

BASICS FOR ALCOHOL USE IN COLLEGE STUDENTS:  
IMPACT OF CHOICE ON ANXIETY

A Thesis  
by  
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## **Abstract**

### **BASICS FOR ALCOHOL USE IN COLLEGE STUDENTS: IMPACT OF CHOICE ON ANXIETY**

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Problematic alcohol consumption and anxiety are common co-occurring issues among college students and have been linked to impairment in multiple areas of life (e.g., interpersonal stress, academic performance). Brief motivational interventions that emphasize flexibility, and a non-labeling, collaborative approach have been identified as effective intervention and prevention strategies for alcohol use in college students. The main goal of the present study was to examine the impact of a brief motivational intervention for alcohol use on anxiety symptoms and anxiety-related variables (e.g., anxiety sensitivity) that relate to both anxiety and alcohol use. College student participants ( $N = 25$ ) were randomly assigned to a researcher-driven brief intervention condition (i.e., an assessment and feedback session) or to a consumer-driven condition, which emphasized additional participant choice (i.e., an assessment and feedback session with 2 additional optional sessions). It was hypothesized that anxiety would decrease across time for participants in both conditions, and would decrease more in the consumer-driven relative to the researcher-driven condition as a function of increased control. Quantity and frequency of alcohol use, and alcohol-related

consequences decreased across time in both conditions but did not vary across conditions. Similarly, anxiety sensitivity in the areas of social and cognitive concerns significantly decreased across time, but not across conditions. However, anxiety symptoms and sensitivity related to physical concerns did not significantly decrease across time. These findings are consistent with past brief alcohol interventions for college students and suggest that such interventions may simultaneously address comorbid concerns. In reality, the conditions were identical as no participants assigned to the consumer-driven condition participated in additional sessions. Limitations and future directions are discussed.

*Keywords:* Alcohol Use, Anxiety symptoms, Anxiety Sensitivity, Brief Alcohol Screening Intervention for College Students (BASICS), Motivational Interviewing, College Students

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### BASICS for Alcohol Use in College Students: Impact of Choice on Anxiety

Approximately 87% of Americans have consumed alcohol in their lifetime (Substance Abuse and Mental Health Services Administration [SAMHSA], 2013) and college students are no exception. On average, 82% of college students report any lifetime use of alcohol, roughly 59% of students report any drinking within the past month, and 39% of students report risky drinking behavior (e.g., heavy episodic drinking; SAMHSA, 2013). Excessive alcohol consumption in college has been linked to consequences such as unintentional injuries, physical and sexual assault, and impaired academic performance (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2015).

Anxiety is also a frequent problem among college students (Anxiety and Depression Association of America [ADAA], 2008), with 42% of students presenting at university counseling centers listing anxiety as a primary concern (Association for University and College Counseling Center Directors, 2014). In addition, approximately 75% of the 40 million American adults suffering from anxiety disorders report their first experience with anxiety before the age of 22 (ADAA, 2008). Alcohol use and anxiety are often comorbid (Grant et al., 2004) and can negatively impact treatment outcomes (e.g., increased risk of relapse; Kushner et al., 2005). In relation to college students, higher levels of anxiety and alcohol use are linked to greater alcohol-related problems, more interpersonal stress, and less support from peers (Buckner, Schmidt, & Eggleston, 2006). Understanding the relationship between alcohol use and anxiety symptoms in the context of alcohol use interventions may be important for the implementation of better suited interventions and the reduction of harmful alcohol consumption and associated impairment in college students.

### **Alcohol Use and Anxiety Comorbidity**

As noted above, the rate of comorbidity between alcohol use and anxiety tends to be quite high. For example, Grant et al. (2004) investigated the relation between alcohol use disorders (AUDs) and anxiety disorders with 43,093 participants using the National Institute on Alcohol Abuse and Alcoholism's National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). They found that 17% ( $n = 622$ ) out of 3,636 participants with an AUD were diagnosed with at least one independent anxiety disorder. Furthermore, of the roughly 6% of individuals who met criteria for an AUD and sought treatment ( $n = 442$ ), approximately 33% had at least one independent anxiety disorder.

Swendsen and colleagues (1998) analyzed four epidemiological cross-sectional investigations, compiling a sample of 22,954 individuals. Using surveys that measured diagnostic criteria for alcohol abuse, depressive disorders, and anxiety disorders, individuals with an AUD were found to have two to three times the risk for both anxiety disorders and depressive disorders compared to individuals without an AUD. In addition, they concluded that the presence of a comorbid anxiety or depressive disorder was associated with an increased severity of alcohol use symptoms in community residents.

Similarly, it is estimated that between 35-54% of individuals diagnosed with an anxiety disorder have a lifetime diagnosis of an AUD (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Boschloo et al. (2011) assessed 2,329 individuals diagnosed with anxiety and/or depressive disorders, and 652 healthy control group participants, for the presence of an AUD. They found a lifetime prevalence of 20% ( $n = 473$ ) for an AUD among those with an anxiety and/or depressive disorder compared to only an approximate 5% ( $n = 36$ ) lifetime AUD prevalence among control participants. Comparably, Gratzner et al. (2004) observed the

prevalence rates of anxiety and AUDs in a community survey of 7,195 participants; approximately 18% ( $n = 256$ ) of the 1,427 individuals who met criteria for an AUD also met criteria for an anxiety disorder.

While cross-sectional studies are valuable, they do not allow for an understanding of the temporal relation between AUDs and anxiety. MacDonald, Crum, Storr, Schuster, and Bienvenu (2011) analyzed the relation between subclinical anxiety symptoms and AUDs over a 23-year period in a sample of 587 adults. Findings indicated that individuals with subclinical anxiety symptoms were two to six times more likely to develop a subsequent AUD compared to individuals without subclinical anxiety symptoms.

Consistent with the general population, the relationship between alcohol use and anxiety symptoms has also been found in college students (Buckner et al., 2006; Dawson, Grant, Stinson, & Chou, 2005; Kushner & Sher, 1993; Schry & White, 2013). For example, Kushner and Sher (1993) evaluated the co-occurrence of anxiety disorders and AUDs in a sample ( $n = 489$ ) of college students using a structured diagnostic interview. Results indicated that among individuals with a diagnosed anxiety disorder ( $n = 141$ ), 39% ( $n = 55$ ) also met criteria for an AUD. It was concluded that individuals with clinically significant symptoms of anxiety were nearly twice as likely (39% versus 21%) to have an AUD compared to individuals without a diagnosed anxiety disorder. Longitudinal research documenting the temporal relationship between anxiety symptoms and alcohol use has also been used to examine college student samples (Kushner, Sher, & Erickson, 1999; O'Grady, Cullum, Tennen, & Armeli, 2011). For example, Kushner et al. (1999) longitudinally assessed 489 college freshmen using a semi-structured clinical interview to evaluate family history, anxiety symptomology, and alcohol consumption at baseline and 1, 4, and 7 years

later. They found that having an anxiety disorder at years 1 or 4 quadrupled the risk for the onset of alcohol dependence in year 7. Similarly, alcohol dependence at years 1 or 4 increased the risk for onset of a new anxiety disorder in year 7 by three to five times.

### **Alcohol Use and Anxiety: Potential Underlying Mechanisms**

Underlying vulnerability mechanisms may help explain the relationship between alcohol use and anxiety. The triple vulnerabilities model, proposed by Barlow (2000, 2002), postulates that emotional disorders, including anxiety, are explained by three vulnerabilities: general biological vulnerability, general psychological vulnerability, and disorder-specific psychological vulnerability. General biological vulnerability encompasses genetics, as well as facets of personality (e.g., neuroticism) that are often stable, constant, and affect the experience of negative emotions. Barlow also discusses the idea of general psychological vulnerability, which relates to early environmental learning experiences that inhibit the development of self-efficacy and appropriate coping strategies, in turn influencing an individual's perception of control over anxiety-related experiences. When the two general vulnerabilities become specifically associated with a trigger (e.g., situation, internal state), they activate a third vulnerability, disorder-specific psychological vulnerability. Anxiety sensitivity and perceived control may function as psychological vulnerabilities for anxiety, which could help, explain the relationship between anxiety and alcohol use.

**Anxiety Sensitivity.** Anxiety sensitivity (AS) is defined as the fear of anxiety and anxiety-related sensations (Gillihan, Farris, & Foa, 2011). Individuals with higher levels of AS are more likely to develop an anxiety disorder and also report experiencing negative emotional states more frequently (Asmundson & Norton, 1995; Reiss & McNally, 1985). In addition, AS positively correlates with alcohol use (DeMartini & Carey, 2011; Schmidt,

Buckner, & Keough, 2007; Stewart, 1995; Stewart, Peterson, & Pihl, 1995; Stewart, Zvolensky, & Eifert, 2001). Stewart et al. (1995) found that those with higher levels of AS reported increased rates of problematic drinking behavior compared to individuals with lower AS ( $M = 7.4$  drinks per week compared to 2.2 drinks per week, respectively), according to self-reports of weekly alcohol consumption and yearly excessive alcohol consumption. Similarly, Schmidt et al. (2007) assessed the relationship between AS and future development of an AUD in a sample of young adults ( $n = 404$ ). They found that over a 2-year period, those with higher levels of AS at baseline had a higher incidence of developing an AUD even when controlling for both a history of substance use disorders and trait anxiety.

Previous research supports the hypothesis that those with higher AS utilize substances, such as alcohol, to avoid or escape negative affective states that are often correlated with aversive stimuli (DeHaas, Calimari, & Bair, 2002; DeHaas, Calamari, Bair, & Martin, 2001; Reyno, Stewart, Brown, Horvath, & Wiens, 2006; Stewart et al., 2001). It has been found that those with higher AS endorse more alcohol use in negative emotional states than those with lower AS in both clinical (DeHaas et al., 2001, 2002; Reyno et al., 2006) and non-clinical populations (Samoluk & Stewart, 1998). Additionally, high AS individuals experience greater decreases in fear responses and anxiety when consuming alcohol compared to those with lower AS (MacDonald, Baker, Stewart, & Skinner, 2000; Stewart & Pihl, 1994; Zack, Poulos, Aramakis, Khamba, & MacLeod, 2007). This relief from negative affective states combined with increased sensitivity to alcohol likely contributes to a high AS individual's tendency to consume alcohol, especially in stressful situations.

Alcohol use and AS have also been examined among college students (Lawyer, Karg, Murphy, & McGlynn, 2002; Samoluk & Stewart, 1998; Stewart et al., 2001). For example,

Stewart and colleagues (2001) found that AS was positively associated with alcohol use among a sample of 109 college participants. When compared with students endorsing low and moderate levels of AS, students with higher levels of AS reported increased typical weekly drinking frequency and increased yearly excessive drinking. Overall, research supports the relation between AS, anxiety disorders, and alcohol consumption, identifying AS as a predictor of substance misuse (DeHaas et al., 2001, 2002). Additionally, research suggests that those with higher AS are more likely to use alcohol as a coping mechanism when experiencing negative affective states, such as anxiety.

**Perceived Control.** Perceived control, defined as the perception of control over aversive emotional experiences and events (Barlow, 2002), has been identified as a general psychological vulnerability mechanism in the triple vulnerabilities model of anxiety disorders (Barlow, 2000; Barlow, 2002; Gallagher, Naragon-Gainey, & Brown, 2014; Suarez, Bennett, Goldstein, & Barlow, 2009; White, Brown, Somers, & Barlow, 2006). According to this model the development of an anxiety disorder is directly linked to an individual's perception of control over aversive emotional experiences and events (Barlow, 2000, 2002).

Research has classified perceived control as an etiological factor with transdiagnostic implications for targeting the development and maintenance anxiety disorders (Barlow, 2002; Gallagher, Bentley, & Barlow, 2014; Suarez et al., 2009), and has found associations between perceived control and negative emotional states (e.g., anxiety, depression; Frazier & Waid, 1999; Karademas & Giannousi, 2013; Keeton, Perry-Jenkins, & Sayer, 2008; Rivard & Cappeliez, 2007; Sastry & Ross, 1998; Wilkinson & Chamove, 1992). Specifically, studies have linked a lack of perceived anxiety control to increased severity of symptoms in panic disorder (Bentley et al., 2013; White et al., 2006), obsessive-compulsive disorder (Moulding

& Kyrios, 2007; Moulding, Kyrios, Doron, & Nedeljkovic, 2009), posttraumatic stress disorder (Vujanovic, Marshall, Gibson, & Zvolensky, 2010; Vujanovic, Zvolensky, & Bernstein, 2008), social anxiety disorder (Glick & Orsillo, 2011; Hofmann, 2005), generalized anxiety disorder (Cannon & Weems, 2010; Stapinsky, Abbott, & Rapee, 2010), and trait anxiety (Brown, White, Forsyth, & Barlow, 2004; Rapee, Craske, Brown, & Barlow, 1996).

While little research directly investigates the relationship between perceived control and alcohol use, previous studies suggest that stress and anxiety are moderators within the relationship (Clarke, MacPherson, & Holmes, 1982; Hui & Bateson, 1991; Newman, 1970). For example, Hui and Bateson (1991) found that low levels of perceived control prompts the need to regain control, and additional research found that alcohol is sometimes viewed as a way to do so (Clarke et al., 1982; Newman, 1970). The large amount of empirical evidence supporting a relationship between anxiety and perceived control, as well as a relationship between anxiety and alcohol use, suggests that further exploration of perceived control and alcohol use is warranted.

### **Brief Interventions for Alcohol Use in College**

Brief interventions are defined as therapeutic interventions, applied in both general healthcare settings and in specialized treatment contexts (Bien, Miller, & Tonigan, 1993), that use assessment, feedback, information, advice, and self-help materials over a short period of time (e.g., one to five sessions determined by the clinician or researcher; Vasilaki, Hosier, & Cox, 2006). Compared to traditional long-term interventions, brief interventions for alcohol use often produce similar treatment outcomes, and are more cost-effective (Bien et al., 1993; Poikolainen, 1999; Vasilaki et al., 2006). For example, the Project MATCH



Research Group (1998b) compared a brief 4 session intervention (i.e., Motivational Enhancement Therapy [MET]) to two 12 session interventions (i.e., Twelve-Step Facilitation Therapy, Cognitive Behavioral Coping Skills Therapy) using a sample of 1,726 randomly assigned adult participants. Participants in all treatment conditions experienced significant decreases in drinking behavior, as well as in other areas of life functioning (Project MATCH Research Group, 1998b) which were maintained at a 39-month follow-up (Project MATCH research group, 1998a).

Likewise, brief motivational interventions have also been identified as effective intervention approaches for alcohol use in college students (Borsari & Carey, 2000; Borsari et al., 2015; Dimeff, Baer, Kivlahan, & Marlatt, 1999; Moreira, Oskrochi, & Foxcroft, 2012). Due to the emphasized flexibility, and non-labeling, collaborative approach, brief interventions for alcohol use are able to address the individual, social, and environmental factors facing college students (Dimeff et al., 1999). Examples of such interventions applied to the college student population include Motivational Interviewing (MI) and Brief Alcohol Screening Intervention for College Students (BASICS).

**Motivational Interviewing (MI).** Motivational interviewing (MI), a guiding, goal-oriented style of communication first described in the 1980s, has a long-standing presence in substance abuse treatment and is commonly employed in brief alcohol use interventions (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). This approach focuses on assisting clients in the exploration and resolution of ambivalence related to behavior change and is designed to “strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person’s own reasons for change within an atmosphere of acceptance and compassion” (Miller & Rollnick, 2013, p. 29). Additionally, MI attempts to

change the value of consequences associated with the behavior by weighing the pros and cons of behavior change. This intervention is collaborative and mediated by a strong working alliance between a client and a therapist (Lundahl et al., 2010), a concept frequently ignored in earlier confrontational AUD treatment (Schneider, Casey, & Kohn, 2000).

While MI was originally conceptualized as an independent intervention, it has evolved into a style that is generally utilized in the context of brief interventions (Miller & Rollnick, 2013). Brown and Miller (1993) found that a motivational intervention resulted in both a reduction in alcohol consumption and a reduction in risk of relapse. Their sample, collected from a substance abuse treatment program, consisted of 28 participants including 21 men and 7 women. Participants in the intervention group completed the Brief Drinker Profile, which assesses demographics, current drinking behaviors, history of drinking behaviors and other substance use, family history, life problems, and motivation for treatment. Participants then received personalized, normative feedback (e.g., quantity and frequency of their drinking behavior), which was delivered in a style uniform with MI. Three months later, a total of 64% of the MI treatment group was abstinent, asymptomatic, and classified in the favorable outcomes category compared to only 29% in the control group. Brief interventions containing both assessment feedback and a MI style can assist in encouraging client involvement and facilitate an improved treatment outcome (Brown & Miller, 1993).

Motivational interviewing is not only an effective brief intervention, but has also been shown to facilitate long-term improvement. For example, Lundahl and colleagues (2010) reported that interventions using MI required 100 fewer minutes of treatment on average while achieving equivalent outcomes compared to other active treatments, such as cognitive

behavioral interventions and 12-step programs. In a longitudinal meta-analysis, Burke, Arkowitz, and Menchola (2003) examined 29 studies analyzing the effects of MI on a variety of target behaviors including alcohol use, smoking cessation, HIV-risk behaviors, and drug addiction. They found that 51% of people who received an adapted version of MI treatment improved at follow-up compared to 37% of people receiving no treatment or treatment as usual. They also found that the effects of the MI intervention were found in participants for up to 4 years after initial treatment.

Consistent with outcomes of MI efficacy in the general population, MI has also shown to be effective with college students (Kazemi, Levine, Dmochoski, Nies, & Sun, 2013). For example, Kazemi and colleagues (2013) examined the impact of MI on alcohol consumption and risky drinking among college freshmen ( $n = 188$ ). Four 50-minute sessions of MI were delivered at baseline, 2-weeks, 3 months, and 6 months. At the 6-month booster session, results showed a significant decrease in the average number of drinks per week, average time spent per drinking episode, and average drinking days over the last 30 days.

**Brief Alcohol Screening Intervention for College Students (BASICS).** The Brief Alcohol Screening and Intervention for College Students (BASICS) program is a brief, non-confrontational, harm-reduction intervention for college students designed to decrease overall alcohol use and reduce both behavioral and health risks associated with problematic alcohol consumption (Dimeff et al., 1999). The BASICS intervention is carried out over two sessions, with data collected via a standardized online system. The first session is used to collect information regarding alcohol consumption patterns and associated impairment, while the second session is designed to offer norm-referenced, personalized feedback on previously collected information, and provide recommendations for reducing future health risks that

often follow problematic alcohol consumption (Dimeff et al., 1999). The norm-referenced, personalized feedback is given in a style consistent with MI (Miller & Rollnick, 2013) and a substantial amount of the feedback includes reference to drinking behavior specific to the student's university population (Dimeff et al., 1999).

A large research base supports the effectiveness of the BASICS intervention among college students (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Borsari & Carey, 2000; Kazemi et al., 2012; Larimer et al., 2001; Marlatt et al., 1998). Marlatt et al. (1998) reported that in a sample of 348 college students, individuals assigned to a brief motivational condition using BASICS during their freshmen year of college demonstrated significant reductions in alcohol consumption and alcohol-related impairment across a 2-year follow-up period compared to individuals in the assessment-only control group. Similarly, Kazemi and colleagues (2012) used BASICS in conjunction with MI to investigate the impact of the intervention on high-risk drinking and polydrug use in a sample of 299 college freshmen. At a 6-month follow-up, significant decreases were found in the amount of alcohol consumed weekly and the amount of time spent drinking per drinking episode.

### **Alcohol Use and Anxiety in the Context of Treatment**

Overall, co-occurring alcohol use issues and anxiety increase barriers when attempting to access and adhere to treatment by creating greater distress during treatment and increasing risk for relapse (Driessen et al., 2001; Farris, Epstein, McCrady, & Hunter-Reel, 2012; Kushner et al., 2009; Thevos et al., 1991). In their recent literature review, Baker, Thornton, Hiles, Hides, and Lubman (2012) concluded that while both long-term and brief interventions produced overall improvement in alcohol consumption and co-occurring mood or anxiety symptoms, MI and cognitive behavioral interventions demonstrated strong

effectiveness related to reducing both alcohol intake and mood and/or anxiety symptoms. Screening for comorbidity and providing additional support prior to and during treatment could help to identify those experiencing anxiety and help to facilitate more successful treatment outcomes (Thevos et al., 1991).

Both alcohol misuse and anxiety often involve ambivalence and avoidance, which can impair treatment retention and adherence, and also maintain or exacerbate symptoms (Slagle & Gray, 2007). However, MI, the communication style used with BASICS, allows for the exploration of problematic behaviors in an empathetic and collaborative environment, targeting ambivalence and avoidance (Slagle & Gray, 2007). Additionally, because of the emphasized collaboration between the client and therapist, MI allows for the accentuation of client autonomy (Miller & Rollnick, 2013). Client autonomy in brief motivational interventions, such as BASICS, highlights the client's perceived control and choice (Csillik, 2013; Slagle & Gray, 2007) potentially addressing the vulnerability of perceived control common among individuals with anxiety symptoms. Additional research has also suggested that the client-centered approach of MI allows for clients to feel a greater sense of confidence surrounding management of their symptoms (Slagle & Gray, 2007), possibly influencing their perception of anxiety control. Therefore, the collaborative nature of MI, as well as additional client choice (e.g., by allowing client to dictate number of sessions), may result in better outcomes.

Previous studies have documented the utility of MI in the treatment of anxiety disorders (Buckner, 2009; Westra, Arkowitz, & Dozois, 2009; Westra & Dozois, 2006). For example, Westra and colleagues (2009) found that when using MI as a pretreatment approach prior to the implementation of cognitive-behavioral therapy for anxiety symptoms,

participants experienced a significant decrease in worry symptoms and displayed a downward trend in DASS anxiety scores compared to those in the no pretreatment group. Similarly, Westra and Dozois (2006) found that individuals in a MI pretreatment group showed significantly higher expectancy for anxiety control, and demonstrated better homework compliance, during the subsequent therapy compared to those without MI pretreatment.

Research has also supported the impact of alcohol use interventions on other areas of life (Baker et al., 2012; Liappas, Paparrigopoulos, Tzavellas, & Christodoulou, 2002; Project MATCH, 1997). There have been documented decreases in symptoms of depression and anxiety (Horigian et al., 2013; Liappas et al., 2002; Schadé et al., 2005; Toneatto, 2005), as well as increases in overall social and global functioning (Baker et al., 2012; Jerrell & Ridgely, 1995, 1999), and quality of life (Aubrey, Cousins, LaFerriere, & Wexler, 2003) following alcohol-specific interventions (Horigian et al., 2013; Liappas et al., 2002; Schadé et al., 2005). For example, Schadé and colleagues (2005) compared the effects of an alcohol use intervention with a combined alcohol use and anxiety intervention in a group of 96 individuals endorsing both anxiety symptoms and disordered alcohol consumption. Though the alcohol treatment group did not receive an anxiety intervention, reductions in all anxiety variables (e.g., agoraphobia, social phobia, avoidance, overall anxiety) were seen across both treatment groups at the 32-week follow-up assessment.

Additionally, Motivational Enhancement Therapy (MET), a brief motivational alcohol use intervention similar to BASICS, resulted in a decrease in levels of AS throughout alcohol use treatment (Korte & Schmidt, 2013, 2015). Consistent with the mechanisms working within MI, MET has also been found to increase the motivation to change AS (Korte

& Schmidt, 2015). Furthermore, as previously mentioned, AS is acknowledged as an underlying psychological vulnerability factor in anxiety disorders, and has also been documented as strongly associated with problematic alcohol consumption (Norton, 2001; Olthuis, Watt, Mackinnon, & Stewart, 2015; Stewart, Samoluk, & MacDonald, 1999).

Overall, the focus of motivational interventions on resolving ambivalence and avoidance, and allowance for shared control during sessions (Hettema, Ernst, Williams, & Miller, 2014; Lundahl et al., 2010), as well as the finding that decreased drinking relates to improvement in other areas of life (e.g., significant decreases in anxiety symptoms; Schadé et al., 2005), suggests a reduction of anxiety symptoms among college students who participate in a brief alcohol intervention.

### **Present Study**

Literature to date supports the efficacy of brief interventions using an MI style for alcohol use (Poikolainen, 1999; Vasilaki et al., 2006) with college students (Baer, 1994; Borsari et al., 2015; Borsari & Carey, 2000; Dimeff et al., 1999; Moreira, et al., 2012). Brief motivational interventions for alcohol use contribute to the reduction of alcohol consumption and associated risk. These interventions have also been shown to impact anxiety symptoms even when not directly targeting anxiety (Korte & Schmidt, 2013; Westra et al., 2009; Westra & Dozois, 2006). Typically, brief interventions involve two sessions as determined by the researcher, clinician, or intervention protocol. It is likely that explicitly increasing client choice could result in brief alcohol interventions having an increased impact on anxiety symptoms (Gallagher et al., 2014) as well as on underlying mechanisms (e.g., perceived control) that are common to both anxiety symptoms and alcohol use (Baer, 1994; Borsari et

al., 2015; Borsari & Carey, 2000; Dimeff et al., 1999; Moreira, et al., 2012; Poikolainen, 1999; Vasilaki et al., 2006).

The present study examined the impact of choice in BASICS on anxiety symptoms and AS among college student participants who reported an interest in learning about their drinking. Participants were randomly assigned to either a researcher-driven BASICS (e.g., two sessions) or a consumer-driven BASICS (e.g., the option of additional sessions [maximum of 2] at the request of the participant) condition. It was hypothesized that participants in both conditions would report a decrease in alcohol consumption and alcohol-related impairment, consistent with previous studies regarding the effectiveness of the BASICS intervention (Baer, et al., 2001; Borsari & Carey, 2000; Kazemi et al., 2012; Larimer et al., 2001; Marlatt et al., 1998). In addition, it was hypothesized that both BASICS conditions would result in decreased anxiety symptoms and AS, as well as increased levels of anxiety control (Buckner, 2009; Horigan et al., 2013; Korte & Schmidt, 2013; Liappas et al., 2002; Toneatto, 2005; Westra et al., 2009; Westra & Dozois, 2006). Finally, it was hypothesized that the participants in the consumer-driven condition would report greater reduction in anxiety symptoms and AS, consistent with greater perceived control, relative to those in the researcher-driven condition (Westra & Dozois, 2006).

## **Method**

### **Participants**

A total of 35 college student participants from a mid-size university in the Southeastern United States were recruited for the present study. A final sample of 25 students (60% female) completed the study, which included a BASICS assessment session, a feedback



session, and a 2-week follow-up. There were no pre-existing differences (i.e., age, gender, alcohol consumption [frequency, quantity], alcohol-related consequences, anxiety symptoms and AS, perceived control, readiness to change) between individuals who completed the study ( $n = 25$ ) and individuals who entered but did not completed the study ( $n = 10$ ; see Table 1).

Participants' ages ranged from 18 to 25 years old ( $M = 20.08$ ,  $SD = 1.78$ ). The sample consisted of mostly upperclassmen (51%) and individuals living off campus (66%). At baseline, participants endorsed drinking between 2 and 12 days every 2 weeks ( $M = 5.20$ ,  $SD = 2.61$ ) and consuming between 1 and 28 total drinks within that same 2-week period ( $M = 5.98$ ,  $SD = 5.24$ ). At baseline, participants reported mean total DASS-21 anxiety subscale scores in the mild range ( $M = 9.42$ ,  $SD = 2.40$ ) and a mean for AS total scores in the normal range (cutoff = 23.4;  $M = 10.23$ ,  $SD = 6.18$ , score range = 2 - 26). The cutoff range was determined by previous research completed using nonclinical samples from the United States and Canada (Taylor et al., 2007). In the current sample, most participants identified as precontemplators suggesting they were not actively committed to changing their drinking behavior ( $n = 23$  of 35). There were no significant differences found in Readiness to Change total scores between conditions at baseline;  $t(33) = -0.60$ ,  $p = .34$ .

## Measures

**Demographic information.** Participants were asked to indicate sex, age, living situation, relationship status, occupation, and education level (see Appendix A).

**Brief Alcohol Screening for College Students (BASICS [Dimeff et al., 1999]).** BASICS is an online assessment and feedback program that assesses multiple aspects of alcohol use including consumption patterns (e.g., quantity and frequency), personal

experiences with (e.g., Alcohol-Related Consequences), understanding of social alcohol norms, protective drinking behaviors (e.g., getting a ride instead of drinking and driving), and family history. BASICS uses a modified version of the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985) also known as the two-week calendar. Participants fill in a series of boxes indicating typical patterns (e.g., quantity, duration) of alcohol use on each day of the week within a typical 2-week period in the recent past. The DDQ is frequently used to assess college student drinking, and is reliable when compared to self-monitored drinking reports (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990). The BASICS program also includes a modified version of the Young Adult Alcohol Problems Screening Test (YAAPST; Hurlbut & Sher, 1992) that assesses negative consequences associated with alcohol use over the student's lifetime and the past year, including frequency of these experiences and behaviors (e.g., hangovers, blackouts, drunk driving, missing class). In addition, BASICS utilizes the Readiness to Change Questionnaire (Heather, Gold, & Rollnick, 1991), a 12-item self-report measure used to assess readiness to engage in behavior change using the Prochaska, DiClemente, and Norcross (1992) transtheoretical stages of change model (e.g., precontemplation [PC], contemplation [C], action [A]). In a sample of 685 individuals, the reliabilities for the three subscales were adequate (e.g., PC  $\alpha = .66$ , C  $\alpha = .66$ , A  $\alpha = .85$ ). The internal consistency of the scales remained adequate (e.g., PC  $\alpha = .76$ , C  $\alpha = .74$ , A  $\alpha = .88$ ) three months later ( $n = 605$  of original 685).

**DASS-21 (Henry & Crawford, 2005).** The Depression Anxiety Stress Scale (DASS-21) is a 21-item self-report measure (see Appendix B) designed to assess cognitive and behavioral distress symptoms experienced within the past week. This measure utilizes three subscales: Depression (7 items; e.g., "I felt that life was meaningless"), Anxiety (7 items; "I

felt I was close to panic”), and Stress (7 items; “I found it difficult to relax”). Participants rate the 21-items on a 4-point Likert-scale ranging from 1 (did not apply to me at all) to 4 (applied to me very much or most of the time). Higher scores are suggestive of higher levels of depression, anxiety, or stress (Henry & Crawford, 2005). Antony and colleagues (1998) assessed internal consistency of the DASS-21 using a total of 307 individuals with panic disorder ( $n = 67$ ), obsessive compulsive disorder ( $n = 54$ ), social phobia ( $n = 74$ ), specific phobia ( $n = 17$ ), or major depressive disorder ( $n = 46$ ) and a group of nonclinical volunteers for comparison ( $n = 49$ ). Internal consistency using Cronbach’s alpha for the DASS-21 Depression, Anxiety, and Stress subscales were .94, .87, and .91, respectively, in both clinical and nonclinical samples. They also found that the DASS-21 Depression subscale was highly correlated with the Beck Depression Inventory ( $r = .79$ ), and that the DASS-21 Anxiety subscale correlated with the Beck Anxiety Inventory ( $r = .85$ ; Antony, Bieling, Cox, Enns, & Swinson, 1998). For the present study, internal consistency using Cronbach’s alpha for the DASS-21 Depression, Anxiety, and Stress subscales were .87, .85, and .86, respectively.

**Anxiety Sensitivity Index (ASI-3; Taylor et al., 2007).** The ASI-3 is an 18-item self-report measure using a Likert scale, with responses ranging from 0 “Very Little” to 4 “Very Much,” that assesses anxiety sensitivity in three domains: Physical, Cognitive, and Social Concerns. The Physical subscale consists of items such as “When my stomach is upset, I worry that I might be seriously ill,” the Cognitive subscale contains items such as “When I cannot keep my mind of a task, I worry that I might be going crazy,” and the Social Concerns subscale consists of items like “It is important for me not to appear nervous.” The ASI-3 demonstrated acceptable internal consistency, with alphas exceeding .70, on the

Physical, Cognitive, and Social Concerns subscales in a sample of 4,720 young adults. Using the same sample, the ASI-3 was found to have high convergent validity ( $r > .73$ ) with the original ASI across all three subscales. The ASI-3 total score has high one-month test-retest reliability, within cross-cultural validations, ranging from .83 to .85 (Sandin, García, Chorot, & Germán, 2007). In the present study, internal consistency using Cronbach's alpha for the ASI-3 Physical, Cognitive, and Social Concerns subscales were .90, .93, and .83, respectively, and .94 for the ASI-3 Total score.

**Anxiety Control Questionnaire- Revised (ACQ-R; Brown, White, Forsyth, & Barlow, 2004).** The ACQ-R is a revised self-report measure used to assess an individual's perceived degree of control over anxiety and anxiety-related situations. Participants use a Likert scale, with responses ranging from 0 "Strongly Disagree" to 5 "Strongly Agree," to rate each item across three subscales: Emotion Control, Threat Control, and Stress Control. The Emotion Control subscale consists of items such as "I am able to control my level of anxiety," the Threat Control subscale contains items such as "When I am frightened by something, there is generally nothing I can do," and the Stress Control subscale includes "When I am put under stress, I am likely to lose control." Scores represent a sum across 15 items and range from 0 to 75. Internal consistency ranges from .81 to .89 (Ballash, Leyfer, Buckley, & Woodruff-Borden, 2006; Brown et al., 2004; Craske et al., 2007). Test-retest reliability was performed over a period of 1 week to 1 month with correlations ranging from .82 to .88 (Rapee et al., 1996). For the present study, total scores were used and internal consistency using Cronbach's alpha for the ACQ-R was .84.

**Procedure**

Volunteer participants were recruited using a Psychology Subject Pool. Participants recruited through the Psychology Subject Pool scheduled the initial meeting through SONA, an online software where students elect to sign up for experiments. Inclusion and exclusion criteria for the Psychology Subject Pool students were provided through SONA. Potential participants were also recruited through flyers (see Appendix C) posted at the Wellness Center, Counseling Center, and Health Services on campus. Individuals called or emailed in response to the recruitment flyer, which included inclusion and exclusion criteria. Inclusion criteria included students 18 years of age or older who generally consume alcohol weekly and were not currently participating in alcohol use treatment. Interested participants who met inclusion criteria were scheduled for an initial individual one-hour and 30-minute meeting with a researcher in a private office in the psychology department on campus.

Prior to the initial meeting, participants were randomly assigned to one of two intervention conditions (researcher-driven or consumer-driven). During the initial meeting, participants were first presented with an informed consent document. The researcher discussed study procedures and participation requirements, emphasized the risks and benefits of partaking in the study, and addressed concerns and questions. Participants were asked to sign the consent form (see Appendix D) if they agreed to participate. Next, participants completed the computerized BASICS program, and several online self-report measures (i.e., demographics questionnaire, DASS-21, ASI-3, and ACQ-R) using a survey website run by a data collection and analysis company called Qualtrics. Participants were then scheduled for the individual feedback session approximately one week later.

**Intervention conditions.** As noted above, participants were randomly assigned to one of two intervention conditions. Those assigned to the *researcher-driven condition* (originally assigned:  $n = 17$ ; total completed:  $n = 11$ ) were scheduled for two sessions consistent with former tests of BASICS (DiFulvio, Linowski, Mazziotti, & Puleo, 2012; Murphy, Dennhardt, Skidmore, Martens, & McDevitt-Murphy, 2010; Terlecki, Buckner, Larimer, & Copeland, 2012). The initial session lasted approximately one hour and 30 minutes and consisted of obtaining informed consent, and completion of the online BASICS program and other self-report measures (as described above). Participants were then scheduled for another one hour and 30-minute meeting approximately one week later. During this session, participants received personalized, objective feedback (See Appendix E) from the assessments completed during the first meeting in a style consistent with MI (Miller & Rollnick, 2013). Specifically, participants received normative feedback on quantity and frequency of alcohol use, alcohol-related consequences, levels of depression, anxiety, and stress, AS scores, and readiness to change. The information was presented in a collaborative and non-judgmental manner, and only information that was of interest to the participant was discussed in further detail. Participants were offered the opportunity to discuss their reactions to the feedback, explore ambivalence about their alcohol use, and potentially discuss options for addressing concerns in a manner consistent with the MI style (Miller & Rollnick, 2013). All participants were provided with a list of campus and community substance use and mental health resources.

Those assigned to the *consumer-driven condition* (originally assigned:  $n = 18$ ; total completed:  $n = 14$ ) participated in procedures identical to the researcher-driven condition for the first two sessions. In addition, during the consent process and during the second meeting,

they were offered the option to request up to two additional meetings. If requested, these were to be scheduled individually and approximately one week apart, and involved continued discussion of individual concerns, ambivalence toward changing use of alcohol, and potential discussion of strategies and resources available to assist with decreasing use of alcohol. Although participants assigned to the consumer-driven condition were offered the option of additional sessions, none of the participants requested additional sessions.

### **Follow-Up Procedures**

Participants in both conditions were assessed two weeks after the completion of the intervention. Ten subjects attended the first session, but not the 2-week follow-up session. The follow-up survey contained multiple self-report measures including: two-week calendar, modified YAAPST, ACQ-R, ASI-3, and DASS-21. The assessments for both conditions were completed in a private research laboratory on campus using the secure survey website called Qualtrics. Each participant was given the option of class credit or \$5.00 as compensation for the completion of the follow-up questionnaires.

### **Results**

A Multivariate Analysis of Variance (MANOVA) using baseline questionnaires as the dependent variables (quantity and frequency of drinking, YAAPST total scores, ASI-3 total scores, DASS-21 anxiety subscale scores, and ACQ-R total scores) and intervention condition (researcher-driven vs. consumer-driven) as the independent variable was conducted to ensure that random assignment was effective. There were no pre-existing differences between groups in regards to quantity or frequency of drinking, ASI total scores, ASI subscale scores, DASS-21 anxiety subscale scores, or YAAPST total scores (Pillai's statistic

= .08,  $F[2, 23] = .33$ ,  $p = .89$ ,  $\eta_p^2 = .08$ ; see Table 1). As previously mentioned, none of the participants in the consumer-driven condition requested additional sessions precluding the potential need to covary for total number of sessions.

### **Alcohol-Use and Consequences Analyses**

At the 2-week follow-up, participants endorsed drinking between 0 and 12 days within the 2-week period following the feedback session ( $M = 3.86$ ,  $SD = 2.92$ ) and consuming between 0 and 11.5 drinks within that same 2-week period ( $M = 4.02$ ,  $SD = 2.86$ ). A mixed-model MANOVA with condition (researcher-driven versus consumer-driven) as the between-subjects variable and time (pre-intervention versus 2-week follow-up) as the within-subjects variable was conducted on the quantity and frequency of alcohol use to assess for changes across time as a function of the intervention condition. Consistent with the hypothesis, a significant multivariate effect of time emerged (Pillai's statistic = .40,  $F [2, 20] = 6.37$ ,  $p = .01$ ,  $\eta_p^2 = .40$ ). Self-reported alcohol use decreased significantly between baseline and the 2-week follow-up (see Table 2): quantity,  $F(1, 21) = 6.64$ ,  $p = .02$ ,  $\eta_p^2 = .25$ ; frequency,  $F(1, 21) = 7.29$ ,  $p = .01$ ,  $\eta_p^2 = .27$ . The interaction between time and intervention condition was insignificant,  $F(2, 20) = .49$ ,  $p = .62$ ,  $\eta_p^2 = .05$ .<sup>1</sup>

Additionally, a 2 x 2 repeated measures Analysis of Variance (ANOVA) was performed with condition (researcher-driven vs. consumer-driven) as the between-subjects' variable and time (pre-intervention versus 2-week follow-up) as the within-subjects' variable on total scores of the YAAPST to observe changes in alcohol-related consequences as a function of the intervention. Again, consistent with the hypothesis, alcohol-related consequences decreased across time regardless of condition (see Table 2),  $F(1, 24) = 35.59$ ,



$p < .001$ ,  $\eta_p^2 = .61$ . Results indicated, again, that there was no difference between the researcher and consumer conditions on YAAPST scores over time,  $F(1, 24) = 1.67$ ,  $p = .21$ ,  $\eta_p^2 = .07$ .

### **Anxiety-Related Analyses**

Participants, on average, endorsed a follow-up mean DASS-21 anxiety score falling in the mild range ( $M = 8.76$ ,  $SD = 2.71$ ) and a follow-up mean total ASI-3 score falling in the normal range ( $M = 5.64$ ,  $SD = 4.87$ ). A mixed-model MANOVA with condition (researcher-driven versus consumer-driven) as the between-subjects variable and time (pre-intervention versus 2-week follow-up) as the within-subjects variable was conducted on the anxiety subscale of the DASS-21, ASI-3 total scores, and ACQ-R total scores to assess for changes across time as a function of condition. A significant multivariate effect of time emerged (Pillai's statistic = .46,  $F [3, 20] = 5.17$ ,  $p = .01$ ,  $\eta_p^2 = .46$ ) in which the anxiety subscale of the DASS-21 and ASI-3 total scores both decreased across time and the ACQ-R total scores increased across time. However, univariate tests suggest the decrease in anxiety scores was primarily to due to a decrease in ASI-3 scores,  $F(1, 22) = 12.74$ ,  $p < .01$ ,  $\eta_p^2 = .39$ , and not DASS-21 anxiety subscale scores,  $F(1, 22) = 1.94$ ,  $p = .18$ ,  $\eta_p^2 = .09$ . An additional MANOVA was conducted to observe changes across time on the ASI-3 subscales across time. Results indicated that while the ASI-3 Social Concerns,  $F(1, 22) = 16.20$ ,  $p = .001$ ,  $\eta_p^2 = .44$ , and ASI-3 Cognitive Concerns,  $F(1, 22) = 6.41$ ,  $p = .02$ ,  $\eta_p^2 = .23$ , significantly decreased across time, the ASI-3 Physical Concerns,  $F(1, 22) = 3.04$ ,  $p = .10$ ,  $\eta_p^2 = .13$ , subscale demonstrated a trend level decline, but was not significant. Contrary to the hypothesis, there was no difference between the researcher-driven and consumer-driven conditions on the

anxiety subscale scores of the DASS-21, ASI-3 total scores, ASI-3 subscale scores, or ACQ-R total scores over time,  $F(3, 20) = .59, p = .63, \eta_p^2 = .09$  (see Table 2).<sup>2</sup>

### Discussion

The present study tested the impact of a brief assessment, feedback, and motivational intervention (Dimeff et al., 1999) on alcohol use, related consequences, anxiety, AS, and anxiety control. College student participants were randomly assigned to a researcher-controlled or a consumer-controlled intervention condition. As predicted, quantity and frequency of alcohol use and alcohol-related consequences, as well as AS decreased between baseline and the 2-week follow-up. Contrary to hypotheses, there were no significant differences between intervention conditions in regards to alcohol use, alcohol-related consequences, anxiety, AS, or perceptions of anxiety control. In reality, conditions were similar in regards to study procedures due to the lack of participation in the optional additional sessions in the consumer-driven condition.

The significant decrease in quantity and frequency of alcohol use from baseline to follow-up is consistent with previous literature suggesting that brief motivational interventions are efficacious in decreasing alcohol consumption (Bien et al., 1993; Borsari & Carey, 2000). Specifically, brief motivational interventions and BASICS have been tested with college students, and reliably result in decreased alcohol use and related consequences (Borsari & Carey, 2000; Borsari et al., 2015; Carey, DeMartini, Prince, Luteran, & Carey, 2013; Dimeff et al., 1999). Because of the flexible and non-labeling approach of brief motivational interventions, college students often perceive having increased autonomy (Dimeff et al., 1999), which has been shown to improve treatment outcomes (Clausen,

Lubeck, & Jones, 2013; Zuroff, Koestner, Moskowitz, McBride, & Bagby, 2012; Zuroff et al., 2007). Of note, no significant differences in anxiety control were observed between study conditions in the present study, suggesting the participants' sense of control over anxiety symptoms and anxiety-related situations was not altered via the perception of choice offered within the different conditions.

The present study also found a decrease in alcohol-related consequences among college students two weeks after completing the brief BASICS assessment and motivational feedback intervention. Similarly, prior research has found that brief motivational interventions assist in the reduction of alcohol-related consequences (Dimeff et al., 1999; Kazemi et al., 2013; Marlatt et al., 1998), particularly academic functioning (e.g., missing class, receiving lower grades; NIAAA, 2015) and risk-taking behavior (e.g., drinking and driving, assault, accidents; NIAAA, 2015). Harm reduction approaches have demonstrated effectiveness with college students (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Larimer & Cronce, 2007; White, 2006), potentially due to the flexibility of outcome goals in which abstinence is not required, and the personalized approach to alcohol-related consequences (Marlatt, 1998; Neighbors, Larimer, Lostutter, & Woods, 2006).

While decreases in self-reported anxiety symptoms, as assessed by the DASS-21, were not found between baseline and 2-week follow-up measures in univariate tests, prior research has documented decreases in anxiety within the context of brief motivational interventions using treatment-seeking populations (Horigian et al., 2013; Liappas et al., 2002; Schadé et al., 2005; Toneatto, 2005). It is possible that the mild level of anxiety, as measured by the DASS-21, in the current college student sample at baseline affected the ability to detect a significant impact of the intervention on anxiety levels. Prior research has

documented a smaller effect size for interventions targeting subclinical anxiety (Cuijpers, Koole, van Dijke, Roca, Li, & Reynolds, 2014) compared to interventions targeting anxiety disorders (Hofmann & Smits, 2008). It is also important to note that, of the studies that conducted follow-up assessments, the follow-up measures were administered between 3 months and 1 year following the intervention, whereas the present study only had a 2-week follow-up (Horigian et al., 2013; Schadé et al., 2005; Toneatto, 2005).

However, the present study found decreased AS across time and a trend for decreased DASS-21 anxiety scores. Individuals with higher levels of AS have been found to utilize substances at higher rates than those with lower levels of AS in adult treatment-seeking samples (DeHaas et al., 2002; DeHaas et al., 2001; Reyno et al., 2006), and in college samples (Lawyer et al., 2002; Samoluk & Stewart, 1998; Stewart et al., 2001). Although anxiety symptoms and AS are related, they are distinct constructs. For example, the ASI-3 assesses fear of physical symptoms of anxiety, as well as, disordered anxiety-related thinking (e.g., worry) and social anxiety-related issues (e.g., concern about the perception of others). Conversely, the DASS-21 Anxiety subscale predominately assesses specific physical symptoms of anxiety (e.g., dryness in mouth, trembling, heart racing). Of note, the present study found that ASI-3 Physical Concerns did not significantly decrease across time, while ASI-3 Social Concerns and ASI-3 Cognitive Concerns significantly decreased across time. The lack of decrease on the ASI-3 Physical Concerns subscale is consistent with the insignificant change across time on the DASS-21 anxiety score that predominantly assesses physical symptoms of anxiety. Additionally, the DASS-21 specifies that the participant should only endorse symptoms if they were experienced over the past week, while the ASI-3 does not provide a specific time period of reporting and suggests that a participant answer

based on how they think they might feel even if they had not had specific experiences (e.g., fainting in public). Of note, previous research has suggested that declining AS scores can be observed following repeated administrations of measures of AS, despite a lack of AS-related intervention (Broman-Fulks, Berman, Martin, Marsic, & Harris, 2009).

Overall, perception of choice, as manipulated by choice in number of possible intervention sessions, did not impact alcohol use, alcohol-related consequences, anxiety, or levels of AS among college students. Notably, no participants in the consumer-driven condition made the decision to attend additional sessions after the feedback session although attrition between the first and second session was low. While there were no active differences between the intervention conditions, it is possible that participants were satisfied with attending only two sessions or that their participation was primarily motivated by earning course credit. Additionally, it is possible that the manipulation lacked strength to change participants' perceptions of choice. Carey and colleagues (2013) found that when college students who violated campus alcohol use policies were given the ability to choose to participate in one of two interventions (i.e., a brief motivational intervention or a computer-delivered education program), compared to those assigned to one of the two interventions, higher levels of client satisfaction were reported. However, no differences were found on overall outcomes (e.g., alcohol use, alcohol-related consequences; Carey et al., 2013).

Perception of control over anxiety-related experiences increased across time, but did not differ between conditions. This is consistent with previous research stating that applying MI to anxiety led to a higher expectancy for subsequent anxiety control (Westra & Dozois, 2006). Additionally, research has suggested that the client-centered approach in MI could relate to increased self-efficacy leading to a positive perception of anxiety control (Slagle &

Gray, 2007). It is possible that differences in levels of perceived control between conditions could have been observed with a larger sample size due to increased statistical power.

**Limitations and Future Directions.** The present study, like all empirical investigations, has limitations. First, the sample size is small and may lack statistical power to detect differences between groups as a function of the intervention. Of note, data collection is ongoing. It is also possible that a lack of strength in the manipulation of the conditions impeded the ability to observe differences between the efficacy (research-driven) and effectiveness (consumer-driven) approach to the intervention. Use of a single consent form for both conditions that highlighted the differences between each condition to the participants could have improved the strength of the manipulation. Additionally, although flyers were posted around campus at Health Services, the Wellness Center, and the Counseling Center, all participants were recruited through SONA, a Psychology Research pool. Individuals recruited through SONA received class credit for participation in the first two sessions and had an option of class credit or \$5 for participation in follow-up appointments. None of the participants in the consumer-driven condition opted to request additional sessions for which no compensation was provided. As previously mentioned, it is possible that subjects participated solely to earn course credit. Additionally, participants could have been satisfied with the information they received from the first two sessions. Reported changes across time suggests the intervention was efficacious even with a non-treatment seeking sample of individuals not necessarily interested in behavior change. Collecting data from a sample of individuals who participate solely due to interest or need could result in more clinically meaningful results. Additionally, recruiting for subjects with

increased severity of anxiety symptoms and higher levels of AS may show more significant results.

In addition, measures were utilized based on reliability and validity, but also based on accessibility (e.g., cost). While the self-reports used were appropriate for the constructs being measured, other measures may have provided a more accurate understanding of the participants' alcohol use, alcohol-related consequences, or anxiety. For example, the DASS-21 assesses anxiety using only 7 items, while a measure specific to anxiety, such as the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988), assesses symptoms of anxiety using 21 items. Although both measures are valid and reliable (Beck et al., 1988; Henry & Crawford, 2005), the BAI has stronger estimates of internal consistency across both clinical and nonclinical samples ( $\alpha = .91$ ; Bardhoshi, Duncan, & Erford, 2016) compared to the DASS-21 ( $\alpha = .82-.87$ ; Antony et al., 1998; Henry & Crawford, 2005), possibly resulting in different findings. Also, all data was collected through the use of self-report measures. While there is data suggesting that self-reports measuring drinking behavior are vulnerable to memory errors and intentional distortion by the participant (Del Boca & Noll, 2000; Rehm, 1998), other studies have found that self-report measures of alcohol use and consequences are valid (Midanik, 1988; Roberts, Siegel, DeJong, & Jernigan, 2014). Real-time recording of alcohol use behaviors and related consequences through the use of diaries (Rehm, 1998) or phone applications (Collins, Kashdan, & Gollnisch, 2003) could allow for more accurate reporting. Use of secondary measures of alcohol use, such as breathalyzers, blood/urine tests, or collateral reports, could also assist in providing more accurate drinking behavior data (Midanik, 1988).

Lastly, ten subjects attended the first session, but not the 2-week follow-up session, which led to a lack of complete data. The present study's attrition rate was typical compared to similar studies (Edwards & Rollnick, 1997; Hansen et al., 2012), and no pre-existing differences were found between participants who completed the study and participants who did not complete the study. Assessing participants directly following the feedback session (session two) could allow for a more complete data set, but would reflect drinking and anxiety during the intervention rather than follow-up data.

Recommendations for future research include supplementing assessment of alcohol use, alcohol-related consequences, and anxiety symptoms to allow for potentially less vulnerable measures. Additional assessment techniques could include diaries or phone applications, or additional self-report measures (e.g., BAI) and collateral reports.

Additionally, conducting follow-up assessment of drinking behavior and related consequences, and anxiety symptoms at not only 2-weeks, but also 3 months, 6 months, 9 months, and 12 months, following participation in the study could allow for a better understanding of behavior change across time. Previous research has suggested that the effects of motivational interventions may germinate over time and demonstrate increasingly evident change with longer-term follow-ups (Miller & Rollnick, 2013).

Overall, the present study has provided a further understanding of the impact of a brief motivational intervention on alcohol use, alcohol-related consequences, AS, and anxiety symptoms in college students. There is limited research examining the effects of alcohol use interventions on anxiety symptoms in non-treatment seeking samples. The present study may contribute to the existing literature documenting the role of transdiagnostic mechanisms (e.g., AS) facilitating the influence of anxiety on alcohol use and related impairment, and, in turn,



assist in the development of better suited approaches to the comorbid, subclinical symptoms of alcohol misuse and anxiety.

## Endnotes

<sup>1</sup>Three participants were outliers on the quantity and frequency of alcohol use variables and were excluded from analyses. Outliers were determined using z-scores that exceeded 3.29 (outside 99.9% of normally distributed data).

<sup>2</sup>Two participants were outliers on the anxiety variables (i.e., DASS-21, ASI-3, ACQ-R) and were excluded from analyses. Outliers were determined using z-scores that exceeded 3.29 (outside 99.9% of normally distributed data).

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Zuroff, D. C., Koestner, R., Moskowitz, D. S., McBride, C., Marshall, M., & Bagby, M.

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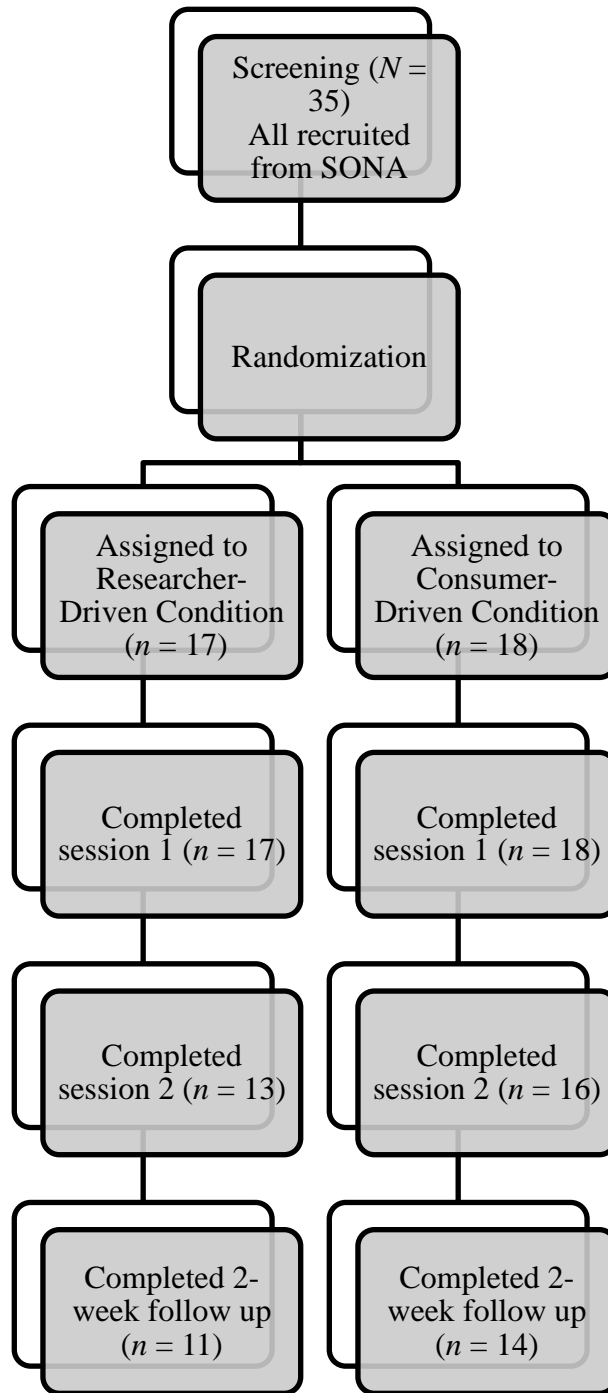


Figure 1. Flow diagram of sampling and randomization process





Table 2

*Means & Standard Deviations per condition from pre-intervention to 2-week follow-up (n = 25)*

	Quantity		Frequency		YAAPST		DASS-21 Anxiety Subscale		ASI-3 Total Scores		ASI-3 Physical Subscale		ASI-3 Social Subscale		ASI-3 Cognitive Subscale			
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
Baseline	Researcher-Driven		5.13	2.60	4.36	1.96	11.00	4.20	9.73	3.47	10.20	6.27	2.55	3.78	8.73	5.97	2.55	4.61
	Consumer-Driven		5.34	3.61	5.91	3.05	9.57	6.02	9.46	2.47	11.71	6.96	2.21	2.42	7.43	4.43	2.23	3.11
	Total		5.50	3.28	4.84	2.61	10.20	5.24	9.25	2.13	11.08	6.58	2.36	3.03	8.00	5.09	2.38	3.79
2-Week Follow-Up	Researcher-Driven		3.79	2.24	3.55	2.30	3.45	3.75	9.09	3.05	8.64	6.37	2.09	4.39	5.09	6.17	1.45	3.56
	Consumer-Driven		4.26	3.47	4.18	3.52	4.71	2.79	8.00	1.73	5.85	5.41	1.23	1.69	3.77	3.00	0.85	1.68
	Total		4.02	2.86	3.86	2.92	4.16	3.24	8.76	2.71	7.13	9.75	1.63	3.17	4.38	4.66	1.13	2.66

## Appendix A

### Demographics Questionnaire

1. Age: \_\_\_\_\_
2. Current living situation (Please check one)
 

<p>a. Living alone _____</p> <p>b. Living with spouse or partner _____</p> <p>c. Living with roommate(s) _____</p> <p>d. Living with children only _____</p>	<p>e. Living with spouse or partner and children _____</p> <p>f. Living with parents _____</p> <p>g. Other (describe) _____</p>
--	---
3. In which county and state were you raised?
 

County: \_\_\_\_\_

State: \_\_\_\_\_
4. On a scale of 1 (urban) to 9 (rural), how you would rate your hometown to be?
 

1      2      3      4      5      6      7      8      9
5. Current marital status (Please check one)
 

<p>a. Single, never been married _____</p> <p>b. Married, living with spouse _____</p>	<p>c. Married, separated _____</p> <p>d. Widowed _____</p> <p>e. Divorced _____</p>
--	---
6. Number of times you have been married (including present): \_\_\_\_\_
7. Do you have children? \_\_\_\_yes \_\_\_\_no; if applicable, number of children: \_\_\_\_\_
8. Major occupation or skill (whether or not presently employed):
 

\_\_\_\_\_
9. Currently employed or self-employed (not including school):
 

<p>a. Full-time _____</p> <p>b. Part-time _____</p>	
---	--

- c. Retired \_\_\_\_\_
- d. Unemployed \_\_\_\_\_
- e. Homemaker \_\_\_\_\_

10. Title of present or most recent job (do NOT list name of employer):

\_\_\_\_\_

11. If unemployed, how long? \_\_\_\_\_

12. Highest year of education completed: \_\_\_\_\_

13. Are you currently pursuing education or training? (Please check one)

- f. Full-time \_\_\_\_\_
- b. Part-time \_\_\_\_\_
- c. No classes now \_\_\_\_\_

**Appendix B****Depression, Anxiety, and Stress Scale (DASS-21)**

Please indicate the frequency or severity of your experiences **over the last week**. The rating scale is as follows:

0 = Did not apply to me at all

1 = Applied to me to some degree or some of the time

2 = Applied to me to a considerable degree or a good part of the time

3 = Applied to me very much or most of the time

- |  |   |   |   |   |
|--|---|---|---|---|
| 1. I found it hard to wind down.   | 0 | 1 | 2 | 3 |
| 2. I was aware of dryness of my mouth.   | 0 | 1 | 2 | 3 |
| 3. I couldn't seem to experience any positive feeling at all.                        | 0 | 1 | 2 | 3 |
| 4. I experienced breathing difficulty.   | 0 | 1 | 2 | 3 |
| 5. I found it difficult to work up the initiative to do things.                      | 0 | 1 | 2 | 3 |
| 6. I tended to over-react to situations.   | 0 | 1 | 2 | 3 |
| 7. I experienced trembling (e.g., in the hands).                                     | 0 | 1 | 2 | 3 |
| 8. I felt that I was using a lot of nervous energy.                                  | 0 | 1 | 2 | 3 |
| 9. I was worried about situations in which I might panic and make a fool of myself.  | 0 | 1 | 2 | 3 |
| 10. I felt that I had nothing to look forward to.                                    | 0 | 1 | 2 | 3 |
| 11. I found myself getting agitated.   | 0 | 1 | 2 | 3 |
| 12. I found it difficult to relax.   | 0 | 1 | 2 | 3 |
| 13. I felt down-hearted and blue.  | 0 | 1 | 2 | 3 |
| 14. I was intolerant of anything that kept me from getting on with what I was doing. | 0 | 1 | 2 | 3 |
| 15. I felt I was close to panic.   | 0 | 1 | 2 | 3 |
| 16. I was unable to become enthusiastic about anything.                              | 0 | 1 | 2 | 3 |
| 17. I felt that I wasn't worth much as a person.                                     | 0 | 1 | 2 | 3 |

18. I felt I was rather touchy.  
0                      1                      2                      3
19. I was aware of the action of my heart in the absence of physical exertion.  
0                      1                      2                      3
20. I felt scared without any good reason.  
0                      1                      2                      3
21. I felt that life was meaningless.  
0                      1                      2                      3



## Appendix D

### Researcher-Driven Condition Informed Consent

#### Consent to Participate in Research *Information to Consider about this Research*

#### **BASICS for Alcohol Use in College Students**

Principal Investigator: Lisa Curtin

Department: Psychology

Contact Information: Lisa Curtin, [curtinla@appstate.edu](mailto:curtinla@appstate.edu); 828-262-2272 ext. 413

Brittany Kirschner; Contact Information:

[kirschnerbn@appstate.edu](mailto:kirschnerbn@appstate.edu)

#### **What is the purpose of this research?**

You are invited to participate in a research study testing the impact of assessment and feedback on alcohol use for college students. We will ask you questions about your alcohol use and history and other experiences (e.g., anxiety) to help address this question. We plan to share the results of this study by presenting the findings at conferences and in publications (all results will be group findings; no individual findings will be presented).

#### **Why am I being invited to take part in this research?**

You are invited to participate in this research because you are at least 18 years old, generally consume alcohol on at least a weekly basis, are willing to participate in additional meetings, and are not currently in alcohol use treatment.

You cannot participate in this research if you are currently in a Psychology class taught by Lisa Curtin.

#### **What will I be asked to do?**

You will be asked to participate in two interviews and to complete follow-up questions two weeks, one month, 3 months, and 6 months after the start of the study. It is estimated that full participation will take approximately 4-5 hours of your time.

The interview(s) will take place in a private office (201 D) in Smith-Wright Hall at Appalachian State University. The individuals who will be conducting the interviews will either be a licensed psychologist and health service provider (Lisa Curtin, Ph.D.) or Brittany Kirschner, a graduate clinician under her supervision.

If you choose to participate, the initial interview will last approximately **two hours** and will consist of learning about the study and your potential participation, completing a number of online alcohol use questionnaires, completing two pencil and paper tasks, and completing additional questionnaires on the computer. The



online alcohol use program and questionnaires ask about your alcohol and other substance use, alcohol-related problems, family history, prior treatment for alcohol use or any other mental health concerns, and thoughts about changing alcohol use. In addition, there are some questions about your perceptions of help-seeking and some personality-type questions. At the end of this meeting, you will meet briefly with a research assistant and will be asked to complete two brief measures about your interview experience (about **10 minutes**). Your answers to these questions will not be shared directly with the person you met with during the interview (Lisa or Brittany).

You will then be scheduled for an interview with the same interviewer (about one week later) that will last approximately **one hour**. During the interview, your answers to the questionnaires will be reviewed and you will have a chance to discuss your concerns, if you have any. At the end of this meeting, you will again meet briefly with a research assistant and will be asked to complete two brief measures about your interview experience. Again, your answers to the questions regarding your interview experience will not be shared directly with the person you met with during the interview.

The second interview will be audio recorded to allow researchers to document the behavior of the interviewer (e.g., to be sure she or he is using the interview style we are interested in). The recordings will be erased after notes are taken on the interviewer style.

You will be asked not to seek treatment for your alcohol use while participating in the first two meetings. If you desire to seek treatment while in the study, please inform us of your intention and we will gladly provide you with a list of referral options and support your wish to discontinue participation in the study.

You will also be asked to complete follow-up questions related to your use of alcohol and other experiences 2-weeks, 1-month, 3 months, and 6 months after the start of the study. These questions will take approximately **20-30 minutes** and will be completed in person but on a computer. If you are not able to come in person, we will ask if you can complete the questions on the phone with a research assistant. You can participate in this follow-up portion of the study if you are in alcohol treatment.

### **What are possible harms or discomforts that I might experience during the research?**

To the best of our knowledge, the risk of harm and discomfort from participating in this research study is no more than you would experience in everyday life. The greatest risk to you would be if someone not involved in the research learned about your participation or your answers to individual questions. For example, we ask about your use of alcohol and other drugs which may be illegal. We will attempt to maintain confidentiality throughout the study; however, due to the nature of internet access, the security of your online survey responses cannot be 100% guaranteed.

We have many safeguards in place to keep your data confidential (described below).

You may find some of the questions we ask to be upsetting or stressful. If so, please talk with the interviewer about your experience. You can also contact the Counseling and Psychological Services Center on campus (1<sup>st</sup> floor Miles Annas Building; 262-3180) or the Wellness Center (2<sup>nd</sup> floor Miles Annas Building; 262-3148). If you disclose an immediate intention to harm yourself or someone else, or disclose harm to a minor or an elderly individual, the interviewer will need to take measures to keep you or others safe. This may involve disclosing this information to a third party. Finally, you have the right to not answer any particular question or to withdraw your participation at any point in time.

**What are possible benefits of this research?**

This study may benefit you by learning about your drinking behaviors. Although there may be no personal benefit from your participation, the information gained by doing this research may help others in the future and inform future research regarding alcohol consumption.

**How will you keep my private information confidential?**

To ensure that your information is kept confidential, study identification numbers, but not names or other identifying information, will be used on all documents, computer files, and recordings. The information you provide us, as well as the recordings of the interviews, will be kept in a locked cabinet in the locked research laboratory in Smith-Wright Hall. The interview recording will be kept for a brief period of time (under lock and key); it will be destroyed after research assistants review to document the interviewer's behavior as consistent with the style being tested in this project. Your identifying information on this form will be the only document linked with your study identification number and it will be stored separately in a locked file cabinet in a private office in Smith-Wright Hall.

Many of the questionnaires will be completed on a computer using Qualtrics, a data collection and analysis company. The survey is administered over a secure (https) encrypted connection in an attempt to prevent eavesdropping or tampering with online communication. Qualtrics is commonly used by researchers affiliated with the Appalachian State University Department of Psychology. The researchers will not collect IP addresses. Qualtrics does not detail information collected, only acknowledging that their information includes (but is not necessarily limited to): *"...domain name, visited surveys, referring URLs, and other publicly available information."*

The Qualtrics privacy statement includes the following:

*"We do not sell or make available specific information about our clients, their clients, or either of their data, except in cooperation with law enforcement bodies in regards to content violations or violations of applicable laws. We maintain a*

*database of user information which is used only for internal purposes such as technical support, notifying members of changes or enhancements to the service.”*

Again, if you disclose an immediate intention to harm yourself or someone else, or disclose harm to a minor or an elderly individual, the interviewer will need to take measures to keep you or others safe. This may involve disclosing this information to a third party.

**Whom can I contact if I have a question?**

If you have questions about your rights as someone taking part in research, contact the Appalachian Institutional Review Board Administrator at 828-262-2692 (days), through email at [irb@appstate.edu](mailto:irb@appstate.edu) or at Appalachian State University, Office of Research Protections, IRB Administrator, Boone, NC 28608.

**Will I be compensated?**

If you are in a psychology class, you can earn 4 Experiential Learning Credits (ELCs) for the first interview and 2 ELCs for the second interview. Your course instructor can also provide you other non-research alternatives to obtain ELCs. One non-research option to receive 1 ELC is to read an article and write a 1-2 page paper summarizing the article and your reaction to the article. More information about this option can be found at: [psych.appstate.edu/research](http://psych.appstate.edu/research). You may also wish to consult your professor to see if other non-research options are available.

You will be compensated \$5 for completion of the follow-up questionnaires (2-weeks, 1-month, 3 months, and 6 months after the start of the project; \$20 total if you complete all four); these questionnaires will take about 20-30 minutes each time. If you are in a psychology class you can earn 1 ELC for each of the follow-up sessions in lieu of the \$5 compensation.

**Do I have to participate?**

Your participation in this research is completely voluntary. If you choose not to participate, there is no penalty or consequence. If you decide to take part in the study you can still decide at any time that you no longer want to participate. You will not lose any benefits or rights you would normally have if you do not participate in the study.

This research project has been approved on January 14, 2016 by the Institutional Review Board (IRB) at Appalachian State University. This approval will expire on November 8, 2016 unless the IRB renews the approval of this research.

**I have decided I want to take part in this research. What should I do now?**

If you have read this form, had the opportunity to ask questions about the research and received satisfactory answers, and want to participate, then sign the consent form and keep a copy for your records.

---

Participant's Name (PRINT)

Signature

Date

You may contact me for follow-up interviews or reminders at:

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

You may leave a general phone message without identifying me as participating in this project:

Yes

No

**Consumer-Driven Condition Informed Consent****Consent to Participate in Research  
Information to Consider about this Research****BASICS for Alcohol Use in College Students**

Principal Investigator: Lisa Curtin

Department: Psychology

Contact Information: Lisa Curtin, [curtinla@appstate.edu](mailto:curtinla@appstate.edu); 828-262-2272 ext. 413

Brittany Kirschner; Contact Information: [kirschnerbn@appstate.edu](mailto:kirschnerbn@appstate.edu)

**What is the purpose of this research?**

You are invited to participate in a research study testing the impact of assessment and feedback on alcohol use for college students. We will ask you questions about your alcohol use and history and other experiences (e.g., anxiety) to help address this question. We plan to share the results of this study by presenting the findings at conferences and in publications (all results will be group findings; no individual findings will be presented).

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**What will I be asked to do?**

You will be asked to participate in at least two interviews, and up to four interviews (if desired), and to complete follow-up questions two weeks, one month, 3 months, and 6 months after the start of the study. It is estimated that full participation will take approximately 4-6 hours of your time.

The interview(s) will take place in a private office (201 D) in Smith-Wright Hall at Appalachian State University. The individuals who will be conducting the interviews will either be a licensed psychologist and health service provider (Lisa Curtin, Ph.D.) or Brittany Kirschner, a graduate clinician under her supervision.

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In addition, there are some questions about your perceptions of help-seeking and some personality-type questions. At the end of this meeting, you will meet briefly with a research assistant and will be asked to complete two brief measures about your interview experience (about **10 minutes**). Your answers to these questions will not be shared directly with the person you met with during the interview (Lisa or Brittany).

You will then be scheduled for an interview with the same interviewer (about one week later) that will last approximately **one hour**. During the interview, your answers to the questionnaires will be reviewed and you will have a chance to discuss your concerns, if you have any. At the end of this meeting, you will again meet briefly with a research assistant and will be asked to complete two brief measures about your interview experience. Again, your answers to the questions regarding your interview experience will not be shared directly with the person you met with during the interview.

Should you request additional meetings (up to two), each will last **approximately one hour** and will allow you the opportunity to discuss concerns that are important to you. At the end of each meeting, you will meet briefly with a research assistant and will be asked to complete two brief measures about your interview experience.

The second (and potentially third and fourth if requested) interview will be audio recorded to allow researchers to document the behavior of the interviewer (e.g., to be sure she or he is using the interview style we are interested in). The recordings will be erased after notes are taken on the interviewer style.

You will be asked not to seek treatment for your alcohol use while participating in the first two meetings. If you desire to seek treatment while in the study, please inform us of your intention and we will gladly provide you with a list of referral options and support your wish to discontinue participation in the study.

You will also be asked to complete follow-up questions related to your use of alcohol and other experiences 2-weeks, 1-month, 3 months, and 6 months after the start of the study. These questions will take approximately **20-30 minutes** and will be completed in person but on a computer. If you are not able to come in person, we will ask if you can complete the questions on the phone with a research assistant. You can participate in this follow-up portion of the study if you are in alcohol treatment.

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*clients, or either of their data, except in cooperation with law enforcement bodies in regards to content violations or violations of applicable laws. We maintain a database of user information which is used only for internal purposes such as technical support, notifying members of changes or enhancements to the service.”*

Again, if you disclose an immediate intention to harm yourself or someone else, or disclose harm to a minor or an elderly individual, the interviewer will need to take measures to keep you or others safe. This may involve disclosing this information to a third party.

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**I have decided I want to take part in this research. What should I do now?**

If you have read this form, had the opportunity to ask questions about the research and received satisfactory answers, and want to participate, then sign the consent form and keep a copy for your records.

---

Participant's Name (PRINT)

Signature

Date

You may contact me for follow-up interviews or reminders at:

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

You may leave a general phone message without identifying me as participating in this project:

Yes

No

**Appendix E**

**Personalized Feedback Report**

Client ID #: \_\_\_\_\_

Mood

**Anxiety:** \_\_\_\_\_

Normal	Mild	Moderate	Severe	Extremely Severe
0-3	4-5	6-7	8-9	10+

**Depression:** \_\_\_\_\_

Normal	Mild	Moderate	Severe	Extremely Severe
0-4	5-6	7-10	11-13	14+

**Stress:** \_\_\_\_\_

Normal	Mild	Moderate	Severe	Extremely Severe
0-7	8-9	10-12	13-16	17+

**Anxiety Sensitivity:** \_\_\_\_\_

< 23.4 Within Normal Range

>23.4 Above Normal Range

Neuropsychological Tests

	<b>Well Above Average</b>	<b>Above Average</b>	<b>Average</b>	<b>Below Average</b>	<b>Well Below Average</b>
<b>TMTA</b>	1	2	3	4	5
<b>TMTB</b>	1	2	3	4	5

**Trail A Norms by Age:**

	<b>20-39</b>	<b>40-49</b>	<b>50-59</b>	<b>60-69</b>
<b>1</b>	< 21	< 22	< 25	<29
<b>2</b>	22-26	23-28	26-29	30-35
<b>3</b>	27-41	29-44	30-48	36-66
<b>4</b>	42-49	45-58	49-66	67-103
<b>5</b>	>50	>59	> 67	>104

**Trail B Norms by Age:**

	<b>20-39</b>	<b>40-49</b>	<b>50-59</b>	<b>60-69</b>
<b>1</b>	<45	<49	<55	<64
<b>2</b>	46-55	50-57	56-75	65-89
<b>3</b>	56-93	58-99	76-134	90-171
<b>4</b>	94-128	100-150	135-176	172-281
<b>5</b>	>129	>151	>177	>282

**Readiness to Change:**

Pre-Contemplation

Contemplation

Action

### **Vita**

Brittany Nicole Kirschner was born in Naugatuck, Connecticut to Joseph Kirschner. She attended Appalachian State University from 2011 to 2014, earning her Bachelor of Science in Psychology with a concentration in Human Services and minors in Sociology and Statistics. In fall 2014, she began her graduate study at Appalachian State University, working toward a Master of Arts in Clinical Psychology, and was awarded this degree in May 2017.