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Psychosocial Maturity and Alcohol Outcomes: The Mediating role of Alcohol Protective Behavioral Strategies

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Psychosocial Maturity and Alcohol Outcomes: The Mediating role of Alcohol Protective Behavioral Strategies

by

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ABSTRACT

The present study evaluated the mediating role of alcohol protective behavioral strategies on the relationship between temperance, responsibility, perspective (i.e., the facets of psychosocial maturity) and alcohol use outcomes. Potential invariant paths among graduate and undergraduate students were also explored. All participants were undergraduate and graduate students at the University of Southern Mississippi aged 18 to 25. Participants reported demographic information and completed measures of temperance, responsibility, perspective, alcohol use, and alcohol consequences. Results indicated the full mediation model showed poor fit the data; greater temperance predicted greater alcohol protective behavioral strategy use, greater responsibility and perspective predicted less alcohol problems, and greater alcohol protective behavioral strategies use predicted less alcohol use and consequences. Invariance testing revealed variant model paths between graduate and undergraduate students, such that greater perspective predicted greater alcohol protective behavioral strategy use only among graduate students. For undergraduates only, greater responsibility was predictive of greater alcohol protective behavioral strategy use. While alcohol protective behavioral strategies predicted less alcohol use and fewer consequences for both academic classes, this relationship was stronger among undergraduate students. Examining the factors of psychosocial maturity as they relate to the subtypes of alcohol protective behavioral strategies may provide more informative results. Additionally, the measurement selection may be impact results. Specifically, the lack of a unified measure of psychosocial maturity could influence which relationships emerged. Further, the measures used were not normed for graduate students, potentially altering the results found.

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CHAPTER I - INTRODUCTION

College campuses are a unique environment in which heavy alcohol consumption is seen as part of the typical college experience (Colby et al., 2009; Osberg et al., 2010; Russell & Arthur, 2016). In recent years, 60.3 % of full-time college students ages 18 to 25 reported having an alcoholic drink in the past month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2020). Additionally, 37.3 % of college students reported binge drinking in the past month, while 9.2 % reported heavy alcohol use in the past month (SAMHSA, 2020). This high rate of alcohol consumption among college students can lead to students experiencing alcohol related negative consequences (Lauher et al., 2020; Patrick et al., 2020; Wechsler et al., 2000.; Wechsler & Nelson, 2008; White & Hingson, 2013). Negative alcohol related consequences can range in severity from minor issues (e.g., Hangovers, or missing classes) to more grievous outcomes (e.g., Car accidents, or death; Aertgeerts & Buntinx, 2002; Hingson et al., 2002; 2005).

Some theorize of an aging, or maturing-out process (Winick, 1962), where alcohol consumption peaks during the early twenties and decreases thereafter (Arnett, 2000; Chen & Kandel, 1995; Johnston et al., 2014; Lee et al., 2013; Snow, 1973; Vergés et al., 2013). The timeline identified in this theory would suggest that traditional college students aged 18 to 25 would go through the maturing-out process. Changes in drinking patterns among undergraduate college students have been extensively researched (Gotham et al., 1997; Jackson et al., 2001; Johnson et al., 2014; Lechner et al., 2020; Lindgren et al., 2020), yet little research focuses on drinking patterns among graduate students who might also fall within the 22-25 age range. Like undergraduates, it is quite

common for graduate students to drink alcohol. Studies have shown roughly 80% of graduate students endorsing drinking (Castaño-Perez & Calderon-Vallejo, 2014; English et al., 2011), wherein students earlier in their graduate academic programs show higher rates of hazardous drinking (English et al., 2011). Following this pattern of decreased drinking, Allen and colleagues (2020) found graduate school students had similar drinking motives to undergraduates, but showed lower levels of alcohol consumption. This is consistent with previous research on age and decreasing alcohol consumption (Johnston et al., 2020; SAMHSA, 2020). Many graduate students might remain in the same alcohol use norming environments as undergraduate students, meaning their drinking patterns could provide insight into whether the maturing out process would remain present. If it does remain, that could suggest the presence non-environmental factors, such as an increase in psychosocial maturity with age, that contribute to the changes in drinking patterns formerly established.

Psychosocial Maturity

There are two main views on what constitutes an individual's psychosocial maturity. Greenberger and Sorensen's definition of psychosocial maturity (1971) is comprised of three distinct factors: individual adequacy, interpersonal adequacy, and social adequacy (Greenberger et al., 1975). The subfactors for each mentioned factor depict an overarching theme of social assimilation as criteria for determining psychosocial maturity. Defining psychosocial maturity in this way fails to acknowledge the individual's internal growth, free from their proximity to society. Instead, when thinking of behaviors like harmful and safe alcohol use, it might be more productive to identify psychosocial maturity based on cognitive abilities as outlined by Steinberg and

Cauffman's (1996) definition. This allows one to assess how individuals interact with their environment, as opposed to how integrated into their environment one is, as the basis for determining their level of psychosocial maturity. It is for this reason this more modern interpretation of psychosocial maturity and means of measurement will be used.

Psychosocial maturity as defined by Steinberg and Cauffman (1996) is composed of three factors: responsibility, temperance, and perspective. Responsibility can be described as ego development, levels of autonomy and identity. Temperance is conveyed as levels of impulsivity and sensation seeking behaviors. Finally, perspective is described as the ability to see situations in a larger context including the long- or short-term consequences and decentration. There is notable overlap between psychosocial maturity factors and cognitive abilities, the two work closely together to influence an individual's judgement and the process of decision making (Cauffman & Steinberg, 2000; Steinberg & Cauffman, 1996). In this way, conceptualizing psychosocial maturity closer to cognitive abilities allows for an examination of the changes in decision-making processes throughout development, as opposed to examining the successes and failures of socialization (Ozkan & Worrall, 2017). However, Steinberg and Cauffman (1996) recognize the variation in human behavior based on situation and note that assessing psychosocial maturity in the proposed way only allows us to examine predispositions to the mentioned factors. In contrast to previous definitions, the focal point of Steinberg and Cauffman's interpretation is the individual's decision making and judgment within certain situational contexts.

Consistent with the developmental path of psychosocial maturity, risk taking behaviors increase with age, and peak in early adulthood (Arnett, 2000; Johnston et al.,

2020; SAMHSA, 2020). Furthermore, judgments of risk-taking favorability (i.e., the risk is a 'good idea') peak in early adulthood as well (Shulman & Cauffman, 2014).These finding are particularly important when examining psychosocial maturity in the context of risky behaviors, given the significant role judgement plays in these behaviors (Helfinstein et al., 2015; Knight et al., 2015; Shulman & Cauffman, 2014).

Psychosocial Maturity and Age

The traditional college student is typically between 18 and 25 years of age, the emerging adulthood stage of development. This phase of development is a transitional period between adolescence and young adulthood, characterized by changes in demographics, identity, subject perspective, and risk behaviors (Arnett, 2000). Additionally, levels of psychosocial maturity undergo development, changing as we age during this period of life. Research has shown a significant difference in psychosocial maturity among the age groups of 16-17 years old and those 22 years and older, as well as between 18-21 years old and those 26 years or older (Steinberg et al., 2009). Similarly, Icenogle and colleagues (2019) found that in the United States psychosocial maturity seemed to peak at the age of 22 years old, followed by a plateau (Icenogle et al., 2019). These studies suggest that the first half of emerging adulthood is spent developing psychosocial maturity, while the second half shows a more stabilized level of psychosocial maturity. As a result, traditional college students undergo a transitional period of psychosocial development, possibly affecting college students' abilities in decision making and judgment. Underdeveloped psychosocial maturity among college students could account for poor judgment and subpar decision-making skills, as well as help explain the high rates of alcohol consumption.

Psychosocial Maturity and Substance Use

The research examining how psychosocial maturity affects substance use (e.g., alcohol) among college students is limited. It is unclear in current literature if college students' psychosocial maturity is associated with their consumption of alcohol and use of protective behavioral strategies. To date we know of the existing relationship between psychosocial maturity and substance use where those with lower levels of psychosocial maturity are found to have higher rates of substance use (Chassin et al., 2010; Jones et al., 1989). This relationship is not unusual given the connection between substance use and the factors of psychosocial maturity: responsibility, temperance, and perspective (Davis et al., 2016; Gil-Rivas & McWhorter, 2013; Mauricio et al., 2009; Verdejo-García et al., 2007). It is important to note that there is a lack of research directly connecting alcohol use and psychosocial maturity, however there is ample research that links alcohol consumption to temperance, perspective, and responsibility (Bjork et al., 2004; Dom et al., 2006; Dougherty et al., 2008; Foster et al., 2016; Joyner et al., 2019; Lawrence et al., 2009; Lee et al., 2020; Mayhew, et al., 2020; Miller et al., 2019; Petry, 2001).

Like general substance use, alcohol consumption and the underpinnings of psychosocial maturity might be related. To our knowledge there is minimal research indicating a definitive connection between alcohol consumption and psychosocial maturity (Chassin et al., 2010; Fischer et al., 2007), yet it is reasonable to assume we would see results similar to the relationship between general substance use and psychosocial maturity. While this research provides links between psychosocial maturity and alcohol consumption, investigation of the relationship between undergraduate and graduate college students and psychosocial maturity has yet to be studied.

Protective Behavioral Strategies

Given the extent to which college student alcohol consumption can have negative, and sometimes fatal, repercussions, a need for harm reduction efforts to mitigate this these negative outcomes is apparent and crucial. Alcohol protective behavioral strategies (sugarMartens et al., 2004) are actions taken before, during, and after drinking, to reduce one's alcohol related consequences experienced (Sugarman & Carey, 2007). Ample studies have shown the use of alcohol protective behavioral strategies is highly effective in alleviating the negative consequences of drinking alcohol (Delva et al 2004; Linden et al., 2014; Martens et al., 2004; Martens et al., 2007b; Sugarman & Carey, 2007).

Current research recognizes a diverse set of individual differences, such as race, sex, and emotional regulation as factors that can influence the use of alcohol protective behavioral strategies, alcohol consumption, and alcohol related consequences (LaBrie et al., 2011; Madson & Zeigler-Hill, 2013; Madson et al., 2013b; Madson et al., 2015; Pearson, 2013). Furthering research on which individual differences create a divergence in the previously mentioned relationship is needed to better examine ways to promote the use of alcohol protective behavioral strategies. In the context of consuming alcohol, judgment is key to safe decision making (Brière et al., 2019; Wolff & Crockett, 2019), suggesting psychosocial maturity may play an active role in the degree to which students use alcohol protective behavioral strategies.

Previous research has well established the mediating role alcohol protective behavioral strategies frequently play in connecting various constructs to alcohol outcomes. Alcohol protective behavioral strategies has been found to be a mediator on alcohol outcomes for constructs such as alcohol expectancies, alcohol beliefs, and

depressive symptoms (Lemoine et al., 2020; Madson et al., 2013b; Villarosa et al., 2018). Similarly, alcohol protective behavioral strategies have demonstrated mediating effects among drinking motives and alcohol outcomes (Ebersole et al., 2012; LaBrie et al., 2011; Madson et al., 2015). More notably, studies have successfully examined alcohol protective behavioral strategies as mediators for self-regulation, self-control, and impulsivity on alcohol outcomes (D'Lima et al., 2012; Pearson et al., 2012, 2013). When examining interventions, alcohol protective behavioral strategies have mediated the effectiveness of these treatments on reducing negative alcohol related consequences (Murphy et al., 2012). This research suggests a possible mediating relationship of alcohol protective behavioral strategies on psychosocial maturity and alcohol outcomes.

Multiple studies have examined different models of alcohol protective behavioral strategies, some of which found a two-factor model (Madson et al., 2013a), three-factor model (Martens et al., 2007a), and even a four-factor model (Walters et al., 2007). Alcohol protective behavioral strategies are most frequently measured using the three-factor model which includes stopping/limiting drinking, serious harm reduction, and manner of drinking. However, more recent research suggests that alcohol protective behavioral strategies can be observed as a univariate construct, using total scores as an observed variable in analysis (Horváth et al., 2020; Martin et al., 2020). In college samples, conceptualizing alcohol protective behavioral strategies as single factor has shown to be successful (Bravo et al., 2015; Horváth et al., 2020; Labrie et al., 2011; Martin et al., 2020). Furthermore, mediation analysis where alcohol protective behavioral strategies are measured as a latent variable has shown to be effective (LaBrie et al., 2011; Martens et al., 2007a). Studying this univariate model of alcohol protective behavioral

strategies in college students is particularly important considering the beneficial effects of alcohol protective behavioral strategies on relieving alcohol negative consequences.

Present Study

Research has shown the frequency in which college students engage in drinking alcohol directly relates to negative consequences (Wechsler et al., 2000.; Wechsler & Nelson, 2008; White & Hingson, 2013). In part, this is likely due to the limited use of alcohol protective behavioral strategies based on the evidence supporting it as an effective harm reduction strategy among college students. Many social and cognitive variables have been established as sound predictors of harmful and safe alcohol use behaviors. To date, the research is limited on the role of psychosocial maturity and alcohol use behaviors among college students. Thus, one's psychosocial maturity may be an individual difference that contributes to the behaviors seen among college student drinkers. Substance use and age have both been shown to relate to levels of psychosocial maturity (Chassin et al., 2010; Icenogle et al., 2019; Jones et al., 1989; Steinberg et al., 2009), therefore it is not unreasonable to predict a variance among undergraduate and graduate students when examining the relationship of psychosocial maturity and alcohol consequences and consumption when mediated by alcohol protective behavioral strategies. Currently there is limited understanding on psychosocial maturity and its relationship to alcohol use (Fischer et al., 2007). Furthermore, there is no research examining alcohol protective behavioral strategies as a mediator between psychosocial maturity and alcohol outcomes. Therefore, the current study aimed to examine links that exist between psychosocial maturity and alcohol use outcomes as well as the degree to

which alcohol protective behavioral strategies mediates this association. Because of potential differences between undergraduate and graduate student's alcohol use behaviors and no research investigating alcohol protective behavioral strategies with graduate students, this study examined to what degree these relationships are invariant based on academic standing (undergraduate or graduate). This study addresses these aims by answering the following questions.

Question 1: To what degree is there a relationship between the factors of psychosocial maturity (i.e., perspective, temperance, and responsibility) with alcohol consumption, and alcohol consequences.

Hypothesis 1: Temperance, perspective, and responsibility will be negatively associated with alcohol consumption and alcohol consequences

Question 2: To what degree do alcohol protective behavioral strategies mediate the relationship the factors of psychosocial maturity (i.e., temperance, perspective, and responsibility) have with alcohol consumption and consequences?

Hypothesis 2: Alcohol protective behavioral strategies will mediate the relationship between temperance, perspective, and responsibility, and alcohol consumption, and consequences such that higher levels of temperance, perspective, and responsibility will predict more alcohol protective behavioral strategies use, which in turn will predict lower levels of alcohol consumption and alcohol consequences.

Question 3: To what degree is the mediating role of alcohol protective behavioral strategies on the factors of psychosocial maturity (i.e., temperance, perspective,

and responsibility) and alcohol consumption and consequences invariant across undergraduate and graduate students ages 18-25 years old?

Hypothesis 3: The mediating role of alcohol protective behavioral strategies on temperance, perspective, and responsibility, and alcohol consumption, and consequences will vary across undergraduate and graduate students ages 18-25 years old.

CHAPTER II – METHOD

Participants and Procedures

For this study, undergraduate students were recruited through the School of Psychology online participant management system (i.e., SONA) and received credit that can be used to fulfill required or extra credit research assignments. Graduate students were recruited via targeted emailing and contacting graduate student organizations. Participants completed the same survey measures through Qualtrics via link provided in either SONA or email. Once participants gave consent, they were then asked to report demographic information, followed by the study measures presented in random order. To be eligible for participation, students must have endorsed drinking alcohol once in the past 30 days and be aged 18 to 25 years-old. Initial participants consisted of undergraduate (n = 281) and graduate students (n = 121). However, 73 cases were removed for not meeting eligibility, 5 removed for not providing informed consent, 31 removed for failing validity checks, and 131 removed for suspected invariant responding. As a result, the final retained sample (N = 153) consisted of 122 undergraduate and 31 graduate students (Master's students: 14%, Doctoral students: 5.3%). Most participants self-identified as White (72.5%) females (83.7%) Psychology majors (22.2%) with a total mean age of 20.62 (SD = 1.94) years. Participants identified racial background of White (72.5%), Black (20.9%), Asian (2%), Hispanic/Latino (2%), and Multi-racial (2.6%). Demographic information by academic classification can be found in Table 1.

Table 1 *Demographics by Academic Classification*

	Undergraduate Students (*N* = 122)	Graduate Students (*N* = 31)
	N (%)	*N* (%)
Race		
African American/Black	3 (9.7%)	29 (23.8%)
Hispanic/Latino/a/e	1 (3.2%)	2 (1.6%)
Asian American	1 (3.2%)	2 (1.6%)
White/Euro American	26 (83.9%)	85 (69.7%)
Multi-racial	N/A	4 (3.3%)
Sex		
Female	15 (12.3 %)	21 (32.3%)
Male	107 (87.7 %)	10 (67.7%)
Academic Classification		
Bachelor's	122 (100%)	
Masters	N/A	21 (72.4%)
Doctorate	N/A	8 (27.6%)
Class Standing		
Freshman	41 (33.6%)	N/A
Sophomore	41 (33.6%)	N/A
Junior	23 (18.9%)	N/A
Senior	17 (13.9%)	N/A
Academic School		
Accountancy	2 (1.6%)	3 (9.7%)
Biological, Environmental and Earth Sciences	12 (9.8%)	1 (3.2%)
Child and Family Sciences	N/A	1 (3.2%)
Communication	5 (4.1%)	N/A
Construction and Design	5 (4.1%)	N/A
Criminal Justice, Forensic Science and Security	4 (3.3%)	N/A
Education	2 (1.6%)	2 (6.5%)
Finance	1 (0.8%)	N/A
Health Professions	19 (15.6%)	N/A
Humanities	2 (1.6%)	1 (3.2%)
Interdisciplinary Studies and Professional Development	1 (0.8%)	N/A
Kinesiology and Nutrition	5 (4.1%)	N/A
Leadership and Advanced Nursing Practice	1 (1.8%)	N/A
Library and Information Science	2 (1.6%)	2 (6.5%)
Management	3 (2.5%)	3 (9.7%)
Marketing	1 (0.8%)	2 (6.5%)

Table 1. (continued)

Mathematics and Natural Sciences	N/A	1 (3.2%)
Music	2 (1.6%)	3 (9.7%)
Performing and Visual Arts	2 (1.6%)	1 (3.2%)
Polymer Science and Engineering	N/A	1 (3.2%)
Professional Nursing Practice	5 (4.1%)	N/A
Psychology	29 (23.8%)	5 (16.1%)
Social Science and Global Studies	4 (3.3%)	1 (3.2%)
Social Work	5 (4.1%)	2 (6.5%)
Speech and Hearing Science	10 (8.2%)	2 (6.5%)
	M (*SD*)	*M* (*SD*)
Age	19.96 (1.41)	23.51 (1.12)

Note: N/A = Not Applicable, *M* = Mean, *SD* = Standard Deviation

Measures

Demographics

Participants were asked to indicate their gender identity, age, race(s), and their academic status (i.e., undergraduate student or graduate student).

Temperance

The 8-item impulse control subscale of the Weinberger Adjustment Inventory (WAI; Weinberger & Schwartz, 1990) was used to assess participants' impulse control. This measure assesses impulsivity in two manners. The first two statements instruct participants to answer what they are usually like (e.g., "I do things without giving them enough thought") using a 5-point Likert type scale from 1 = *False* to 5 = *True*. For the remaining six questions, participants are asked to use a 5-point Likert type scale from 1 = *Almost never* to 5 = *Almost always* to responds to statements regarding assess how often they think, feel, or act a particular way (e.g., "I stop and think things through before I act"). A total score was obtained for all eight responses, ranging from 8 to 40, with higher

scores indicating more impulse control. Previous research supports the reliability and validity of using the WAI-Impulse subscale to measure temperance in psychosocial maturity among adolescent drinkers (Mauricio et al., 2009) and college students (Jones, 2017). In previous research, the WAI-Impulse subscale showed acceptable internal consistency $\alpha = .85 - .88$ (Jones, 2017). For this study, the WAI-Impulse subscale internal consistency was found to be acceptable $\alpha = .79$.

Perspective

The 12-item Consideration of Future Consequences (CFC; Strathman et al., 1994) was used to assess participants ability to see situations in a larger context, including short- and long-term consequences. Participants indicate how characteristic of themselves they find statements such as "My convenience is a big factor in the decisions I make or the actions I take" and "I only act to satisfy immediate concerns, figuring the future will take care of itself" using a 5-point Likert scale ranging from 1 = *Extremely uncharacteristic* to 5 = *Extremely characteristic*. Total scores range from 12-60, with higher scores indicating a greater consideration of future consequences. Previous research supports the reliability and validity of the CFC among drinkers (Acuff et al., 2017) and to measure perspective in psychosocial maturity (Pailing & Reniers, 2018). The internal consistency of the CFC was found to be adequate in past research $\alpha = .86$ (Pailing & Reniers, 2018). For this study, the CFC showed acceptable internal consistency $\alpha = .75$.

Responsibility

The 10-item Resistance to Peer Influence (RPI; Steinberg & Monahan, 2007) was used to assess participants self-reliance and autonomy levels. Participants respond to ten opposing statements (e.g., "Some people go along with their friends just to keep their

friends happy BUT Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy") in which they choose the statement they most identify with and to what degree with choices of 1 = *Statement is really true for me* or 4 = *Statement is sort of true for me*. Total scores range from 10 to 40, with lower scores indicating greater peer influences. Previous research supports the reliability and validity of using the RPI among college student drinkers (Villarosa et al., 2016) and for measuring responsibility in psychosocial maturity (Pailing & Reniers, 2018). Acceptable internal consistency of the RPI was found in previous studies $\alpha = .80$ (Villarosa et al., 2016). The RPI displayed questionable internal consistency for this study $\alpha = .67$.

Protective Behavioral Strategies

Alcohol protective behavioral strategy use was assessed using the 20-Protective Behavioral Strategies Survey (PBSS-20; Treloar et al., 2015). Participants respond to items such as, "Avoid drinking games" and "Put extra ice in your drink", using a 6-point Likert-type scale ranging from 1 = *Never* to 6 = *Always*. The total score, which will be used in this study, ranges from 20 - 120 with higher scores representing greater use of PBSA. Due to an error in data collection among graduate students, not all response scales were available (i.e., missing option 2 = *Rarely*). To account for this error, the response options were recoded in the graduate student sample with the assumption that participants pay closer attention to the number of response options (e.g., a 6-point Likert scale), and the relative position of each response, and pay less attention to the scale qualifiers (e.g., "Never"). As such, the total score for graduate students will be calculated by recoding the response options as follows: 1 = 1, 2 = 2.5, 3 = 3.5, 4 = 4.75, 5 = 6. This decision likely

impacts results given the participants were not able to accurately reflect their alcohol protective behavioral strategy use. It is possible the responses of graduate students are skewed as a result. Using a total score is consistent with previous research among college students (Horváth et al., 2020). Previous research supports the reliability and validity of the PBSS-20 among college student drinkers (Treloar et al., 2015). The PBSS internal consistency was acceptable α = .86 (Ebersole et al., 2012). In this study, the PBSS displayed acceptable internal consistency α = .86.

Negative Alcohol Consequences

The 16-item short Rutgers Alcohol Problem Index (S-RAPI; Earleywine et al., 2008) was used to assess participants negative alcohol consequences. Participants respond to items such as "Felt physically or psychologically dependent on alcohol") using a 5-point Likert scale ranging in 0 = *Never* to 4 = *More than 10 times*. Total scores range from 0-64 with higher scores indicating higher amount of alcohol negative consequences experienced. Research supports the reliability and validity of the S-RAPI among college drinkers (Earleywine et al., 2008). Good internal consistency was shown in previous research α = .85 (Earleywine et al., 2008). This study found acceptable internal consistency for the S-RAPI α = .84.

Alcohol Consumption

The 3-item Alcohol Use Disorder Identification Test- Consumption (AUDIT-C; Bush et al., 1998) was used to assess participants' quantity and frequency of drinking. The first question (i.e., "How often did you have a drink containing alcohol in the past year?") requires participants to respond on a 5 point Likert type scale ranging from 0 = *Never* to 4 = *Four or more times a week,* where responses indicate frequency of drinking.

Question two (i.e., "How many drinks containing alcohol did you have on a typical day when you were drinking in the past year?") asks participants to respond on a 5 point Likert type scaling ranging from 0 = *Never* to 4 = *10 or more*, where responses indicate amount of alcohol consumed. The final question (i.e. "How often did you have six or more drinks on one occasion in the past year?") requires participants to respond on a 5 point Likert type scale ranging from 0 = *Never* to 4 = *Daily or almost daily*, where responses indicated frequency of engaging in heavy episodic drinking. Total scores range from 0 to 12, with higher scores indicating higher levels of alcohol consumption. Previous research supports the reliability and validity of the AUDIT-C in college drinking samples (Campbell & Maisto, 2018). Previous research has found acceptable internal consistency $\alpha = .80$ (Campbell & Maisto, 2018). The internal consistency of the AUDIT-C was questionable for this study $\alpha = .65$.

Data Analytic Plan

Hypothesis 1 was tested through analyzing direct pathways from the three observed variables of psychosocial maturity (i.e., temperance, perspective, and responsibility) as the predictor variables and the outcome variables (i.e., alcohol consumption, and alcohol consequences). Given the developmental nature of psychosocial maturity, age was included as a covariate of psychosocial maturity. Both changes in alcohol consumption and changes in social drinking during COVID-19 were included as covariates of alcohol consumption. Testing hypothesis 2 involved a simple mediation with temperance, perspective, and responsibility as the exogenous predictors, alcohol protective behavioral strategies as the mediator, and alcohol consumption and alcohol consequences as the outcome variables. In addition, age, changes in social

drinking behaviors, and changes in alcohol consumption during COVID-19 were covariates. To test for significance in mediation, the Bootstrapping method was utilized by conducting 5,000 resamples to determine a 95% confidence interval that does not include 0 (Bollen & Stine, 1990). Bootstrapping was chosen over a Sobel test given bootstrapping is a nonparametric method that does not require normal distribution.

The moderating effects of being an undergraduate or graduate level student were assessed through invariance testing for hypothesis 3. All paths in the model were constrained to be equal across academic levels and compared to a model with freed paths. A comparative fit index (CFI) change of $\Delta.005$ or greater was needed to determine a meaningful difference from the constrained model and the re-estimated freed model (Chen, 2007). When the CFI exceed the criteria, freed paths were re-estimated with constraints to identify meaningful differences between academic levels. If the model fit did not deteriorate, the examined path was determined to be invariant between academic levels.

CHAPTER III - RESULTS

The total sample's means, standard deviations, and intercorrelations for selected measures can be located at Table 2. Participants report of alcohol use exceeded the criteria for at risk drinking (M_{female} = 7.74, SD_{female} = 2.28; M_{Male} = 8.20, SD_{Male} = 2.20) based on the recommended cutoff score of 7 drinks for females and 8 drinks for males (Verhoog et al., 2020). Relative to previous samples of USM students, participants endorsed a comparable amount of alcohol protective behavioral strategy use (Lemoine et al., 2020).

Table 2 *Correlations, Means, Standard Deviations, Skewness, and Kurtosis for Selected Measures in Total Sample*

Measure	1	2	3	4	5	6	7	8	9
1. WAI-I	-								
2. CFC	0.44**	-							
3. RPI	0.25**	0.38**	-						
4. PBSS-20	0.29**	0.15	0.20*	-					
5. S-RAPI	-0.33**	-0.23**	-0.27**	-0.27**	-				
6. AUDIT-C	-0.12	0.06	0.01	-0.46**	0.35**	-			
7. Consume Change	-0.07	0.11	-0.07	-0.13	0.15	0.20*	-		
8. Social Use Change	-0.11	-0.06	-0.16*	-0.16*	-0.05	0.06	0.27**	-	
9. Age	0.16	0.21**	0.15	-0.10	0.07	-0.01	-0.01	-0.32	-
Mean	29.26	42.61	31.89	82.94	24.20	7.82	6.11	8.17	20.62
SD	5.45	6.35	4.73	14.69	6.94	2.27	1.86	4.30	1.94
Skewness	-0.41	-0.06	-0.38	-0.30	1.86	0.86	-0.53	0.63	0.80
Kurtosis	0.12	-0.31	0.88	-0.30	4.34	1.13	-0.21	-0.15	-0.27

Note: WAI-I = Weinburger Adjustment Intentory- Impulsivity subscale, *CFC* = Consideration of Future Consequences scale, *RPI* = Resistance to Peer Influence, *PBSS-20* = Protective Behavioral Strategies Scale - 20, *S-RAPI* = Rutegers Alcohol Problems Index – Short form, *AUDIT-C* = Alcohol Use Disorder Identification Test – Consumption subscale, *Consume Change* = Changes in reported alcohol use during COVID-19, *Social Use Change* = Changes in reported social drinking behaviors during COVID-19, *SD* = Standard Deviation

* $p < .01$

** $p < .05$

The factors of psychosocial maturity were all intercorrelated, although not all factors were correlated with alcohol use, alcohol related negative consequence, or alcohol

protective behavioral strategies use. As expected, more alcohol protective behavioral strategies were correlated with a decrease in alcohol use and consequences

Psychosocial Maturity

The initial model analyzed the mediating role of alcohol protective behavioral strategies on the predictive value of temperance, perspective, and responsibility on alcohol use and alcohol related negative consequences. The initial model showed poor fit to the data $\chi^2 = 70.29$ ($p < .001$), CFI = 0.53, RMSEA = 0.13 (90% [.10, .16]), indicating our hypotheses one, and two, were not supported. Estimated predictive value of psychosocial maturity factors on alcohol consumption were non-significant . Of the factors of psychosocial maturity, only perspective ($p = .01$, $\beta = -.22$) and responsibiltiy ($p = .035$, $\beta = -.187$) significantly predicated lowered alcohol related negative consequences. Of the factors of psychosocial maturity, only temperance was a positive significant predictor of total alcohol protective behavioral strategy use ($p = .003$, $\beta = .273$, CI 95% [-0.210, 0.153]). Both responsibility and perspective did not meet the threshold for significance, indicating they were not good predictors of alcohol protective behavioral strategy use. As expected, increased use of alcohol protective behavioral strategy significantly predicted lower alcohol consumption ($p < .001$, $\beta = -.486$, CI 95% [-.608, -.314]) and less alcohol related negative consequences ($p < .001$, $\beta = -.249$, CI 95% [-.369, -.107]). Although, age was not a significant predictor of alcohol consumption or alcohol related consequences. No suggested modifications to the model were theoretically appropriate, thus the initial model was ultimately retained, and paths were examined for invariance. The retained model with significant paths is depicted in Figure 1.

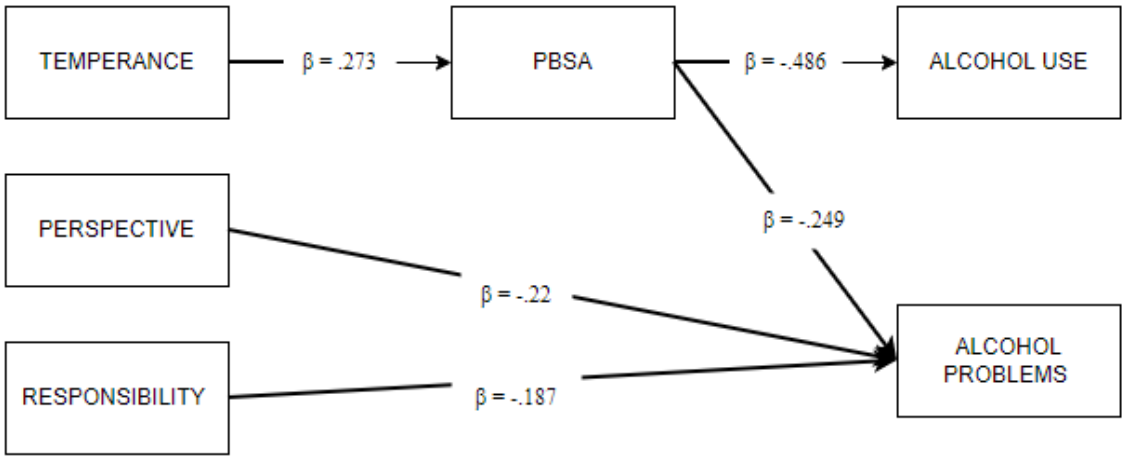

Figure 1. Retained Model with Betas for Significant Paths

Invariance Testing by Academic Level

The final hypothesis that the relationship between the psychosocial maturity factors and alcohol use outcomes, mediated by alcohol protective behavioral strategies, would be variant by academic level was supported. The initial model with all model paths freed showed decent fit to the data χ^2 = 66.76 (p = .002), CFI = .75 RMSEA = 1.00 (90% [.05, .14]). When all paths were constrained to be equal between graduate and undergraduate student, the results indicated a significant decirment in model fit χ^2 = 98.08 (p < .001), CFI = .61 (ΔCFI 0.14), RMSEA = 10 (90% [07., .13]), suggesting potential invariant paths. Betas, standard errors, and confidence intervals of individually freed paths by academic status can be found in Table 3. Individually constrained paths showing a decrement in CFI by Δ.005 when compared to the freed model will be discussed.

Table 3 *Betas, Standard Error, and Confidence Intervals for Individually Freed Paths by Academic Status*

Individual Path	β	SE	95% Confidence Interval
Undergraduate Students			
WAI-I → PBSS-20	**.256**	**.10**	**.048, .464**
CFC → PBSS-20	-.075	.09	-.248, .117
RPI → PBSS-20	**.219**	**.09**	**.024, .397**
PBSS-20 → AUDIT-C	**-.541**	**.085**	**-.684, -.346**
PBSS-20 → S-RAPI	**-.306**	**.076**	**-.448, -.151**
Graduate Students			
WAI-I → PBSS-20	**.398**	**.111**	**.167, .597**
CFC → PBSS-20	**.388**	**.191**	**-.098, .707**
RPI → PBSS-20	-.098	.204	-.513, .298
PBSS-20 → AUDIT-C	-.305	.164	-.601, .039
PBSS-20 → S-RAPI	.001	.190	-.346, .389

Note: Significant effects are in boldface type for emphasis. *WAI-I* = Weinberger Adjustment Inventory-Impulsivity subscale, *CFC* = Consideration of Future Consequences scale, *RPI* = Resistance to Peer Influence, *PBSS-20* = Protective Behavioral Strategies Scale -20, *S-RAPI* = Rutgers Alcohol Problems Index – Short form, *AUDIT-C* = Alcohol Use Disorder Identification Test – Consumption subscale

Perspective predicting alcohol protective behavioral strategy use was non-significant for undergraduates, but had a positive relationship for graduate students (CFI: .71, ΔCFI: .035, [GRADS: β = .388, p = .04, UGRADS: p = .42]). Responsibility was a positive predictor of alcohol protective behavioral strategy use among undergraduates, but not graduate students (CFI: .74, ΔCFI: .011 [GRADS: p = .63, UGRADS: β = .219, p = .02]). Alcohol protective behavioral strategy use was a stronger predictor of lowered alcohol consumption in undergraduates than graduate students (CFI: 0.72, ΔCFI: .026 [GRADS: β = -.305, p = .06, UGRADS: β = -.541, p < .001]), and was a predictor of less alcohol related negative consequences only for undergraduates (CFI: 0.74, ΔCFI: .009 [GRADS: p = .99, UGRADS: β = -.306, p < .001]). Finally, increased age significantly predicted decreased alcohol consumption among graduate students, and not

undergraduates (CFI: 0.72, ΔCFI: .027 [GRADS: β = -.361, p = .06, UGRADS: p = .70]). Our third hypothesis was partially supported by these results.

CHAPTER IV – DISCUSSION

The purpose of this study was to examine the predictive value of the factors of psychosocial on alcohol use and consequences. This relationship was further investigated by exploring alcohol protective behavioral strategies as a potential the mediator. Finally, this study aimed to analyze the moderating role of academic classification (i.e., undergraduate and graduate careers) on the mediated model.

Counter to previous research, higher levels of responsibility, temperance, and perspective did not predict lower levels of alcohol use. These results indicate that a greater ability to be self-reliant (i.e., higher responsibility), higher impulse control (i.e., greater temperance), or greater ability to consider short and long term consequences (i.e., increased perspective) is not associated with less alcohol use. Interestingly, when Riggs Romaine (2019) measured each psychosocial maturity factor by multiple components (e.g., perspective measured by consideration of future consequences and orientation toward the future), at least one component of each psychosocial maturity factor predicted greater alcohol use. The choice in measurement may be responsible for these non-significant results. Currently, there is no unified measure of psychosocial maturity, instead psychosocial maturity is typically measured by assessing each factor individually to produce an overall conceptualization of participant's psychosocial maturity. The inconsistent results could be a product of different measurement methods being used to assess three separate factors of the loosely defined construct of psychosocial maturity.

Additionally, psychosocial maturity factors may be more accurately conceptualized as indirect predictors of alcohol use (Acuff et al., 2018). Although temperance did not predict alcohol related negative consequences, greater perspective

and responsibility were associated with a decrease in number of alcohol related negative consequences experienced. When accounting for the nature of the perspective factor of psychosocial maturity, it is expected that an increased ability to consider consequences would result in experiencing fewer consequences as a result of drinking (Acuff et al., 2018). Specifically, it is likely this trait enables one to foresee consequences, and thus circumvent them. It is possible those higher in responsibility display an increased level of self-regulation, thus reducing alcohol related negative consequences (Hustad et al., 2009).

Temperance was associated with alcohol protective behavioral strategies, perhaps suggesting that an increased use of impulse control in drinking contexts is related to college students utilizing harm reduction strategies more efficiently as compared to those lower in impulse control (González-Ponce et al., 2022). Perspective and responsibility were not predictive of greater alcohol protective behavioral strategy use. It is possible the relationship between the factors of psychosocial maturity and alcohol protective behavioral strategies would be better examined through the subtypes of alcohol protective behavioral strategies. It is likely that measuring alcohol protective behavioral strategies as a unified construct impacted the relationships found. As expected, alcohol protective behavioral strategies were associated with lowered alcohol consumption and alcohol related negative consequences (González-Ponce et al., 2022).

Several differences between undergraduate and graduate students emerged. The positive relationship between perspective and alcohol protective behavioral strategy use was only found among graduate students. Perhaps this is explained by graduate students' long-term exposure to consequences, thus allowing them to assess future consequences and use harm reduction strategies in anticipation of such consequences. Additionally, the

differences in life circumstances between the academic careers may require graduate students to be more conscientious of potential consequences and use harm reduction strategies accordingly. Among only undergraduate students, responsibility was a positive predictor of alcohol protective behavioral strategy use. The non-significant relationship between responsibility and alcohol protective behavioral strategies among graduate students was unexpected and highlights the importance of further investigation into this phenomenon. The relationship between alcohol protective behavioral strategies and lower alcohol use and consequences was stronger in undergraduate students. This suggests that alcohol protective behavioral strategies may be more useful for undergraduate college students than those in graduate careers. One potential explanation for this is the measures of alcohol protective behavioral strategy use and consequences may not accurately reflect graduate student drinking behaviors. Specifically, the drinking consequences graduate students experience most frequently may differ from undergraduate students, and may require alternative strategies to avoid said consequences. Currently, the large majority of research on alcohol protective behavioral strategies has focused on undergraduate students. There may be additional strategies used by graduate students that are not being captured in current research, highlighting a need for future research to examine graduate student alcohol protective behavioral strategy use.

The strength of this study lies in the inclusion of graduate student drinkers. Research on graduate student drinking behaviors is limited, despite this populations high rates of alcohol use (Castaño-Perez & Calderon-Vallejo, 2014; English et al., 2011). Examining graduate student drinking behaviors in the context of psychosocial maturity enriches the small research foundation by shedding light on potential developmental

processes that may comparatively put undergraduate students at risk for more alcohol use and consequences. This study, however, is not without limitations. The sample of graduate students was comparatively much lower than the undergraduate sample, potentially affecting the power of the results. In addition, some measures included displayed concerning internal consistencies in this sample. Finally, an error in data collection for the graduate sample required score transformations, which potentially does not reflect the true responding of the graduate students on alcohol protective behavioral strategy use.

As research focusing on graduate student alcohol use behaviors continues to emerge, examination of other factors that have been previously validated in undergraduate samples in the context of harm reduction is warranted. For example, research should investigate association between harm reduction and factors such as drinking motives, drinking refusal self-efficacy, and alcohol expectancies in graduate student samples. In addition, to continue research related to psychosocial maturity, a validated unified measure of psychosocial maturity is needed. Future research would benefit from examining the validity of the using these measures in graduate student samples. Finally, it would be beneficial to replicate the following study with the addition of alcohol protective behavioral strategy subtype use.

The results of this study can be applied to future clinical interventions. Specifically, these results suggest that alcohol protective behavioral strategies are more effective at reducing alcohol consumption and alcohol related negative consequences among undergraduate students. Intervention efforts should focus on ways to increase the utility of alcohol protective behavioral strategies among graduate students. Perhaps

greater attention should be allocated to education and prevention programs aimed at graduate students. Finally, it may be beneficial to create intervention programs in which college students learn behaviors that increase their responsibility and ability to use temperance in drinking situations.

This study contributed to the growing literature on psychosocial maturity and alcohol use behaviors. Many expected relationships were not established in this sample, further highlighting a need for continued examination of psychosocial maturity in the context of harm reduction. Additionally, the comparison of graduate students to undergraduate students helps inform research on what differences may exist among these groups.

APPENDIX A – Electronic Informed Consent

PURPOSE: The present study is designated to examine the association between psychosocial maturity, alcohol protective behavioral strategies, alcohol consumption, and alcohol consequences among college students. Results will contribute to future research and aid in understanding college drinking behaviors for the improvement of intervention and prevention efforts.

DESCRIPTION OF STUDY: Participation will include the completion of demographic information and several questionnaires through and online secure website. Items will relate to drinking behaviors and experiences, impulsivity, peer influence, and consideration of future consequences. The survey includes quality assurance questions to promote thoughtful answering. Completion should take approximately 30 to 45 minutes. Upon completion, participants will receive 1 SONA credit.

BENEFITS: You will receive 1 SONA credit for participation. Although participants are not expected to directly benefit from participation, this study will contribute to the literature surrounding college student drinking and could aid in the improvement of future intervention and prevention programs.

RISKS: The risks associated with this study may include slight discomfort when answering questions regarding alcohol use and experiences. If you find you are distressed during completion of the questionnaires, you should visit the campus counseling center or notify the researcher immediately. You may skip questions or discontinue your participation in the survey at any time without consequence. You will be able to contact the principal investigator, Michael B. Madson, Ph.D., at any time throughout the study.

CONFIDENTIALITY: This study uses automatic crediting so it is anonymous, and you will not need to provide your name. The online survey has security measures to protect your responses and there are no hard copies of your responses. Findings will be presented in aggregate form with no identifying information to ensure confidentiality and will be stored on a password protected computer.

PARTICIPANT ASSURANCE: Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted) the researcher will take every precaution consistent with the best scientific practice. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits. Questions concerning the research should be directed to Dr. Michael Madson at (601) 266-4546 (or e-mail at michael.madson@usm.edu). This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human participants follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, Box 5147, Hattiesburg, MS 39406, (601) 266-6820. A copy of this form will be given to the participant.

If you become distressed as a result of your participation in this study, then you should contact an agency on-campus or in the surrounding community that may be able to provide services for you. A partial list of available resources is provided below:

University of Southern Mississippi Counseling Center (601) 266-4829

Community Counseling & Assessment Clinic (601) 266-4601

Pine Belt Mental Healthcare (601) 544-4641

Pine Grove Recovery Center (800) 821-7399

Forrest General Psychology Services (601) 288-4900

Lifeway Counseling Service Incorporated (601) 268-3159

Behavioral Health Center (601) 268-5026 Hope Center (601) 264-0890

If you experience distress as a result of your participation in this study, please notify Skyler Hoover (skyler.hoover@usm.edu) or Dr. Michael Madson (michael.madson@usm.edu).

APPENDIX B – IRB Approval Letter

Date: 9-30-2021

IRB #: IRB-20-511
Title: College Student Health Behaviors and Development
Creation Date: 11-11-2020
End Date:
Status: Approved
Principal Investigator: Skyler Hoover
Review Board: Sacco (Exempt/Expedited Board)
Sponsor:

Study History

Submission Type Initial	**Review Type** Expedited	**Decision** Approved
Submission Type Modification	**Review Type** Expedited	**Decision** Approved

Key Study Contacts

Member Skyler Hoover	**Role** Primary Contact	**Contact** skyler.hoover@usm.edu
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Member Skyler Hoover	**Role** Principal Investigator	**Contact** skyler.hoover@usm.edu

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