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The Mediating Effects of Drinking Refusal Self-Efficacy on the Associations between Alcohol Protective Behavioral Strategies and Alcohol Use Outcomes

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THE MEDIATING EFFECTS OF DRINKING REFUSAL SELF-EFFICACY ON THE
ASSOCIATIONS BETWEEN ALCOHOL PROTECTIVE BEHAVIORAL
STRATEGIES AND ALCOHOL USE OUTCOMES

by

Kray Scully

A Dissertation
Submitted to the Graduate School,
the College of Education and Human Sciences
and the School of Psychology
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

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ABSTRACT

Alcohol use continues to pose a serious public health problem at universities across the U.S., largely due to the extent of consumption and frequency of negative consequences experienced among college students. Alcohol protective behavioral strategies (PBS-A) are an empirically supported repertoire of safe drinking behaviors college students can use to monitor and control their alcohol consumption as well as limit harm while drinking. However, there remains a need to better understand how cognitive mechanisms, such as drinking refusal self-efficacy (DRSE), help explain college student safe alcohol use behaviors to enhance evidenced-based intervention and prevention efforts. Recently, studies that examined the moderating effect of DRSE on the associations among PBS and alcohol use outcomes demonstrated contradictory results. Therefore, the present study evaluated the mediating effects of DRSE broadly and its dimensions (i.e., social pressure DRSE, emotional relief DRSE, opportunistic relief DRSE) in the associations among PBS-A and its subtypes with alcohol use outcomes. Data were collected from a national sample of 380 traditional age ($M = 22.50$; $SD = 1.82$), full-time college students (51% male; 68% White, non-Hispanic) who completed an on-line survey about their safe and harmful alcohol use behaviors. Using path analysis, DRSE partially mediated all associations among PBS-A and all outcomes. Moreover, opportunistic relief DRSE mediated relationships between PBS-A and all three outcomes. Finally, all subtypes of DRSE fully mediated the relationship between serious harm reduction PBS-A and negative consequences. Altogether, these results suggest that DRSE may be an important cognitive variable to consider when evaluating PBS-A use and their

relationships with alcohol outcomes among college students. Study limitations as well as clinical and research implications will be discussed.

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DEDICATION

To my wife, Katie, who has been with me on my graduate school journey from the start. It is hard to put into words how invaluable your encouragement, support, and presence have meant to me over the past four years. When I wanted to walk away, you always steered me back in the right direction, assuring me that it was all going to be worth it. Well, you were right... yet again. Thanks, Katie. Love ya!

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CHAPTER I - INTRODUCTION

College Alcohol Use

College student alcohol use remains a serious and widespread public health problem at universities across the United States. Research indicates that alcohol is the most popular and widely used psychoactive substance among college students (Johnston, O'Malley, Bachman, Schulenburg, & Miech, 2018; Osberg et al., 2010; Substance Abuse and Mental Health Services Administration [SAMHSA], 2015). Nearly 60% of college students have regularly consumed alcohol over the past month, with more than half of those engaging in hazardous drinking by exceeding daily and weekly low risk drinking guidelines or engaging in heavy episodic drinking (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2015; SAMHSA, 2015). Researchers estimate that anywhere between a quarter and a third of college students who regularly consume alcohol currently meet criteria for an alcohol use disorder (Blanco et al., 2008; Borsari, Murphy, & Barnett, 2007). Regardless, alcohol consumption at any level is particularly concerning due to the range of alcohol-related negative consequences that adversely affects the quality of life for college student drinkers (Arterberry, Chen, Verges, Bollen, & Martens, 2015).

Alcohol-related negative consequences are the adverse outcomes that might occur because of consuming or being around those who consume alcohol (Arterberry et al., 2015; Borden, Martens, McBride, Sheline, Bloch, & Dude, 2011; Landry, Moorer, Madson, & Zeigler-Hill, 2015; Scholly, Katz, & Kehl, 2014; White & Hingson, 2013). These consequences can be physical (Hingson, Zha, & Weitzman, 2009; Hingson, 2010; White & Hingson, 2013), psychological (Villarosa, Messer, Madson, & Zeigler-Hill,

2018), and academic (Martin, Cremeens, Umstattd, Usdan, Talbott-Forbes, & Garner, 2012; Scholly et al., 2014). Perhaps, most noteworthy among negative outcomes are the estimated 1,800 alcohol-related deaths among college student drinkers each year (White & Hingson, 2013). While alcohol consumption at any level can lead to alcohol-related negative consequences, college students who engage in hazardous drinking tend to experience more alcohol-related harm (Arterberry, Smith, Martens, Cadigan, & Murphy, 2014; Foster, Caravelis, & Kopak, 2013; Randolph, Torres, Gore-Felton, Lloyd, & McGarvey, 2009; Skidmore, Murphy, Martens, and Dennhardt, 2012). Given the severity, frequency, and effects of alcohol-related negative consequences experienced by college student drinkers, it remains paramount to explore the value of safer drinking strategies to potentially intervene in, prevent, or reduce harmful alcohol use outcomes. One such factor with strong empirical support is alcohol protective behavioral strategies.

Alcohol Protective Behavioral Strategies

Alcohol protective behavioral strategies (PBS-A) are a repertoire of behaviors an individual can use to manage alcohol consumption and reduce alcohol-related negative consequences before, while, and after consuming alcohol (Madson, Arnau, & Lambert, 2013; Treloar, Martens, & McCarthy, 2015). Relying upon the tenets of a harm-reduction approach designed to proactively monitor one's alcohol use behaviors rather than encouraging abstinence (Marlatt, Larimer, & Witkiewitz, 2011), PBS-A are generally an effective way to reduce alcohol consumption, engagement in hazardous drinking, and experienced alcohol-related negative consequences among college student drinkers (Araas & Adams, 2009; Borden et al., 2011; Bravo, Prince, & Pearson, 2016; Linden, Kite, Braitman, & Henson, 2014; Madson & Zeigler-Hill, 2013; Pearson, 2013; Villarosa

et al., 2018). Specifically, PBS-A are associated with decreased consumption and alcohol-related negative consequences among drinkers (Scott-Sheldon, Carey, Elliot, Garey, & Carey, 2014). Mere exposure to the concepts of PBS-A can lead to significant reductions in the alcohol-related harm a college student experiences (LaBrie, Kenney, & Lac, 2010; Pearson, 2013; Scott-Sheldon et al., 2014).

PBS-A generally fall into three categories: Stopping/Limiting Drinking (PBS-SLD), Manner of Drinking (PBS-MOD), and Serious Harm Reduction (PBS-SHR; Treloar et al., 2015). PBS-SLD encompass strategies that involve managing the quantity of one's drinking (e.g., "determining not to exceed a set number of drinks") while PBS-MOD focus on modifying how one drinks (e.g., "put extra ice in your drink;" Treloar et al., 2015). PBS-SHR includes non-consumption related behaviors that aim to prevent more serious consequences related to drinking (e.g., "make sure that you go home with a friend;" Treloar et al., 2015). Research on PBS-A's subtypes has consistently demonstrated inverse associations between PBS-SLD and PBS-MOD with typical weekly alcohol use and hazardous drinking while their relationships with alcohol-related negative consequences tend to be non-significant though in the expected direction (Arterberry et al., 2014; LaBrie, Lac, Kenney, & Mizra, 2010; Lewis, Patrick, Lee, Kaysen, Mittman, & Neighbors, 2014; Napper, Kenney, Lac, Lewis, & LaBrie, 2014). Increased PBS-SHR use among college students is typically related to fewer alcohol-related negative consequences (Martens, Martin, Littlefield, Murphy, & Cimini, 2011; Napper et al., 2014). However, recent research indicates that significant associations also exist between PBS-SHR with typical weekly alcohol use and hazardous drinking, suggesting that PBS-

SHR may be protective for harmful alcohol use outcomes altogether (Villarosa et al., 2018; Villarosa-Hurlocker, Madson, Mohn, Zeigler-Hill, & Nicholson, 2018).

Although empirical support has emerged for PBS-A and its subtypes, its use varies across other predictors of alcohol use outcomes among college students. Research over the past decade suggests that PBS use among college students differs across a variety of factors, such as sex, race, and mental health concerns, wherein those who are male, White, non-Hispanic, and have poorer mental health tend to engage in fewer PBS (Howard, Griffin, Boekeloo, Lake, & Bellows, 2007; Jordan, Villarosa-Hurlocker, Ashley, & Madson, 2018; LaBrie et al., 2011; Lawrence, Abel, & Hall, 2010). However, there is still a need to better understand the social cognitive mechanisms that motivate college student alcohol use behaviors, including PBS-A, to enhance evidence-based prevention and intervention efforts.

Social Cognitive Model of College Student Alcohol Use

Social cognitive theory outlines that cognitions mediate the influence of environmental factors in determining behavior across contexts (Bandura & Walters, 1977). Since its inception, research on social cognitive theory has demonstrated its applicability and viability in understanding behaviors across multiple contexts, including health behaviors (Bandura, 1998; Bandura, 2004; Rosenstock, Strecher, & Becker, 1988). For example, when college students are deciding to drink alcohol, they weigh the costs and benefits of consuming alcohol while considering their attitudes and beliefs (e.g., drinking identity, motives) about drinking and others' perceptions (e.g., norms) of alcohol use before acting (e.g., safe [PBS-A] or harmful alcohol use outcomes [hazardous drinking, alcohol-related negative consequences]; Luszczynska & Schwarzer, 2005).

Given the tenets of social cognitive theory, self-efficacy may be an underlying cognitive mechanism that explains the associations between PBS-A and alcohol use outcomes (Bandura, 1999; Bandura, 2004; Burke & Stephens, 1999; DiClemente, Fairhurst, & Pitriowski, 1995). Bandura (2004) outlined that self-efficacy permeates across multiple processes that contribute to behavioral or personal change. Essentially, self-efficacy appears to have significant influence on the decision to engage in harmful health behaviors broadly, including substance use (Bandura, 1999). Self-efficacy, however, is best understood in the context of a specific behavior. Regarding alcohol use, drinking refusal self-efficacy may help better explain the relationships between PBS-A and alcohol use outcomes.

Drinking Refusal Self-Efficacy

Drinking refusal self-efficacy (DRSE) refers to the belief in one's ability to resist engaging in alcohol use behaviors across multiple contexts (Young, Oei, & Crook, 1991). Research suggests that DRSE is best conceptualized through classification into three categories: Social Pressure DRSE (DRSE-SP; e.g., "when someone offers me a drink") associated with confidence in abstaining from alcohol in social situations; Opportunistic Relief (DRSE-OR; e.g., "when I first arrive home") associated with confidence in refusing alcohol when available in recreational contexts; and Emotional Relief DRSE (DRSE-ER; e.g., "when I am angry") associated with confidence in refraining from alcohol when coping with negative affect and experiences (Oei, Hasking, & Young, 2005). Recently, DRSE has been identified as a salient cognitive mechanism in whether one engages in safe or harmful alcohol use behaviors (Klanecky, Woolman, & Becker, 2015; Oei & Morawska, 2004). With college students, research shows that those who

report low DRSE tend to consume more alcohol and experience more alcohol-related negative consequences than those reporting higher DRSE (Foster, Neighbors, & Young, 2014; Goldsmith, Thompson, Black, Tran, & Smith, 2012; Stevens, Littlefield, Blanchard, Talley, & Brown, 2016). Moreover, multiple studies have demonstrated an inverse relationship between DRSE and hazardous drinking behaviors (Gilles, Turk, & Fresco, 2006; Stevens et al., 2016). College students who have poorer mental health (e.g., depressed mood) tend to have lower DRSE, which puts them at a greater risk of engaging in hazardous drinking and experiencing alcohol-related negative consequences (Ralston & Palfai, 2010).

Recently, research has further explored the associations among the subtypes of DRSE with alcohol use outcomes. For example, higher DRSE-SP has consistently been shown to be inversely associated with typical weekly alcohol consumption (Ehret, Ghaidarov, & LaBrie, 2013; Foster, Dukes, & Sartor, 2016; Stevens et al., 2016). However, other associations among DRSE subtypes with alcohol use outcomes are less clear. While some research suggests significant relationships for DRSE-OR and DRSE-ER with typical weekly alcohol use (Foster et al., 2016), other studies have found conflicting evidence as to whether these subtypes significantly predict typical weekly drinking among college students. Specifically, Stevens and colleagues (2016) found that DRSE-ER was inversely associated with typical weekly alcohol use while no such relationship was found with DRSE-OR, but Pearson, Prince, & Bravo (2017) found contradictory results. Monk and Heim (2013) demonstrated a significant inverse association between DRSE-SP and hazardous drinking behaviors. While existing research has consistently supported an inverse association between DRSE-ER and alcohol-related

negative consequences (Ehret et al., 2013; Pearson et al., 2017), uncertainty exists as to whether these relationships hold true for DRSE-SP and DRSE-OR. Given these findings, more research is needed to further explore the relationships among DRSE-SP, DRSE-OR, and DRSE-ER with alcohol use outcomes. Moreover, given its relevance with and its effects on alcohol use outcomes, DRSE's utility with safe drinking behaviors, such as PBS-A, warrants further exploration.

DRSE, PBS-A, and Alcohol Use Outcomes

The research exploring DRSE and PBS-A is emerging but in its early stages. Ehret and colleagues (2013) found that DRSE-SP and PBS-A were inversely associated with typical weekly alcohol consumption while DRSE-OR, DRSE-ER, and PBS-A were negatively related to alcohol-related negative consequences. Moreover, DRSE-SP and DRSE-ER moderated the relationships between PBS-A with typical weekly alcohol consumption and alcohol-related negative consequences such that PBS-A use was most beneficial for college students lower in DRSE (Ehret et al., 2013). Conversely, in a replication attempt, Pearson and colleagues (2017) found that neither DRSE, PBS-A, nor its subtypes predicted typical weekly alcohol use, even when including gender as a covariate. Moreover, no significant moderating effects were observed for DRSE or its subtypes on any associations between PBS-A use with typical weekly alcohol consumption or alcohol-related negative consequences (Pearson et al., 2017). Given these discrepant findings, there is a need to further evaluate the associations among DRSE and its components and PBS-A and its subtypes, with typical weekly drinking and alcohol-related negative consequences. Moreover, no study has yet to consider the relationships among DRSE and PBS-A with hazardous drinking, which may provide more insight into

how these safe alcohol use variables function differently for recreational and hazardous drinkers. Altogether, within a social cognitive model, could DRSE better explain the relationships between PBS-A and alcohol use outcomes instead of buffering the strength of these associations?

Purpose of Study

Given the extent and consequences of college student alcohol use, research on safe alcohol use behaviors has surfaced as an important focal point over the past decade. As PBS-A has emerged as an empirically supported means of reducing harmful alcohol use outcomes, it has become increasingly important to further investigate what factors contribute to PBS-A's effectiveness as a safe drinking behavior. One's belief in one's ability to refuse drinks, or DRSE, may be one factor that could help explain the associations PBS-A has with typical weekly alcohol consumption, hazardous drinking, and alcohol-related negative consequences. However, limited research exists that comprehensively examines alcohol consumption, hazardous drinking, alcohol-related negative consequences, PBS-A, and DRSE. Grounding the understanding of college student alcohol use in social cognitive theory, DRSE may help better explain the associations among PBS-A and alcohol use outcomes. Therefore, the present study evaluated the mediating effects of DRSE broadly and its dimensions in the associations among PBS-A, and its subtypes, and alcohol consumption, hazardous drinking, and alcohol-related negative consequences. Furthermore, the study assessed the predictive abilities of the dimensions of DRSE on alcohol use outcomes. Specifically, this was guided through the following research questions.

Question 1: To what extent do the dimensions of DRSE predict alcohol use outcomes in a college student sample?

Hypothesis 1a: It was expected that increased DRSE-SP would predict decreased typical weekly alcohol consumption, decreased hazardous drinking, and less experienced alcohol-related negative consequences.

Hypothesis 1b: It was expected that increased DRSE-OR would predict decreased typical weekly alcohol consumption and decreased hazardous drinking.

Hypothesis 1c: It was expected that increased DRSE-ER would predict decreased typical weekly alcohol consumption, decreased hazardous drinking, and less experienced alcohol-related negative consequences.

Question 2: To what extent does total DRSE mediate the relationships among PBS-A and its subtypes with alcohol use outcomes in a college student sample?

Hypothesis 2a: It was expected that total DRSE would mediate the associations between total PBS-A with typical weekly alcohol consumption and hazardous drinking.

Hypothesis 2b: It was expected that total DRSE would mediate the associations among PBS-SLD and PBS-MOD with typical weekly alcohol consumption and hazardous drinking.

Hypothesis 2c: It was expected that total DRSE would mediate the association among PBS-SHR and experienced alcohol-related negative consequences.

Question 3: To what extent do the dimensions of DRSE mediate the relationships among total PBS-A with alcohol use outcomes in a college student sample?

Hypothesis 3a: It was expected that DRSE-SP and DRSE-ER would mediate the associations among PBS-A with typical weekly alcohol consumption, hazardous drinking, and experienced alcohol-related negative consequences.

Hypothesis 3b: It was expected that DRSE-OR would mediate the associations among PBS-A with typical weekly alcohol consumption and hazardous drinking.

Question 4: To what extent do the dimensions of DRSE mediate the relationships among PBS-A subtypes with alcohol use outcomes in a college student sample?

Hypothesis 4a: It was expected that the associations between PBS-SLD with typical weekly alcohol consumption and hazardous drinking would be mediated by DRSE-SP, DRSE-OR, and DRSE-ER.

Hypothesis 4b: It was expected that the associations between PBS-MOD with typical weekly alcohol consumption and hazardous drinking would be mediated by DRSE-SP, DRSE-OR, and DRSE-ER.

Hypothesis 4c: It was expected that the relationship between PBS-SHR and experienced alcohol-related negative consequences would be mediated by DRSE-ER and DRSE-SP.

CHAPTER II – METHODOLOGY

Participants and Procedure

There were 3,842 participants in the present study. Participants were recruited through Amazon's worldwide online data collection system MTurk to obtain a larger scope of participants and a more diverse and gender-balanced sample (Arditte, Cek, Shaw, & Timpano, 2016; Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010). To qualify for inclusion, respondents must have been 18-25 years old, physically attend a four-year university or college campus in the United States at the time of completion, and must have reported drinking alcohol at least once within 30 days of study participation.

Prior to participating in the study, respondents received a link to the survey in Qualtrics, read an Institutional Review Board informed consent document, and provided consent to participate. After giving consent, participants completed initial screening items that assessed the aforementioned inclusion criteria to determine eligibility for study participation. Of study respondents, 77 (.2%) opened the survey link and did not consent to participate. Moreover, 2,121 (55.2%) respondents did not meet the traditional age college student cutoff and were subsequently excluded. Of the remaining participants, 787 (20.5%) were removed because they were non-attending college students, 79 (.2%) were excluded due to being primarily online students, 132 (.3%) were eliminated because they were graduate students, 67 (.2%) were omitted due to junior/community college attendance, and 3 (< .01%) were removed for being non-U.S. respondents. Finally, another 78 participants were excluded due to denial of alcohol consumption within 30 days of completing the study. The remaining 498 participants who met inclusion criteria

subsequently completed a demographic questionnaire followed by randomly presented measures of typical weekly alcohol consumption, hazardous drinking, alcohol-related negative consequences, PBS-A use, and DRSE. A validation code was given to respondents upon completion to provide verification for compensation, which was \$0.25 credited to participants' MTurk worker accounts. The study took approximately 30 – 45 minutes for participants to complete.

When examining self-report data, researchers recommend that studies use quality assurance checks when collecting response to maximize data integrity (Huang, Curran, Keeney, Poposki, & DeShon, 2011). As such, multiple validity check items (e.g., “Please select ‘Strongly Disagree’ for this;” Meade & Craig, 2012) were included through the surveys to identify potential careless responding. The 21 (< .01%) participants who failed more than half the validity checks were excluded from further data analysis. To account for potential careless responding, the answers from respondents who complete the survey in less time than 95 percent of the sample were further analyzed. As such, 100 (.3%) respondents were subsequently excluded from data analyses because of evidence of low-effort responding (e.g., selecting the same answer choice for each item on a measure; Huang et al., 2011) as well as failing to finish the survey or provide a validation code for compensation. Data quality assurance was manually managed through Qualtrics, a secure data collection website, and Excel spreadsheets. The remaining 377 (9%) participants ($M(\text{age}) = 22.50$; $SD = 1.82$) were compensated 25 cents because they met inclusion criteria, passed validity checks, and completed at least 75% of the surveys. An overview of the sample's characteristics is provided in Table 1.

Table 1

Participant Demographic Characteristics (N = 377)

<i>Demographic</i>	N	%	<i>Demographic</i>	N	%
Racial/ethnic Identity			Type of University		
African American	34	10%	Public/state	263	70%
Asian American	33	9%	Private	99	26%
Middle Eastern American	4	1%	Liberal Arts College	11	3%
Multiracial	19	5%	Religious Affiliated	4	1%
Native American	20	5%	Greek Status		
White (non-Hispanic)	260	68%	Yes	100	26%
Other	7	2%	No	277	74%
Region of U.S.			Size of School		
Northeast	87	23%	Less than 2,000 Students	21	6%
Southeast	48	13%	2,000 – 5,000 Students	56	15%
Southwest	32	8%	5,000 – 10,000 Students	81	21%
South Atlantic	84	22%	10,000 – 15,000 Students	61	16%
Midwest	63	17%	15,000 – 20,000 Students	51	13%
West	60	17%	More than 20,000 Students	107	29%
Residential Status			Athletic Status		
Dorm	72	19%	Yes	88	23%
Apartment – On-campus	75	20%	No	289	77%
Apartment – Off-campus	166	44%	Marijuana Use		
Fraternity/sorority House	7	2%	Yes	191	51%
With Parents	57	15%	No	186	49%
International Student			Other Illicit Drug Use		
Yes	37	10%	Yes	68	18%
No	340	90%	No	309	82%
Gender					
Male	192	51%			
Female	185	49%			

Measures*Demographics Questionnaire*

Participants completed a brief questionnaire that assesses demographic characteristics such as sex, race, year in school, residential status, Greek Organization

status, athletic status, university information (e.g., type of university, size of university, region of U.S) and other drug use (e.g., marijuana).

Daily Drinking Questionnaire (DDQ)

The Daily Drinking Questionnaire (DDQ; Collins, Park, & Marlatt, 1985) was utilized to measure study participant's typical weekly alcohol consumption. Respondents specified the number of standardized alcoholic drinks they consume and how much time they spend drinking during each day of a typical week. Participants' estimated weekly alcohol consumption scores were derived by summing their self-reported drinks across a typical week.

United States Alcohol Use Disorders Identification Test - Consumption - (USAUDIT-C)

The United States Alcohol Use Disorders Identification Test (USAUDIT-C; Higgins-Biddle & Babor, 2018) was used to assess participant's hazardous drinking behaviors. This 3-item update of the AUDIT initially constructed by Babor, Higgins-Biddle, Saunders, and Montiero (2001) better reflects sex differences in hazardous drinking behaviors and more accurately represents U.S. drinking standards (Higgins-Biddle & Babor, 2018). Respondents rated their engagement in hazardous drinking behaviors on the following items: "How often do you have a drink containing alcohol?," "How many drinks containing alcohol do you have on a typical day when you are drinking?," and "How often do you have X (5 for men; 4 for women) or more drinks on one occasion?" Responses on the USAUDIT-C ranged from 0 (*never*) to 6 (*daily; 10 or more*) for the all items. As such, total scores ranged from 0 to 18, with higher scores indicating increased drinking-related risk and increased engagement in hazardous drinking behaviors. Madson and colleagues (in press) recently established a cutoff score

of 4 for women and men to discriminate at-risk college drinkers on this measure. This and previous versions of the AUDIT have been demonstrated to be reliable and valid in identifying hazardous drinkers and detecting alcohol use problems among college students (Devos-Comby & Lange, 2008; Madson et al., in press; Reinert & Allen, 2007). In this sample, the USAUDIT-C demonstrated acceptable reliability with an alpha coefficient of .71.

Rutgers Alcohol Problem Index (RAPI)

The 23-item Rutgers Alcohol Problem Index (RAPI; Earleywine, LaBrie, & Pederson, 2008) was utilized to measure participant's experiences of alcohol-related negative consequences. The RAPI is designed to account for the frequency of which negative outcomes participants experience during and after consuming alcohol. Negative consequences that the RAPI assessed include "missing a day (or part of a day) of school or work," "having a fight, argument, or bad feeling with a friend," and "suddenly finding yourself in a place that you could not remember getting to," among others. Respondents used a Likert-type scale ranging from 0 (*never*) to 4 (*more than 10 times*) to rate how often they experience a specific alcohol-related negative consequence over the past three years. Total scores on the RAPI ranged from 0 to 92, with higher scores representative of increased frequency of experienced negative outcomes. The RAPI is a widely used and psychometrically sound measure of alcohol-related negative consequences in college student samples (Devos-Comby & Lange, 2008; Neal, Corbin, & Fromme, 2006). For this sample, the RAPI demonstrated very strong internal consistency ($\alpha = .98$).

Protective Behavioral Strategies Scale-20 (PBSS-20)

The Protective Behavioral Strategies Scale-20 (PBSS-20; Treloar, Martens, & McCarthy, 2015) was utilized to assess participants' use of safe drinking strategies before, during, and after alcohol consumption. The recently updated PBSS-20 features items that enhance the reliability of the Serious Harm Reduction (SHR) subscale of Martens and colleagues' (2005) measure while including the original Manner of Drinking (MOD) and Stopping/Limiting Drinking (SLD) subscales. The PBSS-20 includes items such as "refusing to ride in a car with someone who has been drinking," "determining not to exceed a set number of drinks," and "avoid trying to keep up or out-drink others." For each item, participants rated the frequency of which they use each PBS on Likert-type scale ranging from 1 (*never*) to 6 (*always*). Because Bravo, Prince, and Pearson (2016) speculated that the types of PBS may be best measured holistically, the PBSS-20 total score and its three subscales scores were calculated for the proposed study. Scores on the PBS-SHR, PBS-SLD, and PBS-MOD subscales ranged from 8 to 48, 7 to 42, and 5 to 30, respectively, with the PBSS-20 total score ranging from 20 to 120. Higher scores on the PBSS-20 and each of the subscales reflect increased engagement in safe drinking strategies. During its revision, the PBSS-20 demonstrated more acceptable reliability (PBS-SHR: $\alpha = .84$, PBS-SLD: $\alpha = .87$, and PBS-MOD: $\alpha = .83$) and sound convergent and criterion validity statistics (Treloar et al., 2015). The PBSS-20 as a whole was shown to have strong reliability ($\alpha = .92$) within this sample. Moreover, each of the PBSS-20 subscales demonstrated satisfactory internal consistency, with alpha coefficients of .88, .86, and .84 on the PBS-SHR, PBS-SLD, and PBS-MOD subscales, respectively.

Drinking Refusal Self-Efficacy Questionnaire-Revised (DRSEQ-R)

The Drinking Refusal Self-Efficacy Questionnaire-Revised (DRSEQ-R; Oei, Hasking, & Young, 2005; Scully, Mohn, & Madson, 2018) was used to evaluate the extent to which study participants can refuse consuming alcohol in multiple situations. The DRSEQ-R includes 19 items on three subscales: Social Pressure (DRSEQ-SP), Opportunistic Relief (DRSEQ-OR), and Emotional Relief (DRSEQ-ER). Respondents rated their confidence in their abilities to refrain from alcohol use in settings such as “when my friends are drinking,” “when I am on my way home from work/school,” and “when I feel frustrated” (Oei et al., 2005). Item responses ranged from 1 (*I am very sure I would drink*) to 6 (*I am sure I would not drink*), with higher scores reflecting greater self-confidence in one’s ability to refuse alcoholic beverages across different situations. Total and subscale scores were calculated by summing item responses on the DRSEQ-R and its factors (Oei et al., 2005). The DRSEQ-R has been demonstrated as a psychometrically sound measure of drinking refusal self-efficacy for college students in the U.S. (Scully et al., 2018) and abroad (AlMarri, Oei, & AbRahman, 2009; Tak, An, & Woo, 2008). For this sample, the total DRSEQ-R showed strong internal consistency ($\alpha = .92$). Furthermore, all of the DRSEQ-R’s subscales demonstrated satisfactory to strong reliability, with alpha coefficients of .86, .95, and .87 for DRSEQ-SP, DRSEQ-ER, and DRSEQ-OR factors, respectively.

Data Analyses

Respondents ($N = 387$) who completed at least 75% of the survey and met all inclusion criteria were included for data analyses. We used the Statistical Package for the Social Sciences 24th edition (SPSS 24.0) for data cleaning and diagnostics. To reduce the

potential undue influence of extreme values or outliers in the data set, values that fell outside three standard deviations of any given measure's total value were truncated by 1 (i.e., DDQ; Field, 2013). Responses with apparent randomly missed items on measures with Likert-type scales were imputed using the "linear trend at point" function in SPSS.

Structural equation modeling (SEM) was used to analyze the mediating effects of DRSE and its subtypes on the relationships between PBS-A and its dimensions with typical weekly alcohol consumption, hazardous drinking, and alcohol-related negative consequences. For all models, PBS-A and its dimensions (i.e., PBS-SLD, PBS-MOD, PBS-SHR) were predictor variables, DRSE and its subtypes (i.e., DRSE-SP, DRSE-OR, DRSE-ER) were mediators, and the three alcohol use outcomes (i.e., typical weekly alcohol consumption, hazardous drinking, alcohol-related negative consequences) were outcome variables. SEM was used primarily because it multivariately considered all variables in the study, did not require normally distributed data, and reduced potential of Type I error (Muthén & Muthén, 2012; Schumacker & Lomax, 2004). Primary evaluation of hypothesized relationships was explored through analyzing parameter estimates rather than global fit statistics. Mplus 7.12 software (Muthén & Muthén, 2012) was used to run SEMs for the study.

For each model, bootstrapping techniques were used to account for the influence of any skewed data. Bootstrapping makes no assumptions about the sample's distribution and uses a non-parametric approach to estimate effect sizes (Preacher & Hayes, 2004). Typically, bootstrapping uses an extraction of 5,000 resamples to calculate mediation effects for each resampling (Preacher & Hayes, 2004). For each predicted association, the product of the *a* and *b* paths was divided by the *c* path to analyze how much variance is

explained by the mediating variables on each outcome variable (Preacher & Hayes, 2004). For partial mediation, only a decrease in the relationship value between the predictor and outcome variables is required. However, for full mediation, at least 80% of the variance in the association between the predictor and outcome variables is accounted for once the mediating variable is considered (Kenny, 2015). Standardized coefficients and confidence intervals were used for each analysis. Given that the hypothesized mediations were anticipated to affect the outcome variable in the same direction, it was possible that the sum of the proportion mediated could have been over 100% (VanderWeele & Vansteelandt, 2004).

CHAPTER III - RESULTS

Means and standard deviations for and bivariate correlations among each of the study's measures are presented in Table 2. Of note, comparatively speaking, the mean weekly standard drinks (14.79; $SD = 16.35$) indicates a heavier than usual college student alcohol use sample (Johnston et al., 2018). Further, around 89% ($N = 171$) of men and 81% ($N = 152$) of women met the suggested cutoff for at-risk drinking on the USAUDITC (Madson et al., 2018), which suggests that approximately 86% ($N = 323$) of the sample were at an increased risk of misusing alcohol or developing an alcohol use disorder. Bivariate correlation analyses showed that PBS-SHR, DRSE-ER, and DRSE-OR, not PBS-SLD and PBS-MOD, were significantly inversely related to typical weekly alcohol consumption and alcohol-related negative consequences. Moreover, all subscales of PBS-A and factors of DRSE were negatively associated with hazardous drinking. Additionally, PBS-MOD and PBS-SLD had significant positive associations with DRSE-ER and DRSE-OR. While PBS-SHR was positively correlated with DRSE-OR, DRSE-ER, and the other factors of PBS-A, the subscale had a significant negative relationship with DRSE-SP.

Table 2

*Means, Standard Deviations, and Intercorrelations of Predictor, Mediator, and Outcome**Variables*

	1	2	3	4	5	6	7	8	9
1. Alcohol Consumption	--								
2. Negative Consequences	.38**	--							
3. Hazardous Drinking	.50**	.28**	--						
4. Serious Harm Reduction PBS-A	-.11*	-.25**	-.14**	--					
5. Stopping/Limiting Drinking PBS-A	-.03	.06	-.21**	.55**	--				
6. Manner of Drinking PBS-A	-.07	.05	-.30**	.51**	.70**	--			
7. Social Pressure DRSE	-.04	.28**	-.25**	-.20**	.16**	.22**	--		
8. Emotional Relief DRSE	-.28**	-.31**	-.32**	.27**	.19**	.20**	.27**	--	
9. Opportunistic Relief DRSE	-.31**	-.33**	-.30**	.38**	.17**	.18**	.16**	.67**	--
<i>Mean</i>	14.79	42.76	7.42	35.31	25.40	17.93	10.92	27.74	33.21
<i>Standard Deviation</i>	16.35	20.92	3.25	9.07	7.90	6.08	5.09	9.95	8.91

Note: PBS-A = Protective Behavioral Strategies – Alcohol, DRSE = Drinking Refusal Self-Efficacy. * $p < .05$, ** $p < .01$

DRSE Subtypes as Predictors of Alcohol Use Outcomes

Prior to evaluating mediation, analyses initially focused on the direct associations among the subtypes of DRSE with typical weekly alcohol use, hazardous drinking, and alcohol-related negative consequences. Consistent with Hypotheses 1b and 1c, increased DRSE-OR ($\beta = -.23$, $p < 0.001$; CI (99%) = $-.389$, $-.059$) and DRSE-ER ($\beta = -.15$, $p < 0.01$; CI (95%) = $-.262$, $-.037$) significantly predicted decreased weekly alcohol use. Contrary to expectations, typical weekly alcohol use was not predicted by DRSE-SP ($\beta = .05$, $p = .42$; CI (90%) = $-.046$, $.138$). Consistent with Hypotheses 1a, 1b, and 1c, all DRSE subscales predicted decreased hazardous drinking, with DRSE-SP ($\beta = -.12$, $p < 0.05$; CI (90%) = $-.214$, $-.018$), DRSE-OR ($\beta = -.16$, $p < 0.05$; CI (95%) = $-.292$, $-.012$),

and DRSE-ER ($\beta = -.16, p < 0.05; CI (95\%) = -.284, -.018$) being directly inversely related with dangerous alcohol use. When examining for DRSE subtypes' predictive abilities of alcohol-related negative consequences, multiple results were found that were inconsistent with Hypotheses 1a and 1b. While DRSE-ER ($\beta = -.28, p < 0.001; CI (99\%) = -.405, -.152$) significantly predicted fewer negative consequences, increased DRSE-OR ($\beta = -.17, (p < 0.01; CI (99\%) = -.328, -.011$) was also significantly inversely associated with alcohol-related negative consequences. Moreover, unexpectedly, DRSE-SP ($\beta = .34, p < 0.001; CI (99\%) = .153, .465$) significantly predicted more alcohol-related negative consequences, suggesting that increased confidence in one's ability to refrain from drinking in social situations contributed to increased experiences of alcohol-related harm in this college student sample. Therefore, parts of Hypotheses 1a and 1b as well as all of Hypothesis 1c were supported.

Total DRSE as Mediator of PBS-A and Its Subtypes with Alcohol Use Outcomes

Mediation analyses were conducted in order of complexity, with each model including increased paths. Of note, the total effect will represent each association without considering the mediator, and the direct effect will define each relationship while accounting for the mediator.

The first model tested Hypothesis 2a, which assessed whether total DRSE mediated the association between PBS-A with alcohol use outcomes. Significant paths within the model are presented in Figure 1. In this model, all relationships between PBS-A and alcohol use outcomes were mediated. Specifically, DRSE ($\beta = -.09; CI (99\%) = -.16, -.04$) mediated the association between PBS-A and typical weekly alcohol use. The total effect was $\beta = -.08$, and the direct effect was $\beta = .01$, resulting in an over 100%

mediation. Further, DRSE ($\beta = -.10$, CI (99%) = $-.17, -.04$) mediated the relationship between PBS-A and hazardous drinking. Here, the total effect was $\beta = -.25$, and the direct effect was $\beta = -.15$, indicating a 40% mediation. DRSE ($\beta = -.07$, CI (99%) = $-.13, -.03$) also mediated the association between PBS-A and alcohol-related negative consequences. For this relationship, the total effect was $\beta = -.07$, and the direct effect was $\beta = .00$, resulting in a 95% mediation. Per Kenny's (2015) recommendations, DRSE fully mediated the associations between PBS-A with typical weekly alcohol use and alcohol-related negative consequences while partially mediating the relationship between PBS-A and hazardous drinking. Thus, Hypothesis 2a was fully supported.

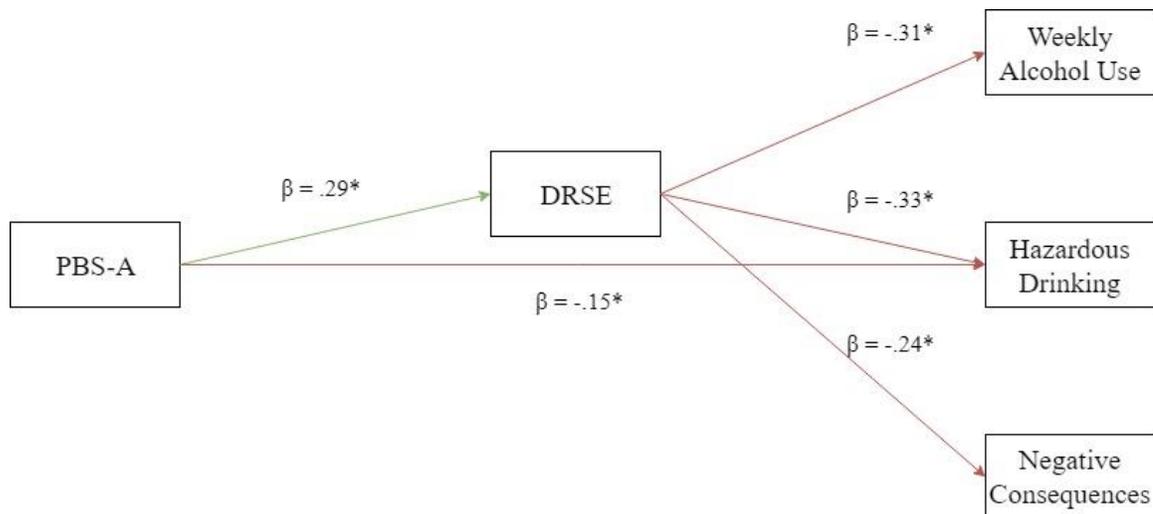


Figure 1. *Observed Path Model for DRSE Total on Associations among PBS-A Total and Alcohol Use Outcomes*

Note: PBS-A = Protective Behavioral Strategies – Alcohol; DRSE = Drinking Refusal Self-Efficacy

The second model tested Hypotheses 2b and 2c, which centered on whether total DRSE mediated the relationships among PBS-A subtypes with typical weekly alcohol use, hazardous drinking, and alcohol-related negative consequences. Figure 2 features significant paths within this model. For typical weekly alcohol use, there was one

significant mediation observed. DRSE ($\beta = -.05$, CI (99%) = $-.11, -.01$) mediated the association between PBS-SHR and typical weekly alcohol use. Here, the total effect was $\beta = -.12$, and the direct effect was $\beta = -.06$, indicating a 42% mediation. For hazardous drinking, inconsistent with expectations, DRSE ($\beta = -.06$, CI (99%) = $-.12, -.01$) only mediated the relationship with PBS-SHR. For this association, the total effect was $\beta = .02$, and the direct effect was $.08$, resulting in an over 100% mediation. Regarding alcohol-related negative consequences, there was one significant mediation present. DRSE ($\beta = -.09$, CI (99%) = $-.09, -.01$) mediated the relationship between PBS-SHR and alcohol-related negative consequences. The total effect was $\beta = -.42$, and the direct effect was $-.38$, indicating only a 10% mediation. Overall, DRSE fully mediated the association between PBS-SHR and hazardous drinking while partially mediating the relationships between PBS-SHR with typical weekly alcohol use and alcohol-related negative consequences, respectively (Kenny, 2015). Therefore, Hypothesis 2b was not supported, and Hypothesis 2c was partially supported.

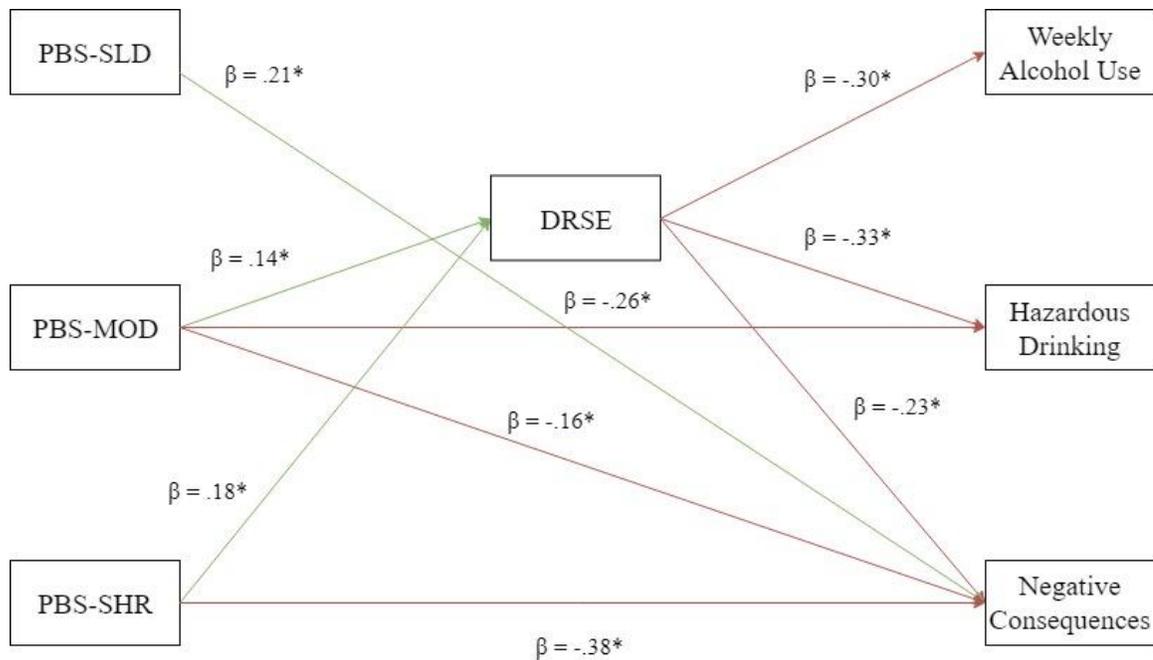


Figure 2. *Observed Path Model for DRSE Total on Associations among PBS-A Subtypes and Alcohol Use Outcomes*

Note: PBS-SLD = Protective Behavioral Strategies – Stopping/Limiting Drinking; PBS-MOD = Protective Behavioral Strategies – Manner of Drinking; PBS-SHR = Protective Behavioral Strategies – Serious Harm Reduction; DRSE – Drinking Refusal Self-Efficacy

DRSE Subtypes as Mediators of PBS-A with Alcohol Use Outcomes

The third model tested Hypotheses 3a, 3b, and 3c, which analyzed whether the subtypes of DRSE mediated the associations between total PBS-A and alcohol use outcomes. Significant paths are presented in Figure 3. For typical weekly alcohol use, there were two significant mediations. Specifically, DRSE-OR ($\beta = -.07$, CI (99%) = $-.14, -.02$) and DRSE-ER ($\beta = -.04$, CI (99%) = $-.10, -.002$) mediated the association between PBS-A and typical weekly alcohol use. The total effect was $\beta = -.09$, and the direct effect was $\beta = .02$, resulting in an 80% mediation for DRSE-OR and 47% mediation for DRSE-ER. Moreover, there was one significant mediation with hazardous drinking as an outcome. DRSE-ER ($\beta = -.04$; CI (95%) = $-.09, -.01$) mediated the relationship between

PBS-A and hazardous drinking. For this association, the total effect was $\beta = -.25$, and the direct effect was $\beta = -.17$, resulting in a 16% mediation. For alcohol-related negative consequences, there were two significant mediations. DRSE-ER ($\beta = -.08$; CI (99%) = -.14, -.03) and DRSE-OR ($\beta = -.07$; CI (99%) = -.13, -.02) mediated the relationship between PBS-A and alcohol-related negative consequences. Here, the total effect was -.07, and the direct effect was .05, indicating an over 100% mediation for DRSE-ER and 80% mediation for DRSE-OR. Per Kenny's (2015) recommendations, DRSE-OR fully mediated the associations between PBS-A with typical weekly alcohol use and alcohol-related negative consequences, respectively. Further, DRSE-ER fully mediated the relationship between PBS-A and alcohol-related negative consequences and partially mediated the associations between PBS-A with typical weekly alcohol use and hazardous drinking (Kenny, 2013). Given these findings, Hypotheses 3a and 3b were partially supported.

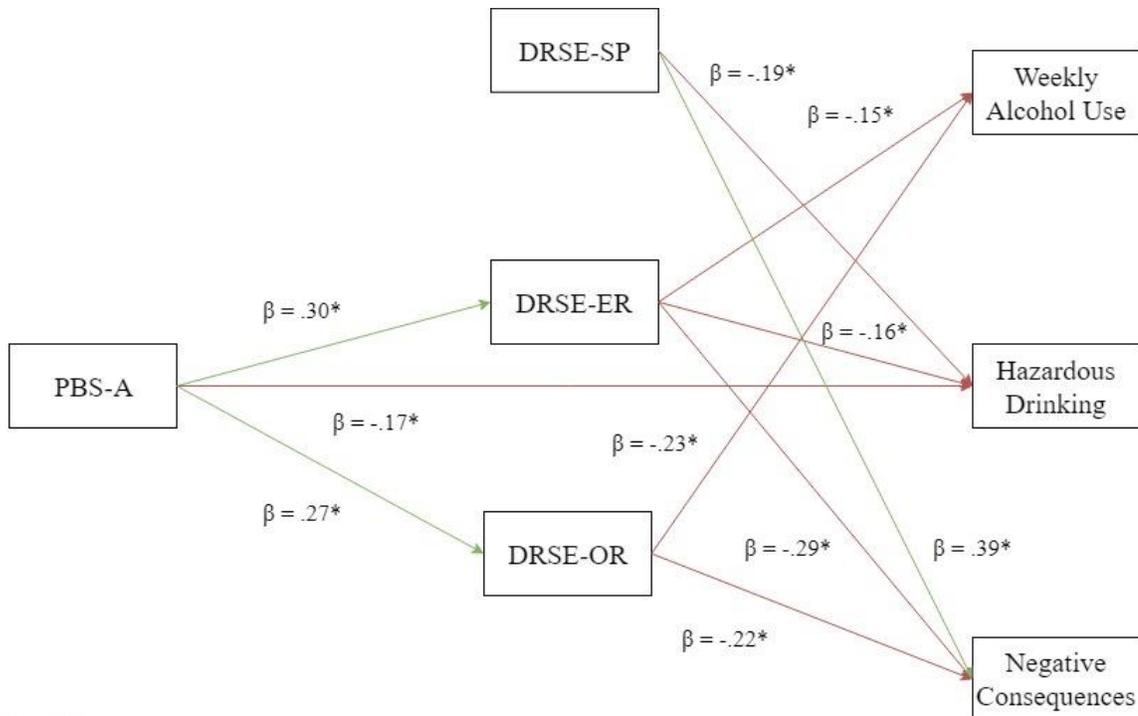


Figure 3. *Observed Path Model for Dimensions of DRSE on Associations among PBS-A and Alcohol Use Outcomes*

Note: PBS-A = Protective Behavioral Strategies – Alcohol; DRSE-SP = Social Pressure Drinking Refusal Self-Efficacy; DRSE-OR = Opportunistic Relief Drinking Refusal Self-Efficacy; DRSE-ER = Emotional Relief Drinking Refusal Self-Efficacy

DRSE Subtypes as Mediators of PBS-A Subtypes with Alcohol Use Outcomes

The fourth model tested Hypotheses 4a, 4b, and 4c, which assessed whether the dimensions of DRSE mediated the relationships between PBS-SLD with alcohol use outcomes. Figure 4 presents all significant paths within this model. A summary of β and p values for all direct and indirect effects among DRSE subtypes, PBS dimensions, and alcohol use outcomes is presented in Table 3.

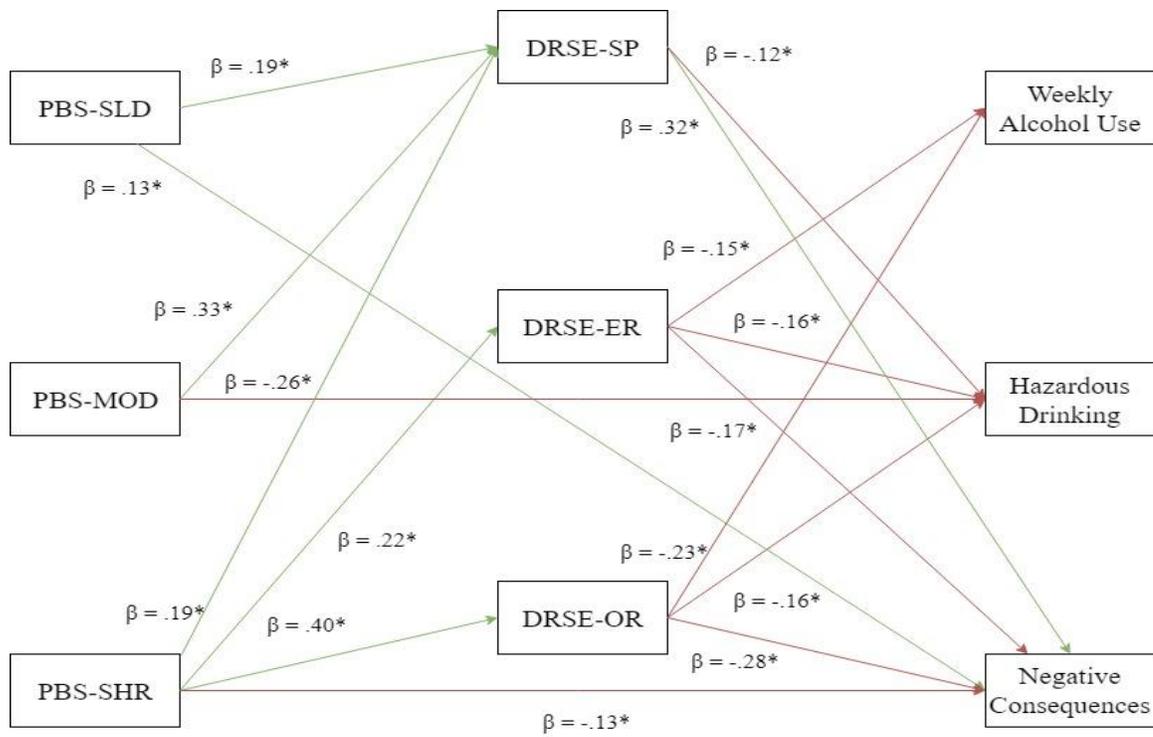


Figure 4. *Observed Path Model for Dimensions of DRSE on Associations Among PBS-A Subtypes and Alcohol Use Outcomes*

Note: PBS-SLD = Protective Behavioral Strategies – Stopping/Limiting Drinking; PBS-MOD = Protective Behavioral Strategies – Manner of Drinking; PBS-SHR = Protective Behavioral Strategies – Serious Harm Reduction; DRSE-SP = Social Pressure Drinking Refusal Self-Efficacy; DRSE-ER = Emotional Relief Drinking Refusal Self-Efficacy; and DRSE-OR = Opportunistic Relief Drinking Refusal Self-Efficacy

Table 3

*Total, Direct, and Indirect Effects of Alcohol Protective Behavioral Strategies on Alcohol**Use Outcomes*

Dependent Variable	DDQ		USAUDITC		RAPI	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
PBS-A Subtypes						
Stopping/Limiting Drinking						
Total Effect	.09	.19	-.01	.92	.20	.00
Direct Effect	.07	.30	.01	.92	.13	.03
Specific Indirect Effects						
Social Pressure	.01	.47	-.02	.12*	.06	.01
Emotional Relief	.00	.84	.00	.84	-.01	.83
Opportunistic Relief	.02	.40	.01	.46	.01	.43
Manner of Drinking						
Total Effect	-.08	.26	-.31	.00	.13	.04
Direct Effect	-.08	.30	-.26	.00	.04	.46
Specific Indirect Effects						
Social Pressure	.02	.44	-.04	.06	.11	.00
Emotional Relief	-.01	.40	-.01	.42	-.02	.37
Opportunistic Relief	-.01	.75	.00	.77	.00	.76
Serious Harm Reduction						
Total Effect	-.12	.04	.02	.78	-.42	.00
Direct Effect	.03	.66	.06	.44	-.13	.06
Specific Indirect Effects						
Social Pressure	-.02	.43	.06	.05*	-.15	.00
Emotional Relief	-.03	.04	-.04	.06*	-.06	.00
Opportunistic Relief	-.09	.00	-.06	.04	-.07	.01

Note: * = Significant coefficients based on parameter estimates through 5,000 bootstrapped samples. All significant standardized beta

coefficients are bold ($p < .05$). PBS-A = Protective Behavioral Strategies – Alcohol; DDQ = Daily Drinking Questionnaire;

USAUDITC = United States Alcohol Use Disorders Identification Test – Consumption; and RAPI = Rutgers Alcohol Problem Index.

PBS-SLD with Alcohol Use Outcomes

For the association between PBS-SLD and typical weekly alcohol use (Hypothesis 4a), there were no significant mediations. When examining hazardous drinking, one significant mediation emerged. DRSE-SP ($\beta = -.02$; CI (95%) = $-.06, -.001$) mediated the relationship between PBS-SLD and hazardous drinking. Here, the total effect was $\beta = -.01$, and the direct effect was $\beta = .01$, resulting in an over 100% mediation. For alcohol-related negative consequences, there was also one significant mediation. Specifically, DRSE-SP ($\beta = .06$; CI (99%) = $.01, .13$) mediated the association

between PBS-SLD and alcohol-related negative consequences. The total effect was $\beta = .20$, and the direct effect was $\beta = .13$, indicating a 31% mediation. Overall, DRSE-SP fully mediated the relationship between PBS-SLD and hazardous drinking and partially mediated the association between PBS-SLD and alcohol-related negative consequences (Kenny, 2015). Therefore, Hypothesis 4a was partially substantiated.

PBS-MOD with Alcohol Use Outcomes

Regarding typical weekly alcohol use, there were no significant mediations, contrary to part of Hypothesis 4b. However, for hazardous drinking, one significant mediation emerged. Specifically, DRSE-SP ($\beta = -.04$; CI (95%) = $-.09, -.004$) mediated the relationship between PBS-MOD and hazardous drinking. For this association, the total effect was $\beta = -.31$, and the direct effect was $\beta = -.26$, indicating a 12% mediation. For alcohol-related negative consequences, there was one significant mediation. DRSE-SP ($\beta = .11$; CI (99%) = $.03, .21$) mediated the relationship between PBS-MOD and alcohol-related negative consequences. Here, the total effect was $.13$, and the direct effect was $.04$, resulting in an 85% mediation. Regarding alcohol-related negative consequences, no significant relationship with PBS-MOD emerged ($\beta = .04, p = .46$). Using Kenny's (2015) recommendations, DRSE-SP partially mediated the association between PBS-MOD and hazardous drinking and fully mediated the relationship between PBS-MOD and alcohol-related negative consequences. Thus, Hypothesis 4b was partially supported.

PBS-SHR with Alcohol Use Outcomes

Inconsistent with part of Hypothesis 4c, for typical weekly alcohol use, two significant mediations emerged. DRSE-ER ($\beta = -.03$; CI (99%) = $-.09, -.002$) and DRSE-

OR ($\beta = -.09$; CI (99%) = $-.18, -.02$) mediated the association between PBS-SHR and typical weekly alcohol use. For this relationship, the total effect was $\beta = -.12$, and the direct effect was $\beta = .03$, indicating a 28% mediation for DRSE-ER and an 80% mediation for DRSE-OR. Additionally, there were three significant mediations observed for hazardous drinking. Specifically, DRSE-SP ($\beta = .06$; CI (95%) = $.001, .11$), DRSE-ER ($\beta = -.04$; CI (99%) = $-.08, -.01$), and DRSE-OR ($\beta = -.06$; CI (95%) = $-.13, -.01$) mediated the association between PBS-SHR and hazardous drinking. Here, the total effect was $.02$, and the direct effect was $.06$, resulting in over 100% mediations for DRSE-SP, DRSE-ER, and DRSE-OR, respectively. Regarding alcohol-related negative consequences, there were also three significant mediations. DRSE-SP ($\beta = -.16$; CI (99%) = $-.26, -.07$), DRSE-ER ($\beta = -.06$; CI (99%) = $-.13, -.02$), and DRSE-OR ($\beta = -.07$; CI (99%) = $-.14, -.01$) mediated the relationship between PBS-SHR and alcohol-related negative consequences. The total effect was $\beta = -.42$, and the direct effect was $-.13$, indicating a 37% mediation for DRSE-SP, a 15% mediation for DRSE-ER, and a 17% mediation for DRSE-OR. DRSE-OR fully mediated the relationship between PBS-SHR and typical weekly alcohol use while DRSE-ER partially mediated it (Kenny, 2015). DRSE-SP fully mediated the association between PBS-SHR and hazardous drinking and partially mediated the relationship between PBS-SHR and alcohol-related negative consequences (Kenny, 2015). DRSE-ER and DRSE-OR fully mediated the association between PBS-SHR and hazardous drinking as well as partially mediated the relationship between PBS-SHR and alcohol-related negative consequences (Kenny, 2015). Therefore, Hypothesis 4c was partially supported

CHAPTER IV - DISCUSSION

The current study examined the direct associations between subtypes of DRSE (Drinking Refusal Self-Efficacy) with typical weekly alcohol use, hazardous drinking, and alcohol-related negative consequences as well as the mediating role of DRSE and its dimensions on the relationships among PBS-A (Alcohol Protective Behavioral Strategies) and its subtypes with these same alcohol use outcomes. Broadly, the study's findings suggest that DRSE may play an important explanatory role in the relationship between PBS-A and alcohol use outcomes and that the dimensions of DRSE warrant further consideration in exploring nuances and saliency in safe and harmful college student alcohol use behaviors.

DRSE Subtypes: Main Effects

As hypothesized, DRSE-ER (Drinking Refusal Self-Efficacy - Emotional Relief) and DRSE-OR (Drinking Refusal Self-Efficacy - Opportunistic Relief) predicted lower rates of typical weekly alcohol use, hazardous drinking, and alcohol-related negative consequences, which was generally consistent with previous literature (Ehret et al., 2013; Monk & Heim, 2013; Pearson et al., 2017). Interestingly, a significant inverse association also emerged between DRSE-OR and negative consequences, marking the first study, to our knowledge, to establish this relationship. This could be explained by the volitional contexts entailed in DRSE-OR, which could not only be protective against alcohol consumption but also alcohol-related negative consequences (Oei et al., 2005). Somewhat unexpectedly, DRSR-SP (social pressure drinking refusal self-efficacy) predicted not only less hazardous drinking but also more alcohol-related negative consequences. From a social-cognitive perspective, a dichotomy becomes somewhat apparent in examining

the relationship between DRSE subscales and alcohol-related negative consequences. Specifically, there may be environmental confounds that affects the protectiveness of DRSE-SP against alcohol-related negative consequences versus DRSE-OR and DRSE-ER, which are less likely to be negated by social factors (Borsari & Carey, 2001; Gilles et al., 2006). Altogether, these results provide up-to-date reference points for the predictive abilities of DRSE subtypes on alcohol use outcomes.

DRSE and PBS-A

As hypothesized (2a), DRSE mediated the relationship between the broad construct of PBS-A with all alcohol use outcomes. On the surface, these results suggest that self-efficacy might perform more of a facilitating role in the associations among safe drinking strategies with alcohol use outcomes rather than a buffering role. Moreover, these findings offer clarification to the contradictory findings observed between Ehret and others' (2013) and Pearson and colleagues' (2017) studies. Essentially, the general construct of harm reduction strategies, such as PBS-A, and its associations with drinking and negative consequences appears to be partially explained by a college student's confidence in his/her ability to refuse alcohol in general. These results support Bandura's (1978, 2004) assertions about the connections among thoughts (i.e., DRSE), behaviors (i.e., PBS-A), and outcomes (i.e., alcohol use outcomes) in health-related behaviors and previous literature attributing DRSE as a salient cognitive contributor of alcohol use outcomes among college students through a social-cognitive lens (Hasking, Boyes, & Mullan, 2015; Oei & Morawska, 2004).

DRSE and PBS-A Subtypes

However, when examining global DRSE as a mediator of PBS-A subtypes (Hypotheses 2b and 2c), only the associations between PBS-SHR (Protective Behavioral Strategies - Serious Harm Reduction) with alcohol use outcomes were mediated by DRSE. Unexpectedly, DRSE also mediated the relationships between PBS-SHR with typical weekly alcohol use and hazardous drinking. It was unsurprising that the relationship between PBS-SHR with alcohol-related negative consequences was mediated by DRSE, especially given that PBS-SHR and DRSE have both been shown to be protective against harmful alcohol use outcomes (Napper et al., 2014; Ralston & Palfai, 2010). The mediations for these consumption variables may be present due to the high PBS-SHR use ($M = 35.09$; $SD = 9.07$) in the sample, which may compensate for elevated alcohol use among participants. In fact, DRSE could be an indirect catalyst and secondary defense for decreased consumption and hazardous drinking among college students that use more PBS-SHR (Oei & Morawska, 2004; Villarosa et al., 2018).

Although it was expected that DRSE would mediate the associations PBS-SLD and PBS-MOD with typical weekly alcohol use and hazardous drinking, no significant mediations emerged. In this study, DRSE played more of a role in explaining indirect PBS-A (i.e., PBS-SHR) rather than more direct PBS-A (i.e., PBS-SLD, PBS-MOD). One potential explanation for these findings may be that these PBS-A may be more influenced by other internal cognitive variables, such as injunctive norms and expectancies, instead of DRSE (Gaher & Simons, 2007; Wood, Nagoshi, & Dennis, 1992). Another possible reason for the lack of mediation may be the behavior specificity of self-efficacy as a construct (Bandura & Walters, 1977; Bandura, 2004). A superficial examination of items

on the PBSS-20 versus the DRSEQ-R, especially regarding PBS-SLD and PBS-MOD, reveals that the PBSS-20 adapts more of a behavioral focus while the DRSEQ-R centers more so on cognition. As such, these two types of PBS-A and refusing drinks in certain contexts may be representative of entirely different behaviors. Perhaps, a slightly revised or integrative measure of the PBSS-20 that assesses participant's confidence in their ability to use PBS-A may have yielded different results.

DRSE Subtypes and PBS-A

As hypothesized (3a), DRSE-ER emerged as a mediator on the relationship PBS-A had with typical weekly alcohol use, hazardous drinking, and alcohol-related negative consequences. Specifically, DRSE-ER explained notable reductions in all alcohol use outcomes when accounting for PBS-A globally. These findings shed insight into the interplay between DRSE-ER and PBS-A and subsequently how it may influence self-regulatory behaviors among college students, especially those struggling with negative mood symptoms (Hustad, Carey, Carey, & Maisto, 2009; Simons, Gaher, Correia, Hansen, & Christopher, 2005). As such, enhancing factors such as DRSE-ER may be instrumental in altering maladaptive self-medicating alcohol use behaviors and reducing alcohol-related harm (Colder, 2001; Simons et al., 2005).

Contrary to part of Hypothesis 3a, no significant mediations emerged for DRSE-SP on any of the relationships between PBS-A and alcohol use outcomes. Similar to discussion regarding PBS-A subscales, the absence of mediations for DRSE-SP may be due to behavioral specificity of self-efficacy (Bandura, 2004). Because of the lack of overlap between PBS-A and DRSE as constructs at item-level, DRSE-SP may not adequately encapsulate self-efficacy for PBS-A relevant to social situations. Additionally,

given its observed positive association with alcohol-related negative consequences in this study, DRSE-SP could be playing an adversarial role to PBS-A rather than a facilitating one, which is partially supportive of Ehret and colleagues' (2013) conclusion that use of PBS-A is most beneficial in the absence of DRSE. As such, the indirect effects of DRSE-SP may be washed out by other social or environmental confounds that may better explain the relationships between PBS-A and alcohol use outcomes (Borsari & Carey, 2001).

Moreover, in partial support of Hypothesis 3b, DRSE-OR mediated the associations PBS-A had with typical weekly alcohol use and alcohol-related negative consequences. These findings fit well within a social-cognitive conceptualization, given previously observed significant associations between DRSE-OR and alcohol use outcomes in this study as well as consistently demonstrated findings between PBS-A with consumption and consequences (Bravo et al., 2016; Pearson, 2013; Scott-Sheldon et al., 2014). However, somewhat unexpectedly, DRSE-OR did not mediate the relationship between PBS-A and hazardous drinking. This lack of mediation may be more attributable to a methodological explanation rather than theoretical justification. Specifically, analyses indicated that DRSE-OR fell just short of mediating this association, suggesting that DRSE-OR may still warrant consideration as a catalyst of this association. Perhaps, in a sample with more participants and greater power, bootstrapping analyses may have demonstrated a significant mediation in this case (Wolf, Harrington, Clark, & Miller, 2013).

DRSE Subtypes and PBS-A Subtypes

In contrast with parts of Hypotheses 4a and 4b, DRSE-SP unexpectedly mediated the relationships between PBS-SLD and PBS-MOD with alcohol-related negative consequences. DRSE-SP catalyzed an increase in negative consequences despite increased use of PBS-SLD and PBS-MOD. These results could be explained by a stop-gap between a college student's DRSE and their actual actions (Bandura, 1999). For instance, one's confidence in their ability to refuse drinks in social environments may look differently when one is alone than when one is with their peers or friends. While a college student may have higher DRSE-SP and intend to use PBS-SLD or PBS-MOD, one's self-efficacy does not necessarily translate into engaging in planned behavior or following through on their intentions (Bandura, 1999). In fact, an array of social or environmental factors, such as peer influence or drinking context, could dissuade one from following through on PBS-A despite their DRSE, which could consequently contribute to increased alcohol-related harm (Lee, Geisner, Patrick, & Neighbors, 2010; O'Hare & Sherrer, 1997). Essentially, although DRSE-SP as well as PBS-SLD and PBS-MOD may be present among college students, these variables may fall subservient to other factors that are more characteristic and acceptable within normative college student alcohol use behaviors (Borsari & Carey, 2001; DeMartini, Carey, Lao, & Luciano, 2011).

When considering PBS-SHR and DRSE subtypes (Hypothesis 4c), DRSE-SP mediated an increase in hazardous drinking while DRSE-ER and DRSE-OR explain decreases in all alcohol use outcomes. While research has constantly demonstrated an inverse association between PBS-SHR and alcohol-related negative consequences (Madson & Zeigler-Hill, 2013), recent literature has alluded to a possible association

between increased PBS-SHR and hazardous drinking (Villarosa-Hurlocker et al., 2018). A college student's ability to self-regulate positively rather than self-medicating and acting in accordance with their confidence in their beliefs through DRSE-ER and DRSE-OR may provide a potential explanation for reduced hazardous drinking. Moreover, based on previously observed direct and indirect effects, speculation can be made that DRSE-ER and DRSE-OR as subtypes may function more so within an individual context whereas DRSE-SP has situational relevance. Given that DRSE-ER and DRSE-OR explain reductions in alcohol use outcomes while DRSE-SP contributes to more dangerous drinking, it is thought that there may be other social or environmental variables, such as norms or motives, that account for this discrepancy (Borsari & Carey, 2001). What appears most promising about these findings is that all DRSE subtypes mediated the relationship between PBS-SHR and alcohol-related negative consequences. While DRSE as a construct does not encapsulate negative consequences, it appears to be protective against alcohol-related harm among college students. These findings suggest that the thought of safe drinking itself may inform more of harm-reduction approach among college students when they consume alcohol (Bandura, 1998; Bandura, 2004).

However, examining these relationships among DRSE and PBS-A as broad constructs and by subtype with alcohol use outcomes yielded varied results that bring accounting for variability into question. Depending upon the context of DRSE as a mediator and modality of PBS-A with alcohol use outcomes, different combinations of dimensions of each of these "safe" alcohol use variables may further insulate college students from alcohol-related harm or even further exacerbate alcohol use outcomes. For example, high PBS-SHR use among study participants may have accounted for much of

the variance in the observed mediations when examining PBS-A globally (Field, 2013). Moreover, DRSE may function differently for college students depending upon the environment they engage in alcohol use behaviors (Borsari & Carey, 2001). Could our understanding of the relationships among DRSE, PBS-A, typical weekly alcohol use, hazardous drinking, and alcohol-related negative consequences have more clarity through parsimony? With alpha levels in the low nineties (DRSEQ-R = .92; PBSS-20 = .92), an argument could be made that DRSE and PBS-A should be evaluated as unitary constructs rather than parsed apart (Field, 2013). Given the juxtaposition of findings observed between a global view of DRSE and PBS-A with alcohol use outcomes versus a subscale-specific emphasis, perhaps yielding to Ockham's razor and opting for a more simplified view of DRSE's mediating role may be better justified (Epstein, 1984). Whether taken holistically or specifically, these results shed valuable insight into how DRSE as a cognitive mechanism explains engagement in PBS-A and subsequent alcohol use outcomes.

Clinical Implications

There are several clinical implications to consider. Because of its salience in the associations between PBS-A and alcohol use outcomes, clinicians may benefit from exploring DRSE across different contexts when assessing potential connections among safe and harmful alcohol use behaviors in clients. Clinicians may also benefit from exploring how a college student's DRSE and PBS-A use may be affected by potential internal factors (e.g., resistance to peer influence [Presley, Meilman, & Leichter, 2002], self-regulation [Hustad et al., 2009]) and environmental variables (e.g., norms [Borsari & Carey, 2001]). As the study's findings support, clinicians in harm reduction programs

such as BASICS (Brief Alcohol Screening and Interventions for College Students Program; Dimeff, 1999; Marlatt, Baer, & Larimer, 1995) could teach and practice drinking refusal skills with college students to enhance their self-efficacy (Hsu & Marlatt, 2012; Jarvis, Tebbutt, Mattick, & Shand, 2005; Lessa & Scanlon, 2006). Regardless of treatment modality, clinicians are encouraged to incorporate more comprehensive exploration of different dimensions of DRSE to better inform their understanding of a student's alcohol use outcomes. Furthermore, an injunctive norm-based intervention that assesses students' perceived acceptability of DRSE across contexts could shed insight into what leads to their engagement in safe and harmful alcohol use behaviors. Furthermore, clinicians would benefit from designing outreach programming to enhance DRSE among college students to promote engagement in safe drinking behaviors, such as PBS-A, and reduce alcohol-related harm. Perhaps, a campus-wide adaptation of Voogt and colleagues' (2014) web-based psychoeducational resource on DRSE could be disseminated to students across college campuses or be included in substance use awareness and prevention programs to proactively curb alcohol use outcomes for incoming freshman or transfer students.

Limitations and Future Research Directions

These results should be interpreted within the study's limitations. Although there were stringent screening criteria, the study collected data via self-report. Given this factor and the financial incentive for completing the survey, some uncertainty exists as to whether participants were college students. Compared to research conducted with college students (Johnston et al., 2018), weekly alcohol use among the study's sample ($M = 14.79$; $SD = 16.35$) was comparatively high, which could have subsequently influenced

results found with weekly alcohol use. While some research suggests that weekly alcohol use may be underreported among college students (Walker & Cosden, 2007), future studies would still likely benefit from extrapolating sub-samples of college student drinkers (e.g., recreational v. hazardous; low v. mild v. heavy), categorizing them by consumption, and assessing how DRSE and its subtypes affect the associations between PBS-A with alcohol use outcomes. Additionally, a majority of participants reported being male and White, non-Hispanic. Given the frequency, extent, and duration of consumption and alcohol-related negative consequences documented among college men (Iwamoto, Corbin, Lejuez, & MacPherson, 2014; Whitley, Madson, & Zeigler-Hill, 2018), the sheer magnitude of self-reported alcohol use and consequences could have predominantly accounted for the variance among the study's hypothesized associations. Therefore, future studies are encouraged to assess the relationships among DRSE, PBS-A, and alcohol use outcomes exclusively within male and female college student populations.

Future research may also benefit from exploring these questions in more culturally and ethnically diverse samples to determine whether these associations are present among different groups. Furthermore, future research may benefit from exploring other socio-cognitive (e.g., motives, self-regulation) and environmental (e.g., drinking context, resistance to peer influence) variables that may affect these associations. Also, given the present study's cross-sectional design, a more longitudinal examination of college student PBS-A, DRSE, weekly alcohol use, hazardous drinking, and alcohol-related negative consequences could provide further insight into how these safe and harmful alcohol use behaviors fluctuate over the academic semester or career. Additionally, while our principal findings are consistent with mediation, using

longitudinal analysis in future research would be invaluable to establishing a causal chain among DRSE, PBS-A, and alcohol use outcomes that substantiates true mediation. Future studies are also encouraged to further evaluate dimensions of DRSE to extend potential explanations for engagement in safe and harmful alcohol use behaviors through different theoretical lens, such as DRSE-ER in the self-medication hypothesis (Colder, 2001) or DRSE-OR in the theory of planned behavior (Conner, Warren, Close, & Sparks, 1999).

Conclusion

The present study explored the mediating effects of DRSE on the associations between PBS-A with weekly alcohol use, hazardous drinking, and alcohol-related negative consequences. At the construct level, DRSE mediated the relationships between PBS-A and alcohol use outcomes. When examining these associations with PBS-A subscales, the relationships between PBS-SHR with these alcohol use outcomes were mediated by DRSE. In another model that included DRSE subtypes as mediators, DRSE-ER mediated all associations between PBS-A and alcohol use outcomes. At the subscale level for PBS-A and DRSE, DRSE-SP mediated the relationships between PBS-SLD and PBS-MOD, respectively, with alcohol-related negative consequences, but explained increases in alcohol-related harm. Further, all DRSE subtypes mediated the association between PBS-SHR and alcohol-related negative consequences. While results at the construct level for DRSE and PBS-A offer some clarification about the role of DRSE in explaining engagement in safe and harmful alcohol use behaviors, subscale-specific findings, especially with DRSE-SP and PBS-SHR, suggest that there may be other important social/environmental variables worth considering when attempting to understand and alleviate alcohol-related harm among college students.

APPENDIX A –IRB Approval Letter



INSTITUTIONAL REVIEW BOARD

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NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

The risks to subjects are minimized.

The risks to subjects are reasonable in relation to the anticipated benefits. The selection of subjects is equitable.

Informed consent is adequate and appropriately documented.

Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.

Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.

Appropriate additional safeguards have been included to protect vulnerable subjects.

Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the “Adverse Effect Report Form”.

If approved, the maximum period of approval is limited to twelve months.

Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18091110

PROJECT TITLE: The Mediating Effects of Drinking Refusal Self-Efficacy on the Associations between Alcohol Protective Behavioral Strategies and Alcohol Use Outcomes **PROJECT TYPE:** Doctoral Dissertation

RESEARCHER(S): Kray Scully

COLLEGE/DIVISION: College of Education and Human Sciences

SCHOOL: Psychology

FUNDING AGENCY/SPONSOR: N/A

IRB COMMITTEE ACTION: Exempt Review Approval

PERIOD OF APPROVAL: 9/25/2018 to 9/25/2019

Edward L. Goshorn, Ph.D.
Institutional Review Board

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