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REDUCING HAZARDOUS DRINKING AMONG VETERANS WITH
POSTTRAUMATIC STRESS DISORDER USING A BRIEF ALCOHOL
INTERVENTION AND AVOIDANCE-FOCUSED FEEDBACK

by

Matthew T. Luciano

A Dissertation

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Abstract

This study supplements a one-session personalized drinking feedback intervention with a one-session activity feedback intervention for veterans with symptoms of PTSD and hazardous drinking. Veterans were screened (N=129) and enrolled (N=15) in an open trial to test feasibility, acceptability, and preliminary efficacy. Veterans completed assessments at baseline and post-intervention (1-month and 3-months). Participants (13.3% women; 40% African American) were recruited through a community in the mid-South. Thirteen participants (86.6%) were retained between the baseline assessment and second intervention session. Descriptive findings from a self-report acceptability questionnaire indicate that elements of this intervention were viewed favorably by a majority of participants. In terms of preliminary efficacy, findings suggest that alcohol consumption is associated with medium to large effect size estimates at the 1-month assessment, as well as the 3-month assessment. PTSD severity was associated with small effect sizes at the 1-month assessment, and trivial effect size estimates at the 3-month assessment. Effect size estimates for theorized mechanisms of change were also noted at the 1-month and 3-month assessments. These findings suggest that this two-session intervention was generally acceptable, feasible, and has the potential to be effective. Therefore, further study of this intervention using a randomized controlled design may be warranted.

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List of Abbreviations

Alcohol Use Disorder (AUD)

Alcohol Use Disorder Identification Test (AUDIT)

Attitudes Toward Seeking Professional Help Scale (ATSPHS)

Brief Alcohol Intervention (BAI)

Behavioral Activation (BA)

Behavioral Activation for Depression Scale (BADSD)

Consideration of Future Consequences Scale (CFCS)

Daily Drinking Questionnaire (DDQ)

Monetary Choice Task (MCT)

Motivational Interviewing (MI)

Posttraumatic Stress Disorder (PTSD)

Posttraumatic Stress Disorder Checklist version 5 (PCL-5)

Randomized Controlled Trial (RCT)

Reward Probability Index (RPI)

Short Inventory of Problems (SIP)

Substance-Free Activity Session (SFAS)

Substance Use Disorder (SUD)

Veterans Affairs (VA)

Reducing Hazardous Drinking Among Veterans with Posttraumatic Stress Disorder Using a Brief Alcohol Intervention and Avoidance-Focused Feedback

Hazardous drinking and posttraumatic stress disorder

Research indicates that roughly 27% to 36% of returning veterans engage in some form of hazardous drinking (Burnett-Zeigler et al., 2011; Santiago, Wilk, Milliken, Castro, Engel, & Hoge, 2010). This number is concerning, especially considering that hazardous drinking has the potential to develop into a more severe alcohol use disorder (AUD). Although effective treatments exist for those with hazardous drinking patterns and AUDs, many veterans choose not to engage in formal treatment for substance-related concerns. One study of veterans in a Veterans Affairs (VA) ambulatory care clinic found that fewer than 4% of veterans who screened positive for an alcohol use disorder actually receive specialty substance use disorder (SUD) treatment in the year after being surveyed (Glass, Perron, Ilgen, Chermack, Ratliff, & Zivin, 2010). This may be because many veterans are not ready to engage in substance misuse treatment, are not able to commit to long-term treatment due to restrictions on their time, and/or because treatment is often inaccessible due to high therapist demand.

Additionally, between 13 and 15% of treatment-seeking veterans are diagnosed with posttraumatic stress disorder (PTSD; Seal, Metzler, Gima, Bertenthal, Maguen, & Marmar, 2009). This is an important consideration when understanding hazardous drinking among veterans, since hazardous drinking and PTSD co-occur at a high rate. For example, one meta-analysis recently reported a wide range in PTSD and alcohol misuse rates between 9.8 and 61.3% (Debell, Fear, Head, Batt-Rawden, Greenberg, Wessely, & Goodwin, 2014). This comorbidity is associated with serious physical health consequences (McDevitt-Murphy, Williams, Bracken, Fields, Monahan, & Murphy, 2010), and individuals who misuse alcohol typically experience more severe symptoms of PTSD when compared to those who do not (Hien,

Campbell, Ruglass, Hu, & Killeen, 2010). Moreover, veterans with an AUD and a PTSD diagnosis are at a high risk for a number of psychosocial consequences including homelessness (Edens, Kaspro, Tsai, & Rosenheck, 2011), depression (Brown, Stout, & Mueller, 1999), suicidal ideation (Ouimette, Goodwin, & Brown, 2006), and suicide attempts (Rojas, Bujarski, Babson, Dutton, & Feldner, 2014). Given the significant consequences associated with co-occurring hazardous drinking and PTSD, there is a need for interventions that can effectively target both issues.

Avoidance, Disengagement, and Comorbidity

Avoidance behavior is a key symptom of PTSD that is often targeted in evidence-based treatments like Cognitive Processing Therapy (Resick & Schnicke, 1993) and Prolonged Exposure Therapy (Foa, Hembree, & Rothbaum, 2007). Researchers suggest that one reason hazardous drinking and PTSD so regularly co-occur is that veterans with PTSD use alcohol as a method of avoiding trauma-related thoughts, feelings, and reminders that would otherwise trigger PTSD-related re-experiencing (Marx & Sloan, 2005). While potentially effective in the short-term, this avoidant coping behavior ultimately contributes to the maintenance or worsening of PTSD symptom expression (Pineles, Mostoufi, Ready, Street, Griffin, & Resick, 2011); therefore, targeting avoidance behavior is an important clinical consideration when treating veterans with co-occurring hazardous drinking and PTSD.

In addition to effortful avoidance, PTSD is sometimes characterized by a loss of interest or pleasure in once pleasurable activities (i.e. anhedonia; American Psychiatric Association, 2013). This symptom likely plays a role in the social isolation associated with PTSD and reflects a reduction in engagement of important life areas. When individuals use disengagement coping styles (including turning away from helpful resources and social networks), PTSD severity

worsens (Held, Owens, Schumm, Chard, & Hansel, 2011). By focusing treatment on re-engaging with these life areas, however, clinicians may be able to reduce PTSD symptoms.

Similarly, hazardous drinking may also decrease as a result of increased engagement behavior. For example, several studies on Behavioral Activation (BA; a therapy for depression that focuses on increasing involvement in goal-directed and value-consistent activities) have shown preliminary efficacy for reducing both PTSD symptoms and alcohol-related problems individually over time. This may be due to an increase in substance-free activities or because activation is associated with notable changes in mood which have a down-stream effect on alcohol consumption. One pilot study investigated BA as a treatment for veterans with PTSD in an open-trial design. Participants in this study showed improvements in PTSD severity after 16-sessions with a moderate effect size (Jakupcak et al., 2006). Similarly, an adaptation of the Behavioral Activation protocol for PTSD was used for veterans with comorbid PTSD and chronic pain. Findings from this open trial demonstrated improvements in PTSD symptom severity. Though study participants did not experience significant changes in their alcohol use, mean consumption did decrease over time (Plagge, Lu, Lovejoy, Karl, & Dobscha, 2013). This may be due to the fact that base rates for alcohol use were low at the pre-intervention assessment.

Nevertheless, problem drinking did significantly decrease over time for a group of college students who received 15 weeks of behavioral activation integrated into a freshman orientation class. This class included information on different reinforcing activities to promote a rewarding college lifestyle and included activity monitoring, identifying values and life goals, and identifying important and/or enjoyable activities in line with their values. While the class focused on planning a variety of reinforcing activities, it did not discuss alcohol use directly. The control group, who received a typical college orientation class, remained unchanged with respect

to problem drinking (Reynolds, MacPherson, Baruch, Tull, & Lejuez, 2011). To date, no studies have investigated the effect of increasing engagement in valued activities for individuals with both PTSD and hazardous drinking patterns.

Behavioral Economic Theory

The efficacy of behavioral activation can be partially understood through behavioral economics. Behavioral economics is a meta-theory that integrates microeconomic concepts and operant psychology to better understand human decision-making. This approach offers a framework for understanding why humans sometimes make behavioral decisions that are not in their best interest, and in many cases may cause adverse long-term consequences. Behavioral economics considers both contextual factors (e.g. availability of alternative sources of reinforcement) and individual factors (e.g. individual differences in the extent to which future outcomes are devalued).

For example, an individual may choose a smaller immediate reinforcer over a larger delayed reinforcer as a function of “temporal discounting” – a behavioral economic index of impulsivity (Ainslie, 1975). Temporal discounting reflects greater valuation of reinforcers that occur sooner in time, even relative to larger reinforcers received after a delay. Thus, for individuals with a tendency to discount delayed reinforcers, a time delay to receiving a reinforcer serves to steeply reduce its value. Therefore, behavior change may require shifting perceived value towards greater behavioral choices that hold a longer-term payoff (Bickel, Miller, Yi, Kowal, Lindquist, & Pitcock, 2007).

An additional construct of interest in behavioral economic theory is the availability of resources in one’s environment (reflecting “supply” in economic terms). In behavioral economics, a person’s time and effort are finite resources that can be expended on different

activities. Highly available reinforcers are more likely to be chosen when alternatives require a greater expenditure of time and effort (Higgins, Bickel, & Hughes, 1994). Thus, the availability of accessible alternative sources of reinforcement may help to divert time and effort away from a maladaptive behavior that may be more readily accessible.

Behavioral Economic Theory and Alcohol Misuse

Behavioral economic theory has been applied to a range of health issues, most prominently hazardous drinking (MacKillop et al., 2010). Through this lens, alcohol misuse develops as a result of a persistently high valuation for alcohol, a preference for immediate rather than delayed reinforcers, and a deficit in rewarding substance-free activities available in the environment (Bickel & Marsch, 2001).

In one study, Joyner, Pickover, Soltis, Dennhardt, Martens, and Murphy (2016) found that low reward availability in one's environment was significantly related to high AUD symptoms ($r=.12$) and alcohol-related problems ($r=.19$) in a sample of college student drinkers. This is in line with behavioral economic perspectives on hazardous drinking in which environmental availability of non-substance alternatives factor into behavioral choices. Correia, Benson, and Carey (2005) found similar results when randomly assigning young adult drinkers to one of three conditions: increased activity, substance reduction, or neutral control. Those in the activity condition were instructed to increase the number of days they engaged in physical and creative activity. Those in the substance reduction condition were asked to self-monitor their number of standard drinks consumed each day. Those in the control condition were simply asked to record the number of minutes they spent engaged in some activity. Results showed that those in the increased activity condition and the substance reduction condition both experienced a reduction in substance use when compared to the control group.

Research also shows that those who misuse alcohol typically show steeper devaluation of more distal rewards than those who do not misuse alcohol (i.e. temporal discounting). Field, Christiansen, Cole, and Goudie (2007) found that heavy drinkers showed more pronounced discounting of delayed hypothetical monetary and alcohol reinforcers when compared to lighter drinkers. This suggests that heavy-drinking individuals may have higher levels of impulsivity. These findings are supported by other studies of temporal discounting. For example, Mitchell, Fields, D'Esposito, and Boettiger (2005) found that those who screened positive for an AUD more frequently chose earlier reinforcers during a behavioral choice task (when compared to a non-alcohol misusing control group). The authors attribute this difference to elevated levels of cognitive impulsivity present in those who misuse alcohol. Petry (2001) similarly found that participants who misuse alcohol are likely to discount delayed reinforcers more rapidly than controls without a history of alcohol abuse. The author also reported that alcohol abstaining participants with a lifetime history of alcohol misuse exhibited a more "intermediate pattern" of alcohol discounting. Their discounting pattern was smaller than those with active alcohol misuse, but larger than those with no history of use. Finally, Vuchinich and Simpson (1998) found that problem drinkers had both a higher discounting of future reinforcers as well as a lower future-orientation when compared to social drinkers. These studies collectively support the idea that problem drinking is closely tied with impulsivity and a lower consideration of potential future consequences.

Behavioral Economic Theory and Mental Health Comorbidity

Mental health problems, including post-trauma sequelae, may present an interesting application for behavioral economics as anxiety, depression, and stress can alter perceptions of value, risk, and benefit. For example, individuals with hazardous patterns of drinking and a co-

occurring PTSD diagnosis have been shown to have greater alcohol demand (alcohol reward value) when compared to individuals who misuse alcohol without PTSD (Tripp, Meshesha, Teeters, Pickover, McDevitt-Murphy, & Murphy, 2015). This suggests that PTSD may be associated with a different valuation of alcohol-related reinforcement.

In order to make the choice to use a substance, the benefit/cost ratio of substance use must be greater than the benefit/cost ratios of other available activities. PTSD-related anhedonia may devalue the *perceived benefit of engaging* in constructive or relaxing activities (i.e. there will be an expected lack of enjoyment from these activities) while PTSD-related negative beliefs about the world may increase the *perceived risk of engaging* in these same activities (i.e. engaging with the world may be perceived to be more dangerous for those with PTSD). At the same time, PTSD-related avoidance may increase the *perceived benefit of alcohol* (due to its anxiolytic effects) while also leading to fewer available substance-free alternatives.

Suppression of reward in one's environment has also been shown to mediate the relationship between PTSD severity and alcohol-related problems/alcohol consumption in a sample of alcohol using young adults (Acuff, Luciano, Soltis, Joyner, McDevitt-Murphy, & Murphy, 2017). This suggests that higher PTSD severity may lead to fewer environmental rewards, and subsequently lead to increased substance use. Delay discounting has also been shown to mediate the relation between depression and alcohol problems, as well as the relation between stress severity and alcohol problems in a sample of binge drinking undergraduates (Soltis, McDevitt-Murphy, & Murphy, 2017). Further, one recent study found that individuals with a probable PTSD diagnosis exhibited steeper (more impulsive) delay discounting than participants in the trauma-exposed non-PTSD group. In this same study, impulsivity was shown to partially mediate the relation between PTSD and alcohol misuse (Morris, Huffman, Naish,

Holshausen, Oshri, McKinnon, Amlung, 2020). This may suggest that trauma-exposed individuals who exhibit elevated PTSD symptoms show a devaluing of future benefits in favor of the immediate relief associated with drinking. It may be the case that stress-related avoidance and depression-related anhedonia (symptoms that overlap with PTSD) are to blame. With this in mind, it may be useful to conceptualize and treat co-occurring hazardous drinking and PTSD with an intervention developed in the behavioral economic framework.

Personalized Alcohol Feedback Interventions

Behavioral economists define a “nudge” as a minor change to an individual’s social environment and perceptions of available choices. Nudges change behavior in a predictable way without conspicuously limiting options or changing the inherent economic incentives (Woodend, Schölmerich, & Denktas, 2015). A “social norms nudge” specifically targets an individual’s belief about his or her behavior relative to the behavior of others (Sunstein, 2014). This concept has been used in the development of low-dose interventions thought to have a public health impact. For example, consumers are willing to pay more for healthy foods after being provided with messages that compare their healthy food consumption to that of a normative sample (Aldrovandi, Brown, & Wood, 2015).

Social norms nudging share similarities with certain brief alcohol interventions (BAIs), which have been used in medical settings as a cost-effective prevention method (O'Donnell, Anderson, Newbury-Birch, Schulte, Schmidt, Reimer, & Kaner, 2014). BAI is a broad term that can refer to an alcohol-focused intervention typically lasting between 25 and 60 minutes. These short interventions are designed to promote self-awareness of a client’s drinking behavior, and motivate the client to engage in positive behavior change. BAIs often incorporate personalized alcohol feedback (e.g., number of drinks over the course of a year, money spent on substances

over the course of a year, highest blood alcohol content over the course of a month), which is associated with a greater reduction of alcohol-related consequences (Tanner-Smith, & Lipsey, 2015). These personalized alcohol feedback interventions present client-provided information into a comprehensive packet and, similar to social norm nudging, provide normative comparisons for participants to reflect on.

Two recent meta-analyses exploring personalized feedback interventions has shown them to be an effective option for reducing alcohol-related harm in a variety of populations (Cadigan, Haeny, Martens, Weaver, Takamatsu, & Arterberry, 2014; Riper, van Straten, Keuken, Smit, Schippers, & Cuijpers, 2009). Although effect sizes are generally small, given the brief nature of these interventions and their capacity to motivate individuals to take steps towards behavior change, personalized feedback interventions are one clinical strategy that may be useful for veterans with co-occurring PTSD and hazardous drinking. These interventions have the benefit of being sensitive to a client's limitations with time, and are relatively brief for providers to administer. Furthermore, many of these interventions are delivered with a Motivational Interviewing style, which is collaborative rather than confrontational, and may be more appropriate for substance users with strong emotional resistance to long-term treatment (Miller & Rollnick, 2013).

One such intervention focused on the reduction of alcohol use among a sample of veterans with problematic patterns of alcohol use and incorporated personalized feedback on PTSD symptoms and coping styles. This study occurred over the course of a single session and compared an interventionist delivered BAI with one that was not delivered by an interventionist (i.e. feedback was reviewed by the veteran). Findings from this study demonstrated reductions in frequency and quantity of alcohol consumption (as well as PTSD severity) across both

conditions (Luciano, McDevitt-Murphy, Acuff, Bellet, Tripp, & Murphy, 2016; McDevitt-Murphy, Murphy, Williams, Monahan, Bracken-Minor, & Fields, 2014).

Activity Intervention Supplements

In light of the small effect sizes associated with standard BAIs, and high dropout rates of traditional substance misuse therapy, recent research has demonstrated that these therapeutic approaches can be supplemented with novel, theoretically-derived elements that improve efficacy. For veterans with PTSD, a four-session motivational enhancement group has been shown to be effective at increasing motivation to change, keeping veterans in treatment longer, improving therapy attendance, and decreasing treatment stigma (Murphy, Thompson, Murray, Rainey, & Uddo, 2009). This brief enhancement group shows that adding additional components to traditional therapies can increase their overall effect.

Additionally, a sample of heavy drinking young adults demonstrated greater reductions in alcohol-related problems after receiving a supplemental feedback session that encouraged discussion and provided feedback related to future goals and substance-free activity engagement (Murphy, Dennhardt, Skidmore, Borsari, Barnett, Colby, & Martens, 2012). As most standard BAIs focus on reducing drinking without increasing alternative activities, this novel supplement incorporated information on substance-free activities that encouraged alternative coping and activity engagement. Findings from this study also demonstrate that the substance-free activity supplement (SFAS) was particularly effective, relative to an active control condition, for reducing drinking in college student drinkers with co-occurring depression. This finding may support the general notion that an activity intervention may be effective for more complex comorbidity. Adapting this intervention supplement (which focuses on engagement with healthy activities, increasing future orientation, and re-allocating time spent in different activities) could

potentially be useful for veterans with patterns of hazardous drinking and PTSD. To date, no such intervention or supplement has been developed to target co-occurring PTSD and hazardous drinking simultaneously.

The Current Study

This study measured the feasibility, acceptability, and preliminary efficacy of an avoidance-focused BAI supplement for a small sample of veterans who screen positive for PTSD and hazardous drinking. To this end, this study tested an avoidance-focused supplement modeled on the SFAS. This intervention supplement was previously evaluated with key informant interviews and changes were made in line with Veteran feedback. In this study, trained interventionists administered the two-session intervention using an open trial design. While the BAI focused on providing a social norms nudge through the use of personalized and normative feedback about alcohol misuse; the avoidance-focused supplement targeted PTSD-related avoidance behavior and anhedonia through other behavioral economic concepts (e.g. reducing temporal discounting, increasing time allocated to socializing without alcohol). This pilot study was also used to derive effect size estimates so that a larger, randomized controlled trial (RCT) may be planned for the future. All participants received the BAI and the novel avoidance-focused supplement. This design fit with Stage 1b of the therapy development model described by Rounsaville and colleagues (2001), in which the authors recommend testing feasibility and acceptability through pilot work before conducting a randomized controlled trial. The specific aims of the proposed study are further described below.

Study Aims

Aim 1: The first aim of this study is to test the acceptability and feasibility of this intervention and the novel activity supplement. Acceptability will focus on individual

components of the intervention, intervention format, adherence to four principals of Motivational Interviewing, intervention mechanisms, and intervention structure. To evaluate feasibility, this manuscript will report on recruitment, participant dropout between the BAI session and the activity session, and demographic characteristics of the final recruited sample. Because this intervention has previously been subjected to key informant interviews, and modified to address concerns expressed by those participants, we anticipate that this intervention will demonstrate appropriate acceptability and feasibility in a sample of veterans.

Aim 2: In line with the goals of a phase 1 pilot study, we will measure the preliminary efficacy of this intervention supplement. As hazardous drinking is a primary variable of interest, we will first examine changes in alcohol consumption and alcohol-related problems. In line with prior SFAS-based studies, it is hypothesized that alcohol consumption will decrease from baseline to the 1-month follow-up. We predict that these changes will be later maintained at the 3-month follow-up. Similarly, we predict that alcohol-related problems will decrease from baseline to the 3-month follow-up. Effect size estimates will be provided from the baseline to 1-month post-intervention, and again from baseline to 3-months post-intervention.

Aim 3: Additionally, we will test the preliminary efficacy of this intervention by noting mean changes in PTSD severity and calculating effect size estimates. Because this intervention was designed to reduce avoidance behavior that may result from PTSD (by increasing engagement, access to potential reinforcers, and consideration of future consequences), it is hypothesized that PTSD severity would decrease at the 1-month follow-up (as compared to baseline). We predict that these changes will be later maintained at the 3-month follow-up. Results will be presented for total PTSD severity and individual PTSD symptom clusters. Effect

size estimates will be calculated between the baseline and 1-month assessment, as well as the baseline and 3-month assessment.

Aim 4: Finally, we will report on findings on theorized mechanisms of action to better understand how this intervention may be causing behavioral and symptomatic change. This study was designed to change intervention outcomes by decreasing impulsivity while increasing time spent in activities, consideration of distal consequence, behavioral engagement, access to (and probability of experiencing) reward, motivation to change alcohol use, and attitudes towards mental health seeking. Again, we will report changes at baseline, 1-month post-intervention, and 3-months post-intervention. Effect size estimates will, again, be calculated for all relevant time periods.

Method

Participants

This study recruited veterans (N=15) from all military eras who reported hazardous drinking and met criteria for PTSD. Eligible participants (a) had a score above an 8 on the Alcohol Use Disorders Identification Test (AUDIT), (b) had a score of at least a 33 on the Posttraumatic Stress Disorder Checklist version 5 (PCL-5), (c) could read and speak English, (d) were 18 years of age or older, and (e) self-reported as being a United States veteran. Participants were excluded for cognitive deficits that hinder their understanding of the intervention and substance use disorders which require a higher level of care. We also exclude those who are currently in treatment for an alcohol use disorder and/or PTSD at baseline. We did not exclude participants who had received psychological or psychiatric treatment for conditions other than PTSD and/or alcohol use. The logic of this decision was twofold: (1) given the difficulty with study recruitment we did not want to further limit this sample and (2) because one theorized

mechanism of action in this intervention was to increase engagement with psychotherapy, we did not want to exclude participants who may benefit from that effect.

Full demographic characteristics of those veterans who consented to participate and who completed a baseline assessment are provided in Table 1. Among those who provided consent, 13 (86.7%) identified as cisgender male while 2 (13.3%) identified as cisgender female. The average age of participants was 38.20 years ($SD=11.85$) with a range between 22 and 63 years of age. The majority of participants identified as either Non-Hispanic White ($n=7$; 46.7%) or Non-Hispanic Black ($n=6$; 40.0%). The remaining participants described their race as Other ($n=2$; 13.3%). Regarding socio-economic status, 7 veterans (46.7%) reported a family income of \leq \$25,000 per year while another 7 veterans (46.7%) reported a family income of \$50,000 – \$74,999 per year. Eight participants (53.3%) were working full-time, 5 (33.3%) were unemployed, and 2 (13.3%) identified as full-time students.

Table 1. Sample Demographics

	N (%)
Race	
White	7 (46.7%)
African American	6 (40.0%)
Other	2 (13.3%)
Ethnicity	
Hispanic	0 (0%)
Non-Hispanic	15 (100%)
Sex	
Male	13 (86.7%)
Female	2 (13.3%)
Employment Status	
Full-Time	8 (53.3%)
Part-Time	0 (0%)
Unemployed	5 (33.3%)
Student	2 (13.3%)
Self-employed	0 (0%)
Income Estimate	
Less than \$25,000/year	7 (46.7%)
\$25,000 - \$49,000/year	1 (6.7%)
\$50,000 – \$74,999/year	7 (46.7%)
\$75,000 – \$99,999/year	0 (0%)
\$100,000 – \$149,999/year	0 (0%)
\$150,000/year or more	0 (0%)
Rank	
E2	0 (0%)
E3	3 (20.0%)
E4	5 (33.3%)
E5	5 (33.3%)
E6	2 (13.3%)
Officer	0 (0%)
Branch	
Army	9 (60.0%)
Navy	1 (6.7%)
Air force	2 (13.3%)
Marines	3 (20.0%)
Coast Guard	0 (0%)

Table continues

Table 1. Sample Demographics

	N (%)
Military Service Era	
Korean War	0 (0%)
Vietnam War	1 (6.7%)
Persian Gulf War	3 (20.0%)
OEF/OIF/OND	9 (60.0%)
Other Conflict	2 (13.3%)
Combat Exposure	
Yes	10 (66.7%)
No	5 (33.3%)

With respect to military service, participants reported having served in the Army (n=9; 60%), Marines (n=3; 20%), Air Force (n=2; 13.3%), and Navy (n=1; 6.7%). Most participants served in Operation Enduring Freedom, Operation Iraqi Freedom, and/or Operation New Dawn (n=9; 60%). Other military eras include the Persian Gulf War (n=3; 20.0%); unlisted conflicts (n=2; 13.3%), and the Vietnam War (n=1; 6.7%). On average, participants spent 7.32 years ($SD=5.04$) in the military, with roughly 1.64 deployments ($SD=1.80$).

At baseline, participants reported an average PTSD Checklist total score of 57.2 ($SD=14.79$). All participants endorsed at least one avoidance or anhedonia symptom (endorsed at “moderately” distressing or above). The average score on the Alcohol Use Disorder Identification Test was 17.94 ($SD=9.23$). In addition to alcohol, participants also reported using other substances including cannabis (n=7; 46.7%), stimulants (n=2; 13.3%), and cocaine (n=1; 6.7%). Baseline data on the full sample for all outcomes and mechanisms can be located in Table 2 and Table 3.

Table 2. Baseline Means and Standard Deviations for Outcomes (N=15; Full Sample)

	<i>M (SD)</i>
DDQ - Number of drinking days per typical week	5.47 (1.64)
DDQ - Drinks per typical week	36.80 (24.96)
DDQ - Binge episodes per typical week	3.13 (2.23)
SIP Total	14.73 (13.37)
SIP – Intrapersonal	3.67 (3.02)
SIP – Physical	3.27 (2.79)
SIP – Social	3.07 (3.13)
SIP – Impulse Control	2.87 (2.53)
SIP –Interpersonal	1.87 (2.97)
PCL-5 Total	57.2 (14.79)
PCL-5 Cluster B	13.33 (4.32)
PCL-5 Cluster C	6.13 (2.23)
PCL-5 Cluster D	19.33 (6.35)
PCL-5 Cluster E	18.40 (6.35)

Notes. Full sample analysis includes all participants who completed a baseline assessment. Questions on the SIP were assessed with a three-month timeframe, so were not included in the 1-month calculations. DDQ=Daily Drinking Questionnaire; SIP=Short Inventory of Problems; PCL-5=PTSD Checklist for DSM-5.

Table 3. Baseline Means and Standard Deviations for Theorized Mechanisms of Action (N=15; Full Sample)

	<i>M (SD)</i>
Delay Reward Discounting	.072 (.084)
BADS Total	73.13 (24.23)
BADS Activation	19.40 (7.82)
BADS Avoidance-Rumination	25.27 (8.09)
RPI Total	50.20 (10.92)
RPI – Environmental Suppression	29.60 (7.41)
RPI - Reward Probability	20.60 (4.82)
Contemplation Ladder	5.93 (2.49)
CFCS	37.00 (7.75)
Time Spent Socializing (without alcohol)	7.93 (6.64)
ATSPH	18.67 (7.80)

Notes. Full sample analysis includes all participants who completed a baseline assessment. BADS=Behavioral Activation for Depression Scale; RPI=Reward Probability Index; CFCS=Consideration of Future Consequences Scale; ATSPH=Attitudes Toward Seeking Professional Help Scale

Procedure

Recruitment of veterans took place through a number of sources. First, we obtained permission to re-contact participants who completed a prospective study of PTSD (Project BRAVE). This project was an observational study of veterans that did not provide any direct intervention. Second, this study recruited participants by placing flyers in a number of community-based organizations that service veterans (e.g. The Memphis Vet Center, the University of Memphis Veterans Resource Center, Veterans of Foreign Wars buildings), public gatherings (e.g. health fairs, veteran-sponsored events), and other community establishments (e.g. gyms, restaurants). Third, this study was promoted through a university listserv of student Veterans in the mid-South. Finally, participants were recruited through online advertising (e.g. Facebook, Craigslist). Potential participants were screened for hazardous drinking and PTSD by phone, in-person, or online. The screening questionnaire included brief demographic questions, an alcohol use disorder screener, and a PTSD symptom checklist.

Eligible participants attended an initial, in-person appointment and provided informed consent for the full study. At this first appointment, participants also completed an online assessment battery. Data from this assessment battery was used by the study interventionist to create a personalized feedback packet focused on drinking. After completing the assessment battery, participants reviewed their personalized feedback with the clinician. The feedback packet included personalized information about one's alcohol consumption, financial costs of alcohol use, caloric costs of alcohol use, consequences of alcohol use, and protective behavioral strategies for drinking. Additionally, this personalized feedback packet included normative comparisons of alcohol consumption, alcohol-related consequences, and blood alcohol content. The session then concluded with a summary of the most salient feedback and a goal-setting

exercise. These intervention components are similar to other alcohol feedback interventions (e.g., Martens, Cadigan, Rogers, & Osborn, 2015; McDevitt-Murphy et al., 2015; Murphy et al., 2012). All of this feedback was delivered with a Motivational Interviewing (MI) style that is focused on resolving ambivalence about change, and when appropriate, establishing concrete goals (Miller & Rollnick, 2013). Together, the baseline assessment and alcohol feedback intervention session took roughly 2 hours to complete over a single appointment.

At the conclusion of the alcohol feedback intervention, participants were asked to schedule a second meeting that would ideally occur one-week from the day that the BAI was delivered. At this second meeting, participants received the supplemental intervention aimed at decreasing avoidance behavior. The same interventionist who conducted the alcohol feedback intervention also conducted the supplemental intervention in order to maintain continuity and rapport. Interventionists included the primary author and two additional clinical psychology doctoral students who were trained in Motivational Interviewing and brief interventions (supervised weekly by a licensed clinical psychologist). These interventionists completed two seminars on MI skills and MI philosophy. Interventionists also completed relevant readings, skill practice, and ultimately two mock intervention sessions using MI skills learned from their didactic training. Following this supplemental session, participants completed a brief measure of intervention acceptability created specifically for this study. Participants received one payment of \$30 for completing the baseline assessment and both interventions.

Participants were then scheduled to complete two follow-up assessments, at one-month and three-months following the second, activity-focused intervention session. These follow-up assessments included many of the same measures from the baseline assessment. Each follow-up assessment took approximately 30-45 minutes, and participants were compensated with \$15 at

the end of each assessment. All in-person appointments occurred in laboratory space on the University of Memphis campus. In order to maximize retention rates, participants were given the option to complete follow-up appointments in-person, or via a secure link sent through email. A summary of the project timeline can be found in Table 4.

Table 4. Timeline of open trial supplementing BAI with avoidance-feedback session.

Screening	Week 1	Week 2	One-Month Post-Intervention	Three-Months Post-Intervention
1. Screening informed consent	1. Full study informed consent	1. Supplemental intervention	1. Follow-up assessment	1. Follow-up assessment
2. Determine eligibility	2. Baseline assessment	2. Acceptability questions	2. \$15 Payment	2. \$15 Payment
	3. Alcohol feedback intervention	3. \$30 Payment		

Alcohol Feedback Intervention

We used an established feedback-based intervention focused on reducing hazardous drinking by presenting information on personalized and normative drinking feedback. This intervention used a Motivational Interviewing style to present information on the following elements: decisional balance on the use of alcohol, personalized and normative information about consumption (e.g. drinking frequency, number of drinks consumed, blood alcohol content), personalized information on drinking consequences, normative information on perceived drinking norms, financial costs associated with participants specific drinking pattern, caloric costs associated with participants specific drinking pattern, and protective behavioral strategies. The session concluded by setting actionable goals and summarizing the most prominent feedback information. Based on prior research studies, it was expected that this session will last approximately 50 minutes. In practice, the average participant in this study completed the

alcohol intervention in 59 minutes. All participants received this intervention before receiving the supplemental intervention.

Avoidance-Focused Feedback Supplement

The supplemental feedback intervention was adapted from an existing manual (SFAS; Murphy, Dennhardt, Skidmore, Borsari, Barnett, Colby, & Martens, 2012) to be more appropriate for a veteran sample dealing with PTSD symptoms, namely avoidance and anhedonia. The SFAS protocol aims to decrease substance use behavior by emphasizing the availability and the value of substance-free reinforcers, even though they may be delayed in time. This avoidance-focused session included feedback on PTSD symptoms, and aimed to engage the participant in problem solving around avoidance behaviors. The avoidance-focused feedback supplement was previously evaluated and modified through use of key informant interviews of veterans with PTSD and a history of hazardous drinking (Luciano, in progress). The adapted supplemental intervention similarly aimed to increase substance-free, goal-oriented engagement behavior. More information about this supplement can be found in Table 5. This session was expected to last between 45 and 60 minutes. In practice, participants completed this intervention in an average of 68 minutes.

Table 5. Avoidance-focused feedback intervention: Elements and description of purpose

Intervention Elements	Purpose
Rapport building and introduction	Fosters a sense of involvement and collaboration.
Feedback on self-reported PTSD symptoms	Provides perspective on PTSD as an important issue to be addressed.
Generate list of avoided trauma-related situations, as well as activities that are no longer enjoyed	Frames avoidance behavior and anhedonia as a cause of mental health decline.
Compare immediate relief to long-term well-being	Highlights the need to engage in activities despite short-term discomfort.
Generate list of strategies to “avoid avoidance”	Provides a specific plan for using approach-oriented behaviors.
Graph depicting self-reported time allocation	Provides perspective on time devoted to avoidance behavior (including drinking).
Graphing exercise to re-distribute time spent avoiding to time spent engaging	Increases future-thinking on specific substance-free and approach-oriented priorities for spending time.
Personalized referrals for further treatment	Provides personalized resources towards treatment engagement for PTSD and hazardous drinking.
Personalized activity suggestions	Presents a list of low- to no-cost activities of interest to veterans.
Episodic future thinking activity wherein participants write about a future plan in detail	Increases future orientation and reminds veteran of the value in more distal rewards.
Grand Summary	Reminds participant of the intervention’s most salient issues. Generate personal take-away points.
Goal Setting	Develops concrete goals to work towards.

Measures

Demographics: Background information on participants included age, gender, sexual orientation, race/ethnicity, employment status, and income. Military history was also collected and includes number of deployments, time spent in the military, rank at discharge, branch of service, service era, and combat exposure. Demographic information was used to generate normative comparison data for the brief alcohol feedback intervention (age and gender) and was also used to characterize the sample to determine study feasibility.

Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993): The AUDIT is a 10-item instrument that assesses hazardous drinking. Items (rated 0 to 4) are summed to create a total AUDIT score (ranging from 0 to 40). The AUDIT was used as a screening instrument for this study, using the recommended cut score of 8 or higher to identify hazardous drinking (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The AUDIT has shown strong reliability and validity across diverse samples (de Meneses-Gaya, Zuardi, Loureiro, & Crippa, 2009). In particular, the AUDIT performs well in detecting alcohol use disorders among veterans (Crawford, Fulton, Swinkels, Beckham, VA Mid-Atlantic MIRECC OEF/OIF Registry Workgroup, & Calhoun, 2013). Cronbach's alpha at baseline for the full sample ($\alpha = .88$) is considered good.

Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985): The DDQ assesses respondents' typical level of alcohol consumption by asking them to report how many drinks they typically consume on each day of the week over the past month. The DDQ has demonstrated strong correlations with other measures of alcohol consumption including drinking quantity and frequency via the Drinking Habits Questionnaire (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990), and has demonstrated good test-retest reliability (Neighbors, Dillard,

Lewis, Bergstrom, & Neil, 2006). Three variables of interest were calculated from the DDQ including (a) “number of drinking days per typical week”, (b) “number of standard drinks per typical week”, and (c) “number of binge days per typical week”. These three calculations were used as primary outcome variables to measure the long-term effect of the intervention (assessed at baseline, 1-month follow-up, and 3-month follow-up). The DDQ was also used to generate normative drinking information for the brief alcohol intervention.

Short Inventory of Problems (SIP; McLellan, Alterman, Cacciola, Metzger, O'Brien, 1992): The SIP is a self-report measure assessing alcohol-related consequences across five domains – physical problems, social problems, problems with impulsive behavior, interpersonal problems, and intrapersonal problems. Scores were derived for the full scale (possible scores range between 0-45) and for each of these domains/subscales (possible scores range between 0-9). Fifteen statements are presented, and respondents are asked to indicate how frequently each occurred over the past three months (e.g., “When drinking, I have done impulsive things that I regretted later). Respondents reply to these statements on a scale of 0 (*Never*) to 3 (*Daily or almost daily*). Psychometric evaluations of the SIP have found it to be a highly reliable and valid instrument in a sample of heavy drinking adults (Alterman, Cacciola, Ivey, Habing, Lynch, 2009). The SIP was also used to generate personalized drinking information for the brief alcohol intervention. Given the 3-month time frame assessed in the measure, the SIP was only administered at the baseline appointment and the 3-month follow-up. Cronbach's alpha at baseline for the full sample total score ($\alpha = .96$) is considered excellent.

PTSD Checklist-5 (PCL-5; Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013): The PCL-5 is a 20-item questionnaire used to assess DSM-5 symptoms of PTSD in the past month. Participants respond to each symptom by rating how much each has bothered them over

the past 30 days (0=*Not at all*; 4=*Extremely*). Items were summed to obtain a total severity score (ranging between 0 and 80). Questions reflecting each of the four PTSD symptom clusters (B, C, D, and E) were also summed to derive cluster scores. The PCL-5 demonstrated strong test-retest reliability, as well as good convergent and discriminant validity in a sample of veterans (Bovin, Marx, Weathers, Gallagher, Rodriguez, Schnurr, & Keane, 2015). In addition to using this measure as a primary outcome in this study, the PCL-5 was used as a screener for inclusion into the study. We employed a cut score of 33 or higher, which has been determined to be an appropriate screening cut-off for veteran samples (Bovin et al., 2015). Cronbach's alpha at baseline for the full sample total score ($\alpha = .93$) is considered excellent.

Monetary Choice Task (MCT; Gray, Amlung, Acker, Sweet, & MacKillop, 2014): The MCT is a measure of the tendency to discount the value of delayed rewards. The MCT is a 27-item measure which asks respondents to choose between two hypothetical monetary sums. The first option reflects a smaller reward delivered immediately. The second option reflects a larger reward delivered later in time (e.g., “Would you rather have \$14 today or \$25 in 19 days?”). A discounting rate (k) is calculated based on the selection of these choices, which reflects the slope of a hyperbolic function (e.g., the subjective value of delayed rewards). An excel-based spreadsheet tool was used to automatically score the Monetary Choice Task (Kaplan, Amlung, Reed, Jarmolowicz, McKerchar, & Lemley, 2016). A larger score reflects a pattern of choosing the smaller, sooner reward more frequently (a more impulsive pattern). The MCT has strong test-retest reliability in a sample of adults (Weafer, Baggott, de Wit, 2013).

The Behavioral Activation for Depression Scale (BADSD; Kanter, Mulick, Busch, Berlin, Martell, 2007): The BADSD measures avoidance behavior and was designed for use in trials of depression interventions. Although the BADSD was developed for individuals with depression, the

items are relevant to patterns of avoidance and engagement/activation that occur across different diagnoses, including PTSD. The BADS includes 25 items assessing activation (engagement in focused, goal-directed scheduled activities) and avoidance/rumination (avoidance of negative aversive states, including ruminative thinking). Participants are prompted to read a statement about avoidance behavior and answer how true that statement is for him/her over the past week (e.g., I did things to avoid feeling sadness or other painful emotions). Each item on the BADS is scored on a seven-point scale (0=*not at all*, 6=*completely*) with a total possible score of 150. The BADS demonstrated good test-retest reliability and internal consistency in a sample of college students (Kanter et al., 2007) and a community sample with depressive symptoms (Kanter, Rusch, Busch, & Sedivy, 2009). Higher scores on the BADS-total and the activation subscale reflect higher levels of activation. Higher scores on the avoidance/rumination subscale reflect higher levels of avoidance behavior. Cronbach's alpha at baseline for the full sample total score ($\alpha = .90$) is considered excellent.

Reward Probability Index (RPI; Carvalho et al., 2011): The RPI is a 20-question measure of response-contingent positive reinforcement. The RPI has two subscales assessing environmental suppressors (i.e., availability of potential reinforcers and the presence of aversive stimuli in the environment) and reward probability (e.g., factors that increase the likelihood of behavioral reinforcement). Originally developed to assess aspects of depression, the RPI has been used in several behavioral economic analyses of hazardous drinking to assess the influence of reward on alcohol use and associated problems (Luciano, Acuff, McDevitt-Murphy, & Murphy, 2019; Acuff et al., 2018; Joyner et al., 2016). Higher scores on the RPI suggest greater reward probability and fewer environmental suppressors inhibiting access to reinforcement. This measure has been shown to have good test-retest reliability, as well as convergent validity with

measures of activity, avoidance, and reinforcement (Carvalho et al., 2011). Cronbach's alpha at baseline for the full sample total score ($\alpha = .91$) is considered excellent.

Contemplation Ladder (Biener & Abrams, 1991): The Contemplation ladder is a method of assessing readiness to change based on the transtheoretical model, which holds that the process of making a behavior change occurs through five discrete stages (precontemplation, contemplation, preparation, action, and maintenance). The contemplation ladder presents respondents with the image of a vertical ladder, with the numbers 0-10 ascending the rungs of the ladder. Respondents are asked to choose the ladder rung that best represents their current perspectives on their alcohol use. Though originally developed to assess smoking, alcohol contemplation ladders demonstrate good reliability (Clair, Stein, Martin, Barnett, Colby, Monti, Golembeske, & Lebeau, 2012) and convergent validity with longer measures that explore readiness to change alcohol consumption (LaBrie, Quinlan, Schiffman, & Earleywine, 2005).

Weekly Time Allocation Questions: Participants were asked to estimate the number of hours they spent on a range of different activities during a typical week over the past month in a free response format. Activities included internet use (excluding social media), social media use, work/school, alcohol use, drug use, time with family, inside leisure activities, outside leisure activities, exercise, religious activity, community or service activity, socializing (without alcohol), wellness activities, and other hobbies. During the activity intervention, Veterans were presented with a graph of how their time is distributed across these categories and were asked to re-graph how they would like to distribute their time differently. Because time is a limited resource, the Matching Law principle would suggest that one's distribution of time across different categories reflects the reinforcing value of those activities (Herrnstein, 1974). In particular, time spent socializing (without alcohol) was examined as a possible mechanism of

change of this intervention. Higher scores on time spent socializing reflect a larger amount of time spent on that activity. Although there are no psychometrics studies to validate this approach, previous studies have used similar methods of assessing time allocation (Meshesha, Utzelmann, Dennhardt, & Murphy, 2018).

Consideration of Future Consequences Scale (CFCS; Strathman, Gleicher, Boninger, & Edwards, 1994): The CFCS is a 12-item questionnaire that assesses the degree to which respondents consider future outcomes. Respondents are presented with statements (e.g., “Often I engage in a particular behavior in order to achieve outcomes that may not result for many years”) and are asked to indicate their level of agreement on a scale of 1 (*extremely uncharacteristic*) to 5 (*extremely characteristic*). A sum score was then created by recoding items that were reverse scored and then adding together all items in the measure. The range of possible scores for the CFCS is between 0 and 60 with higher scores indicating a higher consideration of future consequences. The CFC has demonstrated good test-retest reliability in a sample of young adults (Strathman et al., 1994) and evidence of construct validity in an online community sample of adults (Adams & Nettle, 2009). Cronbach's alpha for the baseline sum score ($\alpha = .80$) was considered good in this sample.

Attitudes Toward Seeking Professional Help Scale (ATSPHS; Fischer and Farina, 1995): The ATSPHS is a measure of attitudes related to mental health treatment. The measure consists of 29 statements. Participants are asked to indicate their level of agreement on a scale of 0 (*disagree*) to 3 (*agree*), creating a total score that may range between 0 and 87. Higher scores on this scale indicate more positive attitudes towards seeking professional help. A psychometric evaluation of this measure found strong evidence for reliability and criterion validity in a sample of medical patients seeking treatment in a primary care clinic (Elhai, Schweinle, & Anderson,

2008). In our sample, the internal consistency for the baseline ATSPHS score ($\alpha = .91$) was considered excellent.

Acceptability Questionnaire: A 28-item questionnaire on intervention acceptability was developed specifically for this study. Questions focused on important aspects of acceptability including individual components of the intervention, intervention format, perception on intervention mechanisms, and intervention structure. Four principles of Motivational Interviewing were also assessed, based on descriptions of MI principles from Miller and Rollnick (2013). Participants rated each statement with one of three descriptive responses to indicate their level of agreement (Yes, Maybe/Sometimes, or No). This measure was used to assess the interventions acceptability and was administered immediately after the activity intervention. Questions measured the acceptability of both intervention sessions.

Analytic Approach

Analyses were conducted using SPSS version 26.0.0. All variables and cut-off scores were calculated using standard scoring rules. Following scoring, variables were examined for outliers. Z-scores were computed for all variables in each sample and outliers (greater than 3.29 standard deviations above the mean) were adjusted to one unit above the highest value in accordance with recommendations from Tabachnick and Fidell (2013). However, no outliers were identified using this approach.

Due to forced responding on Qualtrics, no individual measures contained missing data. However, missing data that is the result of a missed follow-up appointment was addressed as follows. Demographic characteristics were reported for anyone who completed the baseline assessment. All acceptability data was calculated from those who completed the full intervention (both the alcohol session and the activity session). Means, standard deviations, and effect size

estimates were reported twice. First, we ran an intent-to-treat analysis with all the participants who received at least a minimal dose of the intervention (i.e., participants who completed the alcohol feedback but not the activity feedback) with the last observation moved forward for those who missed a follow-up appointment. We then re-ran analyses for intervention completers (i.e., all participants who complete both feedback interventions). In order to most accurately calculate effect size estimates in the completer analyses, baseline means and standard deviations were calculated separately for those who completed the one-month follow up appointment and those who completed the three-month follow up appointment. Seven of the intervention completers had full-data for both the one-month and the three-month follow-ups. Three intervention completers had data for the one-month follow-up assessment only. An additional three intervention completers had data for the three-month follow-up assessment only. This resulted in 10 veterans being used for the one-month effect size calculations, and a different group of 10 veterans being used for the three-month effect size calculations.

In evaluating feasibility, we reported on participant demographic information to characterize the sample that participated in this project (e.g., age, gender, rank, branch, military era, number of deployments, etc.) as this may have relevance to future studies. Participant dropout and recruitment was also monitored throughout the course of the study. We considered this intervention approach to be feasible if we could retain 75% of participants between the first and the second sessions. This is somewhat lower than other SFAS-based interventions among college students (Murphy et al., 2012, Murphy et al., 2019). Next, we reported on intervention acceptability and interventionist adherence to principles of Motivational Interviewing. Responses are reported descriptively, and in terms of the proportion of individuals responding positively or

negatively on each criterion. Acceptability is considered good if at least 75% of participants respond positively to each question regarding acceptability.

The primary outcome analyses examined changes in alcohol consumption (number of drinking days per typical week, number of standard drinks per typical week, and number of binge days per typical week via the DDQ), alcohol-related problems (via the SIP), and PTSD symptom severity (via the PCL-5). We compared changes from baseline to 1-month post-intervention, as well as changes from baseline to 3-months post-intervention for alcohol consumption and PTSD severity. Because the Short Inventory of Problems instructs respondents to refer to “the past three months”, we only administered this measure at the baseline and the 3-month assessment. Hedges’s g was calculated to assess the magnitude of within subject effects. In contrast to Cohen’s d , Hedges’s g was chosen as the effect size estimator because it is the preferred metric for samples less than 20 (Ellis, 2010). Hedges’s g values are considered small ($g = 0.2$ to 0.49), medium ($g = 0.5$ to 0.79), or large ($g = 0.8$ or higher).

We also examined changes in theorized mechanisms of action including temporal discounting (via the MCT), avoidance and activation (via the BADS), aspects of environmental suppression and factors increasing the likelihood of experiencing rewards (via the RPI), motivation to change alcohol use (via the Contemplation Ladder), time allocated to socializing without alcohol (via the Weekly Time Allocation Questions), ability to consider future outcomes (via CFCS), and attitudes on mental health seeking (via ATSPHS). Again, we compared changes from baseline to 1-month post-intervention and changes from baseline to 3-months post-intervention using Hedges’s g as a metric.

Though it would have been preferable to conduct inferential statistical analyses (e.g., repeated measures approaches) for the primary outcomes, a sample size calculation (using a

power of .8, a significance level of .05, and the reported 1-month effect sizes from this study) found that the study would have needed to include 22 people to detect an effect for the alcohol consumption variables. Further, a sample of up to 40 would need to be recruited to detect an effect for the PCL-5 total score. Therefore, the present study was underpowered for these analyses.

Results

Attrition and Retention

A CONSORT (Consolidated Standards Of Reporting Trials) flow chart describing recruitment and retention rates is presented in Figure 1. A total of 129 participants were screened for study eligibility. A large majority of those who completed the screening process were not eligible for the study (n=104), either because they did not meet screening criteria for PTSD or because they did not meet criteria for alcohol misuse. Those who were eligible for the study (N=25) came from a variety of sources. Most participants came from an online survey sent to student veterans enrolled at The University of Memphis (n=8), followed by in-person community recruitment events (n=7), outreach to participants from prior studies by this research group (n=4), posted flyers in the community (n=3), Facebook advertising (n=1), and other sources (n=2). Among those participants screened positive for this study, 10 veterans (40%) did not provide consent. This is either because they could not be contacted/scheduled for an appointment (n=7) or because they were uninterested in the intervention upon hearing more information about study participation (n=3). Study staff made every attempt to reach these participants, which included repeated phone calls, leaving multiple voicemails, and sending scheduling emails when possible.

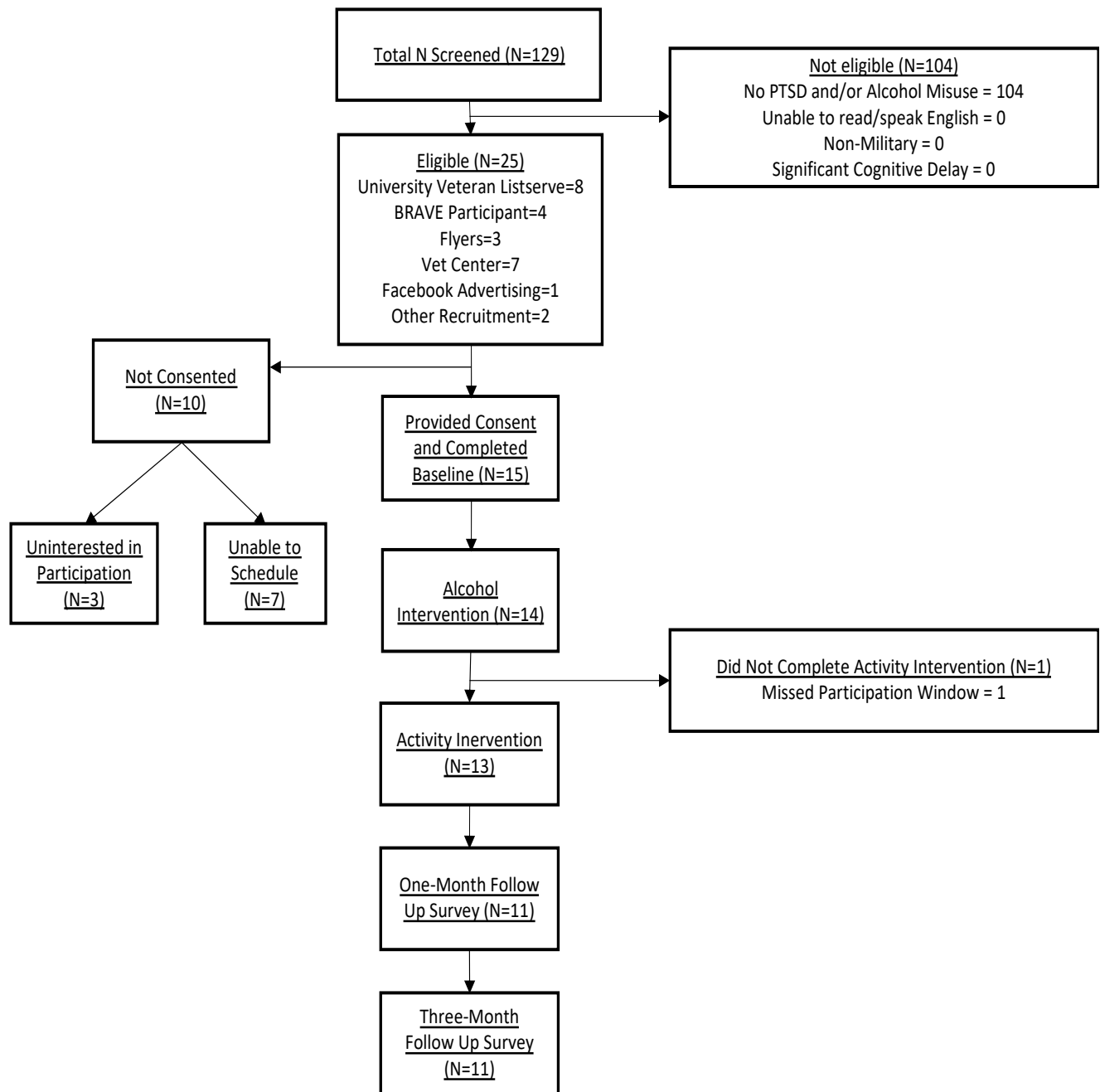


Figure 1. CONSORT flow chart depicting recruitment, intervention completion, and follow-up rates

Of those enrolled (N=15), two participants did not complete the full intervention. This resulted in 13.3% attrition between the baseline assessment and the activity intervention. Of these two participants, one did not return calls to schedule his second appointment and the other was not able to complete the alcohol intervention due to restrictions caused by the COVID-19 outbreak. At follow-up, 11 participants (73% of the baseline sample) were retained for a one-month survey and 11 participants (73% of the baseline sample) were retained for a three-month survey. Though the number of veterans who completed a 1-month and a 3-month assessment were the same, they are comprised of different individuals. In our study, 4 participants did not have data for the 1-month assessment, while a different set of 4 participants did not have data for the 3-month assessment. Participants who did not complete a follow-up appointment either could not be reached after repeated outreach efforts, or missed their window of time to participate in the follow-up survey (30 days). On average, the 1-month survey took 63.6 minutes to complete while the three-month survey took 52.5 minutes to complete.

Intervention Acceptability

An item-by-item report on intervention acceptability can be found in Table 6. In brief, questions reflecting global ratings of the intervention were all above self-prescribed levels of acceptability. All questions received a positive endorsement from 76.9% to 100% of participants. Participants also viewed the intervention structure (i.e., length, helpfulness, and two-session format) as being acceptable, with positive ratings from 84.6% to 100% of participants. When asked about the theorized mechanisms underlying the intervention (e.g., increased future orientation, time re-allocation, increasing access to substance-free activities), participants unanimously agreed that the intervention was helpful for addressing these concepts.

Table 6. Acceptability of Intervention Components

	Yes	Maybe/Sometimes	No
Global Ratings of Intervention			
I would participate in this intervention (last week's session and today) again.	10 (76.9%)	3 (23.1%)	0 (0%)
I would suggest this intervention (last week's session and today) to a friend or family member who is also using alcohol in the aftermath of a past trauma.	13 (100%)	0 (0%)	0 (0%)
I plan on using the information from this intervention (last week's session and today) to make healthier decisions.	13 (100%)	0 (0%)	0 (0%)
I felt that the intervention (last week's session and today) was specific to me (e.g., it considered my experiences, race/ethnicity, gender, and where I come from).	13 (100%)	0 (0%)	0 (0%)
MI Principles – Resisting the Righting Reflex			
I felt like the interventionist was arguing with me.	0 (0%)	0 (0%)	13 (100%)
I felt like the interventionist was trying to correct me.	2 (15.4%)	0 (0%)	11 (84.6%)
MI Principles – Understand the Patients Motivations			
I felt understood to by the interventionist.	12 (92.3%)	1 (7.7%)	0 (0%)
The interventionist made an effort to see my perspectives on a number of issues.	13 (100%)	0 (0%)	0 (0%)
MI Principles – Listen with Empathy			
I felt listened to by the interventionist.	13 (100%)	0 (0%)	0 (0%)
The interventionist gave me the floor to express my thoughts.	13 (100%)	0 (0%)	0 (0%)
MI Principles – Empower the Patient			
I felt empowered by the interventionist.	8 (61.5%)	5 (38.5%)	0 (0%)
I felt like the interventionist was pressuring me to change my behavior.	0 (0%)	0 (0%)	13 (100%)
Intervention Structure			
I found today's feedback packet to be helpful.	13 (100%)	0 (0%)	0 (0%)
I found today's feedback session to be too long.	1 (7.7%)	0 (0%)	12 (92.3%)
The structure of today's intervention was doable for me (i.e., meeting with an interventionist twice over two weeks).	11 (84.6%)	0 (0%)	2 (15.4%)

Table continues

Table 6. Acceptability of Intervention Components

	Yes	Maybe/Sometimes	No
Intervention Components			
I could relate to the scenarios used in today's feedback packet.	13 (100%)	0 (0%)	0 (0%)
I found today's feedback packet to be understandable.	13 (100%)	0 (0%)	0 (0%)
I found today's goal-setting worksheet to be helpful.	11 (84.6%)	0 (0%)	2 (15.4%)
I found the personalized referrals to be helpful.	12 (92.3%)	0 (0%)	1 (7.7%)
I found the personalized activities to be helpful.	13 (100%)	0 (0%)	0 (0%)
I found the future writing activity to be helpful.	9 (69.2%)	0 (0%)	4 (30.8%)
I found the feedback on how I spend my time to be helpful.	13 (100%)	0 (0%)	0 (0%)
I found the brainstorming session on how to engage in activities to be helpful.	12 (92.3%)	0 (0%)	1 (7.7%)
Intervention Mechanisms			
Over the last two conversations, I have become more aware of my drinking pattern and the consequences of my drinking.	13 (100%)	0 (0%)	0 (0%)
Over the last two conversations, I have become more aware of how my daily activities influence my mental health.	13 (100%)	0 (0%)	0 (0%)
Today's session made me think more about my future.	13 (100%)	0 (0%)	0 (0%)
Today's session has given me activities and resources that will help me grow as a person.	13 (100%)	0 (0%)	0 (0%)
Today's session has made me want to make changes in how I spend my time.	13 (100%)	0 (0%)	0 (0%)

Notes. "Today's session" refers to the activity session.

Participants were also asked to rate their interventionist on four core MI principles – resisting the “righting reflex”, understanding participants’ motivations, listening with empathy, and empowering the participant. Questions related to resisting the righting reflex, understanding the participants’ motivations, and listening with empathy were viewed positively among 84.6% to 100% of participants. However, in the domain of “empowering the client”, there was less support for acceptability with only 61.5% of participants reporting that they felt empowered by the interventionist.

Finally, participants reported on the acceptability of individual activity intervention components (e.g., personalized activity list, time allocation activity, brainstorming methods of “avoiding avoidance” behavior). The percent of participants who endorsed agreement on individual intervention components ranged between 84.6% and 100%, which met the self-prescribed limit for acceptability. The only exception to this was the episodic future thinking activity, which fell below self-prescribed levels of acceptability (69.2% of participants found the future writing activity to be helpful).

Preliminary Efficacy of Intervention on Alcohol Consumption and Problems

Changes in alcohol consumption were found from the baseline assessment to the 1-month and 3-month follow-up appointments. Means and standard deviations for consumption quantity and frequency are presented in Table 7 (intervention completers) and Table 8 (intent-to-treat). For all effect sizes reported herein, we refer to the intervention completers sample. Data from intervention completers excludes one participant who did not complete the activity session, but did complete the alcohol feedback session. Average number of standard drinks per typical week, derived from the DDQ, decreased from baseline to the 1-month assessment ($\Delta=14.80$) and from baseline to the 3-month assessment ($\Delta=20.20$). Similar changes were found for the average

number of binge days per typical week, where changes were found from the baseline to the 1-month assessment ($\Delta=1.9$), and from baseline to the 3-month assessment ($\Delta=1.6$). Additionally, the average number of drinking days per typical week decreased between the baseline and 1-month assessment ($\Delta=2.7$), as well as the baseline and 3-month assessment ($\Delta=2.2$).

The change in number of standard drinks per typical week, which occurred between the baseline and the one-month assessment, was associated with a medium effect size. Binge days per typical week and number of drinking days per typical week were associated with large effect sizes during this timeframe. Between the baseline and the 3-month follow-up assessment, the effect size for number of binge days per typical week was in the moderate range. The number of drinking days per typical week and number of standard drinks per typical week had large effect sizes during this same time period.

Further, the average number of alcohol-related problems decreased from the baseline assessment to the 3-month follow-up ($\Delta=2.9$). Because the measure used in this study was developed to assess problems within a 3-month time frame, alcohol-related problems are not reported for the 1-month follow-up. The total SIP score between the baseline and the 3-month assessment was associated with a small effect size. Means for alcohol-related consequences are also presented in Table 7 (intervention completers) and Table 8 (intent-to-treat).

Table 7. Means, Standard Deviations, and Effect Size Estimates for Outcomes (Completers)

	1-Month Completers (n=10)			3-Month Completers (n=10)		
	Baseline <i>M (SD)</i>	1-Month <i>M (SD)</i>	Baseline to 1-Month Hedges's <i>g</i>	Baseline <i>M (SD)</i>	3-Month <i>M (SD)</i>	Baseline to 3-Months Hedges's <i>g</i>
DDQ - Number of drinking days per typical week	5.60 (1.43)	2.90 (2.18)	1.46†	5.50 (1.84)	3.30 (2.91)	.90†
DDQ - Drinks per typical week	37.30 (17.30)	22.50 (27.75)	.64†	34.80 (17.33)	14.60 (18.64)	1.12†
DDQ - Binge episodes per typical week	3.70 (2.26)	1.80 (2.20)	.85†	3.00 (2.00)	1.40 (2.17)	.77†
SIP Total	--	--	--	12.60 (10.54)	9.70 (10.46)	.28†
SIP – Intrapersonal	--	--	--	3.30 (2.67)	2.30 (2.91)	.36†
SIP – Physical	--	--	--	3.10 (2.38)	2.30 (2.54)	.33†
SIP – Social	--	--	--	2.70 (3.02)	1.70 (2.54)	.36†
SIP – Impulse Control	--	--	--	2.40 (2.07)	2.20 (2.15)	.09†
SIP – Interpersonal	--	--	--	1.10 (1.45)	1.20 (1.69)	.06
PCL-5 Total	57.20 (16.72)	48.90 (18.99)	.46†	55.30 (16.37)	57.10 (14.41)	.12
PCL-5 Cluster B	13.90 (4.53)	11.40 (5.37)	.50†	12.60 (4.79)	13.10 (5.09)	.10
PCL-5 Cluster C	6.20 (2.39)	5.80 (1.81)	.18†	6.00 (2.16)	6.50 (1.64)	.23
PCL-5 Cluster D	18.80 (7.63)	16.00 (8.07)	.36†	18.70 (6.72)	19.50 (4.50)	.14
PCL-5 Cluster E	18.30 (4.11)	15.70 (6.40)	.48†	18.00 (4.49)	18.00 (5.16)	.00

Notes. Completers represent all participants who completed both the alcohol feedback and the activity feedback session, as well as a follow-up assessment. Questions on the SIP were assessed with a three-month timeframe, so were not included in the 1-month calculations. DDQ=Daily Drinking Questionnaire; SIP=Short Inventory of Problems; PCL-5=PTSD Checklist for DSM-5; † denotes that means have changed in the hypothesized direction.

Table 8. Means, Standard Deviations, and Effect Size Estimates for Outcomes (Intent-to-Treat Sample; N=14)

	Baseline	1-Month	Baseline to 1-Month	3-Month	Baseline to 3-Months
	<i>M (SD)</i>	<i>M (SD)</i>	Hedges's <i>g</i>	<i>M (SD)</i>	Hedges's <i>g</i>
DDQ - Number of drinking days per typical week	5.43 (1.70)	3.50 (2.38)	.93†	2.71 (2.70)	1.21†
DDQ - Drinks per typical week	32.07 (17.61)	21.50 (23.78)	0.51†	15.50 (21.74)	.84†
DDQ - Binge episodes per typical week	3.00 (2.25)	1.64 (1.91)	0.65†	1.29 (1.94)	.81†
SIP Total	12.57 (10.82)	--	--	14.14 (13.42)	.13
SIP – Intrapersonal	3.29 (2.73)	--	--	3.64 (3.97)	.10
SIP – Physical	2.86 (2.38)	--	--	2.71 (2.61)	.06†
SIP – Social	2.64 (2.76)	--	--	2.64 (3.10)	.00
SIP – Impulse Control	2.43 (1.95)	--	--	3.50 (3.28)	.40
SIP – Interpersonal	1.36 (2.31)	--	--	1.64 (1.82)	.13
PCL-5 Total	56.29 (14.90)	49.79 (16.76)	0.41†	51.57 (15.71)	.31†
PCL-5 Cluster B	13.29 (4.48)	11.29 (4.89)	0.43†	12.14 (4.59)	.25†
PCL-5 Cluster C	6.00 (2.25)	5.57 (1.87)	0.21†	6.14 (1.66)	.07
PCL-5 Cluster D	19.00 (6.46)	17.14 (7.05)	0.28†	17.14 (6.16)	.29†
PCL-5 Cluster E	18.00 (3.84)	15.79 (5.79)	0.45†	16.14 (5.79)	.38†

Notes. Intent-to-treat sample represents all participants who completed, at minimum, the alcohol feedback session and 1 follow-up assessment. Questions on the SIP were assessed with a three-month timeframe, so were not included in the 1-month calculations. DDQ=Daily Drinking Questionnaire; SIP=Short Inventory of Problems; PCL-5=PTSD Checklist for DSM-5; † denotes that means have changed in the hypothesized direction.

Preliminary Efficacy of Intervention on PTSD Severity

Means, standard deviations, and effect size estimates for individual PCL-5 clusters can be found in Table 7 (completers) and Table 8 (intent-to-treat). Changes in the PCL-5 total score are reported from the baseline assessment to the 1-month and 3-month follow-up appointments. The mean PCL-5 score decreased from the baseline to the 1-month assessment ($\Delta=8.3$), but slightly increased between the baseline and the 3-month assessment ($\Delta=-1.8$). The effect size estimate between the baseline assessment and the 1-month assessment for the PCL-5 total score was in the small range. The effect size between the baseline assessment and the 3-months assessment was trivial.

Preliminary Efficacy of Intervention on Theorized Mechanisms of Action

The theorized mechanisms of action that were explored in this analysis include delay reward discounting (monetary choice task), activation and avoidance behavior (BADS), environmental suppressors and reward probability (RPI), motivation to change alcohol use (Contemplation Ladder), time allocation to socializing without alcohol (weekly time allocation), future orientation (CFCS), and attitudes towards help-seeking (ATSPH). Changes in theorized mechanisms of action were found from the baseline assessment to the 1-month and 3-month follow-up assessments. Means and standard deviations for each questionnaire at each timepoint are listed in Table 9 (completers) and Table 10 (intent-to-treat).

The effect size estimates at the 1-month assessment for the BADS activation subscale and the Monetary Choice Task were in the small range. During this same time period, the environmental suppression subscale of the RPI, the Contemplation Ladder, and time allocated to socializing without alcohol had effect sizes in the medium range. All other variables evidenced trivial effect sizes.

Table 9. Means, Standard Deviations, and Effect Size Estimates for Theorized Mechanisms of Action (Completers)

	1-Month Completers (n=10)			3-Month Completers (n=10)		
	Baseline	1-Month	Baseline to 1-Month	Baseline	3-Month	Baseline to 3-Months
	<i>M (SD)</i>	<i>M (SD)</i>	Hedges's <i>g</i>	<i>M (SD)</i>	<i>M (SD)</i>	Hedges's <i>g</i>
Delay Reward Discounting	.10 (.09)	.07 (.07)	.37†	.10 (.09)	.09 (.09)	.10†
BADS Total	79.90 (24.24)	82.89 (25.61)	.12†	71.70 (28.86)	70.10 (30.83)	.05
BADS Activation	21.30 (6.48)	24.55 (10.84)	.36†	19.00 (9.17)	16.30 (9.33)	.29
BADS Avoidance- Rumination	23.10 (8.72)	27.11 (8.70)	.46	25.50 (8.62)	25.60 (11.27)	.01
RPI Total	53.60 (11.24)	55.30 (6.82)	.18†	51.20 (11.76)	49.70 (7.36)	.15
RPI – Enviro. Suppression	21.70 (5.33)	24.10 (3.00)	.55†	21.90 (4.68)	21.00 (3.85)	.21
RPI - Reward Probability	31.90 (7.13)	31.20 (6.44)	.10†	29.30 (7.92)	28.70 (5.68)	.09†
Contemplation Ladder	4.90 (2.08)	3.30 (2.41)	.71†	5.50 (2.32)	2.40 (1.26)	1.66†
Time spent socializing (without alcohol)	6.10 (6.45)	18.66 (32.07)	.54†	7.30 (6.06)	18.90 (24.60)	.64†
CFCS	38.30 (9.30)	39.30 (8.99)	.11†	35.50 (8.58)	35.90 (7.19)	.05†
ATSPH	17.40 (8.87)	18.60 (8.71)	.14†	17.70 (6.17)	18.50 (5.64)	.14†

Notes. Intervention completers represents all participants who completed both the alcohol feedback and the activity feedback session, as well as a follow-up assessment. BADS=Behavioral Activation for Depression Scale; RPI=Reward Probability Index; CFCS=Consideration of Future Consequences Scale; ATSPH=Attitudes Toward Seeking Professional Help Scale; † denotes that means have changed in the hypothesized direction.

Table 10. Means, Standard Deviations, and Effect Size Estimates for Theorized Mechanisms (Intent-to-Treat Sample; N=14)

	Baseline	1-Month	Baseline to 1-Month	3-Month	Baseline to 3-Months
	<i>M (SD)</i>	<i>M (SD)</i>	Hedges's <i>g</i>	<i>M (SD)</i>	Hedges's <i>g</i>
Delay Reward Discounting	.08 (.09)	.06 (.07)	.25†	.07 (.08)	.12†
BADS Total	72.64 (25.08)	76.00 (25.84)	.13†	78.79 (31.57)	.22†
BADS Activation	19.21 (8.09)	22.00 (11.38)	.28†	19.64 (10.37)	.05†
BADS Avoidance- Rumination	25.50 (8.35)	27.71 (8.43)	.26	23.50 (10.50)	.21
RPI Total	51.29 (10.47)	53.57 (8.03)	.14†	50.93 (6.50)	.16†
RPI – Enviro. Suppression	21.07 (4.63)	23.50 (3.31)	.60†	21.29 (3.41)	.05†
RPI - Reward Probability	30.21 (7.29)	30.07 (6.86)	.02†	29.64 (5.23)	.09†
Contemplation Ladder	5.64 (2.31)	3.27 (2.28)	1.03†	2.36 (1.21)	1.78†
Time spent socializing (without alcohol)	7.07 (5.95)	14.93 (25.72)	.42†	16.29 (21.43)	.59†
CFCS	37.21 (7.99)	38.07 (7.87)	.11†	36.64 (7.89)	.07
ATSPH	17.86 (7.41)	18.79 (7.35)	.13†	19.29 (6.29)	.21†

Notes. Intent-to-treat sample represents all participants who completed, at minimum, the alcohol feedback session and 1 follow-up assessment. BADS=Behavioral Activation for Depression Scale; RPI=Reward Probability Index; CFCS=Consideration of Future Consequences Scale; ATSPH=Attitudes Toward Seeking Professional Help Scale; † denotes that means have changed in the hypothesized direction

There was also a small effect size between the baseline and 3-month assessment for the BADS total score and the environmental suppression subscale of the RPI. However, neither of these changes occurred in the anticipated directions. Further, there was a medium effect occurring in the hypothesized direction for time allocated to socializing without alcohol and a large effect size for Contemplation Ladder. All other mechanistic variables had a trivial effect size, and many of the means occurred in un-hypothesized directions. A full account of effect sizes for theorized mechanism of action can be found on Table 9 (intervention completers) and Table 10 (intent-to-treat sample).

Discussion

This open trial investigated a two-session brief intervention aimed at reducing both alcohol misuse and PTSD severity in a sample of veterans. The intervention was comprised of one session focused on hazardous drinking and one session focused on PTSD-related avoidance. Both sessions used personalized feedback, delivered in a motivational interviewing style. Results from this study generally support intervention feasibility and acceptability. Results also support the preliminary efficacy of this brief intervention. Although the study's small sample size precludes tests of statistical significance, we report changes in PTSD severity, alcohol consumption frequency, and alcohol consumption quantity between the baseline and 1-month assessments. Reductions in alcohol frequency, quantity, and alcohol-related problems were also reported between the baseline and the 3-month assessments.

Feasibility data (e.g., sample demographic characteristics, retention, and recruitment) generally support the feasibility of this intervention. Sample demographic characteristics are comparable to published demographics of veterans in the state of Tennessee, where this study was conducted (United States Census Bureau, 2014). The proportion of women in the present

sample was slightly higher than the proportion of women veterans in the Census data (13.3% vs 7.3%). However, the proportion of reported service eras for participants in this study was skewed towards earlier conflicts as compared to the state distribution, and participants tended to be younger as well. It is likely that this representativeness issue is due to a number of factors including recruitment sources, the documented stigma around seeking help with mental health among older veterans (Conner, Copeland, Grote, et al., 2010), and disproportionate alcohol consumption with respect to age. More importantly, this study recruited a highly diverse sample. Forty percent of the sample described their race as African American and most enlisted ranks and service eras were present. However, several important groups were missing from this study. This includes an absence of military officer participation, those who identify as Latinx, individuals whose orientation reflects LGBTQ+, and service members in the United States Coast Guard.

In terms of retention, we were able to retain all but one participant between the alcohol feedback and the avoidance feedback sessions. This participant did not return calls to schedule his second appointment. It should be noted, however, that this participant did complete both remote follow-up appointments. A second person dropped out between the baseline assessment and the alcohol feedback session. This individual completed his baseline assessment and planned to return for the alcohol intervention, but was unable to attend due to the COVID-19 outbreak (although he likely would have completed if given the opportunity). This high retention rate supports the feasibility of this intervention.

While the sample appeared to have strong demographic representation and rates of retention, participant recruitment proved to be somewhat challenging. Over the course of a year, we needed to screen 129 veterans to find 15 participants who would participate in this study. The

low number of those who were recruited suggests that changes need to be made to the participant approach to increase the feasibility of this intervention. Many participants were screened from either a previous study on post-9/11 veterans or from a University listserv of student veterans. These recruitment outlets may not be the most feasible sources of veteran enrollment from an implementation perspective. It is likely that this intervention would have a greater chance of reaching its target audience if it were offered in a primary mental health integration clinic that can conduct both assessment and evidence-based psychotherapy for veterans who may have low motivation to change engagement and drinking behaviors.

Acceptability measures suggest that the intervention was highly acceptable to participants. Participants found the augmented (2-session) format of this intervention to be acceptable, relevant, and helpful. This suggests that a 1-session feedback session may be augmented with little concern of over-burdening veterans. In fact, the information in the second session appeared to be extremely useful, with all but one of those intervention components being viewed above 75% acceptable. Further, MI principles were largely rated positively by clients, which suggests that therapists were able to foster a non-coercive, empathetic, and non-judgmental relationship to the client that is important for client empowerment and sets the stage for behavioral change.

With respect to the alcohol-related outcomes, the one-month effect size for number of standard drinks per typical week was in the moderate range, while the 3-month effect size for the same metric was in the large range for the complete analyses. One-month effect size estimates for number of binge days per typical week fell in the moderate to large range, with 3-month effects represent a moderate effect. Finally, effect sizes for the number of drinking days per

typical week were large at the 1-month assessment and similarly large at the 3-month assessment.

Compared with published studies on single-session feedback sessions in veteran samples, this intervention found overall larger effect size estimates for alcohol consumption (both quantity and frequency). For example, McDevitt-Murphy and colleagues (2015) found a small effect size (Cohen's $d=.34$) for number of drinks per week at the six-week follow-up using a similar measure of alcohol use (the Timeline Followback). Martens and colleagues (2015) found a small effect (Cohen's $d=.31$) for this same outcome 1-month post-intervention (using the DDQ). In terms of number of binge days per typical week, the present study also showed larger effects than is typically seen in single-session interventions with veteran samples. Typically, single-session feedback interventions for heavy drinking veterans have found small effects for number of binge days that range between $d=.14$ and $d=.18$ (McDevitt-Murphy et al., 2015; Cucciare, Weingardt, Ghaus, Boden, & Frayne, 2013) whereas the present study found moderate effects. Finally, the effect sizes for number of drinking days per typical week are much larger than other published studies. For example, Pedersen and colleagues (2017) conducted a single-session alcohol feedback intervention among veterans whose reported means derived small within-group effects (Cohen's $d = .45$) for number of drinking days (using the DDQ). This small effect for drinking frequency was also found by McDevitt-Murphy and colleagues (2015; Cohen's $d=.35$).

Only a randomized controlled trial would be able to answer the question of whether a behavioral economic informed feedback supplement outperforms a single-session alcohol feedback session. Still, a cursory comparison of these effect sizes may provide justification to pursue a more stringent test of the hypothesis that a two-session alcohol and activity feedback session can create an effect larger than those seen in single-session alcohol feedback

interventions for alcohol-related variables in a randomized controlled trial design. It may be that these disparate effects suggest a dose-response model for feedback interventions, wherein the magnitude of the outcome changes as a function of increased exposure to feedback.

Though two-session interventions certainly hold promise, single session feedback interventions have also been shown to be useful in reducing alcohol use behavior for those with PTSD (Monahan, McDevitt-Murphy, Dennhardt, Skidmore, Martens, & Murphy, 2013). Therefore, findings of this study should not discourage single-session interventions in this population, but rather suggest the possibility of increased efficacy for alcohol consumption by adding an activity-focused supplement. Further, providers will need to consider the costs and benefits of having a veteran return for a second intervention session. That decision will depend on participant availability, clinician time, and the incremental benefit that participants are likely to find in the second session.

Study findings for alcohol consumption are generally in line with other studies that have employed the Substance-Free Activity Session on which we based the activity session in this trial. For example, Murphy and colleagues (2012, 2019) supplemented a brief drinking feedback intervention with a substance-free activity feedback session in a sample of college students. In those studies, the authors similarly found moderate effects for drinks per typical week. Additionally, we found that the number of binge days per typical week for the current study are similar to those reported by Murphy and colleagues (2012). Finally, Meshesha et al. (2020) supplemented a BAI with an activity-focused session in a sample of adults who were receiving intensive outpatient treatment for alcohol use disorder and found a much smaller 1-month effect size for number of drinking days per typical week (Cohen's $d=.32$), compared to the large effect found in this study.

Concordance between the effects of the present intervention and the effects of similar interventions is promising from a replication standpoint. Though it is important to view these findings with caution (due to the methodological limitations of a uncontrolled trial and because of inherent differences in the samples), the present study provides important effect size estimates that a future study can use to more exhaustively study whether supplementing a personalized drinking feedback with a behavioral economic informed activity feedback session can be an efficacious intervention approach. Similar intervention supplements are most often used in college students. We extended this existing research by showing similar within-group effects in a very different sample than has been previously studied, namely, veterans with PTSD symptoms and patterns of problematic drinking. Unremitted PTSD symptoms are a predictor of poor substance-related outcomes in traditional treatments for alcohol use disorder (Read, Brown, & Kahler, 2004), thus, it is promising that this two-session intervention may be an effective approach for changing substance use behavior in a clinically complex sample.

In regard to effect size estimates for PTSD severity, this study found that the one-month follow up was in the small range (this was the case both among completers and among the intent-to-treat group). This estimate is similar in magnitude to the reported reduction in PTSD severity reported by Luciano and colleagues (2018), who found a moderate reduction in PTSD severity six weeks after a one-session personalized drinking feedback intervention (Cohen's $d = .51$). Similar effects in both interventions suggest that personalized feedback interventions may be useful for veterans to reduce symptoms of PTSD in the short term. The similarity in effect sizes between the one-session alcohol intervention described by Luciano and colleagues (2018) and the present novel two-session intervention suggest that the novel aspects of the present intervention (e.g., focus on decreasing substance-related activity, increasing future-oriented

thinking) may not be the primary cause of PTSD symptom reduction. In other words, some other mechanism of action that is common to both interventions may have caused the observed one-month decrease in PTSD symptom severity. This could include non-specific therapeutic factors (e.g., collaboration, empathy, positive regard), the Motivational Interviewing therapeutic style used by study interventionists, or receiving feedback on PTSD symptoms. However, the present sample and the sample in the Luciano et al (2018) paper differed somewhat with respect to the nature of their military service and combat exposure. The earlier study included only veterans who deployed in support of the conflicts in Iraq and Afghanistan, while the present study was not limited to that era, nor to veterans who completed combat deployments. Therefore, it cannot be ruled out that differences in these samples account for differences in the effect size estimates.

It is also possible that a change in alcohol consumption was the active ingredient which reduced PTSD severity, since both the one-session and the two-session intervention found meaningful reductions in alcohol use among study veterans. However, this is unlikely for several reasons. First, alcohol consumption continued to decrease at the 3-month follow-up assessment while PTSD severity returned to baseline during this same time period. This would suggest that a change in alcohol use is not a major contributor to PTSD severity. Additionally, Luciano and colleagues (2018) conducted regression analyses to determine if a change in alcohol consumption was related to the change in PTSD severity during the personalized feedback intervention. The results of that analysis found that the change in alcohol explained only a small amount of the variance in the PTSD severity change score.

Moreover, the results of this study suggest that the interventions effect occurred in many of the theorized mechanisms of action by the 1-month follow-up assessment. Yet, the majority of the theorized mechanisms appeared to return to baseline levels by the 3-month follow-up

assessment. Though not a measure of statistically significant change, the difference in these outcomes may suggest a level of preliminary efficacy for this two-session intervention. From baseline to the 1-month follow-up assessment, effect size estimates suggest that delay reward discounting, behavioral avoidance, behavioral activation, environmental suppression of reward, likelihood of a behavior being rewarded (reward probability), time allocation, consideration of the future, motivation to change drinking, and attitudes towards help-seeking all changed from baseline to the 1-month follow-up assessment in anticipated directions. Effect sizes for these variables provide some important data which may inform the design of a larger trial to more accurately study which mechanisms may be most influential for inciting change in the future. Of those theorized mechanisms that changed in expected directions, motivation to change drinking and environmental suppression of rewards were the largest in the sample of intervention completers with moderate effects for each. However, attitudes towards help-seeking and reward probability had the smallest effect sizes in the same set of analyses. Increasing motivation to change drinking and access to environmental rewards were more direct targets of this intervention, so it is not surprising that these variables showed the largest effect sizes. Conversely, attitudes towards help-seeking were less of a focus, and were only considered a potential mechanism in the sense that it was thought to increase engagement and access to environmental reward.

Though the 1-month effect size estimates for the theorized mechanisms of action were promising, many of these variables remitted to near-baseline levels at the 3-month assessment with trivial effect sizes. These include discounting, activation, avoidance/rumination, reward probability, environmental suppression, consideration of the future, and attitudes towards professional help-seeking. Only motivation to change alcohol use ($g = 1.66$) and time allocated

to socializing without alcohol ($g = .54$) were in expected directions and were associated with noteworthy effect sizes three months post intervention. Taken together, this provides preliminary evidence that short-term (1-month) change in activation and behavioral economic constructs are possible after a BAI + activity supplement. Yet, longer-term (3-month) mean change in many of these variables may require a more intensive approach.

One surprising finding was the numeric change in avoidance/rumination behavior (as reported by the BADS subscale). We found that avoidance behavior increased at the 1-month and 3-month time period. Further, increases in avoidance/rumination appear to be incongruous with the increased levels of activation that were also reported at the 1-month assessment. These incongruencies, however, may be somewhat aligned with our theoretical model. Because avoidance is a difficult pattern of behavior to change in such a brief period of time, the true focus of this intervention was to have veterans re-engage in goal-oriented areas of their lives in spite of avoidance behavior. For example, we may encourage a veteran to exercise at home opposed to going to the gym (if going to a crowded gym is an avoided activity associated with anxiety). Therefore, engagement with goal-directed activities could come at the cost of increasing avoidance of negative aversive situations. This should be given careful consideration in the development of this intervention, since decreasing avoidance behavior is a key treatment target in many trauma-focused psychotherapies.

Strengths

The present study has a number of strengths that are worth noting. First, this intervention was developed with a strong theoretical basis. Though there has recently been some work conceptualizing trauma, PTSD, and co-occurring substance use through the lens of behavioral economics (Morris et al., 2020; Luciano et al., 2018; Luciano, Acuff, McDevitt-Murphy,

McKillop, & Murphy, in progress), this literature is in its infancy, and no PTSD interventions have been developed in this framework. Next, the study design incorporated two follow-up assessments. This allowed us to estimate the strength and stability of the intervention effect. Finally, the use of a sample of veterans recruited from the community (as opposed to the VA Medical Center) enhances confidence that the results may be generalizable to a wide swath of veterans. The vast majority of the literature into veterans with PTSD and substance misuse has relied on participants from VA healthcare, which can bias results by assuming that VA-using veterans respond similarly to non-VA using Veterans.

Limitations

Despite the encouraging findings, there are a number of limitations in this study that should be stated. First, the open trial design of this intervention limits the conclusions drawn about study efficacy that could be made if we included a comparison condition. The benefits of open trial designs are that they can be useful for gathering important information about study feasibility and fine-tuning different intervention elements. While pilot work is an important first step in developing an effective and acceptable intervention, a controlled trial would provide more information about this intervention's actual effect.

Additionally, effect size estimates should be viewed in the light of the small sample size. Sample size compounded with missing appointments at the 1-month and 3-month assessment ultimately weakens the confidence in preliminary intervention effects. To be adequately powered for one-month alcohol consumption outcomes, this study would need to recruit between 6 and 22 participants. Further, to be adequately powered for one-month PTSD outcomes this study would need to recruit roughly 40 participants. Because this study was underpowered to conduct more

advanced inferential statistical tests, it is impossible to know if any of the observed effects would reach the threshold of statistical significance.

Third, our measure of reinforcement used a time allocation approach. This approach has several notable drawbacks. For example, a majority of the activities are not mutually exclusive (e.g., a person may report time spent on an inside leisure activity while also using alcohol or drugs) and activity categories are not derived from empirical literature (meaning that important categories may be missing). Additionally, this approach does not account for subjective enjoyment of the activity, which is an important consideration in determining activity reinforcement.

Finally, though this sample was relatively diverse on a number of demographic dimensions including race and age, it was relatively homogenous in other areas. For example, we failed to recruit Latinx and LGBTQ+ individuals. These groups likely have important insights regarding intervention structure, MI style, and intervention content that is informed from their unique cultural perspectives. Further, these groups may respond differently to the intervention in such a way that would influence the study outcomes.

Clinical Significance

This study found moderate effects for important variables of interest including alcohol consumption, alcohol related-problems, and PTSD severity. Thus, an important clinical implication of this study is that it lays the groundwork for more clinical research that can support or contradict the findings of this intervention. In particular, this intervention has both short- and long-term promise to change alcohol use for veterans with PTSD and hazardous patterns of drinking and this may warrant further investigation. Further, this same group of veterans may experience short-term benefit from PTSD. This study represents the first of many steps towards

implementing brief interventions of this nature directly into the VA Hospital and/or Veteran Centers where they can be used by clinicians to support veterans in making important changes to mental and behavioral health.

Future Directions

Several future directions may be warranted in light of the promising levels of acceptability, feasibility, and efficacy reported in this study. First, it may be helpful for future studies to narrow its focus on veterans in a primary care VA setting. This would require collaborating with VA hospitals to establish a steady recruitment stream. From an implementation standpoint, it also would be important to deliver this intervention in a setting where it could do the most good. Community samples may have alcohol use largely under control as compared to VA samples that are actively seeking services and are more likely to have issues related to PTSD and/or alcohol.

Additionally, one aspect of this intervention that was not viewed with high levels of acceptability was the episodic future thinking task, which requires participants to imagine and write about a future activity that they are looking forward to engaging with. It is unclear why this aspect of the intervention was met with lower levels of acceptability, especially since episodic future thinking has been shown to be generally helpful for addressing alcohol-related demand (Snider, LaConte, & Bickel, 2016) and discounting behavior (Bulley & Gullo, 2017). One possibility is that the future writing activity may be especially difficult to complete for individuals with PTSD. These individuals tend to access autobiographical information with less specificity (Brown, Addis, Romano, Marmar, Bryant, Hirst, & Schacter, 2013) which could lead to frustration or confusion among participants. These low acceptability ratings may also be due to the format of the task itself, which is structured very differently from other aspects of the

intervention. Regardless, future iteration of this intervention may consider removing this component.

The next logical step for this intervention is to move beyond an open trial design to an appropriately powered randomized controlled trial (RCT). A RCT would have a number of benefits over an open trial, most importantly being an ability to determine clinical efficacy beyond the effect of time, therapist contact, and expectancy effect. It would be helpful to first compare the intervention to a two-session neutral intervention (such as assessment or psychoeducation). This would support the idea that time and therapist effects were not the cause of any change. From there, it would be valuable to compare this two-session intervention to a single-session intervention to see how much benefit is added from adding avoidance-focused feedback.

Eventually, it may also be beneficial for this study to be replicated and extended in a multi-site study which can draw participants across the United States. As it stands, this study sampled a group of veterans whose culture and geographic location likely informed their perceptions of this study. Increasing the studies diversity would help to improve the external validity of this intervention.

Brief interventions may be beneficial in reducing PTSD severity and hazardous drinking on their own, however, they are likely not sufficient to replace evidence-based, trauma-focused treatments for PTSD (e.g., Cognitive Processing Therapy and Prolonged Exposure Therapy). Such treatments have been shown to be effective in populations with comorbid alcohol use disorders, and are well-suited to the integration of alcohol coping skills (Killeen, Back, & Brady, 2011). Therefore, one interesting direction for this intervention may be to sequence an intervention like the one we developed here prior to a traditional evidence-based treatment for

PTSD. This could theoretically help veterans by allocating their time away from substance-free activities that will inevitably be replaced by substance-free activities and may improve treatment outcomes.

Conclusions

Findings from this study suggest that a two-session personalized feedback intervention can be acceptable and generally feasible to implement. This intervention appears successful in incorporating behavioral economic concepts as a means of increasing substance-free activity. This study also supports the preliminary efficacy at decreasing alcohol consumption and alcohol-related problems, as well as providing temporary relief of PTSD symptoms. Above all, the present study provides a solid foundation for future research into this intervention with the potential to address dual diagnosis among veterans.

References

- Acuff, S. F., Luciano, M. T., Soltis, K. E., Joyner, K. J., McDevitt-Murphy, M. E., & Murphy, J. G. (2018). Access to environmental reward mediates the relation between posttraumatic stress symptoms and alcohol problems and craving. *Experimental and Clinical Psychopharmacology*, *26*, 177-185. doi: 10.1037/pha0000181
- Acuff, S. F., Dennhardt, A. A., Correia, C., & Murphy, J. G. (2019). Measurement of substance-free reinforcement in addiction: A systematic review. *Clinical Psychology Review*, *70*, 79-90. doi: 10.1016/j.cpr.2019.04.003
- Ainslie, G. (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin*, *82*, 463-496. doi: 10.1037/h0076860
- Aldrovandi, S., Brown, G. D., & Wood, A. M. (2015). Social Norms and rank-based nudging: Changing willingness to pay for healthy food. *Journal of Experimental Psychology: Applied*, *21*, 242-254. doi: 10.1037/xap0000048
- Alterman, A. I., Cacciola, J. S., Ivey, M. A., Habing, B., & Lynch, K. G. (2009). Reliability and validity of the alcohol short index of problems and a newly constructed drug short index of problems. *Journal of Studies on Alcohol and Drugs*, *70*, 304-307. doi: 10.15288/jsad.2009.70.304
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing.
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). AUDIT: The Alcohol Use Disorders Identification Test guidelines for use in primary care: World Health Organization. *Geneva: Switzerland*.
- Bickel, W. K., & Marsch, L. A. (2001). Toward a behavioral economic understanding of drug dependence: Delay discounting processes. *Addiction*, *96*, 73-86. doi: 10.1046/j.1360-0443.2001.961736
- Bickel, W. K., Miller, M. L., Yi, R., Kowal, B. P., Lindquist, D. M., & Pitcock, J. A. (2007). Behavioral and neuroeconomics of drug addiction: Competing neural systems and temporal discounting processes. *Drug and Alcohol Dependence*, *90*, 85-91. doi: 10.1016/j.drugalcdep.2006.09.016
- Biener, L., & Abrams, D. B. (1991). The Contemplation Ladder: Validation of a measure of readiness to consider smoking cessation. *Health Psychology*, *10*(5), 360-365.
- Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2015). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (PCL-5) in veterans. *Psychological Assessment*, *28*, 1379-1391. doi: 10.1037/pas0000254

- Brown, A. D., Addis, D. R., Romano, T. A., Marmar, C. R., Bryant, R. A., Hirst, W., & Schacter, D. L. (2014). Episodic and semantic components of autobiographical memories and imagined future events in post-traumatic stress disorder. *Memory*, 22(6), 595-604. doi: 10.1080/09658211.2013.807842
- Brown, P. J., Stout, R. L., & Mueller, T. (1999). Substance use disorder and posttraumatic stress disorder comorbidity: Addiction and psychiatric treatment rates. *Psychology of Addictive Behaviors*, 13, 115-122. doi: 10.1037/0893-164X.13.2.115
- Bulley, A., & Gullo, M. J. (2017). The influence of episodic foresight on delay discounting and demand for alcohol. *Addictive Behaviors*, 66, 1-6. doi: 10.1016/j.addbeh.2016.11.003
- Burnett-Zeigler, I., Ilgen, M., Valenstein, M., Zivin, K., Gorman, L., Blow, A., ... Chermack, S. (2011). Prevalence and correlates of alcohol misuse among returning Afghanistan and Iraq veterans. *Addictive Behaviors*, 36, 801-806. doi: 10.1016/j.addbeh.2010.12.032
- Cadigan, J. M., Haeny, A. M., Martens, M. P., Weaver, C. C., Takamatsu, S. K., & Arterberry, B. J. (2015). Personalized drinking feedback: A meta-analysis of in-person versus computer-delivered interventions. *Journal of Consulting and Clinical Psychology*, 83(2), 430-437. <https://doi.org/10.1037/a0038394>
- Carvalho, J. P., Gawrysiak, M. J., Hellmuth, J. C., McNulty, J. K., Magidson, J. F., Lejuez, C. W., & Hopko, D. R. (2011). The Reward Probability Index: Design and validation of a scale measuring access to environmental reward. *Behavior Therapy*, 42(2), 249-262. doi: 10.1016/j.beth.2010.05.004
- Clair, M., Stein, L. A., Martin, R., Barnett, N. P., Colby, S. M., Monti, P. M., ... & Lebeau, R. (2011). Motivation to change alcohol use and treatment engagement in incarcerated youth. *Addictive behaviors*, 36(6), 674-680. doi: 10.1016/j.addbeh.2011.01.007
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York, NY: Routledge Academic.
- Collins, R. L., Parks, G. A., & Marlatt, G. A. (1985). Social determinants of alcohol consumption: the effects of social interaction and model status on the self-administration of alcohol. *Journal of Consulting and Clinical Psychology*, 53(2), 189-200.
- Conner, K. O., Copeland, V. C., Grote, N. K., Koeske, G., Rosen, D., Reynolds, C. F., 3rd, & Brown, C. (2010). Mental health treatment seeking among older adults with depression: the impact of stigma and race. *The American Journal of Geriatric Psychiatry*, 18(6), 531-543. doi: 10.1097/JGP.0b013e3181cc0366

- Correia, C. J., Benson, T. A., & Carey, K. B. (2005). Decreased substance use following increases in alternative behaviors: A preliminary investigation. *Addictive Behaviors, 30*, 19-27. doi: 10.1016/j.addbeh.2004.04.006
- Crawford, E. F., Fulton, J. J., Swinkels, C. M., Beckham, J. C., VA Mid-Atlantic MIRECC OEF/OIF Registry Workgroup, & Calhoun, P. S. (2013). Diagnostic efficiency of the AUDIT-C in US veterans with military service since September 11, 2001. *Drug and Alcohol Dependence, 132*(1-2), 101-106. doi: 10.1016/j.drugalcdep.2013.01.012
- Cucciare, M. A., Weingardt, K. R., Ghaus, S., Boden, M. T., & Frayne, S. M. (2013). A randomized controlled trial of a web-delivered brief alcohol intervention in Veterans Affairs primary care. *Journal of Studies on Alcohol and Drugs, 74*(3), 428–436. doi: 10.15288/jsad.2013.74.428
- Debell, F., Fear, N. T., Head, M., Batt-Rawden, S., Greenberg, N., Wessely, S., & Goodwin, L. (2014). A systematic review of the comorbidity between PTSD and alcohol misuse. *Social Psychiatry and Psychiatric Epidemiology, 49*(9), 1401–1425. doi: 10.1007/s00127-014-0855-7
- de Meneses-Gaya, C., Zuardi, A. W., Loureiro, S. R., & Crippa, J. A. S. (2009). Alcohol Use Disorders Identification Test (AUDIT): An updated systematic review of psychometric properties. *Psychology & Neuroscience, 2*(1), 83-97. doi: 10.3922/j.psns.2009.1.12
- Edens, E. L., Kaspro, W., Tsai, J., & Rosenheck, R. A. (2011). Association of substance use and VA service-connected disability benefits with risk of homelessness among veterans. *The American Journal on Addictions, 20*, 412-419. doi: 10.1111/j.1521-0391.2011.00166
- Elhai, J. D., Schweinle, W., Anderson, S. M. (2008). Reliability and validity of the Attitudes Toward Seeking Professional Psychological Help Scale-Short Form. *Psychiatry Research, 159*(3), 320-329. doi:10.1016/j.psychres.2007.04.020
- Ellis, P. D. (2010). *The essential guide to effect sizes: Statistical power, meta-analysis, and the interpretation of research results*. Cambridge University Press.
- Field, M., Christiansen, P., Cole, J., Goudie, A. (2007). Delay discounting and the alcohol Stroop in heavy drinking adolescents. *Addiction, 102*, 579–586. doi: 10.1111/j.1360-0443.2007.01743
- Fischer, E. H., & Farina, A. (1995). Attitudes toward seeking professional psychological help: A shortened form and considerations for research. *Journal of College Student Development, 36*, 368-373.
- Foa, E. B., Hembree, E. A., & Rothbaum, B. O. (2007). *Prolonged exposure therapy for PTSD*. New York: Oxford University.

- Glass, J. E., Perron, B. E., Ilgen, M. A., Chermack, S. T., Ratliff, S., & Zivin, K. (2010). Prevalence and correlates of specialty substance use disorder treatment for Department of Veterans Affairs Healthcare System patients with high alcohol consumption. *Drug and Alcohol Dependence*, *112*, 150-155. doi: 10.1016/j.drugalcdep.2010.06.003
- Gray, J. C., Amlung, M. T., Acker, J. D., Sweet, L. H., & MacKillop, J. (2014). Item-based analysis of delayed reward discounting decision making. *Behavioural Processes*, *103*, 256-260. doi: 10.1016/j.beproc.2014.01.006
- Held, P., Owens, G. P., Schumm, J. A., Chard, K. M., & Hansel, J. E. (2011). Disengagement coping as a mediator between trauma-related guilt and PTSD severity. *Journal of Traumatic Stress*, *24*, 708-715. doi: 10.1002/jts.20689
- Herrnstein, R. J. (1974). Formal Properties of the Matching Law. *Journal of the Experimental Analysis of Behavior*, *21*(1), 159-164. doi: 10.1901/jeab.1974.21-159
- Hien, D. A., Campbell, A. N. C., Ruglass, L. M., Hu, M. C., Killeen, T. (2010). The role of alcohol misuse in PTSD outcomes for women in community treatment: A secondary analysis of NIDA's Women and Trauma Study. *Drug and Alcohol Dependence*, *111*, 114-119. doi: 10.1016/j.drugalcdep.2010.04.011.
- Higgins, S. T., Bickel, W. K., Hughes, J. R. (1994). Influence of an alternative reinforcer on human cocaine self-administration. *Life Sciences*, *55*, 179-187. doi: 10.1016/0024-3205(94)00878-7
- Jakupcak, M., Roberts, L. J., Martell, C., Mulick, P., Michael, S., Reed, R., ... McFall, M. (2006). A pilot study of behavioral activation for veterans with posttraumatic stress disorder. *Journal of Traumatic Stress*, *19*, 387-391. doi: 10.1002/jts.20125
- Joyner, K. J., Pickover, A. M., Soltis, K. E., Dennhardt, A. A., Martens, M. P., & Murphy, J. G. (2016). Deficits in access to reward are associated with college student alcohol use disorder. *Alcoholism: Clinical and Experimental Research*, *40*, 2685-2691. doi: 10.1111/acer.13255
- Kanter, J. W., Mulick, P. S., Busch, A. M., Berlin, K. S., & Martell, C. R. (2007). The Behavioral Activation for Depression Scale (BADs): Psychometric properties and factor structure. *Journal of Psychopathology and Behavioral Assessment*, *29*, 191-202. doi: 10.1007/s10862-006-9038-5
- Kanter, J. W., Rusch, L. C., Busch, A. M., & Sedivy, S. K. (2009). Validation of the Behavioral Activation for Depression Scale (BADs) in a community sample with elevated depressive symptoms. *Journal of Psychopathology and Behavioral Assessment*, *31*(1), 36-42. doi: 10.1007/s10862-008-9088-y

- Kaplan, B. A., Amlung, M., Reed, D. D., Jarmolowicz, D. P., McKerchar, T. L., & Lemley, S. M. (2016). Automating scoring of delay discounting for the 21-and 27-item monetary choice questionnaires. *The Behavior Analyst, 39*(2), 293-304. doi: 10.1007/s40614-016-0070-9
- Killeen, T. K., Back, S. E., & Brady, K. T. (2011). The use of exposure-based treatment among individuals with PTSD and co-occurring substance use disorders: Clinical considerations. *Journal of Dual Diagnosis, 7*(4), 194-206. doi: 10.1080/15504263.2011.620421.
- Kivlahan, D. R., Marlatt, G. A., Fromme, K., Coppel, D. B., & Williams, E. (1990). Secondary prevention with college drinkers: Evaluation of an alcohol skills training program. *Journal of Consulting and Clinical Psychology, 58*(6), 805-810. doi: 10.1037/0022-006X.58.6.805
- LaBrie, J. W., Quinlan, T., Schiffman, J. E., & Earleywine, M. E. (2005). Performance of alcohol and safer sex change rulers compared with readiness to change questionnaires. *Psychology of Addictive Behaviors, 19*(1), 112-115. doi: 10.1037/0893-164X.19.1.112.
- Luciano, M. T., Acuff, S. F., McDevitt-Murphy, M. E., & Murphy, J. G. (2019). Behavioral economics and coping-related drinking motives in trauma exposed drinkers: Implications for the self-medication hypothesis. *Experimental and Clinical Psychopharmacology, 28*(3), 265–270. doi: 10.1037/pha0000318.
- Luciano, M. T., McDevitt-Murphy, M. E., Acuff, S. F., Bellet, B. W., Tripp, J. C., & Murphy, J. G. (2018). Posttraumatic stress disorder symptoms improve after an integrated brief alcohol intervention for OEF/OIF/OND veterans. *Psychological Trauma: Theory, Research, Practice and Policy*. Advanced online publication. doi: 10.1037/tra0000378
- MacKillop, J., Miranda, R., Monti, P. M., Ray, L. A., Murphy, J. G., Rohsenow, D. J., ... Gwaltney, C. J. (2010). Alcohol demand, delayed reward discounting, and craving in relation to drinking and alcohol use disorders. *Journal of Abnormal Psychology, 119*, 106-114. doi:10.1037/a0017513
- Martens, M. P., Cadigan, J. M., Rogers, R. E., & Osborn, Z. H. (2015). Personalized drinking feedback intervention for veterans of the wars in Iraq and Afghanistan: A randomized controlled trial. *Journal of Studies on Alcohol and Drugs, 76*(3), 355–359. doi: 10.15288/jsad.2015.76.355
- Marx, B. P., & Sloan, D. M. (2005). Peritraumatic dissociation and experiential avoidance as predictors of posttraumatic stress symptomatology. *Behaviour Research and Therapy, 43*, 569-583. doi: 10.1016/j.brat.2004.04.004

- McDevitt-Murphy, M. E., Murphy, J. G., Williams, J. L., Monahan, C. J., Bracken-Minor, K. L., & Fields, J. A. (2014). Randomized controlled trial of two brief alcohol interventions for OEF/OIF veterans. *Journal of Consulting and Clinical Psychology, 82*, 562-568. doi: 10.1037/a0036714
- McDevitt-Murphy, M. E., Williams, J. L., Bracken, K. L., Fields, J. A., Monahan, C. J., Murphy, J. G. (2010). PTSD symptoms, hazardous drinking, and health functioning among U.S. OEF and OIF veterans presenting to primary care. *Journal of Traumatic Stress, 23*, 108-111. doi: 10.1002/jts.20482.
- McLellan, A. T., Alterman, A. I., Cacciola, J., Metzger, D., & O'Brien, C. P. (1992). A new measure of substance abuse treatment: Initial studies of the treatment services review. *Journal of Nervous and Mental Disorders, 180*, 101-110. doi: 10.1097/00005053-199202000-00007
- Meshesha, L. Z., Soltis, K. E., Wise, E. A., Rohsenow, D. J., Witkiewitz, K., & Murphy, J. G. (2020). Pilot trial investigating a brief behavioral economic intervention as an adjunctive treatment for alcohol use disorder. *Journal of Substance Abuse Treatment, 113*, doi: 10.1016/j.jsat.2020.108002.
- Meshesha, L. Z., Utzelmann, B., Dennhardt, A. A., & Murphy, J. G. (2018). A behavioral economic analysis of marijuana and other drug use among heavy drinking young adults. *Translational Issues in Psychological Science, 4*(1), 65-75. doi:10.1037/tps0000144.
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change*. Guilford press.
- Mitchell, J. M., Fields, H. L., D'Esposito, M., Boettiger, C. A. (2005). Impulsive responding in alcoholics. *Alcoholism: Clinical and Experimental Research, 29*, 2158-2169. doi: 10.1097/01.alc.0000191755.63639.4a
- Monahan, C. J., McDevitt-Murphy, M. E., Dennhardt, A. A., Skidmore, J. R., Martens, M. P., & Murphy, J. G. (2013). The impact of elevated posttraumatic stress on the efficacy of brief alcohol interventions for heavy drinking college students. *Addictive Behaviors, 38*(3), 1719-1725. doi: 10.1016/j.addbeh.2012.09.004
- Morris, V. L., Huffman, L.G., Naish, K.R., Holshausen, K., Oshri, A., McKinnon, M., Amlung, M. (2020). Impulsivity as a mediating factor in the association between posttraumatic stress disorder symptoms and substance use. *Psychological Trauma: Theory, Research, Practice, Policy, 10.1037/tra0000588*. doi:10.1037/tra0000588
- Murphy, J. G., Dennhardt, A. A., Skidmore, J. R., Borsari, B., Barnett, N. P., Colby, S. M., & Martens, M. P. (2012). A randomized controlled trial of a behavioral economic supplement to brief motivational interventions for college drinking. *Journal of Consulting and Clinical Psychology, 80*, 876-86. doi: 10.1037/a0028763

- Murphy, R. T., Thompson, K. E., Murray, M., Rainey, Q., & Uddo, M. M. (2009). Effect of a motivation enhancement intervention on veterans' engagement in PTSD treatment. *Psychological Services, 6*, 264-278. doi: 10.1037/a0017577
- Neighbors, C., Dillard, A. J., Lewis, M. A., Bergstrom, R. L., & Neil, T. A. (2006). Normative misperceptions and temporal precedence of perceived norms and drinking. *Journal of Studies on Alcohol, 67*(2), 290-299. doi: 10.15288/jsa.2006.67.290
- O'Donnell, A., Anderson, P., Newbury-Birch, D., Schulte, B., Schmidt, C., Reimer, J., & Kaner, E. (2014). The impact of brief alcohol interventions in primary healthcare: A systematic review of reviews. *Alcohol and Alcoholism, 49*, 66-78. doi: 10.1093/alcalc/agt170
- Ouimette, P., Goodwin, E., & Brown, P. J. (2006). Health and well being of substance use disorder patients with and without posttraumatic stress disorder. *Addictive Behaviors, 31*, 1415-1423. doi: 10.1016/j.addbeh.2005.11.010
- Pedersen, E. R., Parast, L., Marshall, G. N., Schell, T. L., & Neighbors, C. (2017). A randomized controlled trial of a web-based, personalized normative feedback alcohol intervention for young-adult veterans. *Journal of Consulting and Clinical Psychology, 85*(5), 459-470. doi: 10.1037/ccp0000187.
- Petry, N. M. (2001). Delay discounting of money and alcohol in actively using alcoholics, currently abstinent alcoholics, and controls. *Psychopharmacology, 154*, 243-250. doi: 10.1007/s002130000638
- Pineles, S. L., Mostoufi, S. M., Ready, C. B., Street, A. E., Griffin, M. G., & Resick, P. (2011). Trauma reactivity, avoidant coping, and PTSD symptoms: A moderating relationship?. *Journal of Abnormal Psychology, 120*, 240-246. doi: 10.1037/a0022123
- Plagge, J. M., Lu, M. W., Lovejoy, T. I., Karl, A. I., & Dobscha, S. K. (2013). Treatment of comorbid pain and PTSD in returning veterans: A collaborative approach utilizing behavioral activation. *Pain Medicine, 14*, 1164-1172. doi: 10.1111/pme.12155
- Read, J. P., Brown, P. J., & Kahler, C. W. (2004). Substance use and posttraumatic stress disorders: Symptom interplay and effects on outcome. *Addictive Behaviors, 29*(8), 1665-1672. doi: 10.1016/j.addbeh.2004.02.061
- Resick, P. A., & Schnicke, M. (1993). *Cognitive processing therapy for rape victims: A treatment manual* (Vol. 4). Newbury Park, C.A. Sage.
- Reynolds, E. K., MacPherson, L., Tull, M. T., Baruch, D. E., & Lejuez, C. W. (2011). Integration of the brief behavioral activation treatment for depression (BATD) into a college orientation program: Depression and alcohol outcomes. *Journal of Counseling Psychology, 58*, 555-564. doi: 10.1037/a0024634

- Riper, H., van Straten, A., Keuken, M., Smit, F., Schippers, G., & Cuijpers, P. (2009). Curbing problem drinking with personalized-feedback interventions: A meta-analysis. *American Journal of Preventive Medicine, 36*, 247-255. doi: 10.1016/j.amepre.2008.10.016
- Rojas, S. M., Bujarski, S., Babson, K. A., Dutton, C. E., & Feldner, M. T. (2014). Understanding PTSD comorbidity and suicidal behavior: associations among histories of alcohol dependence, major depressive disorder, and suicidal ideation and attempts. *Journal of Anxiety Disorders, 28*(3), 318–325. doi: 10.1016/j.janxdis.2014.02.004
- Rounsaville, B. J., Carroll, K. M., & Onken, L. S. (2001). A stage model of behavioral therapies research: Getting started and moving on from stage I. *Clinical Psychology: Science and Practice, 8*, 133-142. doi: 10.1093/clipsy.8.2.133
- Santiago, P. N., Wilk, J. E., Milliken, C. S., Castro, C. A., Engel, C. C., & Hoge, C. W. (2010). Screening for alcohol misuse and alcohol-related behaviors among combat veterans. *Psychiatric Services, 61*, 575-581. doi: 10.1176/ps.2010.61.6.575
- Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction, 88*, 791-804. doi: 10.1111/j.1360-0443.1993.tb02093
- Seal, K. H., Metzler, T. J., Gima, K. S., Bertenthal, D., Maguen, S., & Marmar, C. R. (2009). Trends and risk factors for mental health diagnoses among Iraq and Afghanistan veterans using Department of Veterans Affairs health care, 2002-2008. *American Journal of Public Health, 99*, 1651-1658. doi: 10.2105/AJPH.2008.150284
- Snider, S. E., LaConte, S. M., & Bickel, W. K. (2016). Episodic future thinking: Expansion of the temporal window in individuals with alcohol dependence. *Alcoholism: Clinical and Experimental Research, 40*(7), 1558-1566. doi: 10.1111/acer.13112
- Soltis, K. E., McDevitt-Murphy, M., & Murphy, J. G. (2017). Alcohol demand, future orientation, and craving mediate the relation between depressive and stress symptoms and alcohol problems. *Alcoholism: Clinical and Experimental Research, 41*, 1191-1200. doi: 10.1111/acer.13395
- Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. *Journal of Personality and Social Psychology, 66*(4), 742-752. doi: 10.1037/0022-3514.66.4.742
- Sunstein, C. R. (2014). Nudging: A very short guide. *Journal of Consumer Policy, 37*, 583-588. doi: 10.1007/s10603-014-9273-1
- Tabachnick, B. G., Fidell, L. S., & Osterlind, S. J. (2013). *Using multivariate statistics*. New York: Harper & Row.

- Tanner-Smith, E. E., & Lipsey, M. W. (2015). Brief alcohol interventions for adolescents and young adults: A systematic review and meta-analysis. *Journal of Substance Abuse Treatment, 51*, 1–18. doi: 10.1016/j.jsat.2014.09.001
- Tripp, J. C., Meshesha, L. Z., Teeters, J. B., Pickover, A. M., McDevitt-Murphy, M. E., & Murphy, J. G. (2015). Alcohol craving and demand mediate the relation between posttraumatic stress symptoms and alcohol-related consequences. *Experimental and Clinical Psychopharmacology, 23*, 324-331. doi: 10.1037/pha0000040
- U.S. Census Bureau (2015). *2014 Current Population Survey*. Retrieved from <https://www2.census.gov/library/visualizations/2015/comm/vets/tn-vets.pdf>.
- Vuchinich, R. E. & Simpson, C. A. (1998). Hyperbolic temporal discounting in social drinkers and problem drinkers. *Experimental and Clinical Psychopharmacology, 6*, 292–305. doi: 10.1037//1064-1297.6.3.292
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The PTSD Checklist for DSM-5 (PCL-5). *Scale available from the National Center for PTSD at www.ptsd.va.gov*.
- Woodend, A., Schölmerich, V., & Denктаş, S. (2015). “Nudges” to prevent behavioral risk factors associated with major depressive disorder. *American Journal of Public Health, 105*, 2318-2321. doi: 10.2105/AJPH.2015.302820

Appendix A

Draft Manual

Brief Alcohol Intervention

Adapted from Project STRIVE

M. McDevitt-Murphy & J. Murphy 2008

Before the Intervention

Content Overview:

- 1. Session Goals**
 - 2. Initial Considerations**
-

1. Session Goals

1. Understand role of alcohol in veteran's life (functions, pros/cons)
2. Raise concern about drinking and its negative consequences for the veteran.
3. Highlight discrepancy between drinking and goals/values, including employment, readjustment, relationship satisfaction, physical health and career advancement.
4. Provide feedback to veteran via personal information from the assessment and general information about drinking and its effects.
5. Assist veteran in strategizing means for avoiding future alcohol-related problems.
6. Provide guidance to veteran in setting goals for reducing drinking and alcohol-related problems.
7. Elicit self-motivational statements.
8. Increase self-efficacy for change.
9. Set appropriate goals

Clinicians will use the following materials as an outline for the brief intervention session. Each session will include each of the major sections and feedback elements. However, as is consistent with the principles of motivational interviewing, clinicians will respond flexibly to the unique characteristics of each veteran and allocate session time accordingly. Clinicians will be familiar with the questions and follow-up prompts detailed below, but will use questions strategically based on their appraisal of the veteran's unique substance use pattern and motivation to change.

2. Initial Considerations

Before learning the specifics of each section of the intervention, the prospective interviewer should be familiar with these topics before learning the finer points of the brief intervention: motivational interviewing style, handling resistance, session format, and the content of the handouts.

Motivational Interviewing Style: Motivational interviewing (MI) is a therapeutic style that has been used frequently in the context of brief interventions (Miller, Sovereign & Kregge, 1988; Miller 1983, 1996; Bien, Miller & Boroughs, 1993). Motivational interviewing is defined as "a directive, client centered counseling style for eliciting behavior change by helping clients explore and resolve ambivalence" (Rollnick & Miller, 1995, p. 326). It has also been described as an approach that combines both style (empathy) and technique (reflective listening; Miller, 1996). Specifically, the interviewer helps the client explore and resolve ambivalence about reducing one's alcohol use. The interviewer creates an atmosphere of collaboration during the session, adopting the role of a consultant who listens to and gently directs the client towards a greater understanding of his/her problems and options for change. Problems are not assumed; the interviewer explores risks and consequences, but remains open-minded about the need for change. The client alone is responsible for any changes that are made. Above all, the interviewer avoids being confrontational; a style observed to result in client resistance and even increased

drinking (Miller, Benefield & Tonigan, 1993). Overall, this gently guided self-evaluation of personal drinking fosters a greater awareness of the client's relationship with alcohol and the potential value of change (Miller, 1989). Resources describing the motivational interviewing style include Miller and Rollnick (1991), and TIP (Miller, 1999). The interviewer will perform a variety of tasks during the brief intervention: provide assessment feedback, serve as an active and empathetic listener, prompt greater self-awareness of the potential risks and actual costs of a current drinking pattern, and help to resolve ambivalence about potentially harmful drinking behaviors. These tasks can be achieved using the Elicit-Provide-Elicit Process: (a) the client describes a behavior, asks a question, or discloses some information, (b) the interviewer provides a reflection or some informational feedback in nonjudgmental fashion, (c) the client is given the opportunity to reflect on it. In many cases, the interviewer will be able to foster problem recognition (if appropriate) and the desirability of reducing some of the riskier aspects of the participants' drinking. Often options for change will emerge over the course of the interview, with the participant's active involvement and input. However, this is not a necessary outcome of the interview. It is possible that at the end of the session, the participant will not be ready to discuss reducing personal alcohol use. Consistent with the spirit of MI, the individual will be free to do with the information whatever he or she chooses. Thus, a greater awareness of the functional role of alcohol in the participant's life (even without stated intentions to change) can be considered a positive outcome. In sum, MI has its effect through increasing motivation; the volition (or specifics of action) is left to the client.

Handling Resistance: The majority of participants enter the session with some curiosity but not knowing what to expect. The introductory script provides the rationale for the session; in short, participants who have reported drinking regularly are invited to participate (a) to review the assessment information provided previously, (b) to learn some information about alcohol that may be new to many participants, and (c) to become a more informed and safe drinker. Occasionally a participant may not be very pleased to be attending the session. One way to limit the degree of opposition in the participant is to check regularly with the participant to make sure he/she understands what is being discussed: *Does this make sense to you? Do you think what I am talking about applied to you? How so? You have gotten quiet -- what are you thinking about?* In addition, the use of loaded words such as "alcoholism" and "abuse" should be avoided throughout the feedback interview. If the participant becomes defensive, the interviewer should once again roll with the resistance. A participant may repeatedly say, "I'm not an alcoholic/problem drinker, though," or "I don't have a problem." These assertions should not be challenged. It may be useful in these circumstances to have the participant give an example of what their definition of a problem drinker/alcoholic is: *So, it sounds like you don't feel that you have a problem with your drinking. Tell me what your idea of a problem drinker is.* Often, extreme examples will be given: "Someone who drinks every day"; "Someone who drinks alone all the time"; "Someone whose liver is shot from drinking so much." The interviewer can then observe: *Well, it is good that you do not exhibit any of those qualities. However, from this list of consequences, it appears that there are some aspects of your drinking that inconvenience you. Would you be interested in hearing about ways to reduce or get rid of some of these consequences?* The interviewer has not labeled the participant; instead, the focus has been shifted to the actual, concrete consequences that the participant has listed.

Session Format: It is expected that the intervention will take approximately 60 minutes, though this may vary somewhat across participants. In general intervention sessions should last at least 50 minutes and not more than 70 minutes. The remaining 15 – 30 minutes will be used to complete post session forms, to update contact information, and to schedule follow-up appointments. The session will begin with the orientation/rapport building segment, followed by a discussion of the role of alcohol/drug use in their life, and the decisional balance exercise regarding alcohol and drug use. Next, the interviewer will review the personalized feedback with the veteran. The intervention will conclude with assessing the participant's reaction to the intervention and goal setting related to drinking/drug use reduction.

Informational Content: Interviewers should be familiar with basic facts about alcohol metabolism and related gender differences, blood alcohol concentrations, acute behavioral and cognitive effects associated with alcohol intoxication, sources for normative and percentile data, and pharmacological concepts such as tolerance and withdrawal. In particular, the interviewer should be very familiar with the content of the handouts to be provided during the BAI session. Rehearsing how to present the information on each handout will make the session run much smoother, and allows the interviewer to appear more polished, prepared, and credible. It is also essential that you review the feedback forms (and baseline assessment forms) before each session, so you can discuss the information as the participant reads it on the sheet. Optional modals may also be of assistance to interviewers who wish to respond to certain topics raised by curious participants.

Getting Started

Content Overview:

- 3. Establishing Rapport**
- 4. Decisional Balance**

Style:

- 1. Establish rapport**
- 2. Adopt a non-confrontational posture**
- 3. Address any participant questions or resistance**

Goals:

- 1. Get the session started on a good note**
 - 2. Enlist participant's participation in session**
 - 3. Conduct decisional balance exercise, listing pros and cons of drinking**
-

1. Establishing Rapport

When the participant arrives, the feedback material should be in a folder, off to the side. This is done so the sight of the feedback forms or informational handouts doesn't put the participant on the defensive, and to allow initial discussion on topics other than drinking. In addition, the interviewer should seat him or herself at an angle (not in a squared off, face-to-face position with the participant). Finally, the interviewer should keep rapport upbeat and positive.

Most likely, the interviewer will have met with the participant in the previous session. Therefore, to re-establish a positive and empathetic tone, the interviewer should appear relaxed and engage the participant in some innocuous, rapport building conversation. Generic questions can be used to re-establish rapport. The interviewer should smile and actively engage the participant in the conversation. During this initial phase of the session, devoting some time to a casual conversation sets the stage for a positive intervention for two reasons. First, it establishes the interviewer's genuine interest in the participant, which may facilitate the participant's openness to the information to be presented. Second, during this informal interaction, the participant may provide information that can be mentioned later in the session (e.g., interests/hobbies, social networks, home life).

After this initial rapport building, it is time to introduce the purpose and structure of the session. In doing so, the interviewer should attempt to arouse the participant's interest, as well as foster a sense of involvement and collaboration. The following introduction can be used:

Script: *“Thanks again for taking part in this project. As I mentioned earlier, we are doing this project to provide feedback and information to veterans. The purpose of this meeting today is to spend some time talking about your experiences with alcohol use. I would like to provide you with some information that other people have found helpful in making decisions that affect their health – especially related to drinking. We’re also going to talk about how alcohol use fits in with your lifestyle. Most of what we are going to talk about is based on the information you provided when you completed the questionnaires. We put together a feedback packet based on that information, and one of the things we will do today is to go over that feedback together. Feel free to ask questions about any of the information we discuss, or anything else you’d like to know.”*

“You should know that I’m not going to tell you what to do. Instead, I will provide you with some information and perhaps some suggestions for you to consider, but what you decide to do with it is entirely up to you. Many participants find that this is a nice opportunity to talk about ways to maximize the good parts about drinking while minimizing the negative outcomes. How does that sound to you? Do you have any questions before we get started?”

2. Decisional Balance

The decisional balance exercise is valuable to develop an understanding of where alcohol fits in the participant's life. In performing the decisional balance, the interventionist should first inquire about the pros associated with drinking. This is a good place to use reflective listening and open-ended questions. After the pros are listed (solicit until they run out of pros), the interventionist will discuss cons associated with drinking (solicit until they run out of con). Finally, reflect back the most salient pro and con before moving on. The following script may be used:

Script: *“I mentioned that one of the goals of our session today is to talk about how alcohol fits in with your life – what you like about it and what you don’t like. Let’s start by talking about what you like about alcohol? Do you mind if I jot these down while we talk”*

“What are the positives associated with your drinking? What else? Can you think of another example of a pro? What is the most important pro you can think of associated with your drinking?”

“What about the flip side – the things you don’t like so much about drinking? What else? Can you think of another example of a con? What is the most important con you can think of associated with your drinking? So it sounds like you have a few pros and cons associated with drinking, the most important pro being [insert pro] and the most important con being [insert con].”

Two participant profiles may be encountered at this point in the session: the *uninterested participant* or the *defensive participant*. Each will be discussed in turn.

The uninterested participant: This participant may try to get through the session by saying as little as possible. With these individuals, it is especially important to make the feedback as personalized as possible (spend slightly less time providing information), engaging them in the session. Sometimes putting the protocol “on hold” for a moment and finding something about which to connect with the person may pay dividends later (i.e., if the veteran shares an anecdote about their child, ask follow-up questions, express interest). Care should be taken not to badger the participant into participating in the session. It may be helpful to openly address his or her lack of interest by saying something like: *It seems that this information doesn’t really interest you very much – can you tell me about that?* Reflections and open-ended questions are particularly important tools to draw out a reluctant participant. Enlisting the participant’s collaboration can also be useful.

The defensive participant: This participant may suspect that the interviewer is going to confront him/her about drinking, or label him/her as a problem drinker. As a result, the participant may be very quiet, revealing very little personal information and not getting involved in the session. With this participant, an empathic and non-judgmental style is especially useful to establish a “safe” context in which personal information such as doubts and concerns about their drinking can be revealed. The interviewer can emphasize that there will be no attempts to label the participant, and that no presumption of problems is made.

The interviewer can also use the words of the participant (i.e., the participants own concerns about his/her drinking pattern) whenever possible to reduce any defensiveness that may emerge. It is more difficult for the participant to downplay or discount information that he/she has provided: in other words, once they say it, they own it.

In sum, the early part of the interview establishes the working relationship of the interviewer and veteran. A non-judgmental manner in this stage of the interview helps to create conditions in which the participant will begin to reveal information that the interviewer can refer back to throughout the rest of the feedback session. Specifically, the interviewer should be always alert for any information that can be mentioned later in the session, such as:

- Negative consequences (“sometimes I overdo my drinking and throw up”)
- Previous reductions in use (“I barely drank at all before I was deployed”)

- Positive expectancies (“The only way I feel like myself around other people is if I drink”, “It seems that we always have more fun when we drink”; “I look forward to being relaxed and laid back when I drink”; “drinking helps me relax so I can sleep”)
- Drinking norms (“I don’t drink nearly as much as my friends do”)
- Motivation towards change (“sometimes I have thought I drink too much”; “I could do without the hangovers the next morning”; “I know I would feel better if I drank less”)

Alcohol Use and Drinking Pattern

Content overview:

1. Your Drinking Pattern
2. Blood Alcohol Content

Style:

1. Use the information provided by participant to illustrate topics
2. Keep participant involved in session
3. Do not introduce changing personal use
4. Maintain non-judgmental interaction

Goals:

1. Provide participant with a non-judgmental assessment of personal alcohol use
 2. Teach participant about alcohol effects and risks involved
-

The personalized feedback packet will guide the remainder of this session. You can introduce the packet by saying something like:

Script: *“We asked you a lot of questions earlier, and we put that information together here in a personalized feedback packet for you. We’re going to talk about some of this stuff today, and you’ll get to take home that packet of information generated. You can follow along here [gesture towards feedback] as we talk”*

1. Your Drinking Pattern.

The first section relates to the veterans drinking patten. This feedback is based on the participants self-report. The goal of this feedback is to promote self-awareness of drinking behavior. This section also contains drinking norms. It is important to remind participants that these norms come from a sample of people similar to them. Consider the following script:

Script: *“Here we have some feedback about your drinking and how it compares to other people. You reported drinking on [NUMBER] occasions in the past month, and drinking about [NUMBER] drinks per occasion. This means you drink about [NUMBER] drinks per week. The average adult male drinks about [NUMBER] drinks per week. We compared how much you drink to that of other adult males and found that you are at the [PERCENTILE_{th}] percentile. This means that you drink more than PERCENT% of men in the U.S. So only about PERCENT% of males drink more than you.”*

Allow the participant to digest this info. Comment if they appear surprised or mistrustful. *“You seem surprised, what do you make of this?”*

Ask participant how their drinking compares to that of their friends; typically their friends drink as much or more than they do. Note how this is common and is often responsible for the false belief that everyone drinks this much.

The participant may refute the profile of drinking provided on the feedback form. This is understandable: because participants rarely count their drinks on a weekly basis, the figures may be accurate but appear quite high. However, instead of challenging the participant or implying that he or she provided inaccurate information, the interviewer can discuss the novelty of thinking about one's drinking in a reflective manner, as follows:

Script: *“So these numbers look a bit high to you. That is a common response! It may be the case that you have never thought of your alcohol use in terms of drinks per week. Most people don't think of their drinking as a weekly or monthly total. Instead, they tend to count their drinks over the course of a single evening. As a result, adding up the drinks over a number of occasions can be surprising.”*

If the participant still objects to the figures, the interviewer can confirm if the weekly totals are correct by determining whether the reported amounts consumed on each occasion is accurate (have the participant's assessment data handy). This can be done non-judgmentally: the goal is to re-create the totals, not prove the participant wrong. Maintain a collaborative stance and adopt an air of puzzlement and eagerness to get the correct figures (*“Let's go over this to make sure it is accurate”*).

It is possible that the information on the feedback form is incorrect, or that it is not representative of typical drinking for some reason. If this occurs, the interviewer can ask if there are any particular reasons why these numbers are elevated. The participant may provide a valid explanation for the elevated drinking rates (*“I partied a lot during the month you asked about”; “The month you asked about was over the holidays”*). If this occurs, the interviewer can ask them how many months are like this out of the year. If the participant claims that the only time he or she drank in this way was during the month assessed, the interviewer could observe that this did indeed occur and elicit the participant's response to it (*“So, it appears that you only drink this way one month out of the year, and that this amount appears very high to you. What is special or unusual about this month that causes you to drink in a way you seem to feel is heavier than normal?”*)

2. Blood Alcohol Concentration (BAC).

The BAC section of the intervention may be the most important but can also be the most difficult because of the amount of information that has to be conveyed and the combination of educational material and personalized feedback. The interviewer “sets up” the personal feedback (high versus low BACs night taken from participant's TLFB data) with the educational components.

Script: *The next section is about Blood alcohol concentration, or BAC, which is a measure of the amount of alcohol in your bloodstream and an objective indication of how intoxicated you are. For example, a BAC of 0.10 indicates that 1 percent of your blood is alcohol. As BAC increases, so does your level of intoxication. The factors that influence blood alcohol content include:*

- (1) Alcohol quantity - so the more you drink the higher your BAC
- (2) Speed of drinking - if you space drinks out your BAC will not be as high as if you drink quickly.
- (3) Gender - females process alcohol more slowly than males, and will thus have a higher BAC (and feel more impaired) than males, even if they consume the same amount.
- (4) Weight - lighter individuals will have higher BACs than heavier individuals
- (5) Food - drinking on an empty stomach will increase BAC

Generally, drinking no more than one standard drink per hour will keep a person's BAC in a moderate range. Your body is unable to process more than 1 drink in an hour, so if you exceed this rate your BAC will increase rapidly. This chart shows the effects associated with various BACs. BACs under .05 are considered moderate; at this level people report feeling relaxed and more social, and although driving may be impaired, people are pretty much in control of their behavior and not at high risk for getting hurt or doing things they might regret. At BACs higher than .05, the typical drinker starts to notice some of the "less desired" effects of alcohol.

Quickly review other BAC levels and associated effects, such as > .10 (significant motor impairment and vomiting), > .15 (blackouts), > .20 (risk of death by choking, passing out suddenly, coma/death due to depressed respiration and inadequate blood flow to brain).

Next, provide feedback on the participant's estimated BAC on two nights: a (relatively) light or moderate drinking night and a heavy drinking night. Then show them the graphs, explaining that we computed their BAC for two of the drinking nights that they reported in the interview.

Script: *"Now, let's look on the feedback form and see where your BACs are. Based on what you told us, in the last month on one of your lighter drinking nights your BAC was X, which is in the X range (e.g., moderate impaired, etc.), and one of your heavier nights your BAC was X, which is in the X range. [Turn to page 6] We printed graphs to show you the full range of your BAC during these two nights. On the heavier night you had 9 drinks in 4 hours, which resulted in a BAC of X; note how your BAC was still elevated the next morning (be sure participant understands graph Axes). On this other night you had 4 drinks over 3 hours and had a much lower BAC of X, and your BAC was at 0 by X time. Do you have any questions about these graphs? How do those BACs look to you? I'm curious to hear your reaction to this information."*

Allow some time for the participant to respond to these numbers. Use reflections and requests for elaboration to ensure that s/he understands their BACs in relation to the information contained in the chart, and that you elicit statements of surprise or concern. At this time, compare the typical and peak BACs to the effects listed on the PNF table. Talk about the risks associated with their Peak BAC night (e.g., poor judgment and impaired driving above .08, blackouts above .15, etc.)

and ask them for examples; e.g., *have you made some decisions that you later regretted on nights like this?* Use the graph to demonstrate how long their BAC remains elevated for. Ask them to contrast how they feel on the moderate versus the heavy nights, including how they feel the next morning. Use the BAC handout to show them how they can maintain a healthier BAC by altering the amount they drink and the time they drink for. If participant with extreme BAC (>.15) you might share your concerns about the potential risks associated with this (e.g. *“Can I share a concern I have?”*)

Depending on their receptiveness, this is often a good point to discuss tolerance. Many participants will state that they do not feel the positive effects of alcohol at low-moderate BACs (i.e., >.08) and that they feel “in control” at extremely elevated BAC levels (i.e., .15). This indicates a high tolerance. Ask participants how they feel about having a high tolerance. They may point out advantages to high tolerance, but remind them of some disadvantages, including the fact that tolerance reflects the body’s adaptation to large amount of alcohol, and, as such, it is an early sign of your body growing alcohol dependence. Also point out that tolerance makes it more expensive (in both money & calories) to get drunk, and that despite being able to walk straight after drinking large amounts, their brain and liver are still needing to work extra hard to process all of that alcohol. Moreover, a high tolerance can be deceptive, since BAC will still be elevated which can lead to a DUI arrest even if you feel OK.

Other consequences of tolerance can be mentioned, such as the increased strain on the physical organs of the body (i.e., you do not develop tolerance to the harmful effects of alcohol), or failure to notice when you are too impaired to drive. Note that tolerance to the subjective feeling of intoxication can occur while physical impairment (such as slower reaction time) is still there. The interviewer can mention any information provided by the participant indicative of tolerance in a non-judgmental and empathetic way. Unless the participant asks you directly, hold off on mentioning the ways to reduce your tolerance until discussing the Biphasic Effect.

If the participant reports that they feel the effects on the chart at those BACs, then affirm that it appears that they have **not** developed tolerance. After defining tolerance, frame their lack of tolerance in a positive way (*“It is good that you don’t appear to have developed a tolerance to alcohol, so your body can still adequately warn you about your level of intoxication”*).

Risks Associated with Your Drinking

Content overview:

- 1. Financial Cost, Caloric Cost, and Consequences of Drinking**
- 2. Risk Factors**

Style:

- 1. Use the information provided by participant to illustrate topics**
- 2. Keep participant involved in session**
- 3. Do not introduce changing personal use**
- 5. Maintain non-judgmental interaction**

Goals:

- 1. Provide participant with a non-judgmental assessment of risks associated with drinking**
-

1. Financial Cost, and Caloric Cost, and Consequences of Drinking

This next section focuses on difference “costs” associated with drinking (financial and caloric costs). Since finances and caloric intake can be abstract, it is helpful to “translate” these findings into more tangible objects (e.g. dollars spent on beer in a month is the same as how many iPhone; monthly calories is the same as how many cheeseburgers). Consider the following script:

Script: *The next sections will address some of the costs associated with your drinking pattern in a few domains. Based on what you told us about your drinking, it looks like you are spending \$NUMBER dollars on drinking per year. That money is equivalent to a new OBJECT or a OBJECT. What are you're thoughts looking at this? I wonder if money is an issue for you right now? What would you do if you had this extra money at the end of the month?"*

"I also want to bring your attention to the physical costs of drinking. Based on the kinds of alcohol you drink and the amount you drink, it looks like you are consuming NUMBER calories over the course of one month. That is the equivalent to eating NUMBER McDonald's cheeseburgers. What concerns do you have about taking in this amount of calories? I wonder how this might be effecting your health? How many calories would you like to be spending on alcohol in the next month?"

Participants may be uninterested in one of these domains (e.g. participants may not always be interested in counting their calories). If that is the case, the interviewer should continue to roll with resistance. Example: *"So it sounds like calorie intake isn't very important to you. Why might that be a problem for someone else? Since calorie intake isn't important to you, let's look at this next section, which may be more meaningful for you personally".*

The interventionist will also review a list of alcohol consequences, during which time the interviewer should try to elicit elaborations of concerns in service of enhancing problem recognition. At the same time, the interviewer should use this opportunity to elicit change talk from the veteran.

Script: *This section summarizes the negative consequences of your alcohol use that you endorsed on one of the questionnaires. The consequences are arranged into different categories, such as social, academic, etc. It seems like many of your consequences are in DOMAIN domain? Does that sound right? Which one of these do you regret the most or would you most like to avoid in the future? Tell me more about when that happened? How much had you drunk that night? Is it important for you to avoid this in the future? How might you do that?*

Asking the participant to determine which negative consequences to address is consistent with the spirit of motivational interviewing, because it enlists their participation in the discussion. In contrast, reading the list to the participant, or highlighting the negative consequences that the interviewer feels are indicative of problem drinking, may lead the participant to feel as though he/she is receiving a lecture or scolding. Empathetic listening and reflective questioning can be particularly effective in helping the participant give voice to his/her concerns. This style allows the interviewer to get an idea of what problems are particularly troublesome for the participant, data that can be used later when introducing harm reduction.

Discussion of negative consequences can often elicit or encourage change talk. Introducing the idea of maximizing the positive and minimizing the negative aspects of drinking sets the stage for ideas related to harm reduction.

Script: *You have told me that you enjoy drinking in certain contexts – when you are out with your friends, and when you want to relax after a busy week. However, it appears that the effects of drinking are beginning to show up in other areas of your life, such as your relationships, and your job. Is that an accurate assessment? (if necessary to elicit more reaction: What do you make of all of this?)*

2. Risk Factors

Script: *“This next section looks at risk associated with more serious kinds of drinking, like alcohol dependence. Alcohol dependence is a condition that develops after years of heavy drinking in which your body becomes increasingly dependent on alcohol; it basically gets used to having alcohol in its system and compensates by developing tolerance to the effects of alcohol. There is also a psychological component; strong desire or craving for alcohol, spending a lot of time and money on alcohol, and having a hard time control drinking or maintaining limits. We’re not saying that you have alcohol dependence now, but increasing tolerance, blackouts, drinking more than intended are early signs or risk factors for dependence. Based on your responses, it looks like you might be at a high risk for developing a dependence on alcohol. What do you make of this? Have you thought about this before?”*

Some participant may divert attention from him/herself by asserting that others suffer worse consequences (“Well, at least I am not as bad as...”). When encountering such a viewpoint, it may be useful for the interviewer to mention the influence that group norms can have on the perception of consequences. The interviewer could discuss the effects of having a heavy-drinking group of friends as a comparison group, if they experience many side-effects of drinking: one could come to accept that having multiple alcohol-related problems/hassles is normal and acceptable, when in reality it is not normal and doesn’t have to be accepted.

Script: *Next we describe your degree of risk for alcohol problems resulting from your family history of alcohol problems. You mentioned that NUMBER of your relatives have had drinking problems. People who have biological parents or blood relatives with alcohol problems are at greater risk for developing alcohol problems themselves. This does not mean that you will develop a drinking problem – many people with strong family histories of alcohol problems do not – but it does increase your risk for encountering problems related to alcohol. What do you make of this? Do you have any questions about family history and alcohol problems?*

Summary

Script: *I appreciate your patience with going through all of this material – I know it was a lot. I’m curious to hear your overall reaction. What do you make of all of this? What questions do you have? What part was most surprising to you? What part concerned you the most?*

Provide a brief summary of the main points covered during the feedback. It may be valuable to conclude this part of the session by asking the participant what the experience of going over the

form has been like (*How do you feel about the information we have covered so far?*) Such questions allow the interviewer to assess (a) which information was most relevant to the participant and (b) any possible motivation to change personal alcohol use. Therefore, the interviewer should be aware of any self-generated motivational statements from the individual (“I didn't think I drank this much; I've never thought about my drinking this way”), and be prepared to provide reflections with a twist, such as: “*So you like the idea of all the good things associated with drinking, but you'd like to keep the negative effects from spilling over into other parts of your life.*” Such reflections provide an appropriate context to introduce the theory of harm reduction as a way to moderate or stop the participant’s drinking.

Goal Setting

Content overview:

1. Envisioning the Future
2. Establish Goals
3. Conclusion of Session

Style:

1. Keep participant involved in session
2. Maintain non-judgmental interaction
3. Exercise “rolling with resistance”.

Goals:

1. Help the participant with establishing concrete goals and strategies for reducing drinking.
-

1. Envision the Future

Some participants will report little concern/motivation to change even after completing the feedback. It is important to maintain an MI style and not convey your disappointment. Simply reflect their lack of concern back to them, and proceed with envisioning the future.

Script: *What do you think will happen if you continue to drink/use drugs the same way you have been? How might this impact your goal to attend law school? What do you think would happen if you cut down on your drinking/drug use? What would be some advantages (this is a nice place to incorporate the risk factors, money, time, and academic costs of drinking presented in the feedback).*

If participant leaves out some major benefits, ask: *May I suggest one or two more?*

2. Establish Goals

Establish the Participant’s Interest in Changing: This may have already been accomplished in the previous section. However, it is important to have a clear idea of the participants desire to change before moving on.

Script: *Where does this leave you now? How do you see yourself making use of all this information? What do you think has to change? How would you like things to be different?*

If the patient expresses interest in reducing drinking or drinking-related behavior, then establish a plan for drinking reduction or safer drinking-related behaviors.

Script: *What do you think might be your next step? Where do you see yourself going from here? How can you use this information to make the changes in your life that you are hoping to make?*

If the participant is not at all interested in reducing alcohol/drug use, then an alternative script will need to be considered. If the participant is not interested in changing behavior, it is vital that the interviewer maintain a non-judgmental, motivational interviewing style.

Script: *So, although you mentioned that drinking has gotten you into trouble with your parents and may have contributed to your poor grades freshman year, overall you are not ready to make big changes right now (double sided reflection, end with questioning tone inviting participant to confirm or amend)? I can respect your thoughts on this issue and certainly appreciate that you generally have a good time drinking and it's an important way for you to connect with your friends. At what point would you think about cutting back? Can I share one concern that I have? I worry that on the nights when you have 10 – 12 drinks your BAC is getting really high and you may be at risk for getting hurt; either from the direct effects of alcohol on your brain or by getting into a fight, driving, or doing something else you normally would not do. Even though you do not want to cut back now, I wonder if you would be interested in hearing about ways to learn more about your own drinking and the drinking of those around you?*

3. Conclusion of the Session

Begin this section with a “grand summary” that highlights the major take-away points from the feedback packet.

Script: *“I appreciate your openness and honesty in talking to me about how things have been for you after your deployment. Let me try to summarize all that we’ve covered today. It sounds like you recognize that heavy drinking might get in the way of your ability to accomplish your goals. You also mentioned that your family is important to you and that you’re concerned about the effect your anger may be having on your relationships. We talked about how your drinking compares to other people your age and that that you showed other risks such as _____, and what seemed to stand out for you was _____. We also talked about some feelings you’ve had, related to PTSD and depression and how these have influenced your drinking. You think that you want to try to cut back a bit on drinking. You mentioned that you’d like to find healthier ways of coping with your PTSD symptoms and that you’d like to see a counselor about it.”*

Give special attention to summarizing the plan that the participant generated regarding his/her drinking behavior. Include a statement on barriers and self-efficacy.

Script: *“So based on what we talked about today, it sounds like you decided you want to try **RESTATE GOAL**. You mentioned that feel that **LIST BARRIER** might stop you from achieving this goal, but you do feel pretty confident that you will be able to accomplish these goals. Does that sound right? Remember that I said at the start: what you do with the information discussed today is totally up to you. In the last hour, you have done a lot of thinking about the role drinking plays in your life. It looks like you have identified a way (some ways) you can emphasize the*

positive aspects of using alcohol and minimize the risks of negative things happening. [pause for change talk, support self-efficacy if possible].”

Now there are some organizational tasks to complete before you let the participant go. The participant will keep their copies of the feedback packet. The interviewer signs the participant up for a 1-week follow-up where the supplemental feedback intervention will be administered. The interviewer will remind the participant that he/she will be paid \$30 to come in to their next appointment.

Appendix B

Draft Manual

Avoiding Avoidance Activity Supplement (AAAS)

Adapted from the Substance Free Activity Session (SFAS)

Matthew T. Luciano

Avoiding Avoidance Activity Supplement (AAAS) Session

1. Introducing the AAAS Session

After initial rapport building and answering questions regarding the previous session, the interventionist will introduce the purpose and structure of the session. In doing so, the interventionist should attempt to arouse the participant's interest, and foster a sense of involvement and collaboration. The session should be conducted in a Motivational Interviewing style, using reflective listening and a non-judgmental approach. The following introduction script can be used:

Script: *“The goal of our meeting today is to talk through some experiences you might be having as a result of your combat deployment. Many people find that they get into a pattern of avoiding certain activities after their deployments, and this avoidance pattern can be a source of frustration. When people avoid things that make them anxious, it can result in missing out on some of the valuable aspects of life. The goal for this session is to understand the extent to which avoidance is getting in the way of you living the life you want to live. We will also see if we can brainstorm some ideas to address that. Do you have any questions? I’m especially interested in hearing your perspectives on these issues, so this will be more like a conversation than just me presenting information. Any choices you might make regarding how to spend your time or what activities to get involved with are ultimately up to you.”*

2. Trauma-related Symptoms.

In this section, the interventionist will walk through a list of trauma-related symptoms that the veteran endorsed on the PCL-5. Though a veteran may self-identify as having PTSD, it is suggested that the interventionist avoid using terminology that implies we have provided a diagnosis of any kind.

Script: *“I want to first talk about some trauma-related symptoms that you are currently experiencing. Based on what you told us, it looks like you are experiencing a variety of symptoms right now. Many veterans report similar experience. Which of these has been the most difficult for you? I wonder what it means to see this list spelled out? How have these symptoms impacted your life? What about avoidance specifically? Tell me about your loss of interest.”*

The interventionist will likely refer to these symptoms again throughout the intervention, so it is a good idea to write down one or two that you can reference later. It is especially important to get the veteran talking about avoidance and anhedonia in this section since these constructs are the primary targets of this intervention supplement. It is also important to remember to use normalizing language so as not to add distress to the participant.

It is unlikely that a participant will report no avoidance or anhedonia at all, however, it is not impossible. If this is the case, the interventionist should inquire about which things are more difficult to do because of trauma. Though the veteran may not be out rightly avoiding a situation, he or she might be engaging with certain activities much less than before their trauma.

3. Things You Avoid

The interventionist will discuss avoidance behaviors (behaviors that an individual engages in to ward off trauma-related emotions and re-experiencing). The interventionist will then collaborate with the participant to generate a list of avoidance behaviors that the participant uses to manage his/her symptoms of PTSD. Make use of reflections to highlight the emotions associated with the down side of avoidance. Also be alert to themes that highlight key life areas, such as family, career, hobbies, etc. The following script can be used:

Script: *“So alcohol is one way to avoid experiencing symptoms, but there are other ways to avoid feeling bad too. Some people stay away from crowded places, other avoid loud noises, and still other people avoid very specific reminders of their trauma. Even though there might not be any danger – this is just a way people manage the bad thoughts and feelings. I wonder what kinds of things you might avoid? What kinds of feelings are associated with that? How do you avoid those things? Do you mind if I write down these avoiding behaviors? We’re going to talk more about these soon. What comes to your mind when you look at this list? I wonder what your life might be like if you had fewer things you were avoiding? How well do these avoidance behaviors work for you, to reduce your symptoms of PTSD? I wonder about the unintended consequences too – what are you missing out on because of this avoidance?”*

The interventionist should also discuss anhedonia and spend some time discussing how this is different than avoidance. Avoidance is purposeful disengagement due to fear of a stress-response or a re-experiencing symptom. Loss of interest refers to disengagement due the expectation that the activity will not be enjoyable. The interventionist will generate a list of activities that the veteran no longer has interest in (because they are not perceived as enjoyable, not because they are associated with a stress response).

Script: *“Many veterans also stop feeling enjoyment in the aftermath of a trauma. I wonder in what way you can relate to that? Think back to life before your deployment, what did you do for fun back then that you don’t do now? Would it be okay with you if we write down some of these activities that you no longer do because they are not enjoyable.”*

4. Immediate Relief vs. Long-Term Health

This section is designed to get the veteran thinking about the choices that he or she is making. Many people do not think about their future and consequences associated with their actions today. The goal of this section is to have the veteran understand the consequences of short-term thinking and the tradeoffs that are made. The following scripts can be used:

Script: *“If it’s okay with you, I want to direct your attention to this first graph. What do you think this is saying? At first, anxiety and avoidance will cause activities to be less enjoyable. However, repeated engagement in activities will increase your enjoyment payoff over time. When it comes to living your life, everyone needs to make a pretty hard choice. We can either choose to (a) **Avoid** activities that make us anxious **today**, but then feel **worse later**. Or (b) **Engage in** activities that make us anxious **today**, but then feel **better later**. Which choice have you been doing up until this point (A or B)? Which choice would be the best to try if you could (A or B)? Can you think of any examples of this trade-off in your own life?”*

The veteran may or may not be able to generate examples, but that does not mean that the veteran is unable to understand this concept. Three examples are provided in the packet. The interventionist should read all three examples and elicit feedback from the veteran. The following script can be used after each prompt is read:

Script: *I'm curious about what you think about this example? What do you think about the decision that [name of example person] made? How can you relate to that? Tell me about a time that something similar came up for you? How would you act differently than [name of example person]? So you might not be able to relate to this example, so let's read the next example and maybe you'll be able to relate to that a little better.*

If the veteran is unable to relate to an example, roll with the resistance and continue to the next example. The interventionist might notice similarities between the example and the veteran (based on what is known about that participant). If the veteran does not articulate these similarities, it is okay for the interventionist to point them out as long as it is consistent with a non-judgmental, Motivational Interviewing style.

5. Avoiding Avoidance

A. Psychoeducation

Here, we want to help the participant understand that general avoidance behavior may be contributing to their use of alcohol. Also, we want to make the point that there is a large cost to avoidance – missing out on enjoyment or satisfaction from valued life areas. In this section, it may be especially helpful to use double-sided reflection to summarize the participant's avoidance pattern.

To educate the participant, you can talk about how several evidence-based treatments for PTSD rely on confronting the feared (and avoided) stimuli and memories. You can point out that these treatments work because when we stay in an anxiety-provoking (but safe) situation long enough, we learn that they are not as fearful as we once thought.

We also want to make it clear that avoidant behavior and anhedonic responses can lead to a lack of substance-free alternatives in one's environment. This is reflected in the following text:

Script: *“Last time we met, we talked about where alcohol fits in with your life. Now I'd like to understand a little more about your reasons for drinking, and how alcohol makes you feel. Can you tell me some reason why you drink?”*

This flow chart helps to explain why people continue to use alcohol to manage their PTSD symptoms. When a person experiences a trauma, they are likely to develop a host of symptoms like [describe participant self-reported symptoms]. Specifically, avoidance behavior and losing interest in activities are common experiences for many veterans. However, when people avoid things and isolate themselves from the world, they limit the activities that are available to them. When you don't have a lot of substance-free activities available to you, you are more likely to turn to alcohol-focused activities and so your drinking increases. However, alcohol can actually

increase PTSD symptoms in the long run. The cycle of alcohol use then continues on. What are your thoughts about that? I wonder if you see any similarities between this chart, and how you use alcohol?"

B. Personalized Avoidance/Engagement Information

In this section, you and the participant will focus on their pattern of avoidance, and areas of their life where they would like to *increase engagement*. Use the previous activity as a guide.

Consider the following script:

Script: *"From what you've said, it sounds like avoidance affects a lot of areas of your life – you have been avoiding [specific details], and it sounds like the area of your life that has been suffering the most is your family life. It sounds like you miss out on a lot of family activities because of avoidance. Does this ring true for you?"*

Using the last activity as a guide, the interventionist will help the participant to brainstorm a list of specific activities that reflect "avoiding avoidance," or "engaging in life". The engagement behaviors should be healthy and approach-based. The participant may be somewhat resistant, and if that is the case you may need to dial back the level of engagement. It is more important the participant can identify behaviors than act on them right now, but it is important that they identify behaviors that they have some degree of confidence about. The following introduction script can be used:

Script: *"Thinking about your situation, I wonder if there is a way to change some of your avoidance behaviors? Is there a way to avoid your avoidance? You have been feeling like you'd enjoy life more if you were in better physical shape, but you've been avoiding exercise because you don't like feeling your heart race. Could we think about a way to increase your activity level in a way that feels safe for you? I'm hearing your hesitation about engaging in some of these behaviors. Maybe we need to think about some preliminary steps. What would need to be in place for you to feel safe engaging again?"*

6. How You Spend Your Time

This feedback will focus on the amount of time the participant spends in avoidance (including substance misuse) activities, compared with the amount of time spent on other constructive, approach-based activities (e.g., spending time in public, going to work/school, exercising, family activities). Consistent with the motivational interviewing approach, this information should be presented in an empathic, nonjudgmental manner. This information will be in the form of a bar graph, with different activities representing their own bar. The interventionist will discuss the participant's current engagement behavior and inquire about his/her satisfaction with time allocation. This section will also be used to review some more general time management issues and recommendations. The following script can be used:

Script: *"Based on what you told us, this graph is a representation on how you spend your time. What do you think about when you look at this graph? I notice that [points out how a large amount of time is spent]. I also notice that [points out how a small amount of time is spent]. I*

wonder how satisfied you are with how you spend your time? What areas, if any, would you want to see changed in a perfect world? Is there anything surprising to you about this graph?

A blank bar graph will appear below the automated bar graph. This space is for re-allocating a participant's time based on how he or she would like to spend it (if avoidance was not interfering with important life areas and goals). The interventionist will create the graph based on the participant's desired goals. The interventionist will take special care in having the participant include desired time spent on alcohol use. The packet includes three questions that can help guide this next portion of the intervention. Have the client fill out these answers and consider the following script:

Script: *“So it looks like there might be a better way to spend your time if you were better able to approach certain situations differently. Let’s figure out what exactly that would look like. I want to make a new bar graph in this space below. This graph will be a little different from the one above, in that this one will show how you want spend your time. Let’s start with your alcohol use. It looks like right now you are spending [participant self-reported number of drinking hours per week] hours drinking every week. How much time would you want to be drinking? What about being in social situations? What about going to work?”*

7. Personalized Support and Activity Options

The interventionist will provide a personalized list of social options that client may be interested in following up with. These treatment recommendations will be based on self-reported demographic details, military history, trauma type, discharge status, and other factors.

Script: *“In this next section, I want to point out some helpful options that you might want to take advantage of. I know that finding a good treatment fit can be hard, but these treatment providers have a lot of experience with [specific trauma] and are specifically chosen based on your needs. For example, based on what you told us about your discharge status, it looks like the VA might not be a good place for you to receive treatment. However, these other places can help you continue the conversation we started today.”*

The veteran may be resistant to seeking treatment at this time. If so, that is completely fine and the interventionist should roll with the resistance. The important thing is that the veteran has increased access to these resources and they may follow up with these services at a later date.

In addition to these services, the veteran will be presented with a list of personalized activity options. The interventionist may use the following script:

Script: *“I also want to draw your attention to this list of activity options. I know you said that you enjoy watching movies, working out, and going fishing. Based on that, we have a couple of free and low-cost things that might interest you. I also want to let you know about VetTix, which is a website that you can sign up for free of charge. VetTix provides free tickets for veterans (ranging from small events to large events). Is that of interest to you? What kinds of things would you hope to see on that site?”*

8. Considering Your Future

The section on “Considering Your Future” is an Episodic Future Thinking activity. The goal of this activity is to help the veteran become more future oriented. In other words, we will have the veteran describe an event he/she is looking forward to in order to increase the salience of this future event. The interventionist will begin by trying to narrow down one event. Once an event is selected, you can use the following script to direct the participant in the activity.

Script: *“Many people find it difficult to think about long-term goals and planning for their future. Research shows that those who think more about their futures are likely to experience fewer problems related to alcohol use. Let’s do an exercise to help you think more about your future. I want you to take a few minutes and write about something that you might look forward to. In other words, imagine yourself doing something enjoyable that you might do if PTSD wasn’t getting in the way. Be sure to include a lot of details and use ‘I am’ statements.”*

At the end of the activity, have the veteran read what he/she wrote. The interventionist may wish to inquire about what will need to change in order to engage in that activity. If the veteran has difficulty coming up with a future activity he/she is looking forward to, the interventionist may make some suggestions (e.g. a sequel to an upcoming movie, a family event, completion of a long-term project).

9. Summary and Goal Setting

At the end of the session, the interventionist should provide a detailed summary that includes the main topics previously discussed. The interventionist should decide which information to include based on what has been discussed over the 2 sessions. The interventionist should try to hone in on key points that seemed to carry considerable emotional weight or salience with the participant (when talking about what areas of their life they’ve been missing out on, some of these were likely associated with more emotion than others). The summary should touch on the pros and cons, acknowledging the participant’s ambivalence about his/her drinking, avoidance, and engagement in life. If the participant noted that alcohol was being used to avoid thoughts or feelings, the summary should also include some statement to that effect.

Script: *“We’ve talked about a number of ways that avoidance plays a role in your life. You mentioned that you avoid crowded places like schools and movie theaters, and you were surprised about the amount of time you spent drinking to forget about your deployment. You also mentioned that the drinking and avoidance pattern have caused you some distress too – you feel sad that you turn down invitations from friends to go to sporting events or movies. It sounds to me like you would like to make some changes to reduce the ways that drinking is impacting your life (like the hangovers you have been getting) and also to reduce the ways that other types of avoidance have impacted you. I’m curious to hear from you about what stands out most from these two sessions we’ve had? Where would you like to go from here? Finally, you also seemed interested in some of the local treatments we listed, is this an area where you’d like to take action?”*

This summary statement allows the participant to hear the main points of the session, and share with the interventionist what he/she thought was the most notable information. Once these topics have been discussed, and all questions answered, the interventionist can then complete the goal-setting exercise.

Script: *“As the final part of the session, I’d like to work with you on a goal setting exercise. Earlier in the session, you mentioned that these are the things that you avoid, and you already listed some ways to stop avoiding them. Now, from the information that we talked about during the session, what can you do to make progress towards more approach-oriented behavior?”*

10. Goal Setting Worksheet

Goal Setting Worksheet

Please use the spaces provided to list 3 areas of your life that you would like to improve upon. Under each goal, please list how you might approach instead of avoid?

What can you do over the next week?

1. I want to... _____

- Step 1: _____
- Step 2: _____
- Step 3: _____

What can you do over the next month?

2. I want to... _____

- Step 1: _____
- Step 2: _____
- Step 3: _____

What can you do over the next three months?

3. I want to... _____

- Step 1: _____
- Step 2: _____
- Step 3: _____