As a result, the data collection method yielded the desired 520 completed research questionnaire packets.
Data Instrumentation

This researcher employed five data collection measures: (a) general demographic form, (b) Grit-S (Duckworth & Quinn, 2009), (c) ERQ (Gross & John, 2003), (d) PGIS-II (Robitschek et al., 2012), and (e) AUDIT (Saunders et al., 1993). Even though the five data collection instruments may be utilized for research purposes without permission, the researcher asked and received permission for two of the instruments from the developers to use the measures in this study. All five instruments were combined into one research packet and disseminated to participants. The next section introduces the five data collection measures and reviews evidence of reliability and validity of the assessments’ scores.

General Demographic Questionnaire

The researcher used a general demographics questionnaire to gather general demographic information such as participants’ race and gender. Obtaining general participants’ demographic information enabled the researcher to show that the sample is representative of the population of interest (Tabet, 2019). The researcher collected the following information from the participants on the general demographics questionnaire: (a) current college academic classification (i.e., freshman, sophomore, junior, senior), (b) age, (c) race/ethnicity, (d) marital status, (e) gender, (f) resident status (i.e., on-campus/off-campus), (g) current cumulative grade point average, and (h) student status (i.e., full-time/part-time). The demographic data collected on the questionnaire was common in studies examining college students’ alcohol use (Miller et al., 2016; Peterson, 2019; Presley et al., 1994).
Alcohol Use Disorder Identification Test (AUDIT)

The researcher measured participants’ level of alcohol use with the Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993). The AUDIT is a 10-item instrument with three subscales: (a) Hazardous consumption (three items; e.g., how many drinks containing alcohol do you have on a typical day when you are drinking?), (b) Symptoms of Dependence (three items; e.g., how often during the last year have you failed to do what was normally expected of you because of drinking?), and (c) Harmful Alcohol-Related Consequences (four items; e.g., how often during the last year have you had a feeling of guilt or remorse after drinking?). The AUDIT items one to eight are structured using a five-point Likert scale (0 – 4; 0 = never, 1 = less than monthly, 2 = monthly, 3 = weekly, 4 = daily or almost daily). The final two items on the AUDIT use a three-point Likert scale format (0 = No, 2 = Yes, but not in the last year, 4 = Yes, during the last year; Saunders et al., 1993). For the AUDIT, the cutoff scores (i.e., from 0 – 40) are provided where these scores are defined as identifying drinking quantity/frequency, symptoms of dependence, and alcohol-related consequences. Specifically, to determine these subscale scores, the sum of the items is taken. For hazardous consumption, the sum of items one to three totaling eight or above indicates hazardous alcohol use (Claros & Sharma, 2012; Reinert & Allen, 2002). For symptoms of dependence, items four to six are added, with a higher score suggesting the presence of alcohol dependence. Finally, for alcohol-related consequences, the sum of items seven to ten is taken, with higher scores indicating harmful alcohol use (Babor et al., 1992).

Researchers have tested evidence of reliability and validity of the AUDIT scores with diverse populations (López et al., 2019; Reinert & Allen, 2007). Specifically, the psychometric properties of the AUDIT scores are established, including internal consistency, $\alpha = .81$ (Claros & Sharma, 2012; DeMartini & Carey, 2009) and test-retest reliability, $\alpha = .70-.89$ (Tuliao et al.,
Merrill et al. (2016) reported $\alpha = .75$ for drinking quantity subscales and $\alpha = .89$ for alcohol-related subscale. AUDIT has been utilized among college-age samples, as well (Kokotailo et al., 2004; Murphy & Garavan, 2011). Moreover, Tuliao et al. (2016) utilized the AUDIT with college students using Filipino and U.S. samples to determine the factor structure of AUDIT. Tuliao et al. (2016) reported a good model fit for two-factor (i.e., factor one, $\alpha = .80$, $CFI = .952$, and factor two, $\alpha = .74$, $CFI = .952$), and the three-factor (i.e., factor one, $\alpha = .80$, $CFI = .965$, factor two, $\alpha = .66$, $CFI = .965$, and factor three, $\alpha = .62$, $CFI = .965$) structure in the U.S. sample ($N = 1,259$). Further, a likelihood ratio test indicated that the three-factor structure was a good model fit ($28.23$, $df = 2$, $p < .01$) in the U.S. sample. The three-factor structure only fit the Filipino sample ($N = 255$) model as indicated by Cronbach’s $\alpha$ result of $.65$, $.68$, and $.68$ respectively, comparative fit index of $.966$ and likelihood ratio ($13.45$, $df = 2$, $p < .01$).
Grit

The researcher measured participants’ grit scores using the self-reported Grit Short Scale (Grit-S; Duckworth & Quinn, 2009). Duckworth and Quinn (2009) used West Point cadets with an average age of 19.5 years to investigate the factor structure of Grit-S. The confirmatory factor analysis result confirms a two-factor structure model that includes (a) interest $\alpha = .73$ to $.79$, $CFI = .95$ (e.g., new ideas and projects sometimes distract me from my previous ones) and (b) perseverance $\alpha = .60$ to $.78$, $CFI = .95$ (e.g., setbacks don’t discourage me). The eight-item Grit-S scale is structured in Likert style ranging from one (i.e., not like me at all) to five (i.e., very much like me). Duckworth and Quinn (2009) designed the Grit-S to be reported as a total mean score, where the total scores are summed and divided by the number of items (i.e., eight) to get scores that determine participants’ grit level. Meriac et al. (2015) reported adequate internal consistency for the interest subscale of $\alpha = .75$ as well as $\alpha = .65$ for the perseverance subscale. Recently, Mullen and Crowe (2018) found $\alpha = .76$ for the interest subscale, and after removing one item from the perseverance subscale, they found $\alpha = .71$. Grit-S has adequate internal consistency and reliability, with Cronbach’s alpha ranging from $.73$ to $.83$ (Duckworth & Quinn, 2009; Meriac et al., 2015; Mullen & Crowe, 2018). The psychometric properties of Grit-S have been investigated in numerous cultures and college students with satisfactory reliability and validity results (Lechner et al., 2019; Morell et al., 2020; Muenks et al., 2017; Wyszyńska et al., 2017).
Figure 2. Measurement Model for Grit
Personal Growth Initiative

The researcher measured PGI using the self-reported *Personal Growth Initiative Scale-II* (PGIS-II; Robitschek et al., 2012). PGIS-II has been conceptualized as a four-factor construct: (a) four items measuring readiness for change (e.g., I can tell when I am ready to make specific changes in myself); (b) five items measuring planfulness (e.g., I set realistic goals for what I want to change about myself); (c) three items measuring the use of resources (e.g., I ask for help when I try to change myself); and (d) four items measuring intentional behavior (e.g., I take every opportunity to grow as it comes up). All items in PGIS-II are positively worded and structured using a six-point Likert scale ranging from 0 = Disagree Strongly to 5 = Agree Strongly. Subscales can be calculated by summing the items and dividing by the number of items in the subscale. PGIS-II achieved test-retest reliability of \((r = .70)\), and the internal consistency for all subscales are .76 for readiness, .85 for planfulness, .79 for resourcefulness, and .78 for intentional (Robitschek et al., 2012). The PGIS-II four-factor model has been investigated in different cultures and populations (Freitas et al., 2018; Weigold et al., 2018; Yang & Chang, 2014). Specifically, Weigold et al. (2014) investigated to validate the four-factor structure using African American college students \((N = 159)\). The authors reported that the four-factor model best fit the data \((\chi^2 = 289.71, df = 95; \chi^2/df = 3.05, CFA = .92, SRMR = .05)\).
Figure 3. Measurement Model for PGI
Emotion Regulation

To measure participants’ levels of ER, the researcher used the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). ERQ items are answered on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). ERQ is a two-factor scale: (a) six items for cognitive reappraisal (e.g., I control my emotions by changing the way I think about the situation I’m in), and (b) four items for expressive suppression (e.g., I control my emotions by not expressing them). The ERQ is designed to be reported as a total mean score for subscales. Both subscales have strong internal consistency reliability (i.e., cognitive reappraisal $\alpha = .89 - .90$ and expressive suppression $\alpha = .76 - .80$. Preece et al., 2019). Melka et al. (2011) investigated the factor structure of ERQ using undergraduate college students and validated the original factor structure. Specifically, Melka et al. (2011) reported $\alpha = .73$ for expressive suppression and $\alpha = .79$ for cognitive reappraisal. Moreover, the authors reported excellent model fit for a two-factor model ($CFI = .96$, $TLI = .95$, $RMSEA = .05$ and a confidence interval of between .042 to .059). ERQ also has been adapted and used in numerous languages (Balzarotti, 2019).
Figure 4. Measurement Model for ERQ
Research Hypothesis and Research Question

The aim of this study was to examine the directional relationship between college students’ level of harmful alcohol use and their grit, PGI, and ER scores. The following section presents the research hypotheses and exploratory research questions.

Research Question

To what extent can Alcohol-Related problem score be predicted by (a) harmful alcohol consumption composite scores (as measured by AUDIT; Saunders et al., 1993), (b) grit composite scores (as measured by Grit-S; Duckworth & Quinn, 2009), and (c) PGI composite scores (as measured by the PGIS-II; Robitschek et al., 2012)?

Research Hypothesis

College students’ grit (as measured by Grit-S; Duckworth & Quinn, 2009), PGI (as measured by the PGIS-II; Robitschek et al., 2012), and cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003) will contribute to decreased harmful alcohol consumption and consequences (as measured by AUDIT; Saunders et al., 1993). (See Figure 5).
Figure 5. Theoretical Structural Model

**Data Analysis Procedures**

The researcher used Structure Equation Modeling (SEM) to examine the primary research hypothesis. SEM entails the following five steps (Crockett, 2012): (a) model specification, (b) model identification, (c) model estimation, (d) model evaluation, and (e) model modification. Schumacker and Lomax (2016) outline these five steps as follows:

(a) Model specification: The proposed theoretical model is anchored in the literature. The researcher specifies the model based on prior research and theory. The process involves analyzing literature in the field, supporting the selection of the latent variables, and testing the relationship among the variables under investigation.
(b) Model identification: The researcher, during the second step, focused on testing the established measurement model per the data collection instrument using confirmatory factor analyses (CFAs), assessing if the model is under-identified, just identified, or over-identified. A model will be identified if the degree of freedom \((df)\) is equal to or greater than one. According to Schumacker and Lomax (2016), a model with \(df = 0\) shows that a model is saturated or just-identified, meaning there are the same number of free parameters as observations. When a model is under-identified, it will have a negative degree of freedom.

(c) Model estimation: in the third step, the researcher examined how well the model estimates the parameters of a complex relationship. The researcher used the default estimation technique in AMOS and other SEM programs (i.e., maximum likelihood) to estimate parameters.

(d) Model testing: The researcher, during this next step, tested and confirmed the fit of the structure model. The model is evaluated for fit using a non-significant chi-square \((p > .05)\) and other fit indices such as Root-Mean-Square Error of Approximation (RMSEA; values less than .05), Tucker-Lewis Index (TLI; scales from 0 = no fit to 1 = perfect fit), and Standardized Root-mean square residual (SRMR; Value less than .05 – .08 indicated acceptable fit; < .05 indicate close fit).

(e) Model modification: The researcher, during the fifth step, reviewed the results of the modeling test. If the model has poor fit indices, the researcher tests alternative structural models guided by the fit indices or theory to increase goodness of fit. In other words, the researcher used model modification strategies to find a model that best fits the data.
Ethical Considerations

The following ethical considerations were taken and reviewed by the IRB and the researcher’s dissertation committee before data collection:

1. Data were collected anonymously; once collected, the data was securely stored to protect participants’ identity.
2. Participation in the study was voluntary, and participants’ academic standing was not impacted.
3. UCF and other university participants were informed prior to starting their survey that when each participant completes a survey, a donation of $0.50 will be made to an organization that focuses on helping college students overcome addiction.
4. An explanation of the study (written), once approval was obtained from IRB, was given to participants.
5. Participants were informed of their right to stop participating in the study at any stage without any consequences.
6. Although it is not necessary, an attempt to obtain permission to use all instruments for the study was made. As a result, two of the developers have given permission via email before data collection.
7. The researcher collected data once approved by the dissertation chair, committee members, and the IRB.

Limitations of the Study

As it is for any study, this research had many limitations. Since the design of the study was correlational, it can only determine a relationship between the constructs but cannot predict causation (Kline, 2016). As noted, the study used a self-reporting instrument; due to the nature of
a self-reporting survey, an inherent limitation is the accuracy/truthfulness of participants’ answers. Moreover, this investigation was susceptible to threats to internal, external, and construct validity. Further, given the online data collection platform, it is possible for participants to report false demographic data; it is incumbent upon the researcher to take this into consideration when reporting and generalizing the study findings (Shawver et al., 2016; Whitehead, 2007). Finally, another inherent limitation for accessing the population sample through online platforms is the limitation of generalizability (Johnson & Christensen, 2019).

**Chapter Summary**

This study examined the directional relationship between college students’ levels of harmful alcohol consumption and their grit, PGI, and ER scores. In this chapter, the researcher presented the constructs under investigation (i.e., alcohol use, grit, PGI, and ER) and the rationale for the study. In addition, the researcher discussed the significance of the study for counselors and counselor educators and operationally defined terms. The researcher also introduced the research design, population, and population sampling procedure; further, the researcher presented the data instrumentation, research hypothesis and question, data analysis, ethical considerations, and limitations.
CHAPTER TWO: LITERATURE REVIEW

This chapter reviews the four constructs under investigation: (a) alcohol use in undergraduate college students, (b) grit, (c) positive growth initiative (PGI), and (d) emotion regulation (ER). First, the chapter presents the population of interest, undergraduate college students in the United States. Next, the chapter discusses the theoretical framework of Positive Psychology (Duckworth et al., 2005; Seligman, 2011). Subsequently, the chapter reviews research findings examining the prevalence, consequences, and risks of alcohol use in college students, as well as factors that may protect against alcohol abuse, and reviews grit, PGI, and ER, and related research. The chapter concludes with a discussion of the relationship between all constructs of interest and support for this research investigation.

Emerging Adulthood

Most college students in the United States start their college education at the beginning of emerging adulthood (EA), which is between the ages of 18 to 29 years old (Johnson et al., 2010). EA is a stage of development referred to as the stage of opportunity (Steinberg, 2015); creative exploration (Siegel, 2013); and identity exploration, filled with uncertainty, instability, and self-focusing (Arnett, 2006). For many individuals, EA is a time of sensation-seeking and impulsive behavior (Steinberg et al., 2008). EA has received much attention since Arnett (2000) first proposed it as a unique developmental stage. While there has been a rapid rise of interest and work on EA, not all researchers endorse EA as a distinct developmental stage (Côté, 2014; Hendry & Kloep, 2011). The proponent of EA as a developmental stage posits it as a framework that acknowledges the lengthy time between adolescence and adulthood (Arnett, 2007a). Arnett (2000) holds that EA is a theory limited to young people from industrialized and developing
nations and that EA needs to be understood in the context of individuals’ environment (e.g., culture, social class, ethnicity; Arnett, 2007b). Thus, scholars present EA as encompassing the following five elements “… identity explorations, the age of instability, the self-focused age, the age of feeling in-between, and the age of possibilities” (Arnett et al., 2014, p. 570).

In contrast, Kloep and Hendry (2011), who are opponents of EA as a developmental stage, argue that conceptualizing human development in stages does not add to understanding human development; therefore, “…it is useless to describe human transitions as “stages” because in our “movement” through the life course, we are advancing, regressing, developing in some domains and not others” (p. 3). Kloep and Hendry (2011) reject the notion of stage theories of human development and argue that the focus of scientific inquiry should be on overall mechanisms and processes of development rather than labels (i.e., stages).

Despite the ongoing objections, researchers acknowledge numerous factors (e.g., interpersonal relationships, living arrangements, education) that contribute to delaying transition to adulthood (Arnett et al., 2014; Côté, 2014). Despite debate about EA being a developmental stage, researchers from diverse fields of study remain interested in EA and continue to conceptualize it as a developmental stage (Arnett & Tanner, 2011).

Specifically, EA is a period that ushers in many new obligations and challenges, forcing individuals in this age group to be flexible and adaptable to facilitate a wide variety of changes (Taber-Thomas & Perez-Edgar, 2016). Often, individuals in EA pursue career development, meaningful romantic relationships, and novel experiences (Wood et al., 2017). While individuals in this transition period prepare to shift to a new adult role, for some individuals EA continues to be filled with risky behavior, impulsivity, danger, and, importantly, increased alcohol use. Given EA is a stage of uncertainty and risk, numerous researchers have investigated the prevalence,
consequences, predicting, and protective variables of alcohol use in college students. However, to the researcher’s knowledge, no study has examined the role of grit, PGI, and ER in college students’ alcohol use. Therefore, the aim of this study was to investigate the role of grit, PGI, and ER in emerging adults’ (i.e., college students) alcohol use.

**Positive Psychology**

Positive Psychology is one of the new fields in psychology that focuses on examining the positive attributes of individuals. Martin Seligman introduced positive Psychology at the end of the 20th century (Ruini, 2017). Seligman (2011) acknowledges that the roots of Positive Psychology include philosophical traditions such as Utilitarianism (i.e., increasing the overall happiness/good; Brülde & Bykvist, 2010), Virtue (i.e., character quality), Eudaimonia (i.e., living a fulfilling life; Ryan et al., 2008), and Hedonics (i.e., the pursuit of happiness; Lambert et al., 2015). In its first inception, Seligman’s (2002) theory of Positive Psychology centered around *Authentic Happiness*, encompassing positive emotions (i.e., what individuals feel), engagement (i.e., the state of experiencing flow), and meaning. At the heart of the initial theory of Positive Psychology was life satisfaction. Nearly a decade later, Seligman (2011) modified his original theory by shifting attention from life satisfaction to well-being. The modified Positive Psychology theory includes five components: (a) positive emotions, (b) engagement, (c) meaning, (d) positive relationships, and (e) accomplishment.

Whereas traditional psychotherapy focuses on the root cause of psychopathology and individual deficit, Positive Psychology emphasizes expanding the focus of clinical work beyond individuals’ deficits (Duckworth et al., 2005). Although the effort produced exponential results in terms of receiving the attention of researchers and the public, the theory is not without objection (Lambert et al., 2015). For instance, Christopher et al. (2008) evaluated the main tenets
of Positive Psychology and raised important objections, including the grounding in individualist
cultural values, thus concluding that Positive Psychology neglects collective cultural values, such
as communal living/positive interdependency. Lazarus (2003), prominent stress and coping
theorist, acknowledged the need to study positive attributes such as positive emotions but
objected to the over simplicity of Positive Psychology as an inquiry of well-being.

Despite some criticisms of Positive Psychology, researchers have explored the theoretical
framework within the context of addiction (Krentzman, 2013). The revised domains of Positive
Psychology (i.e., positive emotions, engagement, meaning, positive relationship, and
accomplishment) have been investigated in addiction-recovery (i.e., wellness-oriented; Kaskutas
et al., 2014; Krentzman, 2013; Laudet, 2011). Specifically, in an eight-week, mixed-method (i.e.,
qualitative and quantitative research designs) Positive Psychology intervention pilot study,
Akhtar and Boniwell (2010) utilized a sample of non-college adolescents, ages 14 to 20, who had
received treatment for alcohol and drug use, to investigate the role of Positive Psychology
intervention. For the quantitative method, the authors had treatment ($N = 10$) and control groups
($N = 10$). After verbatim transcription and thematic analysis, Akhtar and Boniwell (2010)
reported that eight out of ten participants reported positive feelings (e.g., happier, grateful,
hopeful), a rise in confidence, better relationships, and goal setting that was associated with
motivation. The quantitative $2 \times 2$ ANOVA analysis indicated a significant interaction between
time and condition, which means that the treatment group exhibited improved positive emotions.
The authors concluded that both the qualitative and quantitative results demonstrated better
health and lower alcohol consumption for the treatment group.

Logan et al. (2010) examined the relationship between alcohol use and the virtues of
undergraduate college students ($N = 425$) at a large university in the northwest United States.
The sample contained participants who identified as Caucasian (52%), Asian/Pacific Islander (34%), Other/Multi-Ethnic (8%), Hispanic/Latino (3%), Black/African American, and Native American/American Indian (1%) respectively. Most of the participants (69%) identified as female. The results indicated that three out of the six virtues (i.e., justice ($t(412) = 3.43, p = .001$), temperance ($t(412) = 4.77, p < .001$), and transcendence ($t(412) = 3.36, p = .001$) were correlated with non-drinkers. The authors also reported that wisdom, courage, and humanity were not related to any outcomes ($p > .008$). In addition, analysis of high-risk drinkers and virtues indicated a non-significant result for wisdom, courage, and humanity ($p > .25$). In contrast, high-risk drinkers had low temperance scores ($M = 3.33, SD = .41$), and low-risk drinkers had high scores on justice ($p = .01$) and transcendence ($p = .02$). Logan et al. (2010) concluded that a virtue-based curriculum can have an indirect impact on substance use in college students.

Lindgren et al. (2010) assessed the relationship between curiosity (two factors, as measured by a *Curiosity and Exploration Inventory*, Kashdan et al., 2004) and problem drinking in sensation-seeking female college students ($N = 79$) at the University of Washington. The average age of participants was 18.66 years ($SD = 1.73$), and 53% identified as Caucasian, 33% as Asian, and 14% as African American, Hispanic, or multi-racial. After conducting a zero-inflated negative binomial regression analysis, Lindgren et al. (2010) reported that increased alcohol use was associated with alcohol-related problems; however, lower alcohol use was related with no alcohol-related problems. Moreover, curiosity factors (i.e., exploration and absorption) and sensation seeking did not predict alcohol-related problems ($p < .05$). The authors concluded that “curiosity may be a double-edged sword […] on the one hand, higher scores on the exploration factor were associated with fewer alcohol-related problems. On the other hand,
higher scores on the absorption factor were associated with more alcohol-related problems” (p. 515). The findings identified the impact of college students’ curiosity on their alcohol-associated problems.

In summary, Positive Psychology encourages professionals and researchers in the mental health field to apply a holistic framework to go beyond the clients’ negative symptoms. While there is no “one-size-fits-all” approach to individuals’ wellbeing, Positive Psychology provides an opportunity for counselors and counselor educators to investigate non-cognitive traits such as (a) a passion to persevere for long-term objectives (i.e., Grit); (b) the individual ability to recognize areas of growth, resourcefulness, and the intentional plan to bring the desired goal to fruition (i.e., PGI); and (c) individuals’ ability to identify and regulate which emotion they have when they have it (i.e., ER).

**Alcohol Use in College Students**

College students are at a developmental stage that is uncertain, stressful, and with significant exploration, contributing to increased levels of substance use such as alcohol (Davis et al., 2018). Researchers have identified reasons for the prevalence of substance use in college students, including factors such as (a) access or exposure to different substances (e.g., alcohol, prescription stimulants, marijuana; Arria et al., 2008; Garnier-Dykstra et al., 2012), (b) perception and attitude towards alcohol (Bravo et al., 2017; Bravo et al., 2018; Mallett et al., 2013; Martens et al., 2006), (c) unsupervised freedom and identity exploration without authority figures (e.g., parents or care-givers; Kaynak et al., 2013; Sessa, 2005), (d) prior history of alcohol use (Mohler-Kuo et al., 2003), (e) peer influence (Windle et al., 2017), (f) location and pregaming (Miller et al., 2016), and (g) college students’ perception of various substances as low risk (Schulenberg et al., 2019). Whereas some college students have a history of alcohol use
prior to starting college, some start to experiment during college (Arria et al., 2017). Regardless of the timing of when they start consuming alcohol, research findings identify increased levels of alcohol consumption and drinking culture in college students (Bravo et al., 2017; Piacentini & Banister, 2009).

A World Health Organization (WHO; 2018) global status report on alcohol and health shows the prevalence of heavy episodic drinking in emerging adulthood. Specifically, while heavy episodic drinking is lower in age groups between 15-19, the report found an increased heavy episodic drinking between ages 20-24 compared to the general population. Similarly, a national survey conducted in 2018 reported approximately 2.6 million individuals between 18 and 25 years old (~7.6%) had an illicit drug use disorder in the previous year; one out of ten (10.1%) had an alcohol use disorder (AUD; The Substance Abuse and Mental Health Services Administration [SAMHSA], National Survey on Drug Use and Health 2019). Further, reporting on the pervasiveness of substance use in college, Schulenberg and colleagues (2019) examined and compared college students to their non-college counterparts from ages 19 through 22 using a national sample. The 2018 survey indicated that college students tend to use higher levels of alcohol compared to non-college students. In addition, the prevalence of binge drinking for college students (29%) was higher than their noncollege peers (25%). Moreover, the findings identify that 38% of college students reported being drunk in the past 30 days compared to 24% of non-college peers.

Likewise, Hoeppner et al. (2013) conducted a two-year longitudinal study investigating college students' adherence to the NIAAA (2009) guidelines (i.e., five and four drinks for men and women, respectively) using a sample ($N = 992$) of incoming first-year college students. The participants included more females (58%) than males (42%). The participants were enrolled in
one of three New England universities and colleges; the results identified that 65.6% of students in the first year of college surpassed NIAAA guidelines for weekly or daily drinking, or both. Moreover, more men (88.9%) than women (83.2%) exceeded the guideline. When Hoeppner et al. (2013) examined daily, and weekly alcohol use rates, 64.8% of the females exceeded rates of use compared to 60.7% of men; none of the participants exceeded the weekly alcohol use limits without exceeding the daily alcohol use limit. Considering these results, pervasive alcohol use in college students and its related consequences warrant further investigation.

**Consequences of Alcohol Use**

As noted, alcohol use among college students is high (Meda et al., 2017). There are multiple potential consequences related to high alcohol use in college students, including (a) death (Courtney & Polich, 2009; Hingson et al., 2017); (b) negative consequences on academic performance (Ansari et al., 2013; Meda et al., 2017; Tembo et al., 2017); (c) injuries, blackouts, and hangovers (Boekeloo et al., 2011; Caamaño-Isorna et al., 2017; Perry et al., 2006; Valenstein-Mah et al., 2015); (d) legal problems (Thompson et al., 2006); (e) unsafe sex, sexually transmitted diseases, and sexual violence (Hingson & White, 2012; Rehm et al., 2012); and (f) changes in brain structure (Medina et al., 2008; Squeglia et al., 2012). These consequences are not exhaustive as there are direct and indirect consequences; however, the consequences of alcohol use in college students have received considerable attention.

Specifically, to estimate alcohol-related consequences, Hingson et al. (2009) reported that over 1,800 college students die from alcohol incidents (e.g., motor vehicle); about 599,000 are injured; 696,000 college students are hit or assaulted by a fellow student under alcohol influence; more than 97,000 college students are sexually assaulted (date rape) in alcohol-related incidents each year. Further, White et al. (2002) conducted an e-mail survey to learn about the prevalence
of alcohol-induced blackouts in college students ($N = 772$) at a private university in the southern region of the United States. The participants’ average age of onset of drinking was 16.7 years, and the survey was distributed to all students (i.e., freshmen, sophomores, juniors, and seniors). Participants were asked to complete a 19-question survey that was designed for the study and inquired about the participants’ drinking habits in the last two weeks, family history of alcohol use, whether participants experienced a blackout, and the type of event in which they were participating when they experienced the blackouts. White et al. (2002) reported that 51% of the participants who consumed alcohol had experienced a blackout and 40% reported experiencing a blackout one year before taking the survey. One in ten (9.4%) experienced a blackout two weeks prior to participating in the study. Lastly, numerous participants reported learning about engaging in risky behavior (i.e., driving a car, sexual intercourse) after the fact.

Blackout can also have high financial costs. Mundt and Zakletskaia (2012) investigated alcohol-induced blackouts as an indicator for an emergency department visit and the related cost of such a visit. These data were collected from October 2004 to February 2009 at one Canadian and four United States universities, and the criteria for eligible participants ($N = 954$) were being full-time students, being 18 or older, and having had more than 12 drinks for women or more than 15 drinks for men in the past seven days. When participants met inclusion criteria, they were randomly assigned to the study. Participants chosen for interventions received individualized information designed to increase participants’ awareness about harmful drinking behavior and describe strategies that help decrease such behavior. In contrast, the control group received the general treatment. After analyzing the data, the authors asserted that blackouts are a strong indicator of emergency department visits. Specifically, from 404 emergency department visits of participants, one in eight was related to blackouts. The authors then calculated that a
A college with 40,000 students would spend between $469,000 to $546,000 in emergency department visits related to alcohol-induced blackouts.

Scholars have also examined alcohol consumption and sexual victimization (Lorenz & Ullman, 2016). Mohler-Kuo et al. (2004) utilized data from 119 schools to analyze rape related to alcohol intoxication and found that alcohol intoxication of the victim is the highest predictor of rape in college women. Similarly, Ford (2017) conducted a study ($N = 24,131$) to examine the impact of alcohol consumption and knowing a partner on sexual assault in college students. The survey was distributed between 2005 and 2011 to 24,131 participants at 22 colleges and universities using an online survey. Due to the focus of the study, the author only used participants who identified as straight women at a four-year college/university who had had a recent hookup with a man ($N = 8,005$). After deleting missing values, the final sample size for the analyses was ($N = 7,481$), identifying that the probability ($p \leq .05$) of participants experiencing forced intercourse increased 2.72-fold when they consumed 9 to 10 alcoholic drinks and 2.81-fold when they consumed more than 11 alcoholic drinks, compared to those participants who did not drink.

Yeater et al. (2018) established an at-risk profile for alcohol consumption and sociosexuality of freshmen women at a medium-sized southwestern university ($N = 481$). Most of the participants ($N = 427$ or 88.8%) were heterosexual, while ($N = 54$ or 11.2%) identified as bisexual. Participants identified as White/Caucasian ($N = 190$ or 39.5%), Hispanic American ($N = 175$ or 36.4%), Mexican American ($N = 33$ or 6.9%), Asian/Pacific Islander ($N = 29$ or 6.0%), African American ($N = 23$ or 4.8%), American Indian/Alaskan Native ($N = 12$ or 2.5%), and others ($N = 19$ or 4.0%). Yeater et al. (2018) employed a Demographics Questionnaire (e.g., age, marital status); a 10-item Sexual Experiences Survey (SES; Koss & Gidycz, 1985); a 9-item
Revised Sociosexual Orientation Inventory (SOI-R; Penke & Asendorpf, 2008); and a quantity and frequency of alcohol consumption questionnaire (Q-F) in which participants were asked to report the frequency of alcohol consumption in the past three months, the amount of consumption in one sitting, and the frequency of being drunk the past six months. Yeater and colleagues (2018) used latent profile analysis (LPA) and identified three profiles: (a) low alcohol use–low sociosexuality, (b) high alcohol use–medium sociosexuality, and (c) high alcohol use–high sociosexuality. Specifically, the women with high alcohol use–high sociosexuality profile reported higher victimization in a six-month follow-up compared to high alcohol use–medium sociosexuality (Wald $\chi^2 (1) = 19.66, p < .001$) and low alcohol use–low sociosexuality (Wald $\chi^2 (1) = 45.67, p < .001$). Therefore, female college students’ amount of alcohol consumption relates to their level of sociosexuality.

Meda and colleagues (2017) conducted a two-year longitudinal study using a convenience sample of first-year students, ages 18 to 23 ($N = 1,142$), to explore the impact of alcohol and marijuana on college students’ academic performance. The researchers collected participants’ grade point average (GPA), alcohol use (i.e., number of days participants consumed alcohol in the past 30 days and number of drinks consumed on each occasion), and marijuana use, employing a scale of one (did not use marijuana in the past 30 days) to six (used marijuana more than 20 times in the past 30 days). In addition, the researchers collected other variables such as Scholastic Aptitude Test (SAT) scores, tobacco (cigarette) smoking, Socio-Economic Status (SES), Family History for Alcoholism (FHA), State Trait Anxiety Index (STAI), and Beck Depression Inventory (BDI). The findings identified that students with moderate to high alcohol and marijuana consumption had a significantly lower GPA ($F (2,2267.8) = 20.6; p < .001$) than their counterparts (Meda et al., 2017).
Rohsenow and colleagues (2010) examined current and former university students from the greater Boston area, ages 21-35 ($N = 95$), and the impact of heavy drinking on next-day neurocognitive performance. The authors used a three-item questionnaire to measure participants' 30-day alcohol use and *The Acute Hangover Scale* (AHS; Rohsenow et al., 2007) to measure hangover. The authors found that participants who consumed alcohol had lower scores in tests requiring both continued attention and speed ($p < .002$) with medium effect size (i.e., .30 – .40). A similar placebo-controlled randomly assigned study that examined the impact of binge drinking on next day test-taking performance in Boston-area college students ($N = 196$) concluded that binge drinking did not impact next day test-taking performance; however, the authors asserted that binge drinking impacted neurocognitive measures and mood states (Howland et al., 2010).

Porter and Pryor (2007) investigated the relationship between alcohol use (as measured by heavy episodic drinking survey) and academic performance ($N = 41,598$), using students at 28 four-year private institutions. The institutions varied in terms of student population (e.g., coeducational, women's colleges). Porter and Pryor (2007) divided the data into categories of female and male students at research universities ($N = 32,338$), females and males at liberal arts institutions ($N = 5,446$), and female students at women's institutions ($N = 3,815$). The results from a logistic regression indicated that students who consumed alcohol heavily tend to have a lower GPA, and students’ chances of earning a grade of “A” or “A-” diminished as heavy alcohol consumption in two weeks increased.

Piazza-Gardner et al. (2016) examined the relationship between alcohol consumption and college students’ GPA in a national sample ($N = 22,424$) using the National College Health Assessment (NCHA). The data was collected randomly from over 44 two- and four-year colleges.
and universities; the data had a wide variety of demographic information (e.g., religious affiliation, racial/ethnicity). Piazza-Gardner et al. (2016) results from ANOVA analysis ($F (3, 942.65) = 75.719, p = .000.$) indicated that participants with high alcohol consumption (as measured by a single question) had lower academic performance (i.e., GPA) compared to those with higher academic performance. Moreover, the amount of alcohol participants consumed was a strong indicator of their academic performance, and the probability of being “A” students was lower when binge drinking was higher.

In addition to the impact on college students’ academic performance, researchers have explored the consequences of college alcohol use on others (i.e., second-hand effects). For example, Cabalatungan and McCarthy (2015) used four rounds of cross-sectional data, collected in 1993, 1997, 1999, and 2001, with a combined total sample size of ($N = 53,061$). The data was collected randomly from four-year private and public colleges and universities using a self-reporting instrument. The descriptive analysis of the data indicated that about 70% of participants had experienced second-hand effects. Moreover, results from multiple logistic regression showed a negative association between second-hand exposure and grades; as well, the authors reported ($b = .325, \ SE = .140, p < .05$) a negative relationship between school satisfaction and exposure to second-hand effects in all racial groups except African Americans in the study.

Like Cabalatungan and McCarthy (2015), Thompson et al. (2017) conducted a study using ($N = 1,885$) first-year undergraduate students to investigate the pervasiveness and effects of second-hand (i.e., repercussions of individual alcohol consumption on society) impact in college students. The authors reported that 71% of their sample experienced the impact of the second-hand effect. Participants in the study also expressed various strains (e.g., being harassed).
Thompson et al. (2017) concluded that being exposed and experiencing second-hand impact may have negative consequences for students’ mental health.

**Predicting Factors**

As noted, the increased pervasiveness and consequences of college students’ alcohol use are established. Researchers have worked to identify factors that predict alcohol use in college students. While college students’ identity exploration and lack of identity consolidation increase risk-taking behaviors such as binge drinking and other substance use (Schwartz et al., 2010), researchers also underscore different biopsychosocial predicting factors, including (a) social influence (Abar & Maggs, 2010), (b) prior alcohol use (Yu & Shacket, 2001), (c) non-cognitive traits (Lac et al., 2013), (d) drinking locations (Jakeman et al., 2015; Kypri et al., 2010), (e) students’ attitudes (Chen & Feeley, 2015), and (f) family history of alcoholism (Capone & Wood, 2008; Dager et al., 2013; Harrell et al., 2009).

Abar and Maggs (2010) examined the impact of the process of selection and social influence on the alcohol use of incoming first-year college students ($N = 193$). The authors reported that participants’ pre-college perception of their own and their friends’ alcohol use “predicted perceived drinking norms of one’s closest friends during the first year of college, which in turn predicted actual alcohol use in college” (p. 504). Similarly, Windle et al. (2017) examined the relationship between the consumption of tobacco products, alcohol, and marijuana in college students ($N = 3,418$) and their parents, siblings, and friends in a two-year longitudinal study. Participants were from seven private and public colleges and universities in the state of Georgia with ages ranging from 18 to 25. To assess the relationship between participants’ substance use and use by their peers, siblings, and parents, researchers employed bivariate associations. The statistically significant results ($p < .001$) identified a relationship between
students’ substance use (e.g., alcohol) and that of their peers, siblings, and parents. The odd ratios for parents and siblings were 2.0; the odd ratios for peers’ use were between 6.0 to 9.0, indicating a six to nine-fold increase if college students’ peers are using. To assess their second research question (i.e., the combined influence of parents, siblings, and peers on participants’ substance use), Windle et al. (2017) used SEM and identified mixed outcomes, including an initial model failed to give an acceptable fit for the observed data ($\chi^2 = 382.93, p < .001; \text{CFI} = .903, \text{TLI} = .959, \text{RMSEA} = .028 (.024–.031), \text{SRMR} = .018.$), but they reported an excellent revised model ($\chi^2 = 211.12, p < .001, \text{CFI} = .950, \text{RMSEA} = .020 (.017–.023), \text{SRMR} = .015.$). The second model reveals that participants’ cigarette use was predicted using the three social influencers (i.e., parents, siblings, and friends). In addition, participants’ marijuana use was also predicted by all three influencers ($R^2 = -.210$), and participants’ hookah ($R^2 = .052$) and alcohol use ($R^2 = -.216$) was predicted by siblings’ and peers’ use.

Yu and Shacket (2001) examined predictive factors such as students’ prior history of alcohol use utilizing a telephone interview method, randomly collecting data ($N = 813$) from five colleges in New York State. The result from multiple regression analysis indicated that both frequency ($\beta = .29$) and quantity ($\beta = .31$) of alcohol consumption in high school had an impact on participants’ alcohol consumption behavior in college. Moreover, both high school frequency and quantity of alcohol consumption explained 30% of the variance in a regression model; quantity ($R^2 = .25$) of alcohol consumption had more explanatory power than frequency ($R^2 = .05$) in the regression model. Likewise, Moser et al. (2014) investigated the association between variables prior to starting college (i.e., personalities, internalization of the college drinking culture, descriptive norms, and injunctive norms) and peak estimated blood alcohol concentrations in three drinking contexts (i.e., drinking games, pregameing, and tailgating). The
path analysis results indicated that internalization of the college drinking culture was significantly associated with peak estimated blood alcohol concentrations in the three drinking contexts during the first 30 days of the freshman year. Moser et al. (2014) concluded that participants’ prior beliefs are a significant predictor of alcohol use in college.

Several researchers also examined non-cognitive traits such as attachment as a predicting factor of alcohol use. Lac et al. (2013) employed an integrative mode (i.e., integrating Attachment Theory and Theory of Planned Behavior) to assess the predictive ability of the model using SEM \( (N = 351) \). The authors utilized a revised Inventory of Parent and Peer Attachment (RIPPA; Armsden & Greenberg, 1987) and the Theory of Planned Behavior Scale. The initial model produced acceptable fit indices \( (\chi^2 (147) = 333.73, p < .001; \text{CFI} = .97, \text{NNFI} = .96, \text{SRMR} = .04.) \); after re-estimating the data, the final model yielded \( (\chi^2 (155) = 344.00, p < .001; \text{CFI} = .97, \text{NNFI} = .96, \text{SRMR} = .05.) \). Lac et al. (2013) concluded that “secure peer attachment positively predicted higher alcohol norms and behavioral control, whereas secure maternal attachment negatively predicted alcohol attitudes and behavioral control” (p. 1583). Similarly, in their analysis of undergraduate students’ \( (N = 123) \), Scullin and Jacobs (2001) used existing data to predict participants’ alcohol and nicotine use. The authors reported that heavy drinkers were strongly predicted by extraverted personality \( (M = 169.6) \), conscientiousness moderately predicted heavy drinking \( (M = 153.6) \), while participants’ fearful attachment style was a moderate predictor of alcohol consumption behavior; light drinking behavior scored \( (M = 2.72) \) and heavy drinkers scored \( (M = 3.20) \). Kassel et al. (2007) also conducted a study to investigate the association between adult attachment style and college students’ \( (N = 212) \) cigarette, alcohol, and marijuana use. Kassel et al. (2007) asserted that anxious attachment was significantly \( (p = \)
.05) associated with cigarette smoking ($r = .26$), alcohol use ($r = .22$), and marijuana use ($r = .16$) in college students.

In addition to non-cognitive traits, another risk factor in alcohol use for college students is their drinking locations (Jakeman et al., 2015; Kypri et al., 2010). Miller et al. (2016) examined the effect of drinking location and pregaming in predicting alcohol consumption in college students ($N = 212$) who had been mandated for treatment. The subjects were 59% male and 41% female, average age 19.35 years, at a mid-Atlantic public university. Most of the participants were white (80%), followed by bi/multiracial (8%), Asian (5%), Hispanic/Latino (5%), and African American (2%). Results from a one-way analysis of covariance indicated that students who stated they had consumed alcohol at a residence hall/dorm ($M = .11, SD = .08$) reported significantly lower blood alcohol concentrations (BACs) prior to the event than participants who consumed at a fraternity house ($M = .18, SD = .11; p < .001$) or off-campus apartment ($M = .17, SD = .10; p < .001$). Drinking location by pregaming did not predict event BACs [$F (3, 194) = .83, p = .48, \eta^2 = .01$]. Moreover, participants who engaged in pregaming ($N = 100; M = .17, SD = .10$) had greater event BACs than participants who did not ($N = 112; M = .12, SD = .10$). Miller et al. (2016) conducted hierarchical linear regressions to assess drinking location and reported that fraternity-house drinking accounted for 1.9% of variance in event BAC [$t (204) = 2.11; p = .04; 95\% CI = .002, .07; \text{Adj. } R^2 = .14$], residence hall/dorm drinking accounted for 7.8% of variance in event BAC [$t (204) = -4.47; p < .001; 95\% CI = -.09 - .03; \text{Adj. } R^2 = .20$], off-campus housing drinking accounted for 2.2% of variance in event BAC [$t (204) = 2.28; p = .02; 95\% CI = .004, .05; \text{Adj. } R^2 = .14$], and bar/restaurant drinking did not account for variance in event BAC after accounting for pregaming behavior [$t (204) = .44; p =
The authors concluded that location and pregaming was predictive of alcohol consumption in college students who had been mandated for treatment.

Chen and Feeley (2015) investigated the relationship between college students’ attitudes towards alcohol and emotional distress and their binge-drinking behaviors. The authors utilized a survey to gather participants’ binge drinking at a public university in two waves. The authors reported gathering \( (N = 279) \) in the first wave and \( (N = 179) \) in the second wave; the authors then combined the two data sets to create a new one. Participants’ ages were between 18-29 years \( (M = 19.76, SD = 1.75) \). The authors reported 101 (56.4%) of participants identified as White, 43 (24.0%) as Asian or Pacific Islander, 15 (8.4%) as Black, 5 (2.8%) as Hispanic, 1 (.6%) as American Indian or Alaska Native, and 14 (7.8%) as “Other Ethnicities.” The negative binomial regression result indicated that favorable attitude was a significant indicator of the number of binge-drinking days, \( \text{Exp}(B) \text{1.616}, 95\% \text{ CI}[1.324, 1.972], p < .001 \), meaning as participants’ attitude increased in wave one, participants consumed 1.616-times more days of binge alcohol consumption at wave two.

**Protective Factors**

Alcohol use amongst college students is higher than their non-college peers and often is associated with significant consequences. Scholars have identified protective factors to college students’ alcohol use such as protective behavioral strategies (PBS), emotion regulation strategies, religious practice, and parental supervision. Multiple studies have investigated the role of PBS in college students’ decreased alcohol consumption. For example, Ray and colleagues (2009) investigated the correlation between college students’ \( (N = 229) \) usage of protective behaviors and alcohol consumption, with its associated effects. The average age of participants was 18.61 years, and 54.4% of participants identified as female. A large majority of the
participants identified as Caucasian, while 4.4% identified as Asian, 1.7% as multiracial, .9% as African American, and .9% identified as other. All participants were freshmen and were selected randomly from a public university in the northeast United States. The hypothesized model of Ray and colleagues (2009) yielded an acceptable statistical fit, $\chi^2 (10) = 57.87, p < .01$; CFI = .91, identifying that protective behaviors had a significant effect on alcohol-related consequences. The authors also found that as participants’ protective behaviors increased, their reported heavy alcohol consumption decreased ($p^s < .01$).

In a similar study, Borden et al. (2011) examined the relationship between PBS and excessive drinking and its associated consequences, using a large sample size ($N = 4,154$) from 13 institutions. The median age of participants was 21; about 54.3% of participants identified as female, and 89.6% identified as white. Participants who completed the survey were incentivized by a raffle for $50 or $100 gift certificates to their bookstores. A multiple regression analysis indicated that students with high PBS displayed a weak correlation ($\beta = .23–.25$) with excessive drinking and related consequences ($p < .001$). In a similar study, LaBrie et al. (2010) assessed the relationship between college students’ ($N = 1,820$) health status and the effectiveness of PBS in mitigating risky alcohol consumption and related consequences. Participants were from two large public institutions on the west coast. The mean age of the participants was 19.2 ($SD = 1.33$), and 56.5% of the participants identified as female; moreover, 76% identified as Caucasian and 24% as Asian. After running a regression analysis, the regression model predicted that participants’ lower protective strategies ($\beta = -.35, p < .001$), stronger social health ($\beta = .15, p < .001$), and PBS and social health ($\beta = -.06, p < .05$) contributed to their weekly alcohol consumption. Moreover, the authors reported that lower PBS ($\beta = -.11, p < .001$) added to the prediction of
negative effects of alcohol use. LaBrie et al. (2010) noted that the utilization of PBS was correlated with less alcohol consumption for college students.

Although limited research exists on the effect of different emotion regulation strategies as a protective factor from alcohol use in college students, Norberg et al. (2016) examined the influence of emotion regulation strategies and pre-gaming on alcohol-related problems in college students at multiple universities ($N = 1,857$) between the ages of 18 and 25. Most participants identified as white (70.7%), and 69% were female. The results indicated that the first model (i.e., pre-gaming group $\times$ cognitive reappraisal) interaction [$\beta = -.0002$, SE = .006, $t = (1750) = -.047$, $p = .962$] was not significant with small effect size ($d = .002$). However, after removing the interaction effect and variables such as race, all other variables (i.e., being female ($d = .202$), being older ($r = .045$), drinking more alcohol ($r = .429$), and cognitive reappraisal ($r = .151$) were related to alcohol-use problems. Norberg et al. (2016) identified the intricate relationship between pre-gaming and alcohol-use problems, concluding that participants’ increased usage of cognitive reappraisal was related to their decreased levels of alcohol-related problems.

Blanchard et al. (2019) also examined college students’ ($N = 643$) emotion regulation strategies as a protective factor for substance use within a sample that consisted of 64% females, 67% white, and 15% Hispanic/Latinx. All participants were students at a large southwestern university. Blanchard et al. (2019) used SEM to assess the main effects of emotion regulation strategies (as measured by ERQ; Gross & John, 2003) on substance use-related outcomes. The results indicated an acceptable model fit after removing one item from the emotion regulation questionnaire (CFI = .97, RMSEA = .08). The authors reported that the reappraisal emotion regulation strategy was positively correlated to PBS for alcohol and cannabis use in female participants and negatively associated with binge alcohol consumption in the past two weeks ($r =$
Suppression did not yield a significant result with outcome variables in female participants. Moreover, “reappraisal was positively associated with alcohol-specific harm reduction PBS and approached significance for cannabis-specific PBS use” (p. 97) in male participants. The authors found reappraisal played a protective role for binge drinking (for females) and associated problems (for males). Therefore, the findings identify the importance of ER strategies in understanding alcohol- and cannabis-associated problems in college students.

Scholars have identified the role of college students’ religious practice as a protective factor in their alcohol use. Brechting and colleagues (2010) examined associations between religious beliefs/religious behaviors and alcohol use in college students (N = 159). The participants were from one southeastern university, and their average age was 19.25 years (SD = .8); the majority (91%) identified as Caucasian and 75% identified as female. The results indicated that a high level of religious practice (i.e., engaging in prayer, attending services) and religious beliefs were related to decreased consumption of alcohol (B = 1.78, p < .001).

Bodford and Hussong (2013) investigated college students’ private and public religiosity and their alcohol consumption behavior. The participants (N = 230) were from a large southeastern university with a mean age of 18.77 (SD = .76), and the majority (70.4%) identified as non-Hispanic white, while 60% identified as female. In addition, 75.2% of participants identified as affiliating with Christian denominations. Of those who reported no affiliation, 7.8% were agnostic and 6.5% atheist. Bodford and Hussong (2013) reported that college students who practice their religiosity in public tend to drink less alcohol than those who practice privately (r = –.18, p < .01). Moreover, peer alcohol consumption was a moderating factor (b = –.76.7, p < .01), demonstrating that the association between private religiosity and alcohol consumption was negative for participants with peers who ingest alcohol heavily (b = –25.5, p = .06). Further,
parents’ disapproval of alcohol consumption had a meaningful interaction effect with private religiosity \((b = 53.0, p = .01)\). Therefore, these findings identify the context in which religiosity serves as a protective factor in college students’ alcohol use.

Similarly, Cole et al. (2018) assessed the impact of college students’ \((N = 206)\) religious beliefs and religious behavior on their alcohol and drug use. The sample was 67% female and 74% white, while 14% identified as African Americans, 4% Asians, and 8% identified as other or unknown. Results from regression analyses indicated that religious beliefs and behaviors accounted for a significant amount of variance, \(R^2 = .14; F (2, 203) = 15.82, p < .001\). The authors reported a significant interaction between participants’ religious beliefs and their behaviors. Moreover, religious beliefs negatively predicted alcohol drinking for participants with increased religious behaviors \((\beta = .78, p < .05)\). Next, Cole et al. (2018) reported that participants with strong religious beliefs that are not supported by religious behaviors had increased social availability and alcohol consumption. The authors concluded that participants who score higher in both religious beliefs and religious behavior had a decreased level of alcohol use.

To understand the impact of leaving home on college students’ alcohol consumption (i.e., frequency of alcohol use and heavy episodic drinking) and marijuana use, White et al. (2006) collected data from emerging adults \((N = 319)\). The final sample was 53% male, and the mean age of participants was 18.7 years; the majority (82%) identified as white, while 8% identified as Asian or Pacific Islander, 4% as Hispanic, 3% as Black, and 2% as Native American. The results indicated that participants’ higher religiosity \((b = -0.11, p < .05)\) served as a protective factor against alcohol use six months later. The results identified that increased parental supervision \((b = -0.16, p < .05)\) and having fewer peers who drank \((b = -0.16, p < .001)\) in high school served as a protective factor from heavy episodic drinking in college.
In summary, emerging adults’ identity exploration and risk-taking behavior contribute to increased alcohol use in college students. As noted, research findings identify the pervasiveness of alcohol use in college students and that harmful alcohol use contributes to injuries, blackouts, sexually transmitted diseases, changes in brain structure, and even death. Further, other consequences of college students’ alcohol use can include negative academic performance, hangovers, legal problems, unsafe sex, and sexual violence. Researchers have identified factors that predict alcohol use in emerging adults, such as social influence, prior alcohol use, non-cognitive traits, drinking locations, and students’ attitudes. Researchers have also identified protective factors in college students’ alcohol use, including PBS, emotion regulation strategies, religious practice, and parental supervision.

Grit

As college students strive to navigate the higher-education challenges (e.g., schoolwork) and responsibilities (e.g., financial) of their new environment, they endure increased stress (Sharkey et al., 2017). Some students employ non-cognitive resources such as grit to persist, overcome challenges and become successful. Grit is a Positive Psychology construct that is defined as “perseverance and passion for long-term goals” (Duckworth et al., 2007. p. 1087). In the past decade, the interest in investigating grit has increased. Some scholars use grit and self-control synonymously; however, as Duckworth and Gross (2014) note in their hierarchical goal framework, self-control entails overcoming two impulses (i.e., impulses related to the immediate and impulses related to long-enduring values), as opposed to grit, which involves tenaciously pursuing a goal while facing barriers for a long period.

Grit is correlated with conscientiousness, one of the Big Five personality traits (Schmidt et al., 2018). Specifically, Credé et al. (2017) illustrated the strong similarity between the
constructs; despite these constructs' similarity and predictive power, grit is conceptualized as a unique construct (Schmidt et al., 2018). Another related term that is often used interchangeably with grit is resilience (Stoffel & Cain, 2018), which is defined as the individual’s ability to flourish in the face of difficulty (Connor & Davidson, 2003). Although the definitions appear similar, it is uncertain whether the constructs are referring to similar individual qualities (Meyer et al., 2020). Despite the lack of clarity between grit and resilience, there has been exponential growth in research on this topic (i.e., grit) in education settings (Alhadabi & Karpinski, 2020; Duckworth & Quinn, 2009), performance in the National Spelling Bee, and teachers’ efficacy (Duckworth & Quinn, 2009), and in non-traditional contexts (e.g., workplace, marriage, health).

Eskreis-Winkler et al. (2014) investigated the relationship between grit and retention in four settings (i.e., military, workplace sales, high school, and marriage), employing a longitudinal design to conduct three separate studies using different samples. First, Eskreis-Winkler et al. (2014) examined the predictive power of grit using soldiers ($N = 677$) in Army Special Operation Forces selection courses. The sample was 100% male with a mean age of 25.61 years ($SD = 4.39$). The authors collected data using the Grit Short Scale (Grit-S; Duckworth & Quinn, 2009) and the Armed Services Vocational Aptitude Battery—General Technical (ASVAB-GT; McLaughlin et al., 1984). Participants’ fitness was measured by the army fitness test protocol (i.e., push-ups, sit-ups, and two-mile run). A hierarchical logistic regression model predicted that soldiers with more grit completed training at a higher rate than those with less grit ($\chi^2 (1) = 10.65, p < .001$), identifying that participants with high grit scores were less likely to drop out of the 24-day grueling selection course.

In a second study, Eskreis-Winkler et al. (2014) assessed job retention using sales representatives ($N = 677$) in a vacation ownership corporation. The sample was 77% white, 9%
Black, 7% Hispanic, 2% Asian, and 5% others with a mean age of 43.97 years ($SD = 11.86$); 61% identified as male. Using a binomial logistic regression model that included personality traits, only grit predicted retention ($OR = 1.38$). Moreover, a hierarchical logistic regression model indicated that grit significantly contributed to the model ($\chi^2 (1) = 6.38, p < .012$). In conclusion, Eskreis-Winkler et al. (2014) reported that sales representatives with more grit remained on their job longer than those with less grit.

In a third study, Eskreis-Winkler and colleagues (2014) investigated the predictive ability of grit in on-time graduation of high school juniors ($N = 4,813$) in Chicago. After controlling for other variables, a binary logistic regression indicated that grittier high school juniors graduated at a higher rate ($OR = 1.21$). Lastly, Eskreis-Winkler and colleagues (2014) investigated the correlation between grit, Big Five personality traits, and marital status using ($N = 6,000$) adults. The results indicated that conscientiousness was correlated with an increased likelihood of staying married ($OR = 1.08$). In contrast, having an openness personality was associated with a decreased probability of staying married ($OR = .76$); moreover, grit, extraversion, and emotional stability had no significant relationship. To further examine the role of grit in remaining married by gender, the authors ran a model and found that grit was related with a 17% increased chance of men staying married. Eskreis-Winkler and colleagues (2014) ran a hierarchical logistic regression to confirm the interaction between grit and gender, yielding a significant result ($\chi^2 (1) = 7.25, p < .007$), identifying that men with higher grit scores were less likely to separate or divorce.

Salles and colleagues (2014) examined surgical residents’ ($N = 141$) levels of grit relating to their feelings of burnout and psychological well-being. After conducting a multivariate linear regression, the authors reported that participants with high grit (as measured by Grit-S;
Duckworth & Quinn, 2009) scores had a lower burnout rate ($B = -.20, P = .01$) six months later than those with lower grit score. Moreover, Salles et al. (2014) also reported that grittier participants had better general psychological well-being than less gritty participants ($B = .27, P = .01$). To investigate the predictive ability of grit and conscientious personality traits in exercise behavior within transtheoretical model (TTM) stages, Reed et al. (2013) utilized a Survey Monkey™ platform to collect data from three midwestern universities' students, staff, and faculty. After deleting incomplete surveys, the final sample size was ($N=1,165$). Based on ordinal regression analyses, the researchers reported that grit (as measured by Grit-S; Duckworth & Quinn, 2009) predicted moderate ($\beta = .19$, OR = 1.21, 95% CI 1.04–1.38, $p = .045$) and high-intensity ($\beta = .26$, OR = 1.30, 95% CI 1.10–1.50, $p = .001$) exercise behavior better than did conscientiousness. Additionally, Reed (2014) used the same participants (i.e., universities’ students, staff, and faculty; $N = 1,165$) to test the first hypothesis; the author ran a correlational analysis which indicated that grit, conscientiousness, industriousness, and exercise behavior were correlated positively at ($p < .001$). Reed (2014) further examined the role of grit in exercise behavior using a one-way analysis of variance (ANOVA). The result indicated that participants with a high grit score also had an increased exercise score $F$ (1, 1158) = 43.52, $p < .001$). Therefore, the findings identified the predictive role of grit in participants’ exercise behavior, providing initial support that underlines the vitality of grit for exercise behavior.

Thomas and colleagues (2015) assessed the relationship between participants’ grit (as measured by Grit-O; Duckworth et al., 2007) and their delayed-reward discounting and their body mass index ($N = 450$). Most participants were male (56.2%) and non-Hispanic white (73.1%). The authors reported that grit was not associated with delayed reward discounting in both $\$100$ ($r = -.012, p = .81$) or $\$1000$ ($r = -.003, p = .95$) tasks. In addition, after controlling for
multiple variables, a linear regression analysis indicated that low grit and higher delayed reward discounting scores of participants predicted higher body mass index ($R^2 = .36, p = .04$). As a result, Thomas et al. (2015) concluded that “Grit Scale scores did not lessen the tendency for greater sensitivity to short-term reward to be associated with higher BMI” (p. 134).

Similarly, to illustrate the relationship between grit (as measured by Grit-S; Duckworth & Quinn, 2009) and individuals’ approaches to happiness, Culin et al. (2014) conducted two cross-sectional studies. In their first study, Culin et al. (2014) used online adults ($N = 15,874$) with an average age 33.88 ($SD = 13.32$); 64% of participants identified as female. The authors reported that participants who deliberately engaged in activities to pursue happiness were grittier ($\beta = .34, p < .001$) compared to those who pursue happiness via meaning ($\beta = .15, p < .001$) and pleasure ($\beta = -.10, p < .001$). Moreover, the relationship between engagement and grit was notably greater than the correlation between meaning and grit ($p < .001$). In their second study, Culin et al. (2014) replicated their study by collecting data using Mechanical Turk (MTurk) from ($N = 317$) adults. The average age of participants was 31.59, and 63% identified as female. Like study one, the authors reported participants who sought engagement in life ($\beta = .32, p < .001$) and those who sought meaning ($\beta = .19, p < .001$) had higher grit scores when compared with those who sought pleasure in life ($\beta = -.24, p < .001$). After analyzing both studies, the authors concluded that grittier participants were more likely to seek happiness via engagement.

Sharkey and colleagues (2017) explored the association between grit, intrapersonal characteristics, health-care management skills, and health-related quality of life. Participants were undergraduate students ($N = 470$) from a large midwestern university, with ages ranging from 18 to 23; most of the students identified as freshmen (61.3%), female (68.3%), and Caucasian (72.3%), respectively. A hierarchical multiple regression indicated that college
students with higher grit (as measured by Grit-S; Duckworth & Quinn, 2009) had better health care management skills \( R^2 = .15, p < .001 \), mental-health-related quality of life \( R^2 = .24, p < .001 \), and physical-related quality of life \( R^2 = .11, p < .001 \). Therefore, the findings identified the critical role of grit in non-traditional contexts such as healthcare management skills and quality of life.

Kleiman and colleagues (2013) completed a longitudinal study that investigated grit in the context of mental-health concerns (i.e., suicide ideation) in a sample of participants \( N = 209 \). The researchers examined the protective advantage that integrating gratitude and grit provided to individuals with suicidal ideations. The average age in the sample was 20.51, and a majority (84.2%) identified as female, while 54% identified as Caucasian, 20% Asian, 13% African American and 13% as other. Kleiman et al. (2013) utilized the Beck Suicide Scale (BSS; Beck & Steer, 1991), Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), Original Grit Scale (Duckworth et al., 2007), Gratitude questionnaire (GQ-6; McCullough et al., 2002), and Meaning-in-life questionnaire (MLQ; Steger et al., 2006). While controlling for depression, the authors found a significant interaction between grit and gratitude \( b = -.30, SE = .14, x^2 = 4.64, p = .031 \). The results indicated that the integration of grit and gratitude can serve as a protective factor against participants’ suicidal ideation. The authors concluded that an increased level of gratitude and grit significantly decreased participants’ suicidal ideation.

In addition to the combination of gratitude and grit serving as a protective factor for suicidal ideation, researchers have examined the role of grit in health-related issues such as illness-related distress (Sharkey et al., 2018). The authors used college students \( N = 128 \) with an average age of 21.3 years. Using an online survey, the authors collected data from a large midwestern university where participants self-reported having a chronic disease; 78.3% of
participants identified as Caucasian, and 73.3% identified as female. Results from path analysis indicated that grit (as measured by Grit-S; Duckworth & Quinn, 2009) was directly correlated with lower depressive and anxiety symptoms and greater emotional well-being ($p < .05$).

Sharkey et al. (2018) identified grit as a positive personal attribute for adolescents and young adults with chronic medical conditions.

As noted, there is interest in investigating grit in multiple contexts; however, research examining the relationship between college students’ grit and their alcohol use is limited. Researchers in the field of substance use have begun to explore the possible positive role of grit (Griffin et al., 2016; Guerrero et al., 2016). To validate the use of the Grit-S in a non-college population, Griffin et al. (2016) utilized ($N = 1,673$) inpatient participants (37.6 mean age) who were diagnosed with substance use. Almost all (93.5%) of the participants identified as white, 68.5% as male, 46.2% as employed, and 53.2% as married. The researchers reported preliminary results that support the overall internal consistency ($\alpha = .74$) of Grit-S and of the subscales (i.e., interest $\alpha = .81$, and perseverance $\alpha = .60$). Griffin et al. (2016) concluded that Grit-S has appropriate psychometric properties to be used in a substance-use population.

In another non-college population, Guerrero et al. (2016) examined the relationship between grit (as measured by Grit-S; Duckworth & Quinn, 2009) and healthy behavior using a sample of predominantly Latino adolescents ($N = 1,270$) in five charter high schools with a primarily underserved population in Los Angeles. Guerrero et al. (2016) reported that grittier participants had decreased use of alcohol (odds ratio .30, $p < .001$) and marijuana (odds ratio .21, $p < .05$) in the previous 30 days. As a result, the findings underscore the importance of investigating the relationship between grit and substances such as alcohol in adolescents and college students.
Maddi and colleagues (2013) investigated college students’ \( N = 425 \) hardiness, grit (as measured by *Grit Original Scale*; Duckworth et al., 2007), and emotional intelligence in reducing extreme consumer spending, gambling, and internet addiction. Results from multiple regression analyses indicated that hardiness \( (B = -.655, p = .001) \) and grit \( (B = -.187, p = .001) \) negatively predicted internet addiction. Therefore, the authors concluded that underlined hardiness is a stronger predictive power from the two.

In summary, grit is the ability of individuals to persistently pursue their goals with interest and determination. Grit is essential for sustaining wellbeing and health-related outcomes. College students’ levels of grit impact their academic success and retention rates (Duckworth et al., 2007). Therefore, the researcher hypothesizes the college students’ level of grit will predict their alcohol use. As a result, college students’ level of grit may serve as a protective factor in their harmful alcohol consumption.

**Personal Growth Initiative (PGI)**

Grit is one non-psychological trait that is vital for sustained engagement to achieve various goals. Like grit, Personal Growth Initiative (PGI) is one construct in the field of positive psychology that studies the process of individual growth (Robitschek, 1998). PGI is defined as “… a person’s active and purposeful desire to grow in salient areas” (Weigold et al., 2018, p. 259). At the core of PGI are two main principles: (a) intentionality and (b) transferability. The conceptualization of PGI evolved from understanding the construct as unidimensional (Robitschek, 1998) to multidimensional (Robitschek et al., 2012) and encompasses four vital skills: (a) preparation for change, the individual’s ability to recognize an opportunity and area of growth; (b) planfulness, the ability to formulate approaches to work towards the goal; (c) using resources, the individual’s ability to access resources; (d) intentional behavior, the individual’s
deliberate and conscious effort to work toward achieving growth (Robitschek et al., 2012; Robitschek et al., 2019). Researchers have investigated the importance of understanding individuals’ PGI in multiple contexts, especially for the success of clients who are coping with challenging situations (Robitschek et al., 2012) and for psychological, social, and emotional well-being (Meyers et al., 2015). Moreover, researchers have examined the use of strength-based approaches to developing individuals’ PGI (Thoen & Robitschek, 2013; Woerkom & Meyers, 2019).

PGI has been investigated in mental health, including the counseling process (Weigold et al., 2018). With the aim of understanding the role of PGI (as measured by Personal Growth Initiative Scale-II; PGIS-II; Robitschek et al., 2012) in the therapeutic process, Weigold et al. (2018) collected data from a community mental health clinic at a large midwestern university. The sample ($N = 295$) contained 51% women and had an average age of 34.37, and 70% of the sample identified as white/European American. Weigold et al. (2018) used cross-lagged panel analysis, which is an SEM technique, to examine the relationship between PGI and distress. The authors final model accounted for significant variance for both PGI and distress (i.e., GSI) at Time 2 (56%, $p < .001$) and (58%, $p < .001$) respectively. In their discussion of the result, the authors asserted that individuals with a higher PGI score had decreased distress, and understanding clients’ PGI is beneficial in therapy. In addition, participants’ PGI improved throughout therapy even when PGI was not the focus of the intervention.

In a cross-sectional study, Hoggard et al. (2019) examined the mediating role of PGI as measured by Personal Growth Initiative Scale (PGIS; Robitschek, 1998) in the lived experience of racial discrimination and depressive symptoms among African American men. Hoggard et al. (2019) collected their data ($N = 649$) in three waves from different geographical locations of the
United States (i.e., North, South, West, and Midwest). Participants were recruited from seven barbershops, a community college, a historically Black university, and an African American law enforcement conference. The SEM first model yielded fit indices that was below the expected level, $\chi^2 (303, N = 485) = 1,144.56, p < .001$; CFI = .91, TLI = .90, RMSEA = .08, 90% CI [.07, .08]. After modifying the initial model, the authors reported an acceptable model fit $\chi^2 (300, N = 590) = 839.00, p < .001$; CFI = .96, TLI = .96, RMSEA = .06, 90% CI [.05, .06]. The findings of Hoggard et al. (2019) indicated a significant mediation relationship, meaning participants who reported frequent racial discrimination in participants was correlated with decreased PGI score, and lower level of PGI, in turn, was correlated with increased depressive symptoms ($a \times b = .03, p = .037$).

Robitschek and colleagues (2012) examined PGI as a malleable predictor of treatment outcome in depressed clients ($N = 286$). The authors reported that for PGI (as measured by; $PGIS-II$; Robitschek et al., 2012), the hierarchical multiple regression results showed a significant impact on PGI from intake to termination [$F (1, 518) =126.66; p < .001; \Delta R^2 = .16$]. The change on PGI score was associated with participants’ reduced depression symptoms at termination [$B = −.40 [t (1) = −11.25; p < .001]$. Robitschek and colleagues (2019) concluded that PGI was a malleable predictor for clients in a partial hospital treatment setting and that utilizing a PGI-based treatment approach can improve treatment outcomes.

Similarly, multiple scholars have investigated PGI’s predicting role in individuals’ posttraumatic stress and growth (Borowa et al., 2016; Shigemoto & Robitschek, 2019; Shigemoto et al., 2016). For example, Shigemoto and colleagues (2016) assessed PGI’s (as measured by $PGIS-II$; Robitschek et al., 2012) role in predicting posttraumatic growth, posttraumatic stress, and the degree to which rumination styles describe the connection between
the constructs using college students ($N = 286$). The average age of the sample was 19.60 years, and most participants identified as women (64%) and Caucasian (70%). The SEM result supported the authors’ hypothesized model ($\chi^2 (24) = 32.16, p = .12$). Further, the authors reported a positive direct relationship from behavioral PGI to posttraumatic growth ($\beta = .31, p < .001$). At the same time, the cognitive aspect of PGI was directly negatively related to posttraumatic stress symptoms ($\beta = .20, p < .01$). Conversely, Borowa et al. (2016) assessed PGI’s predicting role of posttraumatic growth in student veterans ($N = 136$). After conducting hierarchical regression to determine the unique variance in PGI, the authors reported that PGI accounted for a nonsignificant 1.3% of the variance; moreover, PGI did not significantly predict posttraumatic stress ($\beta = -.12, p < .01$).

A unique cross-sectional convenience sample study looked at the relationship between PGI (as measured by $PGIS$, Robitschek, 1998) and functional impairment in the daily life of individuals who were impacted by genocide in Rwanda (Blackie et al., 2015). The initial sample ($N = 200$) had 97 males and 103 females, and the average age was 29.40 years. After analyzing the final sample of ($N = 178$), the authors reported that PGI is negatively associated with ($r = -.33, p = .01$) impairment and distress. Likewise, in an attempt to understand the moderating role of PGI (as measured by $PGIS-II$; Robitschek et al., 2012) in lesbian, gay, and bisexual individuals facing heterosexism, Szymanski et al. (2017) conducted a study using a non-college student sample ($N = 356$), 62% ($N = 219$) of whom identified as college students at the time of the data collection. Szymanski et al. (2017) reported that PGI moderated the coping via education/advocacy and social justice ($R^2 = .03; p < .001$), and self-awareness ($R^2 = .04; p < .001$) links.
Matsuo (2019) examined the predicting role of PGI on adults’ psychological empowerment in the workplace. Using an online survey, the authors collected data (N = 320) from employees in the United States in two waves. The longitudinal survey indicated that PGI (as measured by PGIS-II; Robitschek et al., 2012) promoted and had a positive effect on psychological empowerment via different mechanisms such as increased structural job resources (.62, p < .001), social job resources (.35, p < .001), and challenging job demands (.45, p < .001). Therefore, adults’ PGI scores predict their psychological empowerment at work.

Chang and colleagues (2019) examined the ability of PGI to predict life satisfaction in Chinese college students (N = 152). A hierarchical regression analysis indicated that PGI (as measured by PGIS-II; Robitschek et al., 2012) contributed a small to medium (f^2 = .10, 9%) variance in life satisfaction after 15 weeks. In a similar study, Chang and Yang (2016) studied the role of PGI and family growth initiative in a study engagement using Chinese (N = 379) and American (N = 351) college students. After conducting hierarchical regression analyses, Chang and Yang (2016) reported that PGI accounted for 24%, 20%, and 28% in study vigor, dedication, and absorption variance respectively in Chinese students at (p = .001); and 19%, 15%, and 10% variance in study vigor, dedication, and absorption in American students at (p = .001). This finding underlines PGI’s predicting ability of students’ study engagement in a cross-cultural context.

Moreover, Loo et al. (2014) used a mix of college students and individuals from the general Taiwanese Chinese population (N = 801) to investigate the ability of positive traits (i.e., curiosity, gratitude, hope, mindfulness, and PGI (Chinese versions of PGIS; Robitschek, 1998) to predict gambling problems (Loo et al., 2014). The average age in the sample was 25.36 years; a majority (69.50%) identified as students, and 52.38% identified as male. The Hierarchical
Multiple Regression model (i.e., gender in step 1 and in step 2, curiosity and exploration inventory, gratitude questionnaire, adult hope scale, PGI scale, and mindfulness attention awareness scale) indicated that 4.4% variance was explained by the model $F (11, 744) = 3.14, p < .001$, $R^2 = 0.044$. Therefore, the finding identified that Taiwanese Chinese adults’ positive attributes (PGI scores) mitigate their levels of gambling problems.

Kugbey and colleagues (2018) examined the influence of emotional intelligence and PGI (as measured by PGIS-II; Robitschek et al., 2012) on the level of subjective happiness in university students ($N = 260$) from Ghana. Most participants (69.8%) were female, and the mean age was 21.72 years. A sequential regression analysis indicated that emotional intelligence and PGI explained students’ subjective happiness by 27% ($p < .01$). Within the model, Kugbey and colleagues (2018) also reported that 45% of the variance was explained by emotional intelligence, while intentional behavior (i.e., one factor of PGI) explained 26%. As a result, college students’ emotional intelligence and PGI scores predict their levels of subjective happiness.

Researchers have explored PGI in multiple contexts, including mental health, identifying the potential of using interventions to increase individuals’ PGI. However, there is a dearth of research exploring the role of PGI in the context of college students’ alcohol use. For example, to the researcher’s knowledge, there is only one study, using a sample of ($N = 294$) college students, that examined the correlation between participants’ family background (e.g., parental alcoholism) and variables such as PGI (as measured by PGIS; Robitschek, 1998), hardiness, psychological well-being and distress (Robitschek & Kashubeck, 1999). The participants ($N = 163$, women) and ($N = 131$ men) were recruited from the Introduction to Psychology course at a large southwestern university. The authors tested a mediating model that included
exogenous/independent variables (i.e., parental alcoholism and family functioning), the endogenous factors (i.e., well-being and distress), and mediating variables (i.e., hardiness and personal growth orientation) for men. The result indicated an adequate model fit chi-square difference test, $\chi^2 (1) = 41.50, p < .001$, identifying a hardiness-mediating role between family functioning and well-being. In addition, personal growth orientation played a mediating role between family functioning and distress ($p < .05$). Further, Robitschek and Kashubeck (1999) reported a nonsignificant direct impact of family functioning on well-being (.24) and distress (.01). Like the mediation model in men, the mediation model for women had an adequate fit. The authors noted that parental alcoholism had no impact on either well-being or distress; however, parental alcoholism had an indirect impact via family functioning, hardiness, and PGI.

Dordi and Purandare (2018) used a non-college convenience sample of alcoholic individuals ($N = 50$) in India to examine the relationship between life satisfaction, PGI (as measured by PGIS; Robitschek, 1998), and hope. The researchers reported a strong positive relationship between adults’ life satisfaction and PGI ($r = .76$), hope and life satisfaction ($r = .77$), and PGI and hope ($r = .87$), as they had hypothesized. Therefore, adults with an alcohol disorder score at higher levels of life satisfaction, and PGI have greater life hope scores.

In summary, a primary purpose of counseling with individuals abusing alcohol is to support them to reach a stage where they have the insight and motivation to implement desired changes and sustain the changes independently by utilizing resources such as support groups (e.g., Alcohol Anonymous). As noted, as individuals’ PGI scores increase from intake to termination, sustain wellbeing, help overcome difficult and traumatic experiences, predict positive mental health outcomes, enhance life satisfaction, and facilitate student engagement. Moreover, individuals’ readiness (i.e., one of the four domains of PGI) for change is found to
play a critical role in mental health (Robitschek, 1998) and, in general, addiction or substance use (DiClemente et al., 2004). Despite these findings, there is limited research related to PGI and alcohol use in college students.

**Emotion Regulation (ER)**

In addition to PGI and grit, another important construct for college students’ wellbeing is emotion regulation (ER). As noted, college students are in a unique developmental stage where they are exploring, feeling uncertain, pursuing, or engaging in activities that are risky, and responding well to emotional spark activities (Arnett, 2006; Siegel, 2013). These emotions elicit activities college students often engage in, including substance use such as drinking alcohol. The pursuit of emotion reactivity may lead to a heightened or lowered emotion state.

Beyond seeking activities that spark emotions, college students strive to adjust and acclimate to their new environment by building meaningful relationships, which are essential for co-regulation (Swenson et al., 2008). In addition to building meaningful relationships, ER is defined as “the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross, 1998, p. 275). Moreover, ER is conceptualized to have three essential facets: (a) initiation of a goal to adjust the emotion course, (b) engagement (i.e., the conscious/unconscious effort to regulate), and (c) the influence on the emotion trajectory (Gross, 2014).

College students learn to utilize different resources (e.g., intrinsic: emotion regulation skills and extrinsic: co-regulation; Gross & Jazaieri, 2014) to navigate their new environment. Regardless of which intra/interpersonal emotion regulation approach the individual takes, researchers assert that ER happens in context to achieve the desired goal (Mauss & Tamir, 2014). Therefore, ER strategies can be adaptive or maladaptive when assessed in context. The adaptive
nature of ER entails individuals’ ability to be mindful of their emotional experience and to discern the desired goal. Once the desired emotion is recognized and determined, individuals can choose appropriate strategies to enhance the emotional experience or to avoid it (Gross & Jazaieri, 2014). In this process of ER strategies, the most researched strategies employed by individuals are reappraisal and expressive suppression (Gross, 2014). Therefore, ER plays a critical role in college students as they strive to make sense of their world, including their social life, delaying gratification, or engaging in risky substance use such as alcohol consumption.

English and colleagues (2012) examined the importance of ER in friendship in a four-year longitudinal study that examined college students’ (N = 276) level of ER strategies and their newly formed friendships at the beginning of their freshman year. Most of the participants identified as female (61%), and 60% identified as Caucasian. The average age in the sample was 18 years. The authors used the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) to measure ER and used the Big Five Inventory (BFI; John et al., 2008) to measure personality traits. Social connection was measured using two questions designed to quantify warmth and closeness. English and colleagues (2012) reported that suppression strategies predicted weak social functioning (r = -.15, p < .05) while reappraisal predicted better positive social functioning (r = .16, p < .05). The authors concluded that ER strategies at the beginning of four-year college were a significant predictor of the quality of relationships students had four years later.

In addition, individuals’ ER scores contribute to their ability to delay gratification (Luerssen & Ayduk, 2014). While Luerssen and Ayduk (2014) acknowledged a lack of research on the connection between delaying gratification and individuals’ ability to regulate themselves, they cautiously asserted that individuals who are good at delaying gratification also can regulate
themselves. Correspondingly, through the role emotions play in choices related to winning and losing or reward and punishment, ER contributes to decision-making in a significant way (Grecucci & Sanfey, 2014). As a result, college students’ decision-making and ER scores predict their tendency to seek emotionally rewarding activities and engage in risky activities such as alcohol use.

The ability to understand emotions is important in every stage of life (Thompson, 2011); however, it may be more important in college students because of their risky behaviors such as substance use, unsafe sexual behavior (Tull et al., 2012), and other psychopathologies (Gross & Jazaieri, 2014). To understand the predicting ability of individuals’ coping and ER (as measured by ERQ; Gross & John, 2003) strategies, Wong and colleagues (2013) conducted a study of high-risk individuals (N = 560) between the ages of 16 and 25 who abuse prescription drugs. The results indicated that individuals who employed suppression-regulation strategies had an increased chance of initiating use of opioids ($x^2 (3) = 14.06, p < .01$), tranquilizers ($x^2 (3) = 8.69, p < .01$), and stimulants ($x^2 (3) = 7.98, p < .01$) at an earlier age and had severe drug-related problems.

Further, in a meta-analysis of 48 studies (Hu et al., 2014), the authors aim to determine the connection between emotion-regulation strategies (e.g., reappraisal and suppression) and mental health issues (e.g., anxiety). Hu et al. (2014) asserted that reappraisal is related to good mental health ($r = .26$), and suppression predicts negative mental health. Though multiple studies have documented that suppression emotion-regulation strategies are associated with negative mental health, researchers such as Weiss et al. (2017) demonstrated the bidirectional relationship between alcohol use (measured using the NIAAA guidelines), marijuana use (assessed by a “yes” and “no” question), and ER strategies (measured using each participant’s daily diary). The
authors collected their data over nine semesters using undergraduate students enrolled in a psychology course. The final sample (N = 1,640) included mostly (54%) females and was 80% European American; the mean age of the sample was 19.2 years. After running Hierarchical Linear Modeling, Weiss et al. (2017) asserted that students who employed daily reappraisal ER strategies consumed a lower level of alcohol at night (B = - .22, p = .003) and a lower level of marijuana (B = - .30, p = .001). Therefore, findings underscore the reciprocal influence between ER approaches and participants’ level of substance use in which students who utilized reappraisal ER strategies during daytime had decreased substance use. In contrast, students’ increased substance use at night predicted next day ER such as avoidance and reappraisal.

While the bidirectional outcome showed the importance of understanding the relationship between individuals’ level of substance use and their ER strategies, other researchers have attempted to document the ramifications of the inability to properly regulate oneself. In their analysis, Dvorak et al. (2014) looked at ER difficulties and level of alcohol use and its related effect. The participants in the study (N = 1,758) ranged in age from 18 to 31 years; most identified as female (59.7%), and 96.6% identified as Caucasian. The authors measured participants’ alcohol consumption using the Modified Daily Drinking Questionnaire (DDQ-M; Dimeff et al., 1999), the consequences of alcohol were measured using the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read et al., 2006), and ER was measured using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The negative binomial hurdle model was estimated to be (LR x^2 (16) = 172.1, p < .001). Next, the authors estimated an alcohol-related consequences model yielding (LR x^2 (18) = 397.17, p < .001). Further, alcohol consumption increased the probability and frequency of consequences (p < .001). Participants’ non-acceptance emotion responses (p = .001) and inability to control impulses (p = .001) were
also correlated with alcohol-related consequences with small effect size. Moreover, participants’ inability to engage in goal-orientated behaviors was positively correlated with the probability of having alcohol-associated consequences \( (p = .001) \). Therefore, the authors concluded that participants’ difficulty in adequately regulating themselves mostly had alcohol-related consequences.

Blanchard and colleagues (2019) examined college students’ ER strategies and substance use (i.e., alcohol and cannabis) and related consequences and psychometric property of ERQ using undergraduate students \( (N = 643) \) at a large southwestern university. Most of the participants identified as women (67%); 64% identified as white. ER was measured using ERQ (Gross & John, 2003), alcohol use was measured using NIAAA guidelines, alcohol-and cannabis-associated problems were assessed using the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013), and Protective Behavioral Strategies (PBS) were measured by the Protective Behavioral Strategies Scale – 20 (PBSS-20; Treloar et al., 2015). After removing one item from ERQ, the SEM analysis indicated acceptable model fit \( (CFI = .97, RMSEA = .08) \). Moreover, the SEM Standardized Estimates result indicated that ER reappraisal strategies in females were correlated with protective-behavioral strategies (between .11, \( p < .05 \), and .23, \( p < .01 \)) and negatively associated to alcohol consumption (- .16, \( p < .01 \)) with small effect size. However, the analysis yielded a non-significant association with cannabis use in the past two weeks or cannabis-use disorder (CUD) criteria and was negatively related with the alcohol-use disorder ([AUD], - .12, \( p < .05 \)). Moreover, suppression was correlated negatively with alcohol consumption for male participants (- .18, \( p < .05 \)) but reappraisal strategies were negatively correlated with AUD (- .16, \( p < .10 \)) and CUD criteria (-
Blanchard and colleagues (2019) concluded that there is a complex relationship between college students’ substance use (e.g., alcohol use) and their ER scores.

Similarly, Aurora and Klanecky (2016) examined the mediating role of drinking motives (as measured by the Drinking Motives Questionnaire-Revised, [DMQ-R]; Cooper, 1994) on the association between ER (as measured by the Difficulties in Emotion Regulation Scale, [DERS]; Gratz & Roemer, 2004) and drinking problems (as measured by the Alcohol Use Disorder Identification Test [AUDIT]; Saunders et al., 1993) using data (N = 200) from a private university in the midwestern United States. The average age in the sample was 19.45 years; 62% identified as female and 72.2% identified as European-American. The postulated mediating model yielded statistically significant results ($R^2 = .42, F (2, 171) = 60.94, p < .01$), showing that emotion regulation difficulty was positively correlated with alcohol consumption to cope, and alcohol consumption to cope was correlated with problem drinking. The results of the second model of Aurora and Klanecky (2016) indicated that increased motive mediated the association between ER difficulties and problem drinking ($R^2 = .45, F (2, 163) = 66.77, p < .01$). Individual difficulties in ER were correlated with increased motives ($a = .01, p < .01$). Aurora and Klanecky (2016) concluded that “…drinking to cope was a full mediator and drinking to enhance was a partial mediator in the emotion regulation/problem drinking relationship” (p. 346).

In summary, ER is important in every stage of life. Scholars have examined ER with the aim of identifying ER skills that are helpful to college students’ academic success and overall wellbeing. Researchers have also examined ER skills that are related to increased levels of substance use in college students and other individuals. Furthermore, researchers have identified ER skills that serve as a protective factor against increased substance use, such as alcohol.
The Intersectionality of Grit, PGI, and ER

This chapter reviewed the four constructs central to this investigation: (a) alcohol use and related consequences in undergraduate college students, (b) Grit, (c) PGI, and (d) ER. Throughout the chapter, the researcher has presented the challenges and opportunities the transition period (i.e., emerging adulthood) brings to college students. As individuals transition to their college environment, the challenges and opportunities grow exponentially. As noted, in this new environment, college students are exposed to high levels of alcohol use. As a result, researchers have examined variables that serve as both risk and protective factors to college students’ alcohol use. Considering a large number of undergraduate college and university students in degree programs (16.9 million; NCES, 2020) and their characteristics (i.e., impulsivity, creativity, risk-taking, and uncertainty) coupled with the culture, prevalence, and consequences of alcohol use, continuing the investigation to understand alcohol use and its related consequences in undergraduate college students is warranted.

Individuals’ zeal and persistence for long-term goals have been investigated in many domains and found to predict academic success, health-related behaviors, and commitment to marriage in men. While a promising outcome relating to higher levels of grit has been observed, there is an increased interest in studying the role of grit in substance use. Given the importance of long-term commitment that is needed to mitigate alcohol use and increase optimal wellbeing, investigating the role of grit in the context of college students’ alcohol use is vital.

Like grit, a growing amount of literature has found PGI to play a critical role in mental health and optimal living. Both grit and PGI are constructs within the Positive Psychology theoretical framework, focusing on individuals’ strengths. As noted, the primary goal of a field like clinical mental health counseling is to equip and support clients to live an autonomous life (Duckworth et al., 2005; Robitschek, 1998). Therefore, PGI’s main goal is to understand
individuals’ readiness to change and recognize growth opportunities. Recognizing areas of growth and a desire to change is fueled by individuals’ efforts to formulate plans to reach these goals. Part of devising a plan entails being resourceful and utilizing available resources. Once individuals have recognized areas for growth, have devised a plan, and have tapped into their resources, the last step is a deliberate effort to work toward achieving their goals. The four factors of PGI are vital components that need investigation in college students in the context of alcohol use. Given the preliminary results indicating that PGI could be increased in people, understanding the relationship between PGI and alcohol use could provide an insight for future intervention-based studies.

While individuals focus on a long-term goal in the areas that they deem necessary (e.g., completing a college degree), the process of achieving their desired goals requires proper self-regulating skills. Research examining ER, like grit and PGI, offers insight into the level of alcohol use and related consequences in college students. ER strategies such as reappraisal are found to correlate with lower alcohol use, while suppression ER strategies are associated with higher alcohol use (Blanchard et al., 2019; Weiss et al., 2017).

Taken together, college students are at a developmental stage where they explore and consolidate identity, and an undefined extended social role (Arnett, 2001) tends to elicit emotional uncertainty. Therefore, college students’ levels of PGI, ER, and grit can play a critical role in enhancing their healthy behavior and can serve as a protective factor against harmful alcohol use and related consequences. To the researcher’s knowledge, no investigations have examined the relationship between college students’ level of alcohol use and their grit, PGI, and ER scores using structure SEM. As a result, this investigation was important to relate the influence of college students’ grit, PGI, and ER scores to their levels of alcohol use.
CHAPTER THREE: METHODS

In this chapter, the researcher reviews the methods and procedures for this study. The aim of this study was to examine the directional relationship between college students’ level of harmful alcohol consumption and their emotion regulation strategy, grit, and PGI scores. The researcher examined the theoretical model that college students’ level of alcohol use and related consequences and their grit, ER, and PGI scores using SEM. Please see Figure 5 for the hypothesized theoretical model. This chapter provides an overview of the following research investigation elements: (a) research design, (b) population and sampling procedures, (c) data collection methods, (d) data instrumentation, and (e) data analysis procedure.

**Research Design**

The researcher employed a non-experimental, correlational research design (Creswell & Creswell, 2018; Gall et al., 2007; Gay et al., 2012) to investigate the research questions and hypothesis. The correlational research design enables researchers to examine relationships between multiple constructs without manipulating the variables (Pallant, 2016). Correlation does not mean causation but plays two vital roles: (a) it can assess both the predictive nature of one construct over another and (b) it can measure the direction and strength of the relationship between them (i.e., the strength and direction; Graziano & Raulin, 2013). Therefore, the researcher utilized a correlational research design to examine the directional relationship between college students’ level of alcohol use and their grit, PGI, and ER without manipulation (Gall et al., 2007). Although the correlational design is employed in the counseling literature, there has been an increased call for and utilization of sophisticated analysis methods such as SEM (Crockett, 2012). Thus, the researcher employed a robust statistical technique (i.e., SEM)
to assess and test multivariate relationships between the constructs under investigation (Kline, 2016; Tabachnick et al., 2019).

**Population and Sampling**

The population under investigation were undergraduate college students (i.e., emerging adulthood) who were enrolled as part-time or full-time students in two- or four-year institutions (i.e., colleges and universities) in the United States, irrespective of their demographic information such as gender or race/ethnicity. Given the difficulty of surveying a representative cross-section of all college students, the researcher followed Gall and colleagues’ (2007) suggestion that a convenient sampling method be used to collect data.

**Sampling Procedures**

To be part of this study, all participants were at least 18 years old and must be enrolled in a college or university as a part-time or full-time student in the United States. The researcher followed a convenient sampling technique (Johnson & Christensen, 2019) and utilized personal and professional relationships to recruit participants from 45 colleges and universities throughout the United States. The procedures are delineated in the following section (i.e., Data collection methods).

**Data Collection Methods**

The researcher received approval from the Institutional Review Board (IRB) at his university. To support survey instruction clarity (i.e., readability and understandability), Dillman and colleagues (2014) suggested the following guidelines to enhance web-based survey outcomes: (a) the survey should work on a variety of devices; (b) the web-based platform should
be reliable; (c) displays should have similar and consistent question format and layout; (d) the welcome and closing pages should be engaging, pleasant and informative; (e) critical information to be completed should be visually highlighted, and (f) participants should have the flexibility to start and finish at a later time if needed. The researcher identified 10 undergraduate students via personal and professional connections to pilot the survey to best estimate survey completion time, consistency of question format and layout, legibility, and understandability of important information to seek feedback from participants (Dillman et al., 2014). The researcher created a feedback survey in Qualtrics that contained eight items (e.g., What is the browser you used to open the survey link?) and shared the survey link via email and text (see Appendix E for feedback survey).

Next, the researcher integrated feedback from the pilot survey and dissertation committee to enhance the survey’s legibility and understandability. The final questionnaires were distributed following Dillman and colleagues’ (2014) *Tailored Design Method* (TDM) to increase participation. Following the final approval, the researcher drafted an initial email (see Appendix B to see the email) to instructors, colleagues, and friends asking their support to share the study with their students, colleagues, and friends. Within the initial email, a Qualtrics link was embedded that contained (a) the informed consent form that explained volunteers’ rights, the duration of the questionnaire, risks, and advantages of participating, researcher and IRB contact information, and anonymity and confidentiality; (b) the aim of the study; (c) compensation explanation for volunteer participants; and (d) all data collection measures. All potential participants were reached through their instructor of record, colleagues, and some directly by the researcher via email to be part of the study voluntarily; once they agreed to be part of the study, their right to stop at any point of the research was granted.
All data collection items, information, and instructions included (a) the informed consent form, (b) the demographic form, (c) the AUDIT (Saunders et al., 1993), (d) the Grit-S (Duckworth & Quinn, 2009), (e) the ERQ (Gross & John, 2003), and (f) the PGIS-II (Robitschek et al., 2012). These six different study documents were added to a web-based survey platform (i.e., Qualtrics.com) and distributed to all participants using the Qualtrics survey link. Once participants received a research invitation and agreed to complete the research packet, volunteer participants had unrestricted time to complete the survey.

The researcher followed the TDM (Dillman et al., 2014) to collect data from the 45 colleges and universities. Although participants’ response rate can be unpredictable (Pike, 2008; Van Mol, 2017), to obtain a priori calculated sample size \( N = 288 \) from the web-based survey platforms (i.e., Qualtrics), and aligning with previous researchers’ recommendations and research, to get the desired sample size of \( N = 288 \), a conservative estimate of a 10% complete response rate was used (Pike, 2008). Consequently, based on over 50 personal and professional connections the researcher had and the number of students that they invited, approximately 3,000 potential college student participants were sought by employing the method with the aim of collecting 300 completed research packets from multiple universities.

**Sample Size**

In the 2020-2021 academic year, about 16.9 million undergraduate college students were in the U.S. (NCES, 2020). Sound quantitative data collection methods require researchers to have a suitable representation of the population under investigation (Johnson & Christensen, 2019). Gall and colleagues (2007) assert that prior to data collection, the appropriate sample size can be determined to ensure better representation of the sample to the population. Moreover, given the relationship between sample size and statistical power (Murphy et al., 2014),
calculating *a priori* sample size enables researchers to determine appropriate representation and can avoid rejection of the null hypotheses (i.e., Type II error). Furthermore, *a priori* calculation is recommended in SEM to identify the sample size needed to detect model structure and achieve both acceptable effect size and a desired statistical power.

Schumacker and Lomax (2016) recommended that the researcher utilized the [www.danielsoper.com](http://www.danielsoper.com) (Soper, 2018) website to calculate *a priori* sample size for SEM. As noted, based on *a priori* sample size calculations, a minimum sample of 288 is required to detect a specific effect and identify model structure with a large effect size (.5) at high power (.8) with four latent variables (i.e., Grit, PGI, ER, and alcohol use) and ten observed variables (i.e., drinking quantity/frequency, alcohol-related consequences, interest, perseverance, readiness for change, planfulness, using resources, intentional behavior, reappraisal, and suppression) at the probability of $p < .01$.

Given that SEM is a large sample-size technique (Kline, 2016) and following best SEM practices for sample size (Schumacker & Lomax, 2016), the researcher aimed to reach an acceptable model structure and small effect at a high statistical power in this SEM investigation. To attain a sound sample size for this investigation, the researcher collected 520 complete research packets from the data collection method (i.e., Qualtrics). After using a complete case analysis to deal with missing cases (i.e., less than 5%), the final dataset includes 494 cases; the sample was delimited to include only those college students who reported having consumed alcohol ($N = 356$). A large sample size (e.g., $N = 356$) can provide an adequate representation of the population under investigation and offer stronger statistical power (Kline, 2016).
Instrumentation

The researcher used four measures and a demographic survey to collect data for this investigation, including: (a) AUDIT (Saunders et al., 1993), (b) Grit-S (Duckworth & Quinn, 2009), (c) PGIS-II (Robitschek et al., 2012), and (d) ERQ (Gross & John, 2003). Although the instruments that were utilized have no restrictions for non-commercial uses, for research, translation, or education, the researcher received permission (see Appendix F and G to see the permission emails) from the authors of two of the instruments (i.e., grit and PGI) to administer them according to the method of the researcher (i.e., web-based via Qualtrics). The following section of the chapter introduces the data collection measures and reviews research findings relating to the psychometric properties of their scores with diverse samples.

The AUDIT

The AUDIT is a widely used instrument developed by the World Health Organization (WHO) to screen problem alcohol consumption and its related consequences in primary-care settings (see Appendix K for AUDIT; Bateman et al., 2002). Since its inception, AUDIT has been used beyond primary-care settings, including with college students (de Meneses-Gaya et al., 2009; Tuliao et al., 2016). Therefore, the researcher measured participants’ level of alcohol use and related problems with the AUDIT (Saunders, Aasland, Amundsen, et al., 1993).

The AUDIT is a brief (i.e., takes three to five minutes to complete) 10-item instrument initially conceptualized as three subscales: (a) Hazardous Consumption (three items; e.g., how many drinks containing alcohol do you have in a typical day when you are drinking?); (b) Symptoms of Dependence (three items; e.g., how often during the last year have you failed to do what was normally expected of you because of drinking?); and (c) Harmful Alcohol-Related Consequences (four items; e.g., how often during the last year have you had a feeling of guilt or
remorse after drinking?). The AUDIT items one to eight are structured using a five-point Likert scale (e.g., 0 – 4; 0 = never, 1 = less than monthly, 2 = monthly, 3 = weekly, 4 = daily or almost daily). The final two items on the AUDIT use a three-point Likert scale format (0 = No, 2 = Yes, but not in the last year, 4 = Yes, during the last year; Bateman et al., 2002). The AUDIT sum scores can range from 0 – 40. Although AUDIT has three subscales, the developers suggested the cutoff score of eight as an indication of hazardous, harmful alcohol consumption, and possible dependency (Bateman et al., 2002; Saunders, Aasland, Amundsen, et al., 1993; Wade et al., 2012). The “…cut-off value of 8 points yielded sensitivities for the AUDIT for various indices of problematic drinking that were generally in the mid .90’s. Specificities across countries and across criteria averaged in the .80’s” (Bateman et al., 2002, p. 11). Moreover, Bateman et al. (2002) recommended using a unidimensional total score that ranges from 8-15 and 16-19 to reflect a medium and high level of alcohol-related problems, with the score of 20 or more showing the need to further evaluate for a dependency diagnosis.

While the AUDIT developer suggested the cutoff score of eight, multiple scholars have suggested cutoff scores different than eight, making the interpretation of the results challenging (Nadkarni et al., 2019). For example, Gache and colleagues (2005) investigated the validity and reliability of AUDIT scores with primary care clients in France and Switzerland (N = 1,207). The authors reported a cutoff score of (> 6) for both men and women. After investigating evidence of validity and reliability of AUDIT in a primary care setting in Germany, Dybek and colleagues (2006) reported a cutoff score of five yielded a sensitivity and specificity of .97 and .84, respectively. Similarly, scholars suggested different cutoff points for college students. For example, Adewuya (2005) explored the validity of AUDIT scores using Nigerian university students and concluded that a cutoff score of five and above with sensitivity (.94) and specificity
(.92) can screen for alcohol-related problems. In contrast, Kokotailo and colleagues (2004) investigated evidence of the validity of AUDIT scores using U.S. college students ($N = 302$) and reported that a cutoff score of six or greater determined a sensitivity and specificity of 91.0% and 60.0% respectively identified high-risk drinkers.

The creators of AUDIT developed the instrument using data that was collected from primary health care centers in six countries (i.e., Australia, Bulgaria, Kenya, Mexico, Norway, and the United States; Saunders, et al., 1993). Participants’ ages ranged from 18 to 55 years old. Saunders and colleagues (1993) interviewed ($N = 1,905$) participants. After removing ($N = 17$) incomplete data from the initial sample, the authors reported the final sample of ($N = 1,888$). From the final sample, about 270 (14%) were labeled as abstainers, 408 (22%) as very infrequent drinkers, 913 (48%) as drinking patients, and 297 (16%) as alcoholics. Each participant was interviewed by a trained interviewer using a 150-item questionnaire. The aggregated factor analysis results of Saunders, Aasland, Amundsen, and colleagues (1993) yielded a drinking-behavior (i.e., dependence) factor (coefficient of .81), a factor for ever having an alcohol-related and adverse psychological problem (i.e., harmful consequences; .80), and a factor for frequency of consuming six or more drinks (.57). In a subsequent study, Saunders, Aasland, Babor, and colleagues (1993) reported the sensitivity and specificity of AUDIT for hazardous consumption ranged from 95% to 100%, for dependency, it was 100%, and for alcohol-related problems in the last year, the range was 91% to 100.

Like the initial instrument developers, Maisto and colleagues (2000) also investigated the validity of the factor structure of AUDIT scores with a total sample size of ($N = 7,035$) participants from 12 primary-care clinics from southwest Pennsylvania. Most of the participants identified as white (82%), and 52% identified as male. The CFA results indicated that the two-
and three-factor model yielded model fit. Specifically, the authors reported the two-factor model being the best fit ($X^2(34) = 2,433.59, p < .01; GFI = .94, relative fit index = .94$), while the three-factor model yielded ($X^2(32) = 2,395.31, p < .01; GFI = .94, relative fit index = .94$). The results of Maisto and colleagues (2000) aligned with those of the AUDIT developers. They concluded that the AUDIT can be conceptualized as a multi-factor instrument (i.e., two-and-three-factors); however, following the principle of parsimony, they preferred the two-factor model.

Tuliao and colleagues (2016) investigated using Filipino ($N = 255$) and U.S. ($N = 1,259$) college students to determine the factor structure of AUDIT scores. The data for U.S. college students were collected from a large state university and a private liberal arts college. Most of the U.S. participants (73%) identified as female, and the average age of the U.S. sample was 19.95 years. Moreover, 29%, 21%, 24%, and 26% identified as freshmen, sophomores, juniors, and seniors, respectively. The Filipino sample also contained 73% females, with an average age of 18 years, and most (48%) of the participants were second-year undergraduate students, while 23%, 16%, and 13% of participants identified as first-year, third year, and fourth year, respectively.

Tuliao and colleagues (2016) employed AUDIT (Saunders et al., 1993) and the Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) to measure the frequency of alcohol consumption and its related consequences. The CFA results indicated a good model fit for two-factor (i.e., factor one, $\alpha = .80$, $CFI = .952$, and factor two, $\alpha = .74$, $CFI = .952$), and three-factor (i.e., factor one, $\alpha = .80$, $CFI = .965$, factor two, $\alpha = .66$, $CFI = .965$, and factor three, $\alpha = .62$, $CFI = .965$) structure in the U.S. sample ($N = 1,259$). Further, a likelihood ratio test indicated that the three-factor structure was a good model fit ($28.23, df = 2, p < .01$) in the U.S. sample. The three-factor structure only fit the Filipino sample model as indicated by Cronbach’s $\alpha$ result of .65, .68, and .68 respectively, comparative fit index of .966 and likelihood ratio ($13.45, df = 2,$
Tuliao and colleagues (2016) concluded that the three-factor model was a better fit when compared with the one-factor and two-factor models.

In contrast to the conclusion of Tuliao and colleagues (2016), López and colleagues (2019) examined the factor structure of the Ecuadorian version of the AUDIT using college students \((N = 7,905)\) at eleven universities in Ecuador. Most of the participants were female \((53.75\%)\), and the CFA results indicated that both two and three factors yielded adequate goodness of fit indexes. Specifically, López and colleagues (2019) reported \(\chi^2(N = 7,905) = 490.6\) \((34)\), \(RMSEA = .041, CFI = .982\) for two-factor and \(\alpha = .74, CFI = .952\), and \(\chi^2(N = 7,905) = 257.1\) \((34)\), \(RMSEA = .030, CFI = .991\) for the three-factor model. López and colleagues (2019) concluded that although both factor structures had an adequate model fit, they preferred the two-factor model following the principle of parsimony.

Similarly, Erford and colleagues (2020) investigated the internal structure of AUDIT scores using university students \((N = 4,756)\) from a southern university in the United States. Most of the participants identified as white \((70\%)\), while 61% were female. CFA results indicated that the unidimensional model yielded adequate to excellent RMSEA = .083, CFI = .965, Tucker-Lewis Index (TLI) of .955, and standardized root mean square residual (SRMR) of .047. Likewise, the two-factor model also yielded adequate to excellent model fit \(RMSEA = .056, CFI = .985, TLI \text{ of } .980, \text{ and SRMR of } .036\). Finally, the three-factor model also fit the data \((CFI = .986, TLI = .980, RMSEA = .056, \text{ and SRMR } = .035)\). Erford and colleagues (2020) concluded that compared to a unidimensional model, the two- and three-factor models fit the data better. Although the two- and three-factor models essentially had a close model fit, the authors selected the two-factor model over the three-factor model due to the principle of parsimony.
Similar two-factor models (i.e., factor one: hazardous alcohol consumption-items 1-3, and factor two: alcohol-related problem-items 4-10) have also been reported in a general sample in Sweden (Bergman & Källmén, 2002) and a sample in Great Britain (Shevlin & Smith, 2007). Therefore, given the empirical evidence supporting AUDIT scores to measure hazardous alcohol consumption and its related consequences, the researcher determined the AUDIT instrument to be valid for this investigation. Figure 6 presents the anticipated factor structure of the AUDIT scores.

Figure 6. Anticipated Measurement Model of AUDIT
Grit

Duckworth and Quinn (2009) developed a self-reported *Grit Short Scale* (Grit-S). The researcher employed Grit-S to measure participants’ grit scores. Grit-S is an eight-item scale with a two-factor structure model that includes (a) interest (e.g., new ideas and projects sometimes distract me from my previous ones) and (b) perseverance (e.g., setbacks don’t discourage me). The eight-item Grit-S scale is structured in Likert style ranging from one (i.e., not like me at all) to five (i.e., very much like me). Duckworth and Quinn (2009) designed the Grit-S to be reported as a total mean score, where the scores are summed and divided by the number of items (i.e., eight) to get an average that determines participants’ grit level. See Appendix I for Grit-S.

When Duckworth and Quinn (2009) developed the Grit-S, they conducted a series of six studies using diverse populations. For the first study, Duckworth and Quinn (2009) used a class of 2008 West Point cadets (*N* = 1,218) with an average age of 19.5 years (*SD* = 1.1); most of the participants were male (84%). Next, the researchers collected data from the class of 2010 West Point cadets (*N* = 1,308) with similar demographic information as the class of 2008. In addition, the researchers collected data from children who competed in the National Spelling Bee (*N* = 175) with an average age of 13.20 years (*SD* = 1.23). Lastly, the researchers gathered data from Ivy League undergraduate students (*N* = 139), of whom the majority were female (69%), investigating the factor structure of Grit-S scores. All participants in each data collection phase completed the 12-item *Original Grit Scale* (Duckworth et al., 2007).

The SEM result for first study indicated a good fit for the West Point cadets’ class of 2008, ($\chi^2$ (19, *N* = 1,218) = 106.36, *p* < .001; RMSEA = .061, (90% confidence interval [CI] = .50 – .73), CFI = .95. A similar result was reported for the class of 2010, ($\chi^2$ (19, *N* = 1,308) = 135.51, *p* < .001; RMSEA = .068, (90% CI = .58 – .80), CFI = .95. Duckworth and Quinn (2009)
reported a slightly poorer fit for children who competed in the National Spelling Bee ($\chi^2 (19, N = 175) = 71.57, p < .001$; $RMSEA = .101$, (90% CI = .077 – .126), $CFI = .86$ and for the Ivy League undergraduate students ($\chi^2 (19, N = 139) = 43.63, p < .001$; $RMSEA = .097$, (90% CI = .059 – .135), $CFI = .93$). These results offer evidence of construct validity of the GRIT-S scores with a diverse sample of college students, making the GRIT-S a sound assessment for the proposed investigation.

The researchers’ (i.e., Duckworth & Quinn, 2009) second study was cross-sectional with the main objective of confirming the factor structure of Grit-S. The authors used adult participants ($N = 1,554$) with an average age of 45.64 years ($SD = 11.27$). Most of participants (81%) identified as female and the CFA results supported the two-factor model. Specifically, the two-factor model fit the data better compared to a unidimensional model ($\chi^2 (19, N = 1,554) = 188.52, p < .001$; $RMSEA = .076$, (90% CI = .066 – .086), $CFI = .96$). Moreover, Duckworth and Quinn (2009) reported adquate internal consistancy for subscales (a) interest $\alpha = .77$, (b) perseverance $\alpha = .70$, and (c) the whole Grit-S $\alpha = .82$.

Next, with the goal of providing evidence of the validity of the informant version of Grit-S, the authors conducted a third study using an adult population age 25 and above. From the participants ($N = 161$), most (89%) were female, and the average age was 43.11 years; the results identified internal consistency that was rated by family members ($\alpha = .84$), peers ($\alpha = .83$), and self ($\alpha = .83$). The results indicated that informants can reliably evaluate grit.

The objective of the fourth study was to determine the test-retest stability of Grit-S using high-achieving middle- and high-school students ($N = 279$). The results indicated that the Grit-S was taken in the spring was strongly correlated with the result one year later ($r = .68, p < .001$), indicating stability over time. Moreover, the internal consistency for the first year (i.e., 2006)
was (α = .82) and for the second year (i.e., 2007) was (α = .84). Duckworth and Quinn (2009) concluded that Grit-S shows stability over time.

The goal of the fifth study was to examine the predicting ability of Grit-S using the West Point class of 2009 freshman cadets (N = 1,248). The results indicated that cadets who score “…a standard deviation higher than average on the Grit–S were 99% more likely to complete summer training ([B = .69, OR = 1.99, p < .001];” Duckworth & Quinn, 2009, p. 171). The internal consistency in the sample was .77. The authors concluded that Grit-S predicted completion of demanding summer training. Lastly, the sixth study was conducted to examine the predicting ability of Grit-S for performance using 2006 Scripps National Spelling Bee competitors (N = 190). The results identified that participants who scored one standard deviation more on the Grit-S than their competitors were 38% more likely to proceed to further rounds (B = .32, OR = 1.38, p < .04). Therefore, the findings offer evidence of the validity of the Grit-S scores with diverse samples.

Other scholars also have investigated Grit-S factor structure using diverse populations, including college students. For example, Mullen and Crowe (2018) investigated the factor structure of Grit-S scores with a sample of school counselors (N = 330). The CFA results indicated that the one-factor model yielded average fit (χ² (20, N = 330) = 111.51, p < .001; χ²/df = 5.58; GFI = .92; CFI = .86, TLI = .80; RMSEA = .12; SRMSR = .06), while the two-factor model yielded acceptable model fit (χ² (19, N = 330) = 46.94, p < .001; χ²/df = 2.47; GFI = .97; CFI = .96, TLI = .94; RMSEA = .07; SRMSR = .04). Moreover, after removing the lowest factor-loading item (i.e., item two, yielding a loading of .15) from the perseverance subscale, the authors reported a better fit (χ² (13, N = 330) = 43.01, p < .001; χ²/df = 3.31; GFI = .97; CFI = .96, TLI = .93; RMSEA = .08; SRMSR = .05). The authors also reported acceptable internal
consistency for modified Grit-S (α = .80) and α = .76, α = .71 for the interest and perseverance subscales, respectively. Mullen and Crowe (2018) concluded that the modified two-factor structure showed the best fit for the population that they investigated.

Similarly, Wolters and Hussain (2015) examined the relationship between grit and self-regulated learning in college students (N = 213) in a large public university. Most (88%) of the participants were female, and 29% were Hispanic; the sample contained 13% freshmen, 24% sophomores, 35% juniors, and 28% seniors or post-baccalaureate. The CFA results indicated that the two-factor model best fit the data (χ² (19, N = 213) = 20.04, p < .392, RMSEA = .02, 90% CI = .00, .06, CFI = .997. Wyszyńska and colleagues (2017) also examined the psychometric properties of the Polish version of Grit-S using (N = 270) with an average age of 20.79 years; most (54%) of the participants were women. The CFA results indicated that grit is best conceptualized as a two-dimensional (i.e., consistency of interest and perseverance of effort) construct. Specifically, Wyszyńska and colleagues (2017) reported the two-factor structure yielded good fit (χ² (19, N = 270), RMSEA = .038, (90% confidence interval [CI] = .00 – .071), CFI = .979.

While grit is conceptualized as a higher-order factor with two subscales, some researchers have had an objection to this factorial structure. For example, Morell and colleagues (2020) objected to the assertion of Duckworth and Quinn (2009) when they wrote, “…Duckworth and colleagues’ contention that grit is comprised of a higher-order factor with two subfactors is incorrect” (p. 3). Similarly, after conducting a meta-analysis, Credé and colleagues (2017) concluded that “our results based on 584 effect sizes from 88 independent samples representing 66,807 individuals indicate that the higher-order structure of grit is not confirmed…” (p. 492). In a different study, Gonzalez and colleagues (2019) reported a
unidimensional factor structure for Grit-S. Despite the objections, based on evidence supporting Grit-S to measure grit as a two-factor model, the researcher deemed Grit-S to be a sound two-factor measure of grit. Figure 2 presents the anticipated factor structure of the Grit-S.
Personal Growth Initiative

The researcher measured PGI using the self-reported *Personal Growth Initiative Scale-II* (PGIS-II; Robitschek et al., 2012). PGIS-II has been conceptualized as a four-factor construct: (a) four items measuring readiness for change (e.g., I can tell when I am ready to make specific changes in myself); (b) five items measuring planfulness (e.g., I set realistic goals for what I want to change about myself); (c) three items measuring the use of resources (e.g., I ask for help when I try to change myself); and (d) four items measuring intentional behavior (e.g., I take every opportunity to grow as it comes up). All items in PGIS-II are positively worded and structured on a Likert scale ranging from 0 = Disagree Strongly to 5 = Agree Strongly. Subscales can be calculated by summing the items and dividing by the number of items in the subscale. See Appendix H for PGIS-II.

Robitschek and colleagues (2012) conducted a series of three studies using diverse populations to develop and provide evidence of validity and reliability of the PGIS-II scores. In the first study, Robitschek and colleagues (2012) used college students ($N = 632$) to establish the factor structure of PGIS-II. Most (i.e., about two-thirds) of the participants identified as women and European American (68%); the average age of the participants was 19.41 years. The result from an EFA yielded the eigenvalues (> 1) and accounted for 54.26% of the total variance. Moreover, the factors intercorrelated ($r = .31 – .59$) and the internal consistency of subscales were $.76, .85, .79, and .78$ for readiness, planfulness, resourcefulness, and intentionality, respectively, establishing the factor structure of PGIS-II. Robitschek and colleagues (2012) then ran a CFA to confirm the four-factor structure. After following fit indices guidelines ($SRMR = .06, RMSEA = .06, 90\% \text{ confidence interval } [CI] = .05 – .07$) for good fit, the CFA result showed all factor loadings were significant, with internal consistency of $\alpha = .80, \alpha = .88, \alpha = .79$, and $\alpha = .86$ for readiness, planfulness, using resources, and intentional behavior, respectively.
To further establish the factor structure of PGIS-II, Robitschek and colleagues (2012) collected data from three separate samples (i.e., college students for samples one and two, and nationwide for the third) in study two. The first two samples had similar demographics since the data were collected from students in the Introduction to Psychology course. Specifically, sample one ($N = 563$) and two ($N = 551$) participants had 71.8% / 64.4% female participation, with mean ages of 18.70 / 19.55 years. Most of the participants (73.5% / 77.1%) identified as European American. Sample three ($N = 682$) contained adults who identified as (81.6%) European American and (69.7%) female, with an average age of 33.44 years. The CFA result indicated support for the four-factor model. Specifically, the chi-square test yielded $\chi^2(330, N = 1,796) = 1356.70, p < .001$; SRMR = .09; and robust RMSEA = .07 (90% CI [.07, .08]).

In their third study, Robitschek and colleagues (2012) used ($N = 166$) female and ($N = 77$) male students and two male-to-female students to investigate test-retest reliability and concurrent and discriminant validity. Approximately 74% of the participants identified as European American, and the sample average age was 20.13 years ($SD = 4.46$). All participants were from a large southwestern university, and the results indicated satisfactory test-retest reliability for one week ($r = .82$), two weeks ($r = .67$), four weeks ($r = .70$), and six weeks ($r = .62$), giving strong evidence for temporal stability; and strong correlations ranging from ($r = .73$.94) for concurrent and discriminant validity for total score and subscales. After conducting a series of three studies, Robitschek and colleagues (2012) concluded that PGIS-II is a sound multi-factor parsimonious measure.

Multiple scholars have investigated the PGIS-II to confirm the validity of the four-factor model in different cultures and populations. Yang and Chang (2014) examined the factor structure of the Chinese version of PGIS-II using ($N = 927$) university students, of whom ($N =$
502) were female, \(N = 404\) were male, and \(N = 21\) did not identify their sex. The average age of participants was 20.34 years. The CFA result provided support for a first-order four-factor model \((\chi^2 (N = 927) = 816.94, df = 98, p < .001, CFI = .97, RMSEA = .072, (90\% \text{ confidence interval [CI]} = .066, .078), SRMSR = .063)\). Yang and Chang, (2014) concluded that the four-factor model fit their data. Similarly, Weigold and colleagues (2014) investigated the validity of the four-factor structure using African American college students \(N = 159\). The average age for the sample was 22.20 years. Most (74\%) identified as female. The authors reported that the four-factor model best fit the data \((\chi^2 = 289.71, df = 95; \chi^2/df = 3.05, CFA = .92, SRMR = .05)\).

Yakunina and colleagues (2013) also examined the factor structure of PGIS-II using international students \(N = 386\) from 15 U.S. universities. The average age of the sample was 24 years and 52\% of the participants identified as female. The result indicated that the first-order four-factor model yielded a good fit to the data \((\chi^2 (96) = 353.22, p < .001; \chi^2/df = 3.68, CFI = .93, RMSEA = .08; SRMSR = .05)\). Weigold and colleagues (2018) used three different samples (i.e., college students, general adult sample, and clinical sample) to determine which of four models best fits the PGIS-II: single-factor, four-factor, second order, and bifactor. The CFA result showed that the bifactor model had the best fit for all samples. Specifically, the CFA yielded for college students \((\chi^2/df = 216.495/88, CFI = .927, RMSEA = .081 (90\% \text{ confidence interval [CI]} = .067, .095); \text{SRMSR} = .051)\); for the general adult sample \((\chi^2/df = 159.103/88, CFI = .973, RMSEA = .051 (90\%, CI = .038, .064); \text{SRMSR} = .033)\); and for the clinical sample \((\chi^2/df = 141.997/88, CFI = .977, RMSEA = .046(90\%, CI = .031, .060); \text{SRMSR} = .030)\).

Weigold and colleagues (2018) concluded that the bifactor model fit their data best. Considering the evidence of reliability and validity of PGIS-II, the researcher determined the four factor
PGIS-II to be a suitable instrument to measure college students’ level of PGI. Figure 3 presents the anticipated factor structure of the PGIS-II scores.
Emotion Regulation

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) is an instrument to measure individuals’ use of two ER strategies: cognitive reappraisal and expressive suppression. ERQ items are answered on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). ERQ is a two-factor scale: (a) six items for cognitive reappraisal (e.g., I control my emotions by changing the way I think about the situation I’m in), and (b) four items for expressive suppression (e.g., I control my emotions by not expressing them). The ERQ is designed to be reported as a total mean score for subscales. Both subscales have strong internal consistency reliability (i.e., cognitive reappraisal $\alpha = .89 - .90$ and expressive suppression $\alpha = .76 - .80$; Preece et al., 2019). See Appendix J for ERQ.

In the initial validation of ERQ, Gross and John (2003) examined the factor structure using four different samples of undergraduate students (i.e., sample one $N = 791$, two $N = 336$, three $N = 240$, four $N = 116$). The average age for samples one to three was 20 years, and the fourth was 18 years. In three of the samples, most (67%, 63%, and 64%) identified as women, while one sample had 50% women. Using the combined data set ($N = 1,483$), Gross and John (2003) assessed the hypothesized factor structure (i.e., two-factor: cognitive reappraisal and expressive suppression) using CFA. The result indicated that the independence model (i.e., two factors correlating zero) yielded the best fit for the data $\chi^2 (1, N = 1,483) = .3$. Gross and John (2003) also reported average reliability of ($\alpha = .79$) for the reappraisal subscale and ($\alpha = .73$) for the suppression subscale.

Since the inception of the ERQ, multiple scholars have examined the instrument to confirm the factor structure using diverse samples. For instance, Melka et al. (2011) investigated the factor structure of ERQ using undergraduate college students ($N = 1,188$). Most participants were women (55%) and (60.8%) identified as European American; the average sample age was
19.2 years ($SD = 2.7$). Melka and colleagues (2011) reported $\alpha = .73$ for expressive suppression and $\alpha = .79$ for cognitive reappraisal for reliability. Moreover, the authors reported a significant chi-square, ($\chi^2 (34) = 227.58, p < .05$). The authors asserted that the significant chi-square can be because of the large sample size. Contrary to the chi-square test, Melka and colleagues (2011) reported excellent model fit for a two-factor model ($CFI = .96$, $TLI = .95$, $RMSEA = .05$ and a confidence interval of between .042 to .059). The authors concluded that their study provided support for the original factor structure.

Similarly, Cabello and colleagues (2013) examined the psychometric properties of the Spanish version of ERQ scores using ($N = 866$) from the general population; the age ranged from 18 to 80 with an average age of 39.80 years and most (64.4%) of the participants identified as female. The CFA yielded a good fit to the data ($S-B \chi^2 (df = 35) = 201.59, p < .001$; normed $\chi^2 = 5.75$; $RMSEA = .07(90\%, CI = .06, .08)$; $CFI = .91$; $SRMSR = .06$). The authors also reported $\alpha = .75$ for expressive suppression and $\alpha = .79$ for cognitive reappraisal for reliability. Cabello and colleagues' (2013) findings provide evidence to support the validity of the Spanish version of ERQ like the original factor structure of ERQ.

Preece and colleagues (2019) investigated the factor structure of the ERQ using three general community samples (sample one $N = 300$, two $N = 400$, three $N = 348$) in Australia. The average ages for sample one, two, and three were 51.59, 49.27, and 45.62 years, respectively. Most of the participants were women across all samples (i.e., 53.7%, 61%, 64.4%). Preece and colleagues (2019) reported a Cronbach alpha of .89-.90 for cognitive reappraisal and .76-.80 expressive suppression internal consistency for all samples. The CFA result indicated an excellent fit for the original two-factor model in all data sets. Specifically, sample one gave ($RMSEA = .0731$, (90% confidence interval [CI] = .0546, .0920), $CFI = .972$, $SRMSR = .0453$);
sample two, \((RMSEA = .0731, (90\%, CI = .0795, .1100), CFI = .952, SRMSR = .0670)\); and sample three, \((RMSEA = .0796, (90\%, CI = .0631, .0966), CFI = .969, SRMSR = .0550)\). The authors concluded that, like results using the college students’ sample, the general community sample in their study yielded a two-factor model with strong psychometric properties.

Contrary to Preece and colleagues’ (2019) findings, Balzarotti (2019) examined the factor structure of ERQ using Italian community \((N = 415)\) and undergraduate student \((N = 371)\) samples. The community sample consisted of 52% females; 53% of the undergraduate students identified as male and ages ranged from 21-34, with an average age of 22.08 years. The CFA indicated the student sample yielded a barely adequate fit \((\chi^2 (df = 34) = 119.3, p < .000; \chi^2/df = 3.52; SRMSR = .065, TLI = .882, CFI = .911, RMSEA = .083(90\%, CI = .067, .098))\) and a poor fit for the community sample \((\chi^2 (df = 34) = 118.28, p < .000; \chi^2/df = 3.48; SRMSR = .068, TLI = .859, CFI = .893, RMSEA = .077(90\%, CI = .062, .093))\). After removing two items (i.e., items one and three), Balzarotti (2019) reported a better fit \((\chi^2 (19) = 25.72, p = .138, \chi^2/df = 1.35; SRMSR = .030, TLI = .985, CFI = .990, RMSEA = .031(90\%, CI = .000, .059))\) for the student sample, while the community sample yielded the similar fit \((\chi^2 (19) = 34.03, p = .019, \chi^2/df = 1.79; SRMSR = .049, TLI = .960, CFI = .973, RMSEA = .044(90\%, CI = .018, .067))\). While the original ten-item two-factor model did not provide an acceptable model for the data, Balzarotti’s (2019) result showed the eight-item two-factor scale yielded the best fit to the data. After considering the reliability and validity evidence for the 10-item, 2-factor structure ERQ scale, this researcher determined that the original 2-factor scale was appropriate to use for the population of interest in this investigation. Figure 4 presents the anticipated factor structure of the ERQ.
Demographic Questionnaire

The researcher used a demographic questionnaire to gather data from potential participants. Specifically, the researcher asked participants for the following information: (a) college academic classification (i.e., freshman, sophomore, junior, senior), (b) age, (c) race/ethnicity, (d) marital status, (e) gender, (f) resident status (i.e., on-campus/off-campus), (g) cumulative grade average, and (h) student status (i.e., full-time-12 credit hours or more /part-time-six credit hours). The researcher chose these demographic variables because these questions are often collected in studies examining college students’ alcohol use (Miller et al., 2016; Peterson, 2019). See Appendix D for Demographic Questionnaire.
Data Analysis

The researcher used *Statistical Package for Social Science* (SPSS; Version 27.0) to clean and obtain descriptive statistics and to examine the data for the exploratory research question. Moreover, the researcher utilized *Analysis of Moment Structure 27 Edition* (AMOS, 2019) for SEM to investigate the theoretical model structure of the hypothesis (Byrne, 2016).

Data Analysis Procedures

The researcher used SEM to examine the primary research hypothesis (i.e., College students’ grit (as measured by Grit-S; Duckworth & Quinn, 2009), PGI (as measured by the PGIS-II; Robitschek et al., 2012), and cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003) will contribute to decreased hazardous alcohol consumption and related consequences (as measured by AUDIT; Saunders et al., 1993). SEM is “… a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon” (Byrne, 2016, p. 3). Like other statistical approaches, the value that will be obtained depends on the reliability of its underlying assumptions (Kline, 2016). Thus, Kline (2016) outlined the following assumptions to underline the critical role of assumptions to the process of investigation and interpretation. These assumptions include:

(a) Temporal precedence: the expected cause (e.g., “X”) occurs earlier than the expected effect (e.g., “Y”). Although this assumption is noted, temporal precedence is ambiguous and a limitation of correlational design (Gall et al., 2007; Tabet, 2019).

(b) There is a relationship between “X” and “Y.”

(c) The statistical relationship holds while controlling for other extraneous variables; in other words, there is no reasonable justification of covariation between “X” and “Y.”
(d) “The form of the distribution of the data is known; that is, the observed distributions match those assumed by the method used to estimate associations” (Kline, 2016, p. 113).

(e) The direction of a causal relationship is correctly determined.

Moreover, to perform any quantitative data analysis procedures such as SEM, it is critical to screen and clean data to ensure statistical assumptions and conditions are met (Hahs-Vaughn, 2017; Kline, 2016; Osborne, 2013; Schumacker & Lomax, 2016). Prior to analysis, the researcher screened the data for violation of assumptions, including checking the appropriateness of the following conditions: (a) sample size, (b) missing data, (c) outliers, (d) normality, (e) multicollinearity, (f) linearity, and (g) homoscedasticity.

**Missing data**

A statistical approach such as SEM assumes a complete dataset. To ensure the study utilizes appropriate data, the researcher assessed the existence of missing data in the main constructs (i.e., alcohol use, grit, PGI, and ER). Initially, there were 520 participants who responded; from the 520, there were 26 cases that had missing data. As researchers (Osborne, 2013; Tabachnick et al., 2019) have noted, case deletion can be utilized when the cases with missing data are a small percentage of the overall sample (e.g., 5% or less). The 26 cases were not more than (5%). The researcher considered using complete case analysis appropriate to delimit the data to include only those cases that had complete data on the variables in the SEM model. Therefore, the final dataset contains \( N = 494 \); from the final 494 cases, \( N = 356 \) college students who stated in consuming alcohol were used for final SEM analysis.
Outliers and Normality

The researcher assessed the presence of outliers or extreme scores by following identifying scores that are three standard deviations beyond the mean for univariate outliers. Moreover, Mahalanobis distance statistic was used to identify multivariate outliers. Outliers were retained if deemed legitimate and were deleted if the responses are illegitimate (Kline, 2016). Similarly, the researcher assessed the assumption of normality using histograms, Q-Q plots, and the Shapiro Wilks test or Kolmogorov—Smirnov statistic. A non—significant result (p = .05) for Shapiro Wilks test and a non—significant result (p ≤ .05) for Kolmogorov—Smirnov statistic indicated normality (Pallant, 2016). Lastly, the researcher also utilized results for normality and outliers from the SEM analysis.

Multicolinearity, Linearity, and Homoscedasticity

Multicolinearity occurs when there is a high correlation between independent variables (r = .9 or above). The researcher determined the level of correlation to indicate multicolinearity by computing a variance inflation factor (VIF) for each predictor; the VIF should be less than 10 to satisfy the assumption of multicolinearity (Lomax & Hahs-Vaughn, 2012). Likewise, the linearity assumptions check for a linear relationship between the observed and dependent variables. The researcher used residual scatterplots to determine the linearity of the relationship. To establish linearity between variables, the scatterplot shape needs to be oval-shaped (Pallant, 2016). To meet the homoscedasticity assumption, the samples must have close to the same variance, that is, uniform distribution of the residuals. In social sciences, data often do not meet this assumption. To assess homoscedasticity, a visual inspection of scatterplots was used (Tabachnick et al., 2019).
After all data cleaning procedures and testing of statistical assumptions, the researcher followed the five steps of SEM (Crockett, 2012; Schumacker & Lomax, 2016): (a) model specification, (b) model identification, (c) model estimation, (d) model evaluation, and (e) model modification.

Model specification

Model specification is the first step of SEM which depicts the proposed theoretical model that is anchored in the literature. The theoretical model is specified based on prior research and theory before the data analysis phase (see chapter two). The process involves analyzing literature in the field, supporting the selection of the latent variables, and testing the relationship among the variables under investigation (Hoyle, 2011). One way to specify the theoretical model is by utilizing a diagram that depicts the observed and latent variables and, most importantly, the specified relationship (Hoyle, 2015). Moreover, the path diagram shows directional relationships between independent (i.e., exogenous) and dependent (i.e., endogenous) variables. (See Figure 5).

Model Identification

The second step of SEM focuses on testing the model's practicality for SEM analysis (i.e., model identification). The fundamental question about model identification is whether the amount of “unknown information to be estimated in a model (i.e., number of free parameters) is less than or equal to the amount of known information from which the parameters are estimated” (Kenny & Milan, 2012, p. 146). According to Schumacker and Lomax (2016), a model with \( df = 0 \) shows that a model is saturated or just-identified. In other words, there are the same number of free parameters as observations, or the amount of known information is the same as the
unknown (Kenny & Milan, 2012). Similarly, Kenny and Milan (2012) asserted that the known information must be equal to the unknown information for a model to be identified. In other words, the degree of freedom ($df$) is equal to or greater than one (Schumacker & Lomax, 2016). When the model has more unknown information than known, the model will be under-identified, or an under-identified model will have a negative degree of freedom (Schumacker & Lomax, 2016).

The process of identifying the structure model can be burdensome (Crockett, 2012). Therefore, to help identify the structure model, Bollen (1989) recommended a recursive rule and a $t$-rule. Crockett (2012) defined these two rules as follows:

(a) The recursive rule states that the relationships indicated by the model are unidirectional and not reciprocally related. To meet the recursive rule, “[…], there are no correlated errors in the endogenous variables and […] no reciprocal relationships or feedback loops exist among the endogenous variables” (p. 36-37). Researchers can use the output metrics that can be obtained from SEM analysis and the examination of a visual path diagram to decide if the model is recursive or not.

(b) Crockett (2012) described the $t$-rule by stating “the structure model must have more ‘known’ pieces of information than ‘unknown’ pieces in order to find unique solutions” (p. 37). For this investigation, the researcher followed the guidelines discussed for proper model identification and aimed at and achieved the desired over-identified model.

**Model Estimation**

In the third step, the researcher examines how well the model estimates the parameters of a complex relationship (Schumacker & Lomax, 2016). Model estimation includes “[…]
estimating the parameters of the theoretical model in such a way that the theoretical parameter values yield a covariance matrix as close as possible to the observed covariance matrix” (Crockett, 2012, p. 38). The researcher followed general estimation methods widely used in SEM to estimate the structure model (Hoyle, 2011). Before selecting the estimation method, the researcher tested for assumptions to warrant using the methods (Hoyle, 2011). From the widely used multiple estimation methods, maximum likelihood (ML) and general least square (GLS) are the most used. Though ML and GLS are widely used, criteria such as multivariate normality are assumed (Crockett, 2012). Therefore, in this study, the researcher utilized the available estimation techniques in AMOS (i.e., ML-bootstrap).

**Model Testing**

During the model testing step, the researcher tests and confirms the fit of the structure and measurement model. Researchers suggested a two-step process for model testing (Crockett, 2012; Schumacker & Lomax, 2016). Specifically, Schumacker and Lomax (2016) suggested using CFA to test the measurement model. In other words, prior to testing the theoretical model, testing each measurement model is suggested. Once the measurement models are established using CFA, the researcher then proceeds to test the hypothesized theoretical model. The researchers suggested utilizing various fit indices to test and establish the best model fit for the data.

For example, several researchers (e.g., Crockett, 2012; Hahs-Vaughn, 2017; Kline, 2016; Schumacker & Lomax, 2016) highlight the cutoff scores for the following fit indices, including: Chi-Square ($\chi^2$) (a non-significant $\chi^2$ ($p > .05$) to have an acceptable model); goodness-of-fit index (GFI; .90 or above indicates a good fit); the Comparative Fit Index (CFI; requires a value greater than .95 for a good fit); Root-Mean-Square Error of Approximation (RMSEA; values less
than .05); Tucker-Lewis Index (TLI; scales from 0 = no fit to 1 = perfect fit); Standardized Root Mean Square Residual (SRMR; values less than .08 for acceptable fit); and Goodness-of-Fit Index (GFI; ≥ .95 is a good fit).

**Model Modification**

The researcher, during the fifth step, reviewed the results of the modeling test; when the model had poor fit indices, the researcher tests alternative structural models guided by the fit indices or theory to increase goodness of fit. In other words, the researcher used model modification strategies to find a model that best fits the data (Schumacker & Lomax, 2016). Schumacker and Lomax (2016) recommended against changing the structural model by adding or removing a path without properly corroborating the change by a theory.

In summary, SEM entails five specific steps: (a) developing a theoretical model that is based on extensive literature research; (b) investigating and determining the factor structure of the instruments (i.e., AUDIT, Grit-S, PGIS-II, and ERQ) using CFA; (c) assessing the parameters of the theoretical model using widely used estimation method such as ML; (d) utilizing fit indices to examine the best fit for the data; and (e) modifying the model.

**Chapter Summary**

This study examined the directional relationship between college students’ alcohol use and grit, PGI, and ER. Chapter three reviewed the following research methods: (a) research design, (b) population and sampling procedures, (c) data collection methods, (d) data instrumentation, and (e) data analysis procedures.
CHAPTER FOUR: RESULTS

This chapter presents the results of this study, examining the directional relationship between college students’ level of alcohol consumption and their emotion regulation strategy, grit, and PGI scores. The researcher assessed the theoretical model that college students’ grit, PGI, and cognitive reappraisal ER strategy contribute to decreased hazardous alcohol consumption and related consequences. The researcher examined the hypothesis using SEM. The results for the analysis are presented in the subsequent order: (a) data screening and statistical assumptions for SEM, (b) results from descriptive statistics, and (c) SEM results.

Data Screening

Quantitative research requires screening and cleaning data to ensure statistical conditions and assumptions are met (Osborne, 2013). Prior to analysis, the researcher followed major conditions and assumptions that are outlined by Kaplan (2009), including: (a) sample size, (b) missing data, and (c) multivariate normality. Moreover, the researcher also screened the data for outliers, multicollinearity, linearity, and homoscedasticity.

Sample Size

SEM requires a large sample to achieve appropriate power and model fit and to attain consistent parameter estimates (Schumacker & Lomax, 2016). Whereas there is no definitive answer or rule of thumb to what constitutes a sufficiently large sample size, researchers may consider several factors that can influence the sample-size requirement for their study (Kline, 2016). Despite a lack of consensus on the number that represents a “large sample size,” researchers such as Schumacker and Lomax (2016) identified sample sizes between 250-500 and
underlined the importance of attaining larger sample sizes. While emphasizing the difficulty of suggesting specific sample sizes, Kline (2016) also found 200 is a minimum for many studies. Therefore, to attain a sound sample size for this study, calculating *a priori* sample size and determining the appropriate sample size enables the researcher to conduct a study that is generalizable. Thus, as noted (i.e., Chapters 1 & 3), Schumacker and Lomax (2016) recommend Daniel Soper’s statistical calculator to conduct *a priori* sample size calculation. Based on the calculation for this study, a minimum sample of 288 was required to identify a large effect size (.5) at high power (.8) with four latent variables and ten observed variables at the probability of $p < .01$. Therefore, following SEM best practices for sample size, the researcher sought to reach an acceptable model structure and small effect at a high statistical power in this SEM investigation. The researcher achieved more than the estimated minimum sample size by initially collecting 520 completed data packets. After conducting a complete case analysis for missing data, the final sample size was 494; from the 494 cases, $(N = 356)$ participants identified as consuming alcohol. Thus, the researcher deemed $(N = 356)$ satisfactory to proceed with SEM analysis.

**Missing data**

SEM presumes a complete dataset. Despite this assumption, missing data is prevalent in quantitative data analysis (Kaplan, 2009; Tabachnick et al., 2019). Given the prevalence of missing data and to determine the seriousness of missing data, it is incumbent upon the researcher to assess the pattern, the amount, and the reason that data are missing (Tabachnick et al., 2019). As a result, it is vital to evaluate the severity and significance of missingness in the dataset (Osborne, 2013). Consequently, the researcher assessed the existence of missing data in the main constructs (i.e., alcohol use, grit, PGI and ER). There were 520 participants who responded; after the composite score was created for all sub-scales, there were 26 cases that had
missing data. As researchers (Osborne, 2013; Tabachnick et al., 2019) have emphasized, in a large dataset, if the cases with missing data are a small percentage of the overall sample (e.g., 5% or less), case deletion is an innocuous practice. Given that the maximum number of missing cases in this dataset was only 26 (i.e., 5%), the researcher deemed it appropriate to employ complete case analysis and delimited the data to include only those cases that had complete data on the variables in the SEM model. Therefore, after employing a complete case analysis, the final dataset contains \((N = 494)\); because the study was focused on college students’ level of harmful alcohol consumption and related problem, the data were further delimited to include only those college students who stated they had consumed alcohol \((N = 356)\), and it was this subset that was used as the analytic sample.

**Multivariate Normality**

Normality is the underlying assumption of most multivariate statistical procedures and requires the data to be distributed normally (Tabachnick et al., 2019). Lomax and Hahs-Vaughn (2012) listed seven critical characteristics of normal distribution: (a) standard curve, (b) has family of curves, (c) unit normal distribution, (d) “the ability to determine any area under the curve” (p. 80), (e) the ability to be transformed into unit normal distributed, (f) constant association with standard deviation, and (g) the point of inflection and asymptotic. Given that the default estimation technique in AMOS (i.e., maximum likelihood) in SEM requires both univariate and multivariate normality, assessing multivariate normality becomes critical. Although researchers underlined critical characteristics for normal distribution, Kline (2016) noted that detecting all facets of multivariate normality can be difficult. As such, assessment of univariate frequency (i.e., Skew and Kurtosis) is sufficient (Kline, 2016). Similarly, Hahs-Vaughn (2017) underscores that to satisfy the multivariate normality, univariate
normality is required. To determine multivariate normality for all composite subscales (i.e., hazardous alcohol consumption, alcohol-related problems, suppression, reappraisal, interest, effort, readiness, planfulness, using resources, intentional behavior), and given SEM is centered on the examination of covariance and the impact kurtosis has on variance and covariance, the researcher inspected kurtosis output from the SEM analysis (Byrne, 2016). Next, the researcher visually evaluated the Quantile—Quantile (Q-Q) plots and histograms (Figures 7-26). Lastly, the researcher ran the Shapiro Wilks test and Kolmogorov-Smirnov statistic to further determine the data distribution (see Table 1; Pallant, 2016). Whereas a non—significant result ($p > 0.05$) for the Shapiro Wilks test and for the Kolmogorov—Smirnov statistic indicate normality (Osborne, 2013), a straight line with Q-Q plots and a bell-shaped curve histogram indicate normal distribution (Pallant, 2016).

After examining the result to detecting kurtosis and its critical ratio (i.e., $Z$-value), the negative result ranged from $-0.023$ to $2.823$, and the positive ranged from $0.645$ to $37.774$. Most importantly, the multivariate kurtosis and its critical ratio score yielded $26.658$. To interpret the result, Byrne (2016) provides guidelines stating that values greater than five indicate kurtosis problem. Following the guideline, the result (i.e., $26.658$) indicated nonnormality. Moreover, the visual inspection of the Q-Q plots and histograms and interpreting the Shapiro Wilks test and Kolmogorov—Smirnov statistic indicated that the data are not normally distributed.

In a scenario where univariate nonnormality is detected, researchers suggest conducting transformation analysis to minimize the impact of nonnormality (Hahs-Vaughn, 2017; Osborne, 2013; Tabachnick et al., 2019). Following those researchers’ suggestions, this researcher performed logarithmic and square root transformations. Given that logarithmic transformation assumes variables greater than zero and the square root transformation requires non-negative
values, after checking for minimum and maximum values throughout the composite variables, the data contain a minimum of at least one; as such, the researcher did not need to add anything to the subsequent transformation of the following composite subscale variables: (a) hazardous alcohol consumption, (b) alcohol-related problem, (c) ERQ suppression, (d) ERQ reappraisal, (e) grit interest, (f) grit effort, (g) readiness, (h) planfulness, (i) using resources, and (j) intentional behavior. After the transformation, the researcher reevaluated the data by visually inspected the Q-Q plots and histograms. Moreover, as presented in Tables 2 and 3, the significant Shapiro Wilks test and Kolmogorov-Smirnov statistic indicate a similar outcome (i.e., nonnormality) to the initial result. Next, the researcher evaluated the skewness of the initial and transformed variables and found that the skewness did not improve. Although there was only one subscale in the initial data (i.e., alcohol-related problem composite score) and transformed data (i.e., intentional behavior) that has a skewness of greater than two (i.e., 2.6 and -2.4 respectively), Hahs-Vaughn (2017) identified a point of concern if the skewness is greater than 2.0. Therefore, given that there was only one case in either the initial or transformed data, to retain the reliability of the resulting interpretation, the researcher decided to keep the initial (i.e., non-transformed) composite variables (Osborne, 2013; Tabachnick et al., 2019). Moreover, the researcher noted the impact of nonnormality on the interpretation of the data in chapter five.
Table 1

Test of Normality

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Shapiro-Wilk Statistic</th>
<th>df</th>
<th>Sig.</th>
<th>Kolmogorov-Smirnov Statistic</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Consumption</td>
<td>.920</td>
<td>356</td>
<td>&lt; .001</td>
<td>.144</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Alcohol Related Problem</td>
<td>.717</td>
<td>356</td>
<td>&lt; .001</td>
<td>.237</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>ERQ Suppression</td>
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<td>356</td>
<td>&lt; .001</td>
<td>.079</td>
<td>356</td>
<td>&lt; .001</td>
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<tr>
<td>ERQ Reappraisal</td>
<td>.981</td>
<td>356</td>
<td>&lt; .001</td>
<td>.064</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Grit Interest</td>
<td>.981</td>
<td>356</td>
<td>&lt; .001</td>
<td>.096</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Grit Effort</td>
<td>.971</td>
<td>356</td>
<td>&lt; .001</td>
<td>.092</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Readiness</td>
<td>.953</td>
<td>356</td>
<td>&lt; .001</td>
<td>.091</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Planfulness</td>
<td>.959</td>
<td>356</td>
<td>&lt; .001</td>
<td>.085</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Using Resources</td>
<td>.979</td>
<td>356</td>
<td>&lt; .001</td>
<td>.080</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Intentional Behavior</td>
<td>.925</td>
<td>356</td>
<td>&lt; .001</td>
<td>.123</td>
<td>356</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

Note.  

a Alcohol Use Disorders Identification Test subscales.  
b Emotion Regulation Questionnaire subscales.  
c Short Grit subscales.  
d Personal Growth Initiative subscales-II

Figure 7. Histogram for Hazardous Alcohol Consumption.
Figure 8. Normal Q-Q plot for Hazardous Alcohol Consumption.

Figure 9. Histogram for Alcohol-Related Problem.
Figure 10. Normal Q-Q plot for Alcohol-Related Problem.

Figure 11. Histogram for ERQ Suppression.
Figure 12. Normal Q-Q plot for ERQ Suppression.

Figure 13. Histogram for ERQ Reappraisal.
Figure 14. Normal Q-Q plot for ERQ Reappraisal.

Figure 15. Histogram for Grit Interest.
Figure 16. Normal Q-Q plot for Grit Interest.

Figure 17. Histogram for Grit Effort.
Figure 18. Normal Q-Q plot for Grit Effort.

Figure 19. Histogram for Readiness for Change.
Figure 20. Normal Q-Q plot for Readiness for Change.

Figure 21. Histogram for Planfulness.
Figure 22. Histogram for Planfulness.

Figure 23. Histogram for Using Resources.
Figure 24. Histogram for Using Resources.

Figure 25. Histogram for Intentional Behavior.
Figure 26. Normal Q-Q plot for Intentional Behavior.

Table 2

Test of Normality After Logarithmic Transformation

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Shapiro-Wilk</th>
<th>df</th>
<th>Sig.</th>
<th>Kolmogorov-Smirnov</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Consumption&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.946</td>
<td>356</td>
<td>&lt; .001</td>
<td>.119</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Alcohol Related Problem&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.828</td>
<td>356</td>
<td>&lt; .001</td>
<td>.202</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>ERQ Suppression&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.934</td>
<td>356</td>
<td>&lt; .001</td>
<td>.136</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>ERQ Reappraisal&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.873</td>
<td>356</td>
<td>&lt; .001</td>
<td>.131</td>
<td>356</td>
<td>&lt;.001</td>
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<tr>
<td>Grit Interest&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.933</td>
<td>356</td>
<td>&lt; .001</td>
<td>.146</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Grit Effort&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.913</td>
<td>356</td>
<td>&lt; .001</td>
<td>.111</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Readiness&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.855</td>
<td>356</td>
<td>&lt; .001</td>
<td>.145</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Planfulness&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.857</td>
<td>356</td>
<td>&lt; .001</td>
<td>.133</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Using Resources&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.920</td>
<td>356</td>
<td>&lt; .001</td>
<td>.117</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Intentional Behavior&lt;sup&gt;d&lt;/sup&gt;</td>
<td>.810</td>
<td>356</td>
<td>&lt; .001</td>
<td>.153</td>
<td>356</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

<sup>Note.</sup> <sup>a</sup> Alcohol Use Disorders Identification Test subscales. <sup>b</sup> Emotion Regulation Questionnaire subscales. <sup>c</sup> Short Grit subscales. <sup>d</sup> Personal Growth Initiative subscales
Table 3

*Test of Normality After Square Root Transformation*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Shapiro-Wilk</th>
<th>Kolmogorov-Smirnov</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td>Alcohol Consumption a</td>
<td>.940</td>
<td>356</td>
</tr>
<tr>
<td>Alcohol Related Problem a</td>
<td>.782</td>
<td>356</td>
</tr>
<tr>
<td>ERQ Suppression b</td>
<td>.971</td>
<td>356</td>
</tr>
<tr>
<td>ERQ Reappraisal b</td>
<td>.944</td>
<td>356</td>
</tr>
<tr>
<td>Grit Interest c</td>
<td>.966</td>
<td>356</td>
</tr>
<tr>
<td>Grit Effort c</td>
<td>.953</td>
<td>356</td>
</tr>
<tr>
<td>Readiness d</td>
<td>.918</td>
<td>356</td>
</tr>
<tr>
<td>Planfulness d</td>
<td>.923</td>
<td>356</td>
</tr>
<tr>
<td>Using Resources d</td>
<td>.964</td>
<td>356</td>
</tr>
<tr>
<td>Intentional Behavior d</td>
<td>.886</td>
<td>356</td>
</tr>
</tbody>
</table>

*Note.* A Alcohol Use Disorders Identification Test subscales. b Emotion Regulation Questionnaire subscales. c Short Grit subscales. d Personal Growth Initiative subscales

**Linearity**

Linearity assumption is common to most multivariate procedures and checking for a linear relationship between the observed and dependent variables is important (Hahs-Vaughn, 2017; Tabachnick et al., 2019). Whereas the desired relationship is linear, Tabachnick and colleagues (2019) underlined that most relationships are not precisely linear. To establish linearity between variables, scatterplots need to be oval-shaped (Pallant, 2016). The researcher visually inspected regression residual scatterplots to detect linearity and non-linearity of the relationship among the variables and ran regression curve estimation (e.g., Linear, Cubic, quadratic) to determine the best fitting relationship. The results for the best curve fit relationship are reported in Table 4. As noted, while the desired outcome from scatterplot and curve estimation was a linear relationship, the result indicated that not all relationships are linear in this dataset. Given that most relationships are not exactly linear (Tabachnick et al., 2019), and the result in this data are not severe (i.e., “U” shaped patterns), the researcher decided not to modify...
continuous variables to dichotomous at the risk of impacting the existing relationships.

Therefore, the researcher will note the limitation in Chapter five.

Table 4.

*Linearity Between Variables*

<table>
<thead>
<tr>
<th>Hazardous Alcohol consumption</th>
<th>Curve Fit</th>
<th>( t )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERQ Suppression (^b)</td>
<td>Quadratic</td>
<td>-1.124</td>
<td>.106</td>
</tr>
<tr>
<td>ERQ Reappraisal (^b)</td>
<td>Quadratic</td>
<td>- .927</td>
<td>.651</td>
</tr>
<tr>
<td>Grit Interest (^c)</td>
<td>Linear</td>
<td>-1.335</td>
<td>.183</td>
</tr>
<tr>
<td>Grit Effort (^c)</td>
<td>Quadratic</td>
<td>-1.834</td>
<td>.186</td>
</tr>
<tr>
<td>Readiness (^d)</td>
<td>Quadratic</td>
<td>- .927</td>
<td>.651</td>
</tr>
<tr>
<td>Planfulness (^d)</td>
<td>Cubic</td>
<td>-1.877</td>
<td>.097</td>
</tr>
<tr>
<td>Using Resources (^d)</td>
<td>Linear</td>
<td>-2.772</td>
<td>.006</td>
</tr>
<tr>
<td>Intentional (^d)</td>
<td>Cubic</td>
<td>-2.099</td>
<td>.019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alcohol Related Problem (^a)</th>
<th>Curve Fit</th>
<th>( t )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERQ Suppression (^b)</td>
<td>Quadratic</td>
<td>-1.902</td>
<td>.009</td>
</tr>
<tr>
<td>ERQ Reappraisal (^b)</td>
<td>Cubic</td>
<td>-2.809</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Grit Interest (^c)</td>
<td>Cubic</td>
<td>2.272</td>
<td>.063</td>
</tr>
<tr>
<td>Grit Effort (^c)</td>
<td>Quadratic</td>
<td>-4.811</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Readiness (^d)</td>
<td>Quadratic</td>
<td>-4.213</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Planfulness (^d)</td>
<td>Quadratic</td>
<td>-4.176</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Using Resources (^d)</td>
<td>Quadratic</td>
<td>-3.672</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Intentional (^d)</td>
<td>Quadratic</td>
<td>-5.816</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

*Note.* \(^a\) Alcohol Use Disorders Identification Test subscales. \(^b\) Emotion Regulation Questionnaire subscales. \(^c\) Short Grit subscales. \(^d\) Personal Growth Initiative subscales-II.

**Outliers**

Outliers are cases with unusual values on a variable (i.e., univariate) or unusual combinations of values on multiple (i.e., multivariate) variables (Pallant, 2016; Tabachnick et al., 2019). Tabachnick and colleagues (2019) identified four reasons for the presence of outliers: (a) incorrect data entry; (b) not specifying missing values correctly; (c) the outlier is not part of the population the researcher desired to sample from; (d) while the outlier is from the desired
population, nonetheless the distribution of the variable has more outlier than a normal
distribution. To screen the presence of univariate extreme scores, the researcher followed the
suggestion of Tabachnick and colleagues (2019) and converted all responses to standardized $z$
scores, and examined for ± 3.29 value. Outcomes more than ± 3.29 are likely outliers.

The standardized $z$ scores result indicated that out of 356 items, only a total of 7 outliers
were found in all composite scores: (a) alcohol-related problems (two or .56%), (b) readiness for
change (one or .28%), (c) planfulness (one or .28%), and (d) intentional behavior (three or
.84%). Moreover, the researcher also utilized Boxplots to visually examine univariate outliers
throughout all constructs under investigation (see Figures 27 to 35). While inspecting the
Boxplots, values that are dipected far from the median are considered outliers, and extreme
outliers are marked by an asterisk (Pallant, 2016; Tabachnick et al., 2019). Lastly, the researcher
also examined Squared Mahalanobis Distance ($d^2$) from the SEM model output, and the result
also indicated the presence of eight outliers at ($p < .001$). As Osborne (2013) noted, as researcher
strives to get a sample that resembles the population of interest, the probability of justifiable
outliers increases. Therefore, given that there were only seven outliers in the whole SEM model,
to maintain the integrity and consistency of the data, this researcher deemed the presence of
outlier legitimate values and refrained from removing them.
Figure 27. Hazardous Alcohol Consumption Boxplot.

Figure 28. Alcohol Related Problem Boxplot.
Figure 29. ERQ Suppression – Boxplot.

Figure 30. ERQ Reappraisal – Boxplot.
Figure 31. Grit Interest – Boxplot.

Figure 32. Grit Effort – Boxplot.
Figure 33. Readiness for Change – Boxplot.

Figure 34. Planfulness– Boxplot.
Figure 35. Using Resources – Boxplot.

Figure 36. Intentional Behavior – Boxplot.
**Multicollinearity and Singularity**

Multicollinearity, also known as collinearity, occurs when there is a high correlation between two or more independent variables \( r = .9 \) or above; Hahs-Vaughn, 2017; Tabachnick et al., 2019). While multicollinearity indicates a higher association between two or more predictor variables, singularity is a unique case of multicollinearity. Specifically, “it is perfect multicollinearity and occurs when two or more items/variables perfectly predict and are therefore perfectly redundant” (Hahs-Vaughn, 2017, pp. 52-53). Although multicollinearity is understood as higher correlation between predictor variables, Kline (2016) suggested examining the correlation among all variables for SEM analysis. Therefore, to determine the level of correlation to indicate multicollinearity, the researcher first ran a correlation matrix (see Table 5) followed by computing a variance inflation factor (VIF) for each variable (see Table 6). The VIF should be less than 10 to satisfy the assumption of multicollinearity (Lomax & Hahs-Vaughn, 2012). The result from the correlational matrix and the VIF indicated that the assumption of multicollinearity was met.
Table 5.

Correlation Between Variables

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
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<td>H-A-C</td>
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<tr>
<td>ERQ-S</td>
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<td></td>
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<tr>
<td>ERQ-R</td>
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<td>- .08</td>
<td>.083</td>
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</tr>
<tr>
<td>G-I</td>
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<td>.071</td>
<td>- .029</td>
<td>.169**</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>G-E</td>
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<td>-.019</td>
<td>- .024</td>
<td>.085</td>
<td>.311**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-F-C</td>
<td>- .154**</td>
<td>- .095</td>
<td>- .106*</td>
<td>.416**</td>
<td>.278**</td>
<td>.207**</td>
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<tr>
<td>P</td>
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<td>- .040</td>
<td>- .140**</td>
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<td>.393**</td>
<td>.316**</td>
<td>.761**</td>
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<td>.125**</td>
<td>.151**</td>
<td>.533**</td>
<td>.499**</td>
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</tr>
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<td>.709**</td>
<td>.671**</td>
<td>.425**</td>
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* p < .05; ** p < .01.

Table 6

Collinearity Statistics

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<td>Grit Effort</td>
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<td>.324</td>
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<tr>
<td>Planfulness</td>
<td>.325</td>
<td>3.080</td>
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<tr>
<td>Using Resources</td>
<td>.635</td>
<td>1.575</td>
</tr>
<tr>
<td>Intentional Behavior</td>
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</table>

Note. a Alcohol Use Disorders Identification Test subscales (alcohol consumption and related problem). b Emotion Regulation Questionnaire subscales (suppression and reappraisal). c Short Grit subscales (interest and effort). d Personal Growth Initiative subscales-II (readiness, planfulness, using resources, and intentional behavior).
**Heteroscedasticity**

Heteroscedasticity (i.e., unequal variance) occurs either due to nonnormality of one of the variables or for a reason related to one variable being connected to some transformation of the other (Tabachnick et al., 2019). Given that the data failed to meet the assumption of normality and following a subsequent visual re-examining of scatterplots, the result identified the presence of heteroscedasticity. While the data did not meet this assumption, Tabachnick and colleagues (2019) underline that not meeting the assumption can weaken the analysis without invalidating it; as such, they assert that such a situation is not fatal.
Descriptive Data

Before conducting the primary data analyses, the researcher examined and presented the descriptive data. The following section presents the descriptive data, including response rate, participants’ demographic characteristics, and psychometric properties of the instruments’ scores.

Response Rate

Given the large sample size required to conduct SEM (Kline, 2016) and to get sound representation, following the recommendation of Schumacker and Lomax (2016), the researcher determined the sample size that is needed (i.e., \( N = 288 \)) to detect a specific effect. Dillman and colleagues’ (2014) Tailored Design Method web-based survey was followed, using Qualtrics to recruit the desired sample size of \( (N = 500) \). Using the Qualtrics link, the researcher distributed the survey from November 10, 2020 to December 20, 2020 to 45 university/college instructors, professional and personal associates. While the researcher found it difficult to determine the precise number of potential participants who were invited to be part of this study, the best estimation indicates that roughly 3,000 potential participants received the research request. Of the 520 research packets that were returned, all met the study requirements. From these participants, one participant (.2%) completed only 40% of the research packet; three participants (.6%) completed only 45% of the research packet, 19 (3.7%) of the participants completed 50%, two (.4%) completed only 55% of the survey, and 495 (95.2%) of participants completed the entire (i.e., 100%) survey packet. The overall response rate from this study was estimated to be 17.3%. As noted, from the final completed dataset, about 5% had missing data. Following the recommendation of researchers, after utilizing a complete case analysis to deal with the missing cases, the data were 494. The number of participants that identified that they consume alcohol
was 356, making the final dataset and met more than the desire sample size to conduct SEM (Kline, 2016).

Table 7

Response Rates

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Participant Responses (N)</th>
<th>Participants Invited</th>
<th>Overall Response Rate</th>
<th>Missing data (n)</th>
<th>Useable Complete Response Rate</th>
<th>Final Data for SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web-Based</td>
<td>520</td>
<td>~3000</td>
<td>17.3%</td>
<td>26</td>
<td>95%</td>
<td>72.1%</td>
</tr>
<tr>
<td>Total</td>
<td>520</td>
<td>~3000</td>
<td>17.3%</td>
<td>26</td>
<td>494</td>
<td>356</td>
</tr>
</tbody>
</table>

Demographics

The analytic sample included 356 college students, and their demographic statistics are presented in Table 8. What follows is a summary of the tabled statistics. In the analytic sample (N = 356), most (n = 238; 66.9%) identified their sex (i.e., sex on birth certificate) as female compared to males (n = 114; 32.0%). There were 2 (.6%) participants who did not identify their sex and 2 (.6%) cases that were missing. In contrast, while 234 (65.7%) of the participants identified their gender (i.e., What is your current gender?) as female, 117 (32.9%) identified as male, 1 (.3%) as transgender, and 2 (.6%) selected the choice that stated a gender that was not listed; moreover, 1 (.3%) participant did not respond, and there was 1 (.3%) case that was missing. Similarly, most 222 (62.4%) of the participants’ ages ranged from 18 to 20; followed by 104 (29.2%) ages ranging from 21 to 23; 15 (4.2%) ages ranging from 24-26; and 6 (1.7%), 4 (1.1%), 4 (1.1%) ranging from 27-29, 30-32, and 33 and older respectively, with 1 (.3%) missing.
To report participants’ precise racial/ethnic background, the researcher asked two questions with an option to provide specific “another” on the second question. The first question asked participants to describe their race/ethnicity background. In response, most \((n = 247; 69.4\%)\) identified as Caucasian. The remaining participants identified as Black/African American \((n = 50; 14.0\%)\), Asian \((n = 22; 6.2\%)\), Native Hawaiian or other Pacific Islander \((n = 2; 0.6\%)\), American Indian/Alaskan Native \((n = 1; 0.3\%)\), and some other race \((n = 33; 9.3\%)\). There were 1 (.3%) missing responses. The second question asked if participants identified as a person of Hispanic, Latino, or Spanish origin; the vast majority \((n = 292; 82.0\%)\) responded “no.” Of the remainder, 10 (2.8%) identified as Mexican, Mexican American, Chicano; 14 (3.9%) Puerto Rican; 6 (1.7%) Cuban; 30 (8.4%) other Hispanic, Latino, or Spanish; lastly, there were 4 (1.1%) missing. From those who selected other Hispanic, Latino, or Spanish, there were 1 Bolivian, 1 Central American, 1 Chilean, 3 Colombian, 2 Dominican, 2 Guatemalan, 1 Haitian, 1 Honduran, 1 Nicaraguan, 1 Panamanian, 2 Peruvian, 1 Portuguese, 2 Spanish, 6 Venezuelan, and 1 participant who did not provide an answer to the question.

For current college academic classification, most participants, 127 (35.7%), were freshmen; in contrast, the remaining three academic classifications (i.e., sophomore, junior, and senior) were closely distributed. Specifically, participants were 59 (16.6%) sophomores, 83 (23.3%) juniors, and 79 (22.2%) seniors. A few 7 (2.0%) identified as other, and 1 (0.3%) was missing. A total of 85 (23.7%) participants reported completing 0-15 college credits, while 49 (13.8%), 41(11.5%), 32(9.0%), 36 (10.1%), 22(6.2%), 31(8.7%), 52 (14.6%), completed 16-30, 31-45, 46-60, 61-75, 76-90, 91-105, 106-120, college credits, respectively. There were 7 (2.0%) who selected completing a different amount of credit hours and 1(.3%) that did not respond or were missing. When participants were asked the number of college credits they were currently
enrolled in, the vast majority, 257 (72.2%), stated that they were enrolled in between 13-18 credit hours. Next, 74 (20.8%) said they were currently enrolled between 7-12 credit hours, followed by 16 (4.5%), 5 (1.4%), and 3 (.8%) were currently enrolled in credit hours between 0-6, 19-23, and other, respectively. There was 1 (.3%) who did not respond to the question or was missing. Lastly, when participants were asked about their current college cumulative grade point average (i.e., GPA), most 155 (43.5%) said their current GPA was between 3.51-4.0; followed by 136 (38.2%) who stated their GPA was between 3.01-3.50; next, 33 (9.3%) reported their GPA to be between 2.51-3.0; and lastly, (17 (4.8%), 6 (1.7%), 3 (.8%), 1 (.3%), and 1 (.3%) reported their current GPA to be between 2.01-2.50, 0.00-0.50, 1.51-2.00, 1.01-1.50, 0.51-1.00, respectively. There were also 4 (1.1%) participants who did not respond, or their data were missing.

In terms of participants’ relationship status, most 311 (87.4%) were single, 6 (1.7%) were married, 2 (.6%) were divorced, 1 (.3%) was separated and 34 (9.6%) said other (e.g., long-term/serious/committed relationship, dating, complicated, confused, celibate); there were 2 (.6%) cases that were missing. Most 110 (30.9%) of the participants reside in off-campus apartment (non-university sponsored); followed by 104 (29.2%) a campus dormitory; 95 (26.7%) reside off-campus apartment (non-university sponsored), 25 (7.0%) on-campus apartment, 15 (4.2%) off-campus university-sponsored housing, and 6 (1.7%) other. There was one participant who was missing. Finally, only 11 (3.1%) identified themselves as a member of a fraternity, 45 (12.6%) as a member of a sorority, and 19 (5.3%) identified as a full-time student-athlete (e.g., NCAA).
Table 8.

Participants’ Demographic Data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>Total %</th>
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<td><strong>Sex</strong></td>
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<tr>
<td>Female</td>
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<td>66.9</td>
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<td>Male</td>
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<td>Male</td>
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<td>6.2</td>
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<tr>
<td>Native Hawaiian or other Pacific Islander</td>
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<td>0.6</td>
</tr>
<tr>
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<td>0.3</td>
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</tr>
<tr>
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<td>8.4</td>
</tr>
<tr>
<td>Missing cases</td>
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<td>1.1</td>
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</tr>
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<td>Life University</td>
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<td>.3</td>
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**Current College Academic Classification**

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<tr>
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<td>Junior</td>
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<td>23.3</td>
</tr>
<tr>
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<td>Other</td>
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<td>2.0</td>
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<tr>
<td>Missing cases</td>
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</tr>
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</table>

**College Credits Completed**

<table>
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<tr>
<th>Credits Range</th>
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<th>Total %</th>
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<td>0-15</td>
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<td>23.9</td>
</tr>
<tr>
<td>16-30</td>
<td>49</td>
<td>13.8</td>
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<tr>
<td>31-45</td>
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<td>11.5</td>
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<td>46-60</td>
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<tr>
<td>61-75</td>
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<td>10.1</td>
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<tr>
<td>76-90</td>
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<td>6.2</td>
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<td>91-105</td>
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<td>8.7</td>
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**College Credits Currently Enrolled**

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<td>7-12</td>
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<tr>
<td>13-18</td>
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<td>72.2</td>
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<td>19-23</td>
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<td>1.4</td>
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<tr>
<td>Other</td>
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<td>.8</td>
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<tr>
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</table>

**Current College Cumulative Grade Point Average (GPA)**

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<td>0.51-1.00</td>
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<td>1.01-1.50</td>
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<td>.3</td>
</tr>
<tr>
<td>1.51-2.00</td>
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<td>.8</td>
</tr>
<tr>
<td>2.01-2.50</td>
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<td>4.8</td>
</tr>
<tr>
<td>2.51-3.00</td>
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<td>3.01-3.50</td>
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<td>-------</td>
<td>---------</td>
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<tr>
<td><strong>Current Relational Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>311</td>
<td>87.4</td>
</tr>
<tr>
<td>Married</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td>Separated</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>.6</td>
</tr>
<tr>
<td>Other</td>
<td>34</td>
<td>9.6</td>
</tr>
<tr>
<td>Missing cases</td>
<td>2</td>
<td>.6</td>
</tr>
<tr>
<td><strong>Current Residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Campus Dormitory</td>
<td>104</td>
<td>29.2</td>
</tr>
<tr>
<td>On Campus Apartment</td>
<td>25</td>
<td>7.0</td>
</tr>
<tr>
<td>Off Campus University sponsored housing</td>
<td>15</td>
<td>4.2</td>
</tr>
<tr>
<td>Off Campus Apartment (non-university sponsored)</td>
<td>95</td>
<td>26.7</td>
</tr>
<tr>
<td>Off Campus housing (non-university sponsored)</td>
<td>110</td>
<td>30.9</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td>Missing Cases</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td><strong>A Member of Fraternity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
<td>3.4</td>
</tr>
<tr>
<td>No</td>
<td>343</td>
<td>96.3</td>
</tr>
<tr>
<td>Missing cases</td>
<td>2</td>
<td>.6</td>
</tr>
<tr>
<td><strong>A Member of Sorority</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45</td>
<td>12.6</td>
</tr>
<tr>
<td>No</td>
<td>310</td>
<td>87.1</td>
</tr>
<tr>
<td>Missing cases</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td><strong>Full-Time Student-Athlete</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>No</td>
<td>336</td>
<td>94.4</td>
</tr>
<tr>
<td>Missing system</td>
<td>1</td>
<td>.3</td>
</tr>
</tbody>
</table>

*Note. N = 356*
**Instrument Psychometrics**

Prior to the main SEM analysis, sample-specific psychometric properties (i.e., reliability and validity evidence) of the instruments’ scores used in the investigation were examined. Given the difficulties of measuring constructs directly in fields such as social sciences, which results in measurement error concerns (Osborne, 2013), conducting a reliability coefficients test is vital. In the following section, the researcher presents the reliability coefficients of composite subscale scores for: (a) AUDIT (Saunders et al., 1993), (b) Grit-S (Duckworth & Quinn, 2009), (c) PGIS-II (Robitschek et al., 2012), and (d) ERQ (Gross & John, 2003).

**Alcohol Use Disorder Identification Test (AUDIT)**

In this study, alcohol use is defined as the consumption of alcohol (frequency and quantity). While AUDIT initial conceptualized as a three-subscale instrument, a plethora of subsequent studies provided evidence for a more parsimony two-factor models (i.e., factor one: hazardous alcohol consumption-items 1-3, and factor two: alcohol-related problem-items 4-10; Bergman & Källmén, 2002; Erford et al., 2020; López et al., 2019; Shevlin & Smith, 2007). Therefore, in this study, the researcher conceptualized AUDIT as a two-factor model (see chapter 3). The two-factor model items are structured using a five-point Likert scale; specifically, items one to eight are structured using (e.g., 0 – 4; 0 = never, 1 = less than monthly, 2 = monthly, 3 = weekly, 4 = daily or almost daily). The final two items on the AUDIT use a three-point Likert scale format (0 = No, 2 = Yes, but not in the last year, 4 = Yes, during the last year; Bateman et al., 2002). All first 3 items (i.e., hazardous alcohol consumption subscale) are structured using a five-point Likert scale, while the last 7 items (i.e., alcohol-related problem subscale) are structured using a five-point and three-point Likert scale. To get the subscales scores, the researchers took the sum of all the items in the subscale.
The researcher conducted the internal consistency reliability (i.e., Cronbach’s α) on the entire AUDIT scale and subscales. The Cronbach’s α score for the total AUDIT scale (i.e., 10 items) was ($\alpha = .847$), while Cronbach’s α for hazardous alcohol consumption subscale (i.e., items 1-3) and alcohol-related problem-items subscale (i.e., items 4-10) was ($\alpha = .794$), respectively. Given that the ideal Cronbach alpha coefficient scores were above .7 (Pallant, 2016), the result indicates acceptable internal consistency reliability for AUDIT and the subscales with this sample. Table 9 presents the measures of central tendencies for the AUDIT.

Table 9.

**AUDIT Measures of Central Tendencies**

<table>
<thead>
<tr>
<th>Scale</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
<th>$Mdn$</th>
<th>Mode</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUDIT Total</td>
<td>16.23</td>
<td>5.06</td>
<td>35.00</td>
<td>15.00</td>
<td>11.00</td>
<td>.847</td>
</tr>
<tr>
<td>Alcohol Consumption</td>
<td>6.96</td>
<td>2.44</td>
<td>11.00</td>
<td>7.00</td>
<td>4.00</td>
<td>.794</td>
</tr>
<tr>
<td>Alcohol Related Problem</td>
<td>9.26</td>
<td>3.20</td>
<td>25.00</td>
<td>8.00</td>
<td>7.00</td>
<td>.794</td>
</tr>
</tbody>
</table>

*Note. N = 356*
Grit

Grit is defined as individuals’ “perseverance and passion for long-term goals” (Duckworth et al., 2007, p. 1087). The researcher utilized Grit Short Scale [Grit-S; Duckworth & Quinn, 2009]) to measure grit. Grit-S is an eight-item scale with a two-factor structure model (i.e., interest (e.g., new ideas and projects sometimes distract me from my previous ones) and perseverance of effort (e.g., setbacks don’t discourage me). Grit-S scale is structured in Likert style ranging from one (i.e., not like me at all) to five (i.e., very much like me), and it is designed to be utilized as a total mean score (Duckworth & Quinn, 2009). Specifically, the items scores are summed and divided by the number of items (i.e., eight) to get an average that defines participants’ level of grit. To assess Grit-S scale internal consistency, the researcher ran a reliability analysis. The initial Cronbach’s α result for total grit score (i.e., 8 items) was (α = .756), while grit interest subscale reliability test yielded (α = .792), and for effort subscale (α = .672). Whereas the total Grit-S scale and interest subscale result indicated acceptable internal consistency, the perseverance effort subscale fall short of the desired Cronbach’s α (i.e., .7); thus, the internal consistency of the perseverance effort subscale was questionable. Although the internal consistency of perseverance Cronbach’s α result was lower than the desired cutoff score, the outcome was within the range of previous research (i.e., α = .60 to .78; Duckworth & Quinn, 2009; Meriac et al., 2015; Mullen & Crowe, 2018). Moreover, after the researcher removed item two due to its lower correlation matrix, the internal consistency improved to the desired Cronbach’s α above (i.e., .738); however, the researcher retained the initial 8 items scale in this study. Table 10 presents measures of central tendency for the Grit-S scale that includes results from the improved perseverance effort.
Table 10.

*Grit Short Scale Measures of Central Tendencies*

<table>
<thead>
<tr>
<th>Scale</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
<th>$Mdn$</th>
<th>Mode</th>
<th>Cronbach’s $\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grit mean Score</td>
<td>3.37</td>
<td>.62</td>
<td>3.38</td>
<td>3.37</td>
<td>3.50</td>
<td>.756</td>
</tr>
<tr>
<td>Interest subscale</td>
<td>11.70</td>
<td>3.50</td>
<td>16.00</td>
<td>12.00</td>
<td>13.00</td>
<td>.792</td>
</tr>
<tr>
<td>Effort subscale</td>
<td>15.31</td>
<td>2.68</td>
<td>16.00</td>
<td>15.00</td>
<td>17.00</td>
<td>.672</td>
</tr>
</tbody>
</table>

*Note. N = 356*
Personal Growth Initiative (PGI)

Personal Growth Initiative “refers to a person’s active and purposeful desire to grow in salient areas” (Weigold et al., 2018, p. 259). The researcher used Personal Growth Initiative Scale-II (PGIS-II; Robitschek et al., 2012) scores to measure participants’ PGI. Similar to the developers’ conceptualization of PGI, in this study, PGIS-II was conceptualized as a four-factor construct: (a) four items (i.e., 2, 8, 11, and 16) measuring readiness for change (e.g., I can tell when I am ready to make specific changes in myself); (b) five items (i.e., 1, 3, 5, 10, and 13) measuring planfulness (e.g., I set realistic goals for what I want to change about myself); (c) three items (i.e., 6, 12, and 14) measuring the use of resources (e.g., I ask for help when I try to change myself); and (d) four items (i.e., 4, 7, 9, and 15) measuring intentional behavior (e.g., I take every opportunity to grow as it comes up). All items in PGIS-II are positively worded and structured in a Likert scale ranging from 0 = Disagree Strongly to 5 = Agree Strongly. The scores can be determined by adding the items and dividing by the total of items in the subscale (Robitschek et al., 2012). To determine PGIS-II scale internal consistency, the researcher examined the scale’s reliability by conducting a reliability analysis. The internal consistency for the entire PGIS-II scale was (α = .930), indicating excellent reliability. While the Cronbach’s α for readiness for change subscale was (.832); similarly, Planfulness subscale had (α = .890), Using Resources (α = .792), and Intentional Behavior (α = .846) indicating good internal consistency for this sample. Table 11 presents measures of central tendency for the PGIS-II scale.
Table 11.

PGIS-II Measures of Central Tendencies

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Mdn</th>
<th>Mode</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGI-II mean</td>
<td>4.49</td>
<td>0.82</td>
<td>5.00</td>
<td>4.53</td>
<td>6.00</td>
<td>.930</td>
</tr>
<tr>
<td>Readiness</td>
<td>18.52</td>
<td>3.65</td>
<td>5.00</td>
<td>4.75</td>
<td>4.00</td>
<td>.832</td>
</tr>
<tr>
<td>Planfulness</td>
<td>22.45</td>
<td>5.13</td>
<td>5.00</td>
<td>4.60</td>
<td>6.00</td>
<td>.890</td>
</tr>
<tr>
<td>Using Resource</td>
<td>11.90</td>
<td>3.38</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>.792</td>
</tr>
<tr>
<td>Intentional Behavior</td>
<td>19.61</td>
<td>3.55</td>
<td>5.00</td>
<td>5.00</td>
<td>6.00</td>
<td>.846</td>
</tr>
</tbody>
</table>

Note. N = 356
Emotion Regulation Questionnaire (ERQ)

Emotion Regulation “refers to the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Gross, 1998, p. 275). The researcher utilized the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) to measure participants’ emotion regulation strategies. ERQ assesses individuals’ use of two ER strategies (i.e., cognitive reappraisal and expressive suppression). ERQ items are structured using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). ERQ is initially conceptualized and validated by numerous studies (e.g., Balzarotti, 2019; Preece et al., 2019) as a two-factor scale: (a) six items (i.e., 1, 3, 5, 7, 8, and 10) for cognitive reappraisal (e.g., I control my emotions by changing the way I think about the situation I’m in), and (b) four items (i.e., 2, 4, 6, and 9) for expressive suppression (e.g., I control my emotions by not expressing them). The ERQ is designed to be reported as a total mean score for subscales Gross & John, 2003). The researcher assessed ERQ internal consistency reliability and the Cronbach’s α score for the total ERQ (i.e., 10 items), Cognitive reappraisal (i.e., 6 items) and expressive suppression (i.e., 4 items) were (α = .765), (α = .864), and (α = .758) indicated acceptable internal consistency reliability for this sample. Table 12 presents measures of central tendency for the ERQ scale.

Table 12.

ERQ Measures of Central Tendencies

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Mdn</th>
<th>Mode</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ERQ</td>
<td>8.67</td>
<td>1.83</td>
<td>12.00</td>
<td>8.75</td>
<td>8.75</td>
<td>.765</td>
</tr>
<tr>
<td>Reappraisal</td>
<td>4.83</td>
<td>1.18</td>
<td>6.00</td>
<td>4.83</td>
<td>5.17</td>
<td>.864</td>
</tr>
<tr>
<td>Suppression</td>
<td>3.96</td>
<td>1.31</td>
<td>6.00</td>
<td>4.00</td>
<td>4.50</td>
<td>.758</td>
</tr>
</tbody>
</table>

Note. N = 356
Data Analysis

The research question examined was: To what extent can harmful alcohol consumption and related consequences (as measured by AUDIT; Saunders et al., 1993) be predicted by grit (as measured by Grit-S; Duckworth & Quinn, 2009), PGI (as measured by the PGIS-II; Robitschek et al., 2012), and cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003)? It was hypothesized that college students’ grit (as measured by Grit-S; Duckworth & Quinn, 2009), PGI (as measured by the PGIS-II; Robitschek et al., 2012), and cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003) will contribute to decreased hazardous alcohol consumption and related consequences (as measured by AUDIT; Saunders et al., 1993). Please see Figure 5 for the hypothesized theoretical model.

The researcher utilized Analysis of Moment Structure 27 Edition (AMOS, 2019) for SEM to investigate the theoretical model structure of the hypothesis (Byrne, 2016). As discussed, SEM involves a sequential process (i.e., five steps) to examine the hypothesized multivariate relationships including: (a) model specification, (b) model identification, (c) model estimation, (d) modeling testing, and (e) modeling modifications.
Model Specification and Identification

As noted, the first step in the SEM process is a specification of the theoretical model, which is established prior to data collection. The researcher conducted a comprehensive literature review (see Chapter 2) to establish existing relationships between the constructs under investigation (i.e., alcohol consumption and related problems, grit, PGI, and ER; Schumacker & Lomax, 2016). The second phase of the SEM process (i.e., model identification) is defined as “...going from the known information to the unknown parameters” (Kenny & Milan, 2012, p. 145). The researcher aims to see if the specified model can produce a unique solution (Schumacker & Lomax, 2016). In other words, “this step helps the researcher to determine whether the specified model is capable of producing actual results that can be estimated in SEM analysis” (Crockett, 2012, p. 34). While acknowledging the complex process of model identification (Crockett, 2012), researchers point out the connection between the known versus unknown information that determines if the model is under-identified, just-identified, or overidentified (Kenny & Milan, 2012). Specifically, the model is considered under-identified or underdetermined if the model has more free parameters than observations (Kline, 2016); in other words, it is not possible to get a unique estimate of the parameters. For example, consider the following equation that was provided by Kenny and Milan (2012): 10 = 2x + y; in this equation, there is one known piece of information (i.e., 10), and in contrast, there are two unknown variables or free parameters (i.e., x and y). As noted, an under-identified model has numerous valid solutions and therefore cannot yield a unique result. In contrast to an under-identified model, the model is just-identified when a model contains equal known and unknown information. Correspondingly, when a model has more known information than unknown, the model is called overidentified (Kenny & Milan, 2012; Kline, 2016). As Kenny and Milan (2012) note, “the difference between known versus unknown information typically equals the model’s
degree of freedom” (p. 146). Most importantly, as Crockett (2012) asserted, while underidentified and overidentified models are both considered identified, overidentified is considered ideal. As noted (see Chapter 3), Bollen (1989) recommended a recursive rule (i.e., relationships are unidirectional and not reciprocally related) and a t-rule (i.e., “…the number of nonredundant elements in the covariance matrix of observed variables must be greater than or equal to the number of unknown parameters” [p. 93]). The researcher followed these recommendations for model identification. Therefore, the relationships in the hypothesized model for this study were recursive (i.e., relationships are unidirectional; see Figure 5), and to determine whether this study met the t-rule condition, the researcher utilized a formula (i.e., $p (p+1) / 2$) that was provided by Crockett (2012). In the formula, $p$ is the number of observed variables. In this study, there were 10 observed variables. After calculating (i.e., $10 (10+1) / 2$), the number of known elements was 55. Given that the number of known elements (i.e., 55) exceeded the number of unknown (i.e., the relationship between independent and dependent variables, factor loadings, and errors terms = 35) in this theoretical model, the model is overidentified with the 20 degrees of freedom (Byrne, 2016; Crockett, 2012) and hence meets the criteria for model identification.
Model Estimation

Model estimation, the third step of SEM, and evaluation is an essential part of the SEM procedure. As noted earlier in this chapter, prior to selecting the estimation method, the researcher tested the conditions and assumptions for SEM. Lei and Wu (2012) underscored that the value of parameter estimates, related standard error estimates, and overall model fit statistics are contingent on the choice of suitable estimation methods. Given that the data from this investigation were non-normal, Byrne (2016) accentuated a technique (i.e., asymptotically distribution-free; ADF) to analyze non-normal data. Although ADF is available in AMOS, it requires a large sample size (e.g., n = 1000 - 5000); thus, if ADF’s conditions are not met, the result can be misleading and cannot be trusted (Byrne, 2016). Given that the current study sample size is not large enough to utilize ADF, Byrne (2016) endorsed correcting the default estimation technique in AMOS and other SEM programs (i.e., maximum likelihood) rather than using a different estimation technique. One of these corrected techniques is the Satorra-Bentler chi-square or maximum likelihood robust (MLR; Satorra & Bentler, 1994). MLR takes into consideration multiple variables and is flexible for large and small sample sizes (Byrne, 2016). While MLR can be utilized for this study, unfortunately, AMOS software does not have built-in MLR. Despite that, AMOS provides a bootstrap approach to handle non-normal data (Hancock & Liu, 2012). According to Nevitt and Hancock (2001), in the presence of non-normality and for a sample size greater than or equal to 200, there is evidence that bootstrapping leads to less biased results than ML. Therefore, for this investigation, the researcher followed the recommendation and available estimation techniques in AMOS (i.e., ML-bootstrap). The researcher noted the limitation of utilizing this estimation technique in chapter five.
Model Testing

Model testing involves confirming the fit of the structure and measurement model.

Following researchers’ (Crockett, 2012; Schumacker & Lomax, 2016) suggestion of a two-step process (i.e., measurement and theoretical) for model testing, in this investigation, the researcher utilized CFA to test the measurement model prior to testing the theoretical model. After conducting the CFA to establish the measurement models, the researcher then continued to test the hypothesized theoretical model. Various fit indices and standardized loading estimates were utilized to test and determine model fit for the data (Byrne, 2016; Kline, 2016). See Table 13 for the description of model fit evaluation indices.

Table 13.

Description of Model Fit indices

<table>
<thead>
<tr>
<th>Indices</th>
<th>Description</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square ($\chi^2$)</td>
<td>Assesses inference associated to SEM model fit.</td>
<td>A non-significant $\chi^2$ ($p &gt; .05$, the model is acceptable.</td>
</tr>
<tr>
<td>Goodness-of-Fit Index (GFI)</td>
<td>Measures relative variance and covariance.</td>
<td>.90 or above indicates a good fit.</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>Evaluates the fit of a hypothesized model to the fit of the null mode.</td>
<td>.90 for adequate fit and .95 for good fit.</td>
</tr>
<tr>
<td>Tucker Lewis Index (TLI)</td>
<td>Represents an incremental fit measure.</td>
<td>.90 is acceptable and close to .95 is a good fit.</td>
</tr>
<tr>
<td>Standardized Root-mean square residual (SRMR)</td>
<td>Reflects the mean difference between the observed and model-predicted correlation.</td>
<td>.05 – .08 indicate acceptable fit; $&lt; .05$ indicate close fit.</td>
</tr>
<tr>
<td>Root Mean Squared Error of Approximation (RMSEA)</td>
<td>Assesses the amount of variance within the hypothesized model.</td>
<td>.08 or less indicates a good fit.</td>
</tr>
</tbody>
</table>

Table adapted from (Fan & Sivo, 2007; Hahs-Vaughn, 2017; Hu & Bentler, 1999; Schumacker & Lomax, 2016; Tabet, 2019)
Confirmatory Factor Analysis - Alcohol Use Disorder Identification Test (AUDIT)

College students’ level of hazardous alcohol consumption and related consequences was measured using AUDIT. The researcher examined the CFA of the hypothesized 10 items and 2 factors (i.e., hazardous consumption and related consequences) AUDIT scale. As hypothesized, the two factor AUDIT scale demonstrated a good fit with all item factors loadings above .40 (Figure 37): $\chi^2/df = 2.581, p < .001$; CFI = .955; TLI = .940; RMSEA = .067 and SRMR = .046. See Table 14 for AUDIT model fit indices. Whereas Chi-Square ($\chi^2$) result is significant, this result is common for a large sample size (i.e., 200 - 500; Byrne, 2016; Hahs-Vaughn, 2017; Kline, 2016) and therefore, it is vital to utilize other fit indices when interpreting the result. The results provide evidence that the latent factor (AUDIT) strongly reflects the associated observed variables (i.e., hazardous consumption and related consequences); thus, continuing to conduct a SEM is reasonable.

Table 14.

Model Fit Indices of AUDIT

<table>
<thead>
<tr>
<th>Theorized Measurement Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2/df$</th>
<th>$p$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>87.767</td>
<td>34</td>
<td></td>
<td>2.581</td>
<td>.000</td>
<td>.955</td>
<td>.940</td>
<td>.067</td>
<td>.046</td>
</tr>
</tbody>
</table>
Figure 37. Measurement Model of AUDIT
Confirmatory Factor Analysis – Grit Short Scale (Grit-S)

College students’ level grit, defined as “perseverance and passion for long-term goals” (Duckworth et al., 2007. p. 1087), was measured using the theorized eight items and two-factor Grit-S. The researcher analyzed the CFA of the theorized eight items and two factors (i.e., interest and effort) grit scale. As postulated, the two factor Grit-S demonstrated acceptable fit to the data with all item factors loadings above .40 (Figure 38) except item two (.35) and $\chi^2(19) = 2.996, p < .001$; CFI = .948; TLI = .924; RMSEA = .075 and SRMR = .065. As noted, while the significant Chi-Square ($\chi^2$) result is expected, the low factor loading of item two can be concerning. In the past, researchers such as Mullen and Crowe (2018) have had to remove item two (.17) in their study due to poor factor-loading. In this study, the researcher also examined the factor structure of Grit-S after removing item two from the model. The result yielded improved factor loadings (Figure 39) for effort factor items and similar acceptable CFI = .948 result; however, the other fit indices (i.e., $\chi^2(13) = 3.774, p < .001$, TLI = .917; RMSEA = .088 and SRMR = .071) did not improve. Therefore, after following Hair et al., (2019) guideline for identifying the significant of the factor loading (i.e., .35). Hair et al. (2019) recommend ($N = 250$) for factor loading of .35 to be significant. Given that the current study sample size (i.e., 356) is greater than the sample size provided by the guideline by Hair and colleagues (2019), factor loading (.35) was deemed acceptable; consequently, accepted the initial theorized model. The results identified that the latent factor (Grit) is a strong reflection of the associated observed variables (i.e., interest and effort); consequently, continuing to conduct a SEM is reasonable. See Table 15 for initial Grit-S fit indices and modified model.
Table 15.

*Model Fit Indices of Grit-S and Modified Grit-S*

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>$p$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorized Measurement Model</td>
<td>56.921</td>
<td>19</td>
<td>2.996</td>
<td>.000</td>
<td>.948</td>
<td>.924</td>
<td>.075</td>
<td>.065</td>
</tr>
<tr>
<td>Modified Measurement Model 1</td>
<td>49.141</td>
<td>13</td>
<td>3.774</td>
<td>.000</td>
<td>.948</td>
<td>.917</td>
<td>.088</td>
<td>.071</td>
</tr>
</tbody>
</table>

**Figure 38.** Measurement Model of Grit-S.
Figure 39. Modified Measurement Model of Grit-S.
Confirmatory Factor Analysis – Personal Growth Initiative (PGI)

College students’ level PGI was measured using the theorized 16 items and a four-factor (i.e., readiness for change, planfulness, use of resources, intentional behavior) self-reported Personal Growth Initiative Scale-II (PGIS-II; Robitschek et al., 2012). The researcher employed a CFA to test hypothesized 16 items PGIS-II scale. The CFA result indicated that the four-factor model had poor fit to the data with all item factors loadings above .60 (Figure 41) and $\chi^2(98) = 5.290$, $p = .000$; CFI = .883; TLI = .857; RMSEA = .110 and SRMR = .083. See Table 16 for PGIS-II fit indices. Following modification indices suggestion between error terms, error terms were allowed to covary. Specifically, first between e1 and e6 (MI = 33.82), second between e2 and e15 (MI = 27.32), and the third was between e7 and e13 (MI = 22.37). The first two error terms (e1 and e6) loaded on using resources and planfulness subscales; the second two (e2 and e15) loaded using resources and intentional behavior subscales; the last two (e7 and e13) loaded on planfulness and intentional behavior subscales. Upon closer examination of individual items, the paired items had related content. Specifically, (i.e., e1 and e6 loaded on items 2 and 3. Whereas item 2 focuses on awareness and readiness for specific change, item 3 focuses on awareness and the ability to make a plan to change). Similarly, e2 and e15 loaded on items 8 and 9. The content for items 8 and 9 focused on figuring out the change needed about self and effort to grow as a person. The last pair (i.e., e7 and e13) loaded on items 5 and 4. The items' content focused on taking opportunities to grow and making a realistic plan to change for personal growth. This modification procedure had been used when investigating the psychometric properties of PGIS-II (Yakunnina et al., 2013; Weigold et al., 2014). The modified measurement model yielded better fit (Figure 42) as indicated by improved but still significant $\chi^2(95) = 4.537$, $p < .001$; acceptable CFI = .907; improved TLI = .882 and mediocre RMSEA = .100 scores and finally acceptable SRMR = .0784. The modified fit indices were similar in terms of yielding
acceptable but not excellent fit with other studies. For example, the developer (i.e., Robitschek et al., 2012) of PGIS-II initially reported $\chi^2(330, N = 1,796) = 1356.70, p < .001$; SRMR = .09; and robust RMSEA = .07 (90% CI [.07, .08]). Moreover, Weigold and colleagues (2014) reported $\text{CFI} = .89$, SRMR = .06, and $\chi^2 = 352.55, df = 101; \chi^2/df = 3.49, p = .001$. Finally, Yakunnina et al. (2013) reported $\chi^2(96) = 353.22, p < .001, \chi^2/df = 3.68$; CFI (.93), RMSEA (.08), and SRMR (.05).

After reviewing the initial and modified CFA results, the researcher opted to examine the factor structure of PGIS-II using exploratory factor analysis (EFA) in these data. An EFA was conducted on the 16 items PGIS-II by employing Principal Axis Factoring with Promax Rotation due to the nonnormality of the data (Hair et al., 2019). After the initial EFA analysis, the researcher removed nine items due to (a) low commonality (< .5), (b) low factor loadings (< .40), and (c) item cross-loading on more than one factor. Following the criteria and initial removal of the nine items, the researcher re-loaded each deleted item in search of the strongest fit, which led to adding one item.

Next, the researcher used an eigenvalue (< 1) and the Scree plot to establish the number of factors in this dataset. A single-factor model, with all eight items loading on a single factor (see Figure 40), was derived as indicated by good Kaiser-Meyer-Olkin (KMO) .907, commonalities ranging from .473 to .705, and a single-factor accounting for 64.088 of the variances (Hair et al., 2019). Moreover, the researcher also fixed a number of factors to four to test the original factor loading in this study. The EFA analysis yielded two items loading on factor three and four, five items loading on factor two, and the remaining seven items loading on factor one (KMO = .913; commonalities ranging from .443 to .936 four-factor accounting for 71.937 variances). Although the four-factor solution yielded good variance, commonalities, and
KMO values, given that factors three and four only had two items, these factors cannot be a standalone latent variable. Therefore, given the similarity CFA results (i.e., adequate but not excellent fit) observed in the literature and in this study, the results provide evidence that the latent factor (PGI) reflects the associated observed variables (i.e., readiness for change, planfulness, use of resources, intentional behavior). Therefore, the modified measurement model (i.e., a model that allowed the error terms to covary) was deemed (Figure 41) acceptable to continue to conduct a SEM.

Table 16.

*Model Fit Indices of PGIS-II and Modified PGIS-II*

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>$P$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorized Measurement Model</td>
<td>518.460</td>
<td>98</td>
<td>5.290</td>
<td>.000</td>
<td>.883</td>
<td>.857</td>
<td>.110</td>
<td>.0830</td>
</tr>
<tr>
<td>Modified Measurement Model 1</td>
<td>430.992</td>
<td>95</td>
<td>4.537</td>
<td>.000</td>
<td>.907</td>
<td>.882</td>
<td>.100</td>
<td>.0784</td>
</tr>
</tbody>
</table>

Figure 40. Scree Plot for the PGIS-II.
Figure 41. Measurement Model of PGIS-II.
Figure 42. Modified Measurement Model of PGIS-II.
Confirmatory Factor Analysis – Emotion Regulation Questionnaire (ERQ)

College students’ use of two ER strategies was measured using the two-factor Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The researcher inspected the CFA of the hypothesized ten items and two factors (i.e., cognitive reappraisal and expressive suppression) ERQ. As hypothesized, the two factor ERQ showed a good fit with all item factors loadings above .45 (Figure 4): $\chi^2(34) = 3.308$, $p < .001$; CFI = .946; TLI = .929; RMSEA = .081 and SRMR = .0529. See Table 17 for ERQ model fit indices. Like the other instruments in this study, the Chi-Square ($\chi^2$) result is significant and common for a large sample size (i.e., 200 - 500; Byrne, 2016; Hahs-Vaughn; 2017; Kline, 2016). The results provide evidence that the latent factor (ER) is a strong reflection of the associated observed variables (i.e., cognitive reappraisal and expressive suppression); thus, continuing to conduct a SEM is warranted.

Table 17.

Model Fit Indices of ERQ

<table>
<thead>
<tr>
<th>Theorized Measurement Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>$P$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>112.462</td>
<td>34</td>
<td>.308</td>
<td>.000</td>
<td>.946</td>
<td>.929</td>
<td>.081</td>
<td>.0529</td>
<td></td>
</tr>
</tbody>
</table>
Figure 43. Measurement Model of ERQ.
Structural Model

After establishing the measurement models for exogenous (i.e., Grit-S, PGIS-II, and ERQ) and endogenous (i.e., dependent: AUDIT) latent variables, the hypothesized theoretical model was examined (see Figure 5). The exogenous (i.e., independent) Grit was defined as a two-factor scale (i.e., interest and effort). Personal Growth Initiative was defined as a four-factor scale (i.e., Readiness for change, Planfulness, Using Resources, and intentional behavior), and Cognitive Reappraisal was a subscale of ERQ. The dependent (i.e., endogenous) The Alcohol Use Disorders Identification Test (AUDIT) was defined as a two-factor model (i.e., hazardous alcohol consumption and related consequences).

The hypothesized structural model depicted the directional relationship (Figure 5) that college students’ (a) grit, (b) PGI, and (c) cognitive reappraisal ER strategy will contribute to decreased hazardous alcohol consumption and related consequences. As recommended, Bootstrap ML was employed to estimate the hypothesized model (Byrne, 2016). Moreover, fit indices, unstandardized estimates, and standardized estimate results were considered to make interpretation of the results (Jackson et al., 2009). Pallant (2016) provides a guideline to interpret parameter estimates. Specifically, a value of .29, .30 to .49, and .5-1.00 represent a weak, moderate, and strong relationship, respectively.

The initial theorized model (Figure 5) was unable to converge and yield a unique solution. That is, the iteration limit was reached due to the models’ complexity and being under-identified. Following Byrne's (2016) recommendation, in the second model, the dependent variable subscale (i.e., hazardous alcohol consumption) was freed, and added a 1.0 constraints on the alcohol-related problem, as well as the independent variable grit (see Figure 4 for hypothesized model two). The result supported the hypothesized model two as indicated by $\chi^2/df = 2.821, p = .000; CFI = .939; TLI = .923; RMSEA = .072; SRMR = .050$. Moreover, the results
indicated a significant positive relationship (30.5% of variance explained) between grit and alcohol consumption and related problem ($b = 1.0; \beta = .553; p < .001$) with a moderate effect size. In contrast, there was a significant negative relationship (56.5% of variance explained) between PGI and alcohol consumption and related problem ($b = -2.691; \beta = -.745; p < .001$) with a large effect size. Furthermore, there was a non-significant positive relationship (1.6% of variance explained) between alcohol consumption and related problem and cognitive reappraisal ER strategy ($b = .405; \beta = .128; p = .171$) with a small effect size. See Table 18 for the standardized result.

Figure 44. Hypothesized Structural Model Two.
Table 18.

*Theorized Structural Model Two Standardized Results*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimate</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grit ON AUDIT</td>
<td>.553</td>
<td>.001</td>
</tr>
<tr>
<td>PGI ON AUDIT</td>
<td>.745</td>
<td>.001</td>
</tr>
<tr>
<td>Reappraisal ON AUDIT</td>
<td>.128</td>
<td>.171</td>
</tr>
</tbody>
</table>

*Note.* ON represents the directional relationship where Grit (interest and effort), PGI (Readiness for change, Planfulness, Using Resources, and intentional behavior), Cognitive Reappraisal relationship with AUDIT (hazardous alcohol consumption and related consequences). The exogenous (i.e., independent or predictor) variable always appears on the left side of the ON.

When the initial hypothesized model does not converge, and given the inconsistent support for hypothesized models, as well as the non-significant relationships of reappraisal with alcohol consumption and related problem, further modifying of the structural model was warranted (Schumacker & Lomax, 2016). In the third model, the constraint (1.0) was removed from grit and added on PGI. The third model was unable to converge (see Figure 45).

Figure 45. Hypothesized Structural Model Three.
Next, in the fourth model, the constraint from the alcohol-related problem was removed and added to the hazardous alcohol consumption subscale. The result from the fourth model (Figure 46) converged and had the best fit indices of all the models that were tested ($\chi^2/df = 2.744, p = .000; \text{CFI} = .942; \text{TLI} = .926; \text{RMSEA} = .070; \text{SRMR} = .050$). See Table 19 for statistically significant fit indices. Based on the final result from the fourth model (See Table 20 for standardized result fourth model), the results indicated a significant negative relationship (72.3% of variance explained) between grit and alcohol consumption and related problem ($b = -.697; \beta = -.849; p < .001$) with a large effect size. In contrast, there was a significant positive relationship (46.00% of variance explained) between PGI and alcohol consumption and related problem ($b = 1.0; \beta = .678; p < .001$) with a large effect size. Furthermore, a non-significant negative relationship (1.6% of variance explained) between alcohol consumption and related problem and cognitive reappraisal ER strategy ($b = -.164; \beta = -.127; p = .179$) with a small effect size.

Table 19.

<table>
<thead>
<tr>
<th>Model Fit Indices of structure model</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2$</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Model Two</td>
</tr>
<tr>
<td>Model Four</td>
</tr>
</tbody>
</table>
Table 20.

*Theorized Structural Model Four Standardized Results*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimate</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grit ON AUDIT</td>
<td>-.849</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>PGI ON AUDIT</td>
<td>.678</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Reappraisal ON AUDIT</td>
<td>-.127</td>
<td>.179</td>
</tr>
</tbody>
</table>

*Note.* ON represents the directional relationship where Grit (interest and effort), PGI (Readiness for change, Planfulness, Using Resources, and intentional behavior), Cognitive Reappraisal relationship with AUDIT (hazardous alcohol consumption and related consequences). The exogenous (i.e., independent or predictor) variable always appears on the left side of the ON.

Figure 46. Hypothesized Structural Model Four.
Finally, in the fifth model, the constraint from PGI was removed and added cognitive reappraisal ER strategy. The result from the fifth model (Figure 47) converged and had good fit indices ($\chi^2/df = 2.891, p = .000; \text{CFI} = .937; \text{TLI} = .920; \text{RMSEA} = .073; \text{SRMR} = .066$). See Table 21 for structure models fit indices. Based on the final result from the fifth model (See Table 22 for standardized result fourth model), the results indicated a significant positive relationship (12.6% of variance explained) between grit and alcohol consumption and related problem ($b = .484; \beta = .355; p = .012$) with a moderate effect size. In contrast to model four, there was a significant negative relationship (21.3% of variance explained) between PGI and alcohol consumption and related problem ($b = 1.607; \beta = -.461; p < .001$) with a moderate effect size. Furthermore, there was a significant positive relationship (8.5% of variance explained) between alcohol consumption and related problem and cognitive reappraisal ER strategy ($b = 1.0; \beta = .292; p < .001$) with a small effect size.

Table 21.

Model Fit Indices of All structure models

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2/df$</th>
<th>$p$</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
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</thead>
<tbody>
<tr>
<td>Model Two</td>
<td>203.143</td>
<td>72</td>
<td>2.821</td>
<td>.000</td>
<td>.939</td>
<td>.923</td>
<td>.072</td>
<td>.050</td>
</tr>
<tr>
<td>Model Four</td>
<td>197.586</td>
<td>72</td>
<td>2.744</td>
<td>.000</td>
<td>.942</td>
<td>.926</td>
<td>.070</td>
<td>.050</td>
</tr>
<tr>
<td>Model Five</td>
<td>208.176</td>
<td>72</td>
<td>2.891</td>
<td>.000</td>
<td>.937</td>
<td>.920</td>
<td>.073</td>
<td>.066</td>
</tr>
</tbody>
</table>
Table 22.

Theorized Structural Model Four Standardized Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimate</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grit ON AUDIT</td>
<td>.355</td>
<td>.012</td>
</tr>
<tr>
<td>PGI ON AUDIT</td>
<td>-.461</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Reappraisal ON AUDIT</td>
<td>.292</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

*Note. ON represents the directional relationship where Grit (interest and effort), PGI (Readiness for change, Planfulness, Using Resources, and intentional behavior), Cognitive Reappraisal relationship with AUDIT (hazardous alcohol consumption and related consequences). The exogenous (i.e., independent or predictor) variable always appears on the left side of the ON.
Figure 47. Hypothesized Structural Model Five.
Chapter Four Summary

Chapter four presented the results of this study. Specifically, the researcher aimed to assess the directional relationship between college students’ level of alcohol consumption and their emotion regulation strategy, grit, and PGI scores. The researcher assessed the theoretical model that college students’ Grit, PGI, and cognitive reappraisal ER strategy contribute to decreased hazardous alcohol consumption and related consequences. The researcher evaluated and presented data screening, statistical assumptions, and descriptive results, including response rates and participants’ demographic data. Moreover, the researcher presented the psychometric property of all constructs under investigation. Next, the researcher investigated and presented results for the primary research hypothesis using SEM. Finally, the researcher examined the research question and presented the result. In chapter five, the researcher delineates the discussion and interpretation of the results of this study. In addition, the researcher outlines implications for counselors, counselor educators, and future research.
CHAPTER FIVE: DISCUSSION

Chapter five presents a review of the study and a discussion of the results from this investigation. The researcher discussed the results of the SEM data analysis to give the context of the results that were reported in chapter four within the literature that examined hazardous alcohol consumption and related problems, grit, PGI, and ER in college students. Next, the researcher outlines the study's limitations and presents implications of the findings for counselors, counselor educators, and researchers.

Study Summary

Most college students in America start their college career at the developmental stage of emerging adulthood, ranging between 18-29 years of age (Johnson et al., 2010). Emerging adulthood is characterized by uncertainty, exploration, impulsivity, and creativity (Arnett et al., 2014; Siegel, 2013). As college students pursue new ideas and build abilities that prepare them for future career and adult responsibilities, they are also exploring meaningful romantic relationships, increasingly seeking sensation and novelty (Wood et al., 2017). As emerging adulthood is a period of exploration, sensation-seeking and impulsivity may lead to risky behavior such as harmful alcohol consumption. As a result, the culture and pervasiveness of alcohol use in college students is strong (Schulenberg et al., 2019).

Whereas some college students consumed alcohol prior to enrolling in college, some tend to initiate during their college career (Arria et al., 2017). Scholars have identified reasons such as easy access or exposure to different substances, lack of supervision from authority figures, favorable attitudes, and perceive a low risk for the prevalence of alcohol consumption in college students (Arria et al., 2017; Bravo et al., 2018; Garnier-Dykstra et al., 2012; Kaynak et al., 2013;
Schulenberg et al., 2019). Scholars also identified the consequences of harmful alcohol consumptions, such as death, poor academic performance, injuries, legal issues, and unprotected sex in college students (Caamaño-Isorna et al., 2017; Hingson et al., 2017; Rehm et al., 2012; Thompson et al., 2006).

As a result of enormous personal and systemic consequences of alcohol consumption in college students, researchers put a concerted effort to investigate variables that serve as protective factors, including religious practices (Brechtling et al., 2010), parental supervision (White et al., 2006), and emotion regulation strategies (Blanchard et al., 2019). Researchers also investigated predicting factors of alcohol consumption in college students, such as social influence, prior alcohol use, non-cognitive traits, and drinking locations (Abar & Maggs, 2010; Jakeman et al., 2015; Lac et al., 2013; Yu & Shacket, 2001). Whereas, researchers have examined the relationship between college students’ substance use and ER scores (Dvorak et al., 2014; Wong et al., 2013); however, after an extensive review of the literature, no studies were identified that investigated college students level of harmful alcohol consumption and related problems and their level of grit, PGI, and reappraisal emotion regulation strategy.

Given the consequences of harmful alcohol use and the potential benefits of the constructs (i.e., grit, PGI, and ER) hold, this study investigated the hypothesized directional relationship between college students’ level of grit, PGI, and cognitive reappraisal ER strategy and hazardous alcohol consumption and related consequences. The research received IRB approval prior to any recruitment of participants and data collection. In addition, the researcher collected data utilizing the Tailored Design Method via online (i.e., www.qualtrics.com; Dillman et al., 2014). The final sample size for this study consists of 356 college students who identified as consuming alcohol and included, (a) their demographic info, (b) their level of grit as measured
by Grit-S; Duckworth & Quinn, 2009), (c) their PGI (as measured by the PGIS-II; Robitschek et al., 2012), (d) their cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003), and (e) their level hazardous alcohol consumption and related consequences (as measured by AUDIT; Saunders et al., 1993). To analyze the data for this investigation, quantitative procedures including (a) SEM, (b) CFA, (c) descriptive statistics were utilized.

**Primary Research Question**

To what extent can harmful alcohol consumption and related consequences (as measured by AUDIT; Saunders et al., 1993) be predicted by grit (as measured by Grit-S; Duckworth & Quinn, 2009), PGI (as measured by the PGIS-II; Robitschek et al., 2012), and cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003)?

**Research Hypothesis**

College students’ grit (as measured by Grit-S; Duckworth & Quinn, 2009), PGI (as measured by the PGIS-II; Robitschek et al., 2012), and cognitive reappraisal ER strategy (as measured by ERQ; Gross & John, 2003) will contribute to decreased hazardous alcohol consumption and related consequences (as measured by AUDIT; Saunders et al., 1993). Please see Figure 5 for the hypothesized theoretical model.
**Descriptive Data Analysis**

College students (i.e., part-time or full-time) were the target population for this study. Undergraduate students from 45 colleges and universities around the United States were invited to participate in this study regardless of their demographic background. The data collection occurred between the Fall of 2020 (from November 10, 2020, to December 20, 2020) via online (www.qualtrics.com) due to the COVID-19 pandemic restriction.

It was difficult to get a precise number of individuals invited to participate in this study. The best estimation suggests that approximately 3,000 potential participants received the research request, and 520 participants completed the survey (17.3%). The final number of participants who identified as consuming alcohol was 356. The demographic variables that were collected in this study including (a) sex on birth certificate, (b) gender (c) racial/ethnicity, (d) college academic classification, (d) education, (e) college credits currently enrolled, (f) college cumulative grade point average, (g) relationship status, (h) age, (i) university/college of attendance, (j) current residence (k) member of fraternity/sorority, and (l) full-time student-athlete. These demographic variables of undergraduate college students that were collected in this study were consistent with previous research. Specifically, Meda and colleagues (2017) reported the participant undergraduate college student age ranged from 18-23; in the current study, over 91% of participants' age ranged between 18-23. In addition, Miller et al. (2016) reported that most (80%) of their undergraduate college student participants identified as white, while the majority (30%) lived in an on-campus house; similar to Miller et al. (2016) in this study, most of the participants in the current study were identified as Caucasian (69.4%) and about 29.2% lived on-campus dormitory. Peterson (2019) gathered data on undergraduate college students' age, ethnicity, and gender and reported a 19% response rate, majority (59.21%) and (91.35%) identified as female and Caucasian, respectively. Similar to Peterson (2019), the
current study response rate was 17.3%, majority (65.7%) and (69.4%) of the participants identified as female and Caucasian, respectively. Presley and colleagues (1994) collected undergraduate college students’ demographic data such as gender, age, GPA, relationship status, full-time/part-time, academic classification, and racial/ethnicity, which align with the current sample. Yeater et al. (2018) gathered undergraduate college students’ academic classification, age, marital status, sexual orientation, racial/ethnic membership, and academic status. While Yeater et al. (2018) reported 39% of their participants identifying as White/Caucasian, and their relationship status (99.8%) being single, the trend was also seen in the current study as (87.4%) and (69.4%) of participants identified as single and Caucasian respectively.

**Instrument Descriptive Statistics**

Four data collection instruments were utilized to measure the constructs of interest. Participants’ level of harmful alcohol consumption and related problems was measured using AUDIT (Saunders et al., 1993). Grit-S (Duckworth & Quinn, 2009) measured participants’ level of grit. At the same time, PGIS-II (Robitschek et al., 2012) and ERQ (Gross & John, 2003) were utilized to measure participants’ level of PGI and ER. All the data collection instruments (i.e., AUDIT, Grit-S, PGIS-II, and ERQ) factor structures were examined with these data, resulting in acceptable to good model fit; these results align with previous research with the same population. Table 23 presents model fit and reliability scores for the four data collection measures with these data.
Table 23.

Instrument Statistics

<table>
<thead>
<tr>
<th></th>
<th>α</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>p</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUDIT Total</td>
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<td>87.767</td>
<td>34</td>
<td>2.581</td>
<td>.000</td>
<td>.955</td>
<td>.940</td>
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<td>Alcohol Consumption</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Grit mean Score</td>
<td>.756</td>
<td>56.921</td>
<td>19</td>
<td>2.996</td>
<td>.000</td>
<td>.948</td>
<td>.924</td>
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<td>Interest subscale</td>
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<td>Effort subscale</td>
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<td></td>
<td></td>
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<tr>
<td>PGI-II mean</td>
<td>.930</td>
<td>430.992</td>
<td>95</td>
<td>4.537</td>
<td>.000</td>
<td>.907</td>
<td>.882</td>
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Discussion of Findings

The initial structure model was unable to converge due to the model being under-identified and complex. Therefore, following Byrne's (2016) recommendation, the second hypothesis model was manipulated by freeing parameters. The second structure model (see Figure 43) over-identified and yielded a unique solution. The second structure model identified that both grit and PGI were statistically significant relationship accounting for about 30.5% and 56.55% of the variance in college students’ alcohol consumption and related problem respectively, while there was not a statistically significant relationship between cognitive reappraisal ER strategy accounted and college students’ harmful alcohol consumption and related problem in the model. Given the inconsistent results that the models yielded and the non-significant relationship that was observed, the researcher deemed it necessary to modify and examine model two. As such, in the third model, the researcher further manipulated by freeing parameters constraint (1.0). Specifically, the parameters constraint was removed from grit and added on PGI. The third model was under-identified and unable to converge (see Figure 44).

Following a similar procedure, the researcher manipulated model three by freeing parameters constraint (1.0) from alcohol-related problems and added to hazardous alcohol consumption subscale while maintaining the constraint on PGI. The results of the best fitting structural equation model (Model 4, as detailed in chapter four) indicated that both grit and PGI were a statistically significant relationship. Specifically, grit had a negative relationship accounting for 72.3% of the variance, while PGI had a positive relationship with college students’ harmful alcohol consumption and related problem, accounting for about 46% of the variance. There was no statistically significant relationship between cognitive reappraisal ER strategy and college students’ harmful alcohol consumption and related problems. Finally, in the last hypothesized structure model, the researcher further manipulated the parameters constraint
(1.0) by freeing PGI and adding the constraint to cognitive reappraisal. The fifth model converged (see Figure 46) and had good fit indices. In the last model, grit had a positive relationship (12.6% of variance explained), PGI had a significant negative relationship (21.3% of variance explained) with alcohol consumption and related problem. Additionally, unlike any of the tested structure models, cognitive reappraisal ER strategy had a significant positive relationship (8.5% of variance explained) with alcohol consumption and related problems.

The result from model four identified that college students’ level of grit had a negative relationship with their alcohol consumption and related problems. In other words, higher grit scores are associated with lower alcohol consumption and related problem scores. Thus, grit can serve as a protective factor. Researchers (e.g., Griffin et al., 2016; Guerrero et al., 2016; Maddi et al., 2013) examined the role of grit in the field of substance use. Multiple studies identified that grit had a positive role in sustaining wellbeing (e.g., the protective role of grit and gratitude against suicidal ideation in college students; Kleiman et al., 2013), and grit as a positive personal asset in adolescents and young adults with chronic medical conditions (Sharkey et al., 2018), the result from the fourth model followed the trend that was observed in the general literature (i.e., playing a positive role in sustaining wellbeing and support of positive behaviors; Duckworth et al., 2007; Meyer et al., 2020). While noting grit’s protective role, it is critical to underscore that these results need to be interpreted with caution due to the presence of non-normal data and parameters constraint (1.0) added in the model.

Contrary to the result from hypothesis structure model two, college students’ level of PGI and their alcohol consumption and related problems was positive with a large effect size in structure mode four. As noted, given that there was no research that examined PGI in the context of college students’ level of alcohol use, it is difficult to compare this result. Moreover, in the
PGI literature, researchers note the role of PGI in supporting individuals who are coping with challenging situations (Robitschek et al., 2012). Assuming the difficulties college students face as they pursue their goal of completing their undergraduate degree and the added COVID-19 pandemic, the challenge students face become overwhelming, and while PGI help individuals cope better with challenging situations, PGI’s positive relationship with alcohol and related problems was not in line with Robitschek and colleagues’ (2012) findings. However, as noted that alcohol consumption can serve as a coping strategy (Aurora & Klanecky, 2016), it is conceivable that college students with high PGI scores may have used alcohol as a coping strategy.

As noted, while keeping the impact of the COVID-19 pandemic in mind, it is also important to underline the minor shift that occurred related to cognitive reappraisal ER strategy and a more evident change in PGI and grit influence. Specifically, the shift from non-significant positive to non-significant negative relationship cognitive reappraisal ER strategy had with hazardous alcohol consumption, and related problems indicate the possible impact of adding parameter constraints on one of the independent variables (i.e., PGI). Moreover, another possible reason for the non-significant ER strategy result in this model may have occurred due to a moderate ($r = .46$) and small ($r = .16$) relationship cognitive reappraisal strategies have with PGI and grit, respectively. Given the relationships, it is possible to observe the one construct having a strong explanation of variance in the model.

Unlike grit and PGI, emotion regulation strategies have been investigated in the context of college students’ harmful alcohol consumptions and related problems. Although the majority (65%) of participants in this study identified as female, and it will be a stretch to compare it with an all-female sample, the non-significant result of this study was in contrast with previous
findings. Specifically, Blanchard and colleagues (2019) reported ER reappraisal strategies in females were associated with protective-behavioral strategies (between .11, $p < .05$, and .23, $p < .01$) and negatively related to alcohol consumption (-.16, $p < .01$) with small effect size. Blanchard and colleagues (2019) also underlining the complex relationship between college students’ substance use (e.g., alcohol use) and their ER scores. Likewise, given the ongoing COVID-19 pandemic environment and the possibility that participants could use alcohol to cope (Aurora & Klanecky, 2016), the complex relationship between cognitive reappraisal and hazardous alcohol consumption and related problems could also exist in this study. Furthermore, other researchers (e.g., Aurora & Klanecky, 2016; Dvorak et al., 2014), while utilizing different emotion regulation measurements, also noted that participants’ emotion regulation difficulty had alcohol-related consequences. Whereas these studies utilized general ER strategies and will be difficult to compare with the current study, at the risk of being redundant, the ongoing COVID-19 pandemic and the added stress may have contributed to the difficulty of utilizing healthy coping ER strategies.
Limitations

As with any study, this research investigations have multiple limitations. Specifically, this study had the following limitation, and interpretation of the result requires to account for the following limitations relating to (a) research design, (b) sampling procedures, and (c) instrumentation. The following section presents the study limitation.

Research Design

Given that the design of the study is correlational, it can only determine a relationship between the constructs but cannot predict causation (Kline, 2016). The correlation design enables the researchers to investigate direction (i.e., positive or negative) between variables; moreover, the correlational design also allows to assess how one constructs in the study impact on the other variables (Gall et al., 2007). While the findings in this study provide preliminary evidence in establishing a directional relationship between college students’ level of harmful alcohol use and related problems with their grit, PGI, and cognitive reappraisal scores, another limitation of correlational research design is that it cannot establish the cause and effect (i.e., unclear temporal precedence; Johnson & Christensen, 2019). Therefore, in this study, the results cannot conclusively suggest grit, PGI, and cognitive reappraisal scores cause lower alcohol consumption and related problems. Furthermore, as noted, whereas this study provides preliminary evidence to ascertain the directionality of the relationship, it also could not control for extraneous or confounding variables. Lastly, the study used a self-reporting instrument; due to the nature of a self-reporting survey, an inherent limitation is the accuracy/truthfulness of participants’ answers (Gall et al., 2007). Similarly, given the online data collection platform, it is possible for participants to report false (e.g., demographic) data; as such, the researcher took this into
consideration when reporting, generalizing, and interpreting the study findings (Shawver et al., 2016; Whitehead, 2007).

**Sampling**

Whereas achieving a large and diverse population sample enables researchers to generalize (Hahs-Vaughn, 2017) when the whole population of interest is difficult to sample, a convenient sampling method is practical and acceptable (Gall et al., 2007). Participants in this study were collected from colleges and universities in the United States of America. Mainly from colleges and universities from the southeast and midwest region of the United States of America. As such, the findings of this study cannot be generalized to all college students throughout the United States or outside the United States. Moreover, although the majority of college students were enrolled identified as female (NCES, 2020), the enrollment difference was small. However, more than half of the participants in the study were female and Caucasian; thus, the results of this study may not be generalizable to all college or university students in the United States of America.

Furthermore, it is also critical and incumbent upon the researcher to consider the role of various environmental contexts and their effect on generalizability (Gall et al., 2007). Considering data collection occurred during the fall semester of 2020 (from November 10, 2020, to December 20, 2020) in the middle global COVID-19 pandemic, it is essential to consider the influence of the environment on the study’s outcome. While it is difficult to determine how the timing of this investigation may have been impacted, it is possible that the presence of the pandemic may have influenced the relationship of the constructs. Specifically, it is possible to speculate the probability of college students with a high level of grit and PGI may have
intentionally used alcohol as a coping method during one of the most stressful times (season of COVID-19 pandemic). As a result, it is vital to be cautious when interpreting this study findings.

**Instrumentation**

This investigation utilized four data collection instruments. While all four instruments used in this study had been found previously to have sound reliability and validity scores (Graziano & Raulin, 2013), and were used with similar populations, one of the inherent limitations of self-reported scales is the reliability of participants answers and that instruments may not measure the constructs of interest fully (Johnson & Christensen, 2019). As noted, whereas all scores from the instruments had been reported having strong internal consistency, to determine whether all instruments had sound psychometric properties, the researcher assessed psychometrics of all instruments utilized in the study.

As such, one of the primary limitations observed in the study was related to a scale that measured grit (i.e., *Grit Short Scale* [Grit-S; Duckworth & Quinn, 2009]). Although the result for internal consistency reliability (i.e., Cronbach’s α) of total grit score was acceptable (α = .756), one of the subscales (i.e., effort subscale) fail to yield above the desired Cronbach’s α cutoff score of (.7). Specifically, the two subscales yielded (α = .792) for interest subscale, and (α = .672) effort subscale. Given that one of the subscales failed short of the desired score, following previous research (i.e., Mullen & Crowe, 2018), one item was removed, and the internal consistency was reexamined. The result from the analysis identifies improved internal consistency of Cronbach’s α of (.738). Similarly, while the two factor Grit-S demonstrated satisfactory fit to the data ($\chi^2(19) = 2.996, p < .001$; CFI = .948; TLI = .924; RMSEA = .075 and SRMR = .065) with all item factors loadings above .40 (Figure 37) excluding item two (.35). Given that item two factor loading was below the desired (.4), the researcher deleted the item and
reexamined the CFA. The factor loadings after deleting the item improved; however, the new factor structure yielded the worst fit than the first. As such, whereas the internal consistency of effort subscale Cronbach’s α result was lower than the desired cutoff score, the outcome was within the range of previous research (i.e., α = .60 to .78; Duckworth & Quinn, 2009; Meriac et al., 2015; Mullen & Crowe, 2018); moreover, given that this study sample size was large enough (i.e., 356), the factor loading (i.e., .35) is acceptable (Hair et al., 2019). In conclusion, while the researcher deemed the results from the CFA and Cronbach’s α acceptable for this study, it is important to note that one of the subscales (i.e., interest) lower Cronbach’s α result and one of the items in effort subscale had lower factor loading and can be a potential limitation.

In contrast to Grit Short Scale, Cronbach’s α scores, the Personal Growth Initiative Scale-II (PGIS-II; Robitschek et al., 2012) internal consistency results ranged from acceptable (α = .792) to excellent (α = .930). Although the internal consistency result was positive, the initial CFA result was not ($\chi^2(98) = 5.290, p = .000; CFI = .883; TLI = .857; RMSEA = .110$ and SRMR = .083). After allowing the error terms to covary, the modified factor structure yielded better but not excellent fit indices ($\chi^2(95) = 4.537, p < .001; \text{acceptable CFI} = .907; \text{improved TLI} = .882 \text{ and mediocre RMSEA} = .100 \text{ scores and finally acceptable SRMR} = .0784)$. By allowing the error terms to covery, the modified factor structure broke the recursive rule and needed to be noted as a limitation. Moreover, the researcher also ran EFA to assess the factor structure in this dataset. The EFA result yielded the strongest single-factor model, which contrasted with the four-factor structure model of the original scale. Given the adequate but not excellent fit observed in the PGI literature (Robitschek et al., 2012; Weigold et al., 2014; Yakunnina et al., 2013), although the researcher accepted the modified adequate structure model fit in this study, PGIS-II CFA results can be a limitation. Finally, the remaining two
measurement instruments (i.e., AUDIT and ERQ) had acceptable Cronbach’s α scores and CFA results. In sum, while survey research is commonly used (Dillman et al., 2014), as discussed above, it is not without limitation. Therefore, it is vital to keep the limitation in mind when interpreting the outcome of this study.
Implication of the Findings

The findings from this research add to an emerging body of literature involving college students’ level of alcohol consumption and related problems and potential variables that serve as a protective or predicting factors. Specifically, the findings from this study add to: (a) an initial understanding of the association between college students’ level of grit, PGI and their alcohol consumption and related problems; (b) an initial understanding of the relationships between independent variables (i.e., grit, PGI, and ER) with alcohol consumption and related problems. The implications of this study are further delineated.

Implications for Counselors

This study sought to add to counselors’ understanding of how to utilize positive attributes of college students to reduce the impact of hazardous alcohol consumption and related problems. Researchers have made a concerted effort to investigate numerous approaches that focused on understanding clients’ different qualities (e.g., deficit or strength; Duckworth et al., 2005; Welfare et al., 2013). Given that college students’ stage of development is characterized as being uncertain, impulsive, sensation-seeking, and exploration (Arnett et al., 2014; Steinberg et al., 2008), mitigating the impact of college students’ alcohol consumption has received much attention over the last many decades (Bravo et al., 2018; Mallett et al., 2013; Windle et al., 2017). The interest in college students’ alcohol use and abuse has produced various approaches and identified many variables that have the potential to mitigate the consequences of alcohol consumptions in college students (Abar & Maggs, 2010; Chen & Feeley, 2015; Dager et al., 2013; Jakeman et al., 2015). In line with the ongoing effort to better understand the role of cognitive reappraisal ER strategy, much work on the potential benefit of ER strategies such as cognitive reappraisal was carried out (Blanchard et al., 2019).
In contrast to existing studies that documented the negative relationship between college students’ ER strategies (e.g., cognitive reappraisal) and their level of hazardous alcohol use and related problems, the structure model that yielded the strongest fit indices (i.e., structure model four) indicate that the relationship between cognitive reappraisal ER strategies and level of hazardous alcohol consumption and related problem was non-significant. This finding further illustrates the complex relationship (Blanchard et al., 2019; Weiss et al., 2017); therefore, counselors need to pay close attention and assess their clients’ (i.e., college students) best ER strategy that yields sound therapeutic outcomes. The finding from this study also offers an insight to counselors by establishing an initial relationship between grit and PGI, as participants’ grit scores were negatively correlated with their levels of alcohol consumption and related problems.

When looking at the result from the best fit model (i.e., model four) closely, first, this study adds to counselors understanding that grit can serve as a protective factor, continuing the observed trend in grit literature that indicated the importance of long-term commitment that is needed to increase optimal wellbeing (Sharkey et al., 2018) and gritty behavior predicting academic success (Duckworth et al., 2007). Similarly, while the relationship between PGI scores and college students’ level of alcohol consumption and related problems tells a different story (i.e., positively related as a result did not support the hypothesis for this study), counselors can still gain insight from this result. That is, college students with a high level of PGI may have the awareness and understanding about their readiness to change and the motivation about their desired goal; in addition, it may mean that they can develop realistic plans to work towards the desired outcome. Furthermore, increasing awareness and ability may mean that college students know how to gauge their readiness and commitment to bring the desired goal to fruition, which
may require college students to know how to access different resources that support their goals and effectively utilize resources to maintain the desired behavior. Therefore, it is vital for counselors to assess their values and preferred therapeutic orientation (e.g., strength-based vs. deficit base) and tailor and understand the processes individuals take to change and maintain change (e.g., Stages of Change; Prochaska et al., 1994). It is essential to note this model is not designed to provide us how individuals' readiness for changes transfer to action. Rather, construct like PGI offers counselors insight into how people's readiness for change gets transferred to plan, and their plan to be resourceful, and finally, how individuals can be intentional and utilize that resource that will enable them to sustain the desired goal. In addition, given that the two constructs (i.e., grit and PGI) that yielded significant results in structure model four are conceived from the Positive Psychology theoretical framework, counselors will benefit from utilizing the framework as a guideline to best conceptualize their clients, which will allow them to utilized strength-based approach (e.g., Solution-focused therapy) could work best.

Implications for Counselor Educators

This study continues to underline the unique developmental stage of college students and the opportunity and the risk it provides for multiple stockholders. One of the stakeholders that continued to work hard and have a unique responsibility to cultivate and equip the next generation of counselors are counselor educators. Counselor educators are encouraged to examine and utilize effective evidence-based therapeutic interventions (Council for Accreditation of Counseling and Related Educational Programs; CACREP, 2016). The result from this study offers counselor educators an insight to use to better prepare counselors-in-training to tackle clinical issues that college students may present related to alcohol consumption and related problem. Moreover, counselor educators should expand the counseling tradition of
holistic wellness approach by integrating some of the constructs that have been investigated thoroughly from the Positive Psychology theoretical framework; specifically, the result from this study identified that grit had a potential protective role, while PGI can be a risk factor; as such, understanding the role of the constructs can aid educators better train their students. As a result, counselor educators may want to familiarize themselves with the grit literature and the role the construct may offer to mitigate college students’ alcohol use and related problems, as well as learn and investigate the role of PGI in a clinical setting to offer their students another tool.
Recommendation for Future Research

Future research investigating the relationship between college students’ grit, PGI, and cognitive reappraisal should consider the limitations of this study. While this study was correlational design, and results could not determine causality. However, the result can provide a groundwork for possible experimental research exploring the impact of grit, PGI, cognitive reappraisal on college students' level of harmful alcohol use and related problems. Specific, given that there is at least a preliminary study that indicated that PGI can be increased in college students, future research could assess how interventions designed to increase PGI could influence mitigating severe consequences of alcohol consumption in college students.

Additionally, this study employed convenience sampling; future studies should use random, diverse, and balanced (e.g., race/ethnicity) samples. Furthermore, researchers can consider collecting data both in person and via online platforms to get a better picture of the data. As noted, there was no study that investigated the constructs together using college students. As a result, there is limited researcher that investigated the psychometric properties of grit and PGI. Therefore, future researchers can investigate the psychometric properties of grit and PGI. Specifically, the grit scale yielded acceptable CFA results, which was consistent with the overall results that were reported; similarly, the CFA result for PGI in this study was mediocre and consistent with the general literature. As such, examining the factor structure of Grit Short Scale and Personal Growth Initiative Scale-II will benefit the field at large.
Chapter Five Summary

Throughout chapter five, the researcher presented a review of this study and provided context by comparing the outcome with existing literature. Structure model four yielded the best fit to the hypothesized model. College students’ level of grit explained a substantial percentage of the variance (72.3%) and PGI (46.00%) with their alcohol consumption and related problem. Given the several limitations noted, it is essential to interpret the results of this research with caution. Overall, the findings of the study result in implications for counselors, counselor educators, and researchers. Consequently, the conclusions of this study add to an emerging body of literature regarding college students’ level of grit, PGI, cognitive reappraisal, and alcohol consumption, and related problems.
EXEMPTION DETERMINATION

October 30, 2020

Dear Gelawdiyos Haile:

On 10/30/2020, the IRB determined the following submission to be human subjects research that is exempt from regulation:

<table>
<thead>
<tr>
<th>Type of Review:</th>
<th>Initial Study, Category 2</th>
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<tr>
<td>Title:</td>
<td>The Contribution of College Students’ Levels of Alcohol Use to their Grit, Personal Growth Initiatives, and Emotion Regulation Scores Using Structure Equation Modeling</td>
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<td>Investigator:</td>
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<tr>
<td>IRB ID:</td>
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Documents Reviewed:
- HRP-251-FORM - Faculty Advisor Scientific-Scholarly Review fillable form 10.06.2020.pdf, Category: Faculty Research Approval;
- AUDIT scale.pdf, Category: Survey / Questionnaire;
- Email instrument distribution script 10-28-2020.docx, Category: Recruitment Materials;
- EQQ.pdf, Category: Survey / Questionnaire;
- General Demographic Questionnaire Final.docx, Category: Survey / Questionnaire;
- Grit-8-item scale.pdf, Category: Survey / Questionnaire;
- HRP-254-FORM Explanation of Research_IRB edits final.pdf, Category: Consent Form;
- pgis-ii instrument with_scoring.pdf, Category: Survey / Questionnaire;

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on
submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Racine Jacques, Ph.D.
Designated Reviewer
APPENDIX B: EMAIL INVITATION TO POTENTIAL PARTICIPANTS
Email Instrument Distribution Script

Researcher Script

Hello!

We are sending you this email to invite you to participate in an IRB approved research study that will help us learn more about the relationship between college students’ levels of alcohol use and their level of grit, Personal Growth Initiatives, and Emotion Regulation scores.

Participation in this study is completely voluntary and in no way affects your grade or standing in this class or university; however, to take part in this study, you must be (1) at least 18 years of age, and (2) enrolled as an undergraduate student as part-time or full-time. There are no anticipated risks for participating in our investigation and the study will benefit the field by giving us further insight into how the variables under investigation will contribute to students’ level of alcohol use.

If you agree to be part of this study, you will be asked to complete a short demographic form and a 10-15-minute questionnaire that includes questions asking about your personal thoughts and experiences. To protect your privacy, all participants’ IP addresses will be masked by Qualtrics and will be unavailable to, and unidentifiable by, the researchers or others. If you volunteer to complete the survey, the researcher will donate $0.50 per complete survey to college/university-based addiction recovery programs. Only the researchers will have access to the data on Qualtrics.

If you are interested, please read the explanation of research form and decide if you wish to participate. Please let me know if you have any questions that I may be able to address.

Thank you very much for your time and consideration!

Professor Script

Colleagues of mine are conducting research related to the different factors that relate to alcohol in college students. They have asked if I would be willing to share an invitation to take part in this study in my courses. Participation in this study is completely voluntary and in no way affects your grade or standing in this class or university. If you agree to be part of this study, you will be asked to complete a short demographic form and a 10-15-minute questionnaire that includes questions asking about your personal thoughts and experiences.

If you are interested, please read the explanation of research form that I will provide and decide if you wish to participate. If you have any questions, please contact Gelawdiyos Haile or Dr. Glenn Lambie via the contact information on the form.

Thank you!
APPENDIX C: INFORMED CONSENT
Title of Project: The Contribution of College Students' Levels of Alcohol Use to their Grit, Personal Growth Initiatives, and Emotion Regulation Scores Using Structure Equation Modeling.

Principal Investigator: Gelawdyos Hatle, M.S.

Other Investigators: Vikki T. Gaskin-Butler, M.Div., Ph.D

Faculty Supervisor: Glenn W. Lambie, Ph.D.

Purpose of the research study: The purpose of this research is to investigate the relationship between college students' levels of alcohol use and their level of grit, Personal Growth Initiatives, and Emotion Regulation scores.

Thank you for agreeing to participate in our research. Before you begin, please note that the data you provide may be collected using this questionnaire.

What you should know about a research study:

- A research study is something you volunteer for.
- Whether or not you take part is up to you.
- You should take part in this study only because you want to.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide will not be held against you.
- Feel free to ask all the questions you want before you decide.
- If you volunteer to complete the survey, the researcher will donate $0.50 per complete survey to college/university-based addiction recovery program.

What will I be asked to do? If you agree to be part of this study, you will be asked to complete a short demographic form and a quick 44-item questionnaire that includes questions asking about your personal thoughts and experiences.

Time required: We expect that the questionnaire should take approximately 10 minutes to complete.

Confidentiality: The questionnaires are anonymous, meaning we will not collect personal information including names, addresses, or contact information in this study. The questionnaire will be anonymous meaning your answers to the questions will not be linked to your name or any other identifiable information. We can be audited by the IRB and other representatives of UCF so they can view our records, but there will be complete anonymity since responses will not be linked to names.
You must be 18 years of age or older and enrolled at University of Central Florida or other universities to take part in this research study.

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints: Gelawdiyos Haile, Doctoral Candidate, Department of Counselor Education and School Psychology, 407-823-2401 or gmhaile@knights.ucf.edu or Dr. Glenn W. Lambie, Professor and Associate Dean for Graduate Affairs and Faculty Excellence, (407) 823-4779, or by email at glenn.lambie@ucf.edu

IRB contact about your rights in this study or to report a complaint: If you have questions about your rights as a research participant, or have concerns about the conduct of this study, please contact Institutional Review Board (IRB), University of Central Florida, Office of Research, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901, or email irb@ucf.edu.
APPENDIX D: GENERAL DEMOGRAPHICS FORM
General Demographic Questionnaire

Instructions: responses to the following questions will assist us in understanding more about you. All responses are confidential.

1. What is the highest level of education that you have attained?
   - □ High school degree or GED
   - □ Attained an associate’s degree
   - □ Attained a vocational/technical certificate
   - □ Attained a bachelor’s degree
   - □ Attained a graduate degree (e.g., masters, doctoral)

2. What is your age in years?
   - □ 18-20
   - □ 21-23
   - □ 24-26
   - □ 27-29
   - □ 30-32
   - □ 33 and older

3. What sex were you assigned at birth? (For example, on your birth certificate).
   - □ Female
   - □ Male
   - □ Intersex
   - □ No answer

4. What is your current gender?
   - □ Male
   - □ Female
   - □ Transgender
   - □ A gender not listed here
   - □ No answer

5. How do you describe your race/ethnicity background (select all that apply)?
   - □ American Indian or Alaska Native
   - □ Asian
   - □ Black or African American
   - □ Caucasian
   - □ Native Hawaiian or other Pacific Islander
   - □ Some other race

6. Do you identify as a person of Hispanic, Latino, or Spanish origin?
☐ No, not of Hispanic, Latino, or Spanish origin
☐ Yes, Mexican, Mexican American, Chicano
☐ Yes, Puerto Rican
☐ Yes, Cuban
☐ Yes, another Hispanic, Latino, or Spanish origin

7. How many college credits have you completed?
☐ 0 - 15
☐ 16 - 30
☐ 31 - 45
☐ 46 - 60
☐ 61 - 75
☐ 76 - 90
☐ 91 - 105
☐ 106-120
☐ Other (please specify):

8. What is your current college academic classification?
☐ Freshman
☐ Sophomore
☐ Junior
☐ Senior
☐ Other (please specify):

9. Relationship status:
☐ Single
☐ Married
☐ Widowed
☐ Separated
☐ Divorced
☐ Other (please specify): ___
17. Are you a full time student athlete (e.g., competing in National Collegiate Athletic Association [NCAA]: NCAA-I, NCAA-II, NCAA-III or National Association of Intercollegiate Athletics [NAIA] on scholarship)?
   a. Yes, what is the sport you play? ____
   b. No

18. At what age did you first consume alcohol?
   [ ] I have never consumed alcohol
   [ ] Under 14
   [ ] 15-17
   [ ] 18-20
   [ ] 21-23
   [ ] 24-26
   [ ] 27-29
   [ ] 30 or older

Thank you! Please continue on to the next page.
APPENDIX E: FEEDBACK FORM
Pilot the survey

Instructions: Thank you for your willingness to complete the survey. To complete the survey, please open the following link. After completing the online survey, please provide your feedback relating to the survey items using the following link.

1. What is the browser you used to open the survey link?
   A. Chrome
   B. Firefox
   C. Internet Explorer
   D. Safari
   E. Other: please specify:

2. Were you able to open the link without difficulty?
   - Yes
   - No: please specify the difficulty you experienced

3. Please select the device you use to open the survey:
   - Apple products (e.g., MacBook Pro, MacBook Air, iPhone, iPad)
   - Other PC and cell phones (e.g., Samsung, Dell, Lenovo)
   - Other: please specify:

4. Please rate your access to the survey via the link:
   - Poor
   - Fair
   - Excellent
   If you have suggestion to strengthen the functionality of the link please specify it here:  

5. Once you opened the link to the survey, the format and layout were consistent.
   - Very strongly agree
   - Strongly agree
   - Agree
   - Neither agree nor disagree
   - Disagree. If you disagree, please specify suggestions to strengthen the functionality of the link:  
   - Strongly disagree? If you disagree, please specify suggestions to strengthen the functionality of the link:
   - Very strongly disagree. If you disagree, please specify suggestions to strengthen the functionality of the link:  

6. To what extent do you agree or disagree that the items were understandable?
   - Very strongly agree
   - Strongly agree
   - Agree
   - Neither agree nor disagree
☐ Disagree. If you disagree, please specify suggestions to strengthen the understandability of the survey
☐ Strongly disagree? If you disagree, please specify suggestions to strengthen the understandability of the survey _____

☐ Very strongly disagree. If you disagree, please specify suggestions to strengthen the understandability of the survey

7. To what extent do you agree or disagree that the instructions were clear?

☐ Very strongly agree
☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree. If you disagree, do you have feedback to make it better? _____
☐ Strongly disagree? If you disagree, please specify suggestions to strengthen the clarity of the instructions?
☐ Very strongly disagree. If you disagree, please specify suggestions to strengthen the clarity of the instructions?

8. Please provide additional feedback about your experience in accessing and completing the questionnaire.

Thank you for your feedback.
APPENDIX F: EMAIL PERMISSION TO USE GRIT-S
Dear Dr. Duckworth,

My name is Gelawdiyos Haile. I am a second year Ph.D. student in Counselor Education at the University of Central Florida (UCF). I am beginning a research project examining the relationship between undergraduate college students’ substance abuse (use), their levels of grit, attachment style, and perceived stress. I will be conducting this research in collaboration with Dr. Glenn W. Lambie, Professor and Associate Dean of Graduate Affairs & Faculty Excellence.

As we reviewed the literature for instruments that measure Grit, we identified your work with your colleague, including “Development and Validation of the Short Grit Scale (Grit-S),” introducing us to the Grit Scale (Grit-S). The Grit-S was helpful for us in conceptualizing our construct of interest — thank you.

I am writing to ask for your permission to use the Grit Scale (Grit-S; Duckworth & Quinn, 2009) in our research. Specifically, I would like your permission to use the Grit-S to assess college students grit score.

Thank you in advance for considering this request.

Sincerely,

Gelawdiyos Haile, MS.

University of Central Florida
AACTE Holmes Scholar
Doctoral Student, Counselor Education
College of Community Innovation & Education
gmhaile@knights.ucf.edu

Permission for
Grit-S.docx

Angela Duckworth
Re: Seeking instrument permission
To: Gelawdiyos Haile, Cc: Glenn Lambie

You're welcome to use my scales! See my Penn website below. There are no restrictions for non-commercial uses for research, translation, or education.

With grit and gratitude,

Angela

Angela Duckworth
Have you signed up for my Thought of the Week?

Founder and CEO, Character Lab
Christopher H. Browne Distinguished Professor of Psychology, University of Pennsylvania
Faculty Co-Director, The Behavior Change For Good Initiative
Faculty Co-Director, Wharton People Analytics
Twitter | Instagram | Facebook | LinkedIn
APPENDIX G: EMAIL PERMISSION TO USE PGIS-II
Dear Dr. Robitschek,

My name is Gelawdiyos Haile. I am a second year Ph.D. in Education—Counselor Education at the University of Central Florida (UCF). Few weeks ago I emailed you seeking permission for your instrument (Personal Growth Initiative Scale–II (PGIS-II)). I am emailing again to follow-up my previous email. My apology for multiple emails you have received. Here is the essence of my previous email.

My name is Gelawdiyos Haile. I am a second year Ph.D. in Education—Counselor Education at the University of Central Florida (UCF). I am beginning my dissertation research project examining directional relationship of college students’ level of substance use and their level grit, Emotion Regulation and Personal Growth Initiatives scores. I will be conducting this research under the guidance of my dissertation chair Dr. Glenn W. Lambie, Professor and Associate Dean of Graduate Affairs & Faculty Excellence.

As I reviewed the literature for instruments that measure Personal Growth Initiative (PGIS), I identified your work with your colleagues, including “Development and Psychometric Evaluation of the Personal Growth Initiative Scale–II,” introduced me to Personal Growth Initiative Scale–II (PGIS-II). PGIS-II was helpful for me in conceptualizing my construct of interest —thank you.

I am writing to ask for your permission to use the Personal Growth Initiative Scale-II [PGIS-II; Robitschek et al., 2012]) in my research. Specifically, I would like your permission to use the PGIS-II to assess college students’ intentional personal growth.

Thank you in advance for considering this request.

Sincerely,

Gelawdiyos Haile, MS., NCC.

University of Central Florida

AACTE Holmes Scholar

Doctoral Student, Counselor Education

College of Community Innovation & Education

gmhaile@knights.ucf.edu

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Robitschek, Chris
RE: Follow-up
To: Gelawdiyos Haile

February 27, 2020 at 3:07 PM

Yes, you have my permission to use the PGIS-II in your research, in this and any subsequent projects. I wish you well in your research efforts.

Christine Robitschek, Ph.D.
Associate Professor
Department of Psychological Sciences
Texas Tech University
APPENDIX H: PERSONAL GROWTH INITIATIVE SCALE-II
Due to copyright permission to reprint, I was not able to reference Personal Growth Initiative Scale-II. However, the scale can be accessed at: https://pgilab.wordpress.com/pgis-ii-information/
APPENDIX I: GRIT SHORT SCALE
Short Grit Scale

Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!

1. New ideas and projects sometimes distract me from previous ones.*
   ❑ Very much like me
   ❑ Mostly like me
   ❑ Somewhat like me
   ❑ Not much like me
   ❑ Not like me at all

2. Setbacks don’t discourage me.
   ❑ Very much like me
   ❑ Mostly like me
   ❑ Somewhat like me
   ❑ Not much like me
   ❑ Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest.*
   ❑ Very much like me
   ❑ Mostly like me
   ❑ Somewhat like me
   ❑ Not much like me
   ❑ Not like me at all

4. I am a hard worker.
   ❑ Very much like me
   ❑ Mostly like me
   ❑ Somewhat like me
   ❑ Not much like me
   ❑ Not like me at all

5. I often set a goal but later choose to pursue a different one.*
   ❑ Very much like me
   ❑ Mostly like me
   ❑ Somewhat like me
   ❑ Not much like me
   ❑ Not like me at all

6. I have difficulty maintaining my focus on projects that take more than a few months to complete.*
   ❑ Very much like me
   ❑ Mostly like me
   ❑ Somewhat like me
   ❑ Not much like me
   ❑ Not like me at all
7. I finish whatever I begin.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

8. I am diligent.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

**Scoring:**
1. For questions 2, 4, 7 and 8 assign the following points:
   5 = Very much like me
   4 = Mostly like me
   3 = Somewhat like me
   2 = Not much like me
   1 = Not like me at all

2. For questions 1, 3, 5 and 6 assign the following points:
   1 = Very much like me
   2 = Mostly like me
   3 = Somewhat like me
   4 = Not much like me
   5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

**Grit Scale citation**


http://www.sas.upenn.edu/~duckworth/images/Grit%20JPSP.pdf
APPENDIX J: EMOTION REGULATION QUESTIONNAIRE
Emotion Regulation Questionnaire (ERQ)
Gross & John
9/03

The Emotion Regulation Questionnaire is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression.

Citation

Instructions and Items
We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>neutral</td>
<td>strongly agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. ____ When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.
2. ____ I keep my emotions to myself.
3. ____ When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about.
4. ____ When I am feeling positive emotions, I am careful not to express them.
5. ____ When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. ____ I control my emotions by not expressing them.
7. ____ When I want to feel more positive emotion, I change the way I’m thinking about the situation.
8. ____ I control my emotions by changing the way I think about the situation I’m in.
9. ____ When I am feeling negative emotions, I make sure not to express them.
10. ____ When I want to feel less negative emotion, I change the way I’m thinking about the situation.

Note
Do not change item order, as items 1 and 3 at the beginning of the questionnaire define the terms “positive emotion” and “negative emotion”.

Scoring (no reversals)
Reappraisal Items: 1, 3, 5, 7, 8, 10; Suppression Items: 2, 4, 6, 9.
APPENDIX K: ALCOHOL USE DISORDERS IDENTIFICATION TEST
AUDIT questionnaire: screen for alcohol misuse

Please circle the answer that is correct for you

1. How often do you have a drink containing alcohol?
   - Never
   - Monthly or less
   - 2–4 times a month
   - 2–3 times a week
   - 4 or more times a week

2. How many standard drinks containing alcohol do you have on a typical day when drinking?
   - 1 or 2
   - 3 or 4
   - 5 or 6
   - 7 to 9
   - 10 or more

3. How often do you have six or more drinks on one occasion?
   - Never
   - Less than monthly
   - Monthly
   - Weekly
   - Daily or almost daily

4. During the past year, how often have you found that you were not able to stop drinking once you had started?
   - Never
   - Less than monthly
   - Monthly
   - Weekly
   - Daily or almost daily

5. During the past year, how often have you failed to do what was normally expected of you because of drinking?
   - Never
   - Less than monthly
   - Monthly
   - Weekly
   - Daily or almost daily

6. During the past year, how often have you needed a drink in the morning to get yourself going after a heavy drinking session?

1
7. During the past year, how often have you had a feeling of guilt or remorse after drinking?
   - Never
   - Less than monthly
   - Monthly
   - Weekly
   - Daily or almost daily

8. During the past year, have you been unable to remember what happened the night before because you had been drinking?
   - Never
   - Less than monthly
   - Monthly
   - Weekly
   - Daily or almost daily

9. Have you or someone else been injured as a result of your drinking?
   - No
   - Yes, but not in the past year
   - Yes, during the past year

10. Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?
    - No
    - Yes, but not in the past year
    - Yes, during the past year

**Scoring the audit**

Scores for each question range from 0 to 4, with the first response for each question (eg never) scoring 0, the second (eg less than monthly) scoring 1, the third (eg monthly) scoring 2, the fourth (eg weekly) scoring 3, and the last response (eg daily or almost daily) scoring 4. For questions 9 and 10, which only have three responses, the scoring is 0, 2 and 4 (from left to right).

A score of 8 or more is associated with harmful or hazardous drinking, a score of 13 or more in women, and 15 or more in men, is likely to indicate alcohol dependence.

---

**Order Information**
Description: Donation Form  
Invoice Number: 60ab/3d513005

**Billing Information**
Gelawdiyos Haile

**Shipping Information**
gmhaile@knights.ucf.edu

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
<th>Qty</th>
<th>Taxable</th>
<th>Unit Price</th>
<th>Item Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Enter Amount</td>
<td>Entered Amount</td>
<td>1</td>
<td>Y</td>
<td>$260.00 (USD)</td>
<td>$260.00 (USD)</td>
</tr>
</tbody>
</table>

**Total:** $260.00 (USD)

**Payment Information**
Date/Time: 24-May-2021 11:43:33 PDT  
Transaction ID: 63055409767  
Payment Method: Visa xxxx2384  
Transaction Type: Purchase  
Auth Code: 06103C

**Merchant Contact Information**
ASSOCIATION OF RECOVERY  
Kennesaw, GA 30156  
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recovery@collegiaterecovery.org
REFERENCES


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