Contextual Effects on Relations among Alcohol Outcome Expectancies,

Subjective Response, and Drinking Behavior

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved November 2015 by the
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ARIZONA STATE UNIVERSITY

August 2016

ABSTRACT

Positive alcohol outcome expectancies (AOEs) are consistent longitudinal predictors of later alcohol use; however, exclusion of solitary drinking contexts in the measurement of AOEs may have resulted in an underestimation of the importance of low arousal positive (LAP) effects. The current study aimed to clarify the literature on the association between AOEs and drinking outcomes by examining the role of drinking context in AOE measurement. Further, exclusion of contextual influences has also limited understanding of the unique effects of AOEs relative to subjective responses (SR) to alcohol. The present study addressed this important question by exploring relations between AOEs and SR when drinking context was held constant across parallel measures of these constructs. Understanding which of these factors drives relations between alcohol effects and drinking behavior has important implications for intervention. After conducting confirmatory factor analysis (CFA) and tests of measurement invariance for the AOE and SR measures, 4 aims collectively examined the role of context in reporting of AOEs (Aims 1 and 2), the extent to which context specific AOEs uniquely relate to drinking outcomes (Aim 3), and the importance of context effects on correspondence between AOEs and SR (Aim 4). Results of Aims 1 and 2 demonstrated that participants are imagining contexts when reporting on measures of AOEs that do not specify the context, and found significant mean differences in high and low arousal positive AOEs across contexts. Contrary to the hypotheses of Aim 3, context-specific AOEs were not significantly associated with drinking behavior. Results of Aim 4 indicated that while LAP AOEs for both unspecified and solitary contexts were associated with LAP SR in a solitary setting, unspecified context AOEs had a stronger relation than the solitary context AOEs. No significant relations between high arousal positive (HAP) AOEs and HAP SR emerged. The findings suggest that further investigation of the relation between context-specific AOEs and drinking outcomes/SR is warranted. Future studies of these hypotheses in samples with a wider range of drinking behavior, or at different stages of alcohol involvement, will elucidate whether mean level differences in context specific AOEs are important in understanding alcohol related outcomes.

DEDICATION

This project is dedicated to the many people who encouraged and supported me throughout my dissertation project, the last 6 years of graduate school, and for most years of my life. I want to especially thank Jason, who has been my biggest supporter for the last 9 years, and who always sees me for my best even when I am at my worst. He changed his life in order to accommodate my dreams, and I am forever grateful for the beautiful life we have built together. I look forward to the many years of happiness to come, and I love you very much. I would also especially like to thank my mom, who has always been an unfaltering source of support, throughout this endeavor but also in countless others. She has been there to cheer me on, pick me up, give me a reality check, and remind me "not to burn my candle at both ends." I am grateful beyond words for her love. She made me the woman I am today. I also am thankful to Nana, who has been my cheerleader in all things for my <u>entire</u> life. Her love and continual gestures of care, no matter how big or how small, have never gone unnoticed or unappreciated. She always has a special place in my heart and in my life. A big thank you to my little sister Erin, who has been an inspiration to me in so many ways, but particularly in lessons of courage and being true to yourself. Thank you for your support, and for your example. I also want to thank my dad, for always pushing me to challenge myself, reminding me of my potential, and teaching me the importance of working hard but remaining kind and humble. Finally, I want to extend many thanks to my best friends, who have been there for all of my challenges and triumphs, who visited me countless times in AZ, and who

made our long-distance friendship seem like no distance at all. Danielle, Erin, Elise, Amanda, and Melinda- I love you and am so grateful for you.

ACKNOWLEDGMENTS

I would like to thank my mentor and committee chair, William Corbin, for his expert guidance, constructive feedback, and unfaltering encouragement throughout this project, as well as throughout my graduate career. I have enjoyed working with him so much over the past 6 years. I am very grateful for his mentorship and feel lucky to have been his student. I would also like to thank the members of my committee, Laurie Chassin, Manuel Barrera, and David Mackinnon for their invaluable expertise, support, and assistance in shaping the project. Without these committee members this would not have been possible, and I am very grateful for their advice and guidance.

TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

Figure Page

INTRODUCTION

Alcohol misuse is one of the most ubiquitous health risk behaviors in the United States. The cost of excessive consumption illustrates the pervasive nature of this problem, with $223.6 billion as of 2006 (or approximately $746 per person) towards the direct and indirect cost of alcohol use (Bouchery et al., 2011). These estimates are substantially lower than those that include intangible costs, such as pain and suffering. Misuse of alcohol and associated problems are of particular concern for emerging adults (age 18-25), with frequent heavy use and peak levels of heavy episodic drinking during this critical developmental period (Cranford et al., 2006). Heavy drinking contributes to the experience of a host of negative consequences (Hingson et al., 2005). Incidence of alcohol use disorders (AUDs) peaks during this age period (Grant et al., 2004), and approximately 32% of college students meet DSM-IV criteria for alcohol abuse with another 6% classified as alcohol dependent (Knight et al., 2002). Given the burden attributable to excessive alcohol consumption, research has focused on identifying specific risk factors that contribute to the development of alcohol use and problems among emerging adults. Two such risk factors are alcohol outcome expectancies (AOEs) and subjective response (SR) to alcohol.

There is little debate in the alcohol expectancy literature that positive AOEs are longitudinal predictors of later alcohol use (Jones et al., 2001). However, while particular types of positive expectancies are consistently related to later alcohol outcomes (e.g. sociability, global positive change, liquid courage) others have a less consistent relation (e.g. tension reduction) (Corcoran & Parker, 1991). These findings may be accurately capturing a differential association between various types of positive AOEs and alcohol outcomes. Alternatively, it may be that the exclusion of drinking context in the measurement of AOEs has resulted in an underestimation of the importance of low arousal positive effects (e.g. calm, mellow). Most notably, existing measures of AOEs fail to specify the social drinking context for which respondents are reporting alcohol expectancies (e.g., drinking alone versus drinking in a group). It may be that the majority of respondents are imagining stimulating group contexts that are not conducive to the experience of low arousal positive effects. If the social drinking context is specified when reporting on AOEs, low arousal positive AOEs may emerge as significantly associated with alcohol use when individuals report on these expectancies for contexts that are more conducive to these effects (e.g. drinking alone). To this end, the current study aims to clarify and expand the literature on the association between expectancies and drinking outcomes by examining the role of social drinking context in expectancy measurement. Should low arousal positive AOEs emerge as significantly associated with alcohol use when reported for certain drinking contexts (e.g. solitary), this would represent an important extension of the expectancy literature.

Although identifying context specific relations between low arousal positive expectancies and drinking outcomes would have important implications, it is possible that such relations may simply reflect individual differences in the well-established stress-response dampening effects of alcohol. It is possible that individuals who report strong low arousal positive expectancies actually experience increased low arousal positive subjective effects when they consume alcohol, such that their expectancies accurately reflect their experience. However, it is difficult to delineate the relation between low arousal positive AOES and low arousal positive subjective response (SR) to alcohol due to inconsistency in the drinking context for which the constructs are measured. While this issue is particularly relevant for low arousal positive effects, the relation between AOEs and SR is a broader question that extends to high arousal positive effects as well. Specifically, the extent to which high arousal positive AOEs simply reflect individual differences in stimulant SR also remains unclear. As with low arousal positive effects, this is may be in part attributable to inconsistency of drinking context in measurement. Although reports of high arousal positive AOEs are likely given for imagined stimulating group contexts that are conducive to these effects, these contexts are not specified in AOE measures in a uniform way. Furthermore, high arousal positive SR is typically measured in a solitary low arousal laboratory setting that is not conducive to high arousal positive SR effects. Therefore, the relation between high arousal positive AOEs and high arousal positive SR may be greater when the effects are measured in corresponding contexts. If so, this would suggest that high arousal positive expectancies are accurate reflections of stimulant alcohol response.

Unfortunately, it has been difficult in previous studies to accurately examine the degree of correspondence between AOEs and SR for both high arousal positive and low arousal positive effects due to a lack of corresponding measures and inconsistency in the drinking context for which the effects are measured. To address this question, the present study will explore the relation between AOEs and SR to alcohol once drinking context (drinking alone versus drinking in a group) is held constant across two parallel measures of these constructs. Regardless of the results, the findings will have important implications for prevention and intervention. There are well-established prevention/treatment approaches that address both AOEs and SR to alcohol (Garbutt et al., 2005; Labbe & Maisto, 2011; O'Malley, Garbutt, Gastfriend, Dong, & Kranzler, 2007; Peterson, Conrod, Vassileva, Gianoulakis, & Pihl, 2006; Scott-Sheldon, Terry, Carey, Garey, & Carey, 2012; Setiawan et al., 2011). Understanding which of these factors drives potential relations between alcohol effects and drinking behavior will provide important information about which treatment approach is likely to have the most benefit for individuals with strong positive expectations.

The present study's focus on drinking context in expectancy measurement, and the effect of context on relations between AOEs and alcohol use, draws from a large and persuasive literature on alcohol expectancy theory. Alcohol expectancy theory expands upon earlier memory-based cognitive learning theories which postulate that cognitive mechanisms have an important influence on behavior (Goldman, Del Boca, & Darkes, 1999; Smith & Goldman, 1994). Outcome expectancies are learned relationships between a stimulus, a response, and outcomes of the response. As an individual acquires information regarding the outcomes of certain behaviors in different contexts, this information is stored in memory. These memories direct subsequent behavior by helping organize and interpret information in the environment and by guiding appropriate responses. When faced with stimuli similar to previously encoded material, expectancies about outcomes of behavior are activated (Goldman et al., 1999). Engagement in the behavior depends on evaluations regarding the nature of the outcome. The behavior is increased when the outcome is expected to be positive, whereas negative expectancies regarding the outcome decrease participation in the behavior, consistent with operant conditioning models of reinforcement and Social Learning Theory (Bandura, 1977).

In terms of alcohol consumption, alcohol outcome expectancies (AOEs) are conceptualized as learned templates about the anticipated effects of drinking (Goldman et al., 1999). Information from alcohol-related experiences linking alcohol consumption to anticipated reinforcement is stored in memory (Smith & Goldman, 1994). Expectancies about the effects of consumption are some of the best established predictors of alcohol use and problems even after other important variables are accounted for, such as age, gender, previous alcohol use, and family history of alcohol use disorders (Goldman, 1994; Goldman et al., 1999; Jones, Corbin, & Fromme, 2001). This relation is robust, and has been replicated using a variety of expectancy instruments, alcohol outcome variables, and populations (Goldman et al., 1999).

The development of AOEs is thought to be a multifaceted process. Within a social learning framework, AOEs are acquired through both indirect (observations of other's drinking behavior) and direct (actual received pharmacological effects) experiences with alcohol (Jones et al., 2001). The role of vicarious learning in the development of AOEs is supported by literature demonstrating that children endorse AOEs prior to initiation of drinking. Expectancies about alcohol outcomes are present as early as elementary school (Dunn & Goldman, 1998; Miller, Smith, & Goldman, 1990). Younger children report primarily negative AOEs, but positive AOEs increase with age as children mature toward drinking (Miller et al., 1990). The substantial association between positive AOEs and drinking is evident by pre-adolescence, contributing to the initiation of alcohol use (Dunn & Goldman, 1998). For adolescents, AOEs formed before the initiation of drinking predict likelihood of drinking onset, future levels of consumption once drinking has begun, and can discriminate between high and low risk teens (Christiansen, Smith, Roehling, & Goldman, 1989; Smith & Goldman, 1994). This prospective evidence suggests that AOEs are acquired through indirect experience with alcohol and lends confidence in AOEs as predictors of alcohol outcomes separate from individual differences in pharmacological responses to alcohol.

However, alcohol expectancy theory and the social learning perspective suggest that AOEs are also acquired through direct experience with alcohol use. Pre-drinking AOEs for positive outcomes may lead to more positive early drinking experiences, and AOEs are subsequently shaped as a function of this experience (Smith & Goldman 1994), consistent with reciprocal determinism in Social Learning Theory (Sher, Wood, Richardson, & Jackson, 2005). Prospective studies of reciprocal effects support this pattern (Sher, Wood, Wood, & Raskin, 1996; Smith, Goldman, Greenbaum, & Christiansen, 1995) and increased alcohol experience is associated with increased endorsement of positive AOEs (Southwick, Steele, Marlatt, & Lindell, 1981). Consistent evidence for the utility of AOEs as predictors of alcohol-related behavior (and as meditators of the influence of drinking experiences on later drinking behavior) suggests AOEs are an important target for intervention programs.

Consistent with alcohol expectancy theory, increased expectations that the outcomes of alcohol use will be positive and reinforcing, as well as attenuated expectation regarding negative effects of alcohol, are associated with greater alcohol use and problems (Brown, Christiansen & Goldman, 1987; Christiansen & Goldman, 1983; Fromme, Stroot & Kaplan, 1993; Fromme & D'Amico, 2000). While research supports the predictive utility of both types of AOEs, positive AOEs are much more consistently linked to alcohol outcomes than are negative AOEs (see Jones et al., 2001 for review;

Brown, Goldman, Inn, & Anderson, 1980; Goldman et al., 1999; Smith & Goldman, 1994). Prospective and experimental studies provide support for the causal nature of this relation (Carey, 1995; Carter, McNair, Corbin, & Black, 1998; Christiansen et al., 1989; Kidorf, Sherman, Johnson, & Bigelow, 1995; Leeman, Toll, Taylor, & Volpicelli, 2009; Roehrich & Goldman, 1995; Sher et al., 1996; Smith et al., 1995; Stein, Goldman & Del Boca, 1997). Early studies also delineated the utility of positive AOEs in differentiating between groups, demonstrating that heavier drinkers report more positive AOEs than lighter drinkers (Southwick, et al., 1981) and positive AOEs differ between groups of varying problem drinking severity (Conners, O'Farrell, Cutter, & Thompson, 1986; Lewis & O'Neill, 2000; Thombs, 1993). Overall, the emphasis on positive (rather than negative) AOEs in the literature is largely due to their consistent relation with alcohol outcomes. As such, positive AOEs have been the focus of efforts to reduce alcohol use through interventions like expectancy challenges (Labbe & Maisto, 2011). Given the more consistent relation between positive AOEs and alcohol use, and the present study's focus on the effects of social context on the AOE and alcohol use relation, the current study will examine positive AOEs only. Positive AOEs can be further parsed into high and low arousal affective quadrants.

Affect regulation is a primary motivator of alcohol use and AOEs are often categorized along affective dimensions (Goldman et al., 1999; Lang, Patrick, & Stritzke, 1999). AOEs vary in terms of arousal (high/low) in addition to valence (positive/negative), with the affective space divided into four quadrants (Morean, Corbin, & Treat, 2012). This is consistent with Russell's (1980) argument that affective states are best represented in a two-dimensional bipolar space, as in the circumplex model of affect.

Expectations for positive reinforcement (enhancement of positive affective experience) and negative reinforcement (decrease in aversive affective stimulus) are both important dimensions of positive AOEs (Read, Wood, Lejuez, Palfai, & Slack, 2004). Inclusion of both High Arousal Positive (e.g., lively, sociable, funny) and Low Arousal Positive (e.g., calm, relaxed, mellow) AOEs is critical to comprehensive measurement of positive expected effects (Morean et al., 2012; Goldman & Darkes, 2004). Further, AOEs that vary on dimensions of valence and arousal may have differential relations to alcohol outcomes (Morean et al., 2012).

In emerging adult populations, expectancy effects that fall into the high arousal positive quadrant such as sociability, social/physical pleasure, global positive change, and liquid courage, demonstrate consistent relations with alcohol outcomes (Goldman, Greenbaum, & Darkes, 1997; Morean et al., 2012). In contrast, low arousal positive AOEs (such as tension reduction) have an inconsistent relation with drinking behavior, despite the importance of these effects in alcohol expectancy theory (Corcoran & Parker, 1991; Morean et al., 2012). These findings are also surprising given the large existing literatures on tension reduction (Conger, 1956; Young, Oei, & Knight, 1990), stress-response dampening (Sher & Levenson, 1982), and drinking to cope (Cooper, Russell, & George, 1988; Holahan, Moos, Holahan, Cronkite & Randall, 2001). Based on these literatures, expectancies for low arousal positive effects should be strongly associated with later alcohol use, as has been demonstrated for high arousal positive effects. Although it is possible that theories focused on negative reinforcement are simply not accurate, an alternative explanation exists for the failure to find consistent relations between low arousal positive AOEs and later alcohol use. Such findings may be attributable to the failure of existing AOE measures to account for aspects of the drinking context.

Social context is a potentially powerful, but frequently overlooked, variable to consider in expectancy measurement. For emerging adults, the majority of drinking occurs in relatively stimulating environments (e.g., bars, parties, with friends) (Harford & Grant, 1987; O'Hare, 1990; Wechsler & McFadden, 1979). These stimulating environments include physical settings such as parties, bars, and fraternity and sorority gatherings, as well as social settings, with drinking occurring among family, friends, and members of the opposite sex (Cashin, Presley, & Meilman, 1998; O'Hare, 1990; Wechsler et al., 1995). For example, in a national survey of Canadian university students, the majority of drinking events involved being with four or more people and being with friends, and most drinking events involved a get-together or party. The physical drinking settings were most commonly someone's home, a bar, a disco, a pub, or a tavern (Wells, Mihic, Tremblay, Graham, & Demers, 2008). It is clear that for emerging adults, drinking occurs most frequently with other people (Christiansen, Vik, & Jarchow, 2002; Mohr et al., 2001; Wechsler, Dowdall, Davenport, & Castillo, 1995), and drinking with others occurs at a much higher frequency than drinking alone (Mays, Usdan, Arriola, Weitzel, & Bernhardt, 2009). For example, 73.4% of young adults report typically drinking with a friend, while 11.6% report usually drinking alone/with a date/other (Wells, Graham, Speechley, & Koval, 2005). These findings are consistent with the characterization of drinking in young adulthood as a social activity (Harford, 1984). Further, the prevalence of heavy drinking in social contexts is high, with heavy drinking occurring most frequently at off-campus parties (31%), followed by off-campus bars (22%), fraternity/sorority parties (15%), and dormitory parties (10%) (Harford, Wechsler, & Seibring, 2002). Similarly, mean levels of heavy drinking are highest in a convivial context (as compared to a personal-intimate context and a negative coping context) (O'Hare, 2001; Talbott, Umstattd, Usdan, Martin, & Geiger, 2010).

The importance of specifying the context when measuring AOEs is rooted in social learning theory. A basic premise of social learning theory is that the social environment and cognitive processes jointly influence, and are influenced by, behavior (Bandura, 1977). AOEs are cognitive constructs, and social learning theory suggests that they are inherently linked to and interact reciprocally with situational/contextual factors (Abrams & Niaura, 1987; O'Hare & Sherrer, 1997). Consistent with social learning theory, there is considerable evidence that the particular parameters of the drinking context (e.g., number of drinks consumed, time over which drinks are consumed) impact reports of AOEs (Earleywine & Martin, 1993; Morean et al., 2012). AOEs vary depending on the amount of alcohol the respondent imagines consuming (George & Dermen, 1988; Southwick, Steele, Marlatt, & Lindell, 1981) as well as the duration of the drinking episode (Demmel, Klusener, & Rist, 2004). Positive stimulating effects are associated with moderate doses of alcohol early in the drinking episode, whereas negative sedating effects are associated with higher doses later in the drinking episode (Dunn & Earleywine, 2001; Earleywine & Martin, 1993; George & Dermen, 1988).

Although there is evidence that AOEs are impacted by these aspects of the drinking context, and some measures have incorporated these contextual cues into expectancy measures (A-BAES; Earleywine, 1994; Earleywine & Martin, 1993), the most widely used measures fail to address the parameters of the drinking context.

Therefore, it is unclear to what extent mean levels of different types of positive AOEs, as well as observed group differences in AOEs, are attributable to differences in imagined dose and drinking duration. Furthermore, AOEs may vary depending on other contextual factors also not typically considered in traditional expectancy measurement. In fact, there is emerging evidence for differences in AOEs as a function of aspects of the social drinking context.

Studies focused exclusively on manipulation of social context effects on AOEs have primarily manipulated gender composition as the social context variable. These studies have produced equivocal findings. For example, one study found that positive AOEs did not vary across three types of social drinking contexts (large mixed-gender groups, small mixed-gender groups, and small same-gender groups) for university students (Senchak, Leonard, & Greene, 1998). However, this study was limited by use of a composite measure of positive AOEs (social/sexual enhancement, tension reduction, and increased expressiveness combined), making variation of particular positive AOE domains across certain drinking contexts impossible to detect. Further, the types of social contexts assessed did not reflect the wide range of situations in which emerging adults consume alcohol. Other lab-based studies have found that manipulation of social drinking context (sex of one's drinking partner) influences college student's AOEs (Corcoran & Michels, 1998). Additional research on the effect of social drinking context on AOEs is warranted given mixed findings and methodological limitations of prior studies.

Previous literature demonstrates that drinking in social contexts with other people is the typical drinking context for emerging adults. As such, when asked to report on AOEs for an unspecified drinking context, it is likely that emerging adults imagine these stimulating social contexts, as they are most salient to them. However, emerging adults may also hold important expectancies about alcohol's effects when drinking alone, even if this is a social drinking context that they encounter less frequently. Studies in children have already demonstrated that individuals possess expectancies about drinking even before they have consumed alcohol (Dunn & Goldman, 1998), and the same is likely true for drinking in novel or less familiar contexts. A solitary drinking context is likely to be associated with expectancies that are low arousal, such as feeling calm or relaxed. Demonstration that stronger relations between low arousal positive AOEs and drinking outcomes emerge when AOEs are assessed in a low stimulation drinking context (drinking alone) would be important for several reasons. Prominent models of risk for alcohol problems emphasize the shift from positive to negative reinforcement of alcohol use (Robinson & Berridge, 1993; Koob, 2006). A shift towards negatively reinforcing effects, such as low arousal positive AOEs, may be associated with changes in drinking contexts. Individuals may begin drinking in contexts that they believe to be more likely to elicit negatively reinforcing effects (e.g., drinking alone) versus highly stimulating contexts (e.g., drinking with friends). Indeed, solitary drinking is an established risk factor for alcohol problems (particularly when high quantities of alcohol are consumed) and is linked with tension reduction expectancies (Booth, 2006; Bourgault & Demers, 1997; Brown, 1985; Demers and Bourgault, 1996). The mechanism of risk conferred by solitary drinking may be, at least in part, increased expectancies for low arousal positive effects for this drinking context. A more thorough understanding of which contexts evoke low arousal positive AOEs, and whether these context-specific AOEs are associated with later drinking behavior, will assist in augmenting existing models of risk for alcohol-related problems.

Although studies that have experimentally manipulated social drinking context are most relevant, previous studies of relations between different types of AOEs and the frequency of drinking in different contexts also support the hypotheses of the current study. For example, in a sample of Mexican American college students, those who expected more physical and social pleasure and increased social assertiveness were more likely to drink in less personal physical and social settings (e.g., at a party, with acquaintances) (Zamboanga, 2005), though the cross-sectional nature of this study makes the direction of effects uncertain. Further, participants may have imagined these less personal contexts when reporting on AOEs, thereby eliciting AOEs congruent with a less personal context and explaining subsequent associations with context-specific drinking. Unfortunately, competing explanations for these findings could not be directly examined based on the study design.

A similar study (O'Hare, 1998) examined the association between three positive AOEs (increased social assertiveness, tension reduction, and enhanced sexual pleasure from the Alcohol Expectancy Questionnaire) and likelihood of excessive drinking in convivial, personal-intimate, and negative coping contexts measured by the 23-item Drinking Context Scale (O'Hare, 1997). AOEs of increased social assertiveness and increased tension reduction were associated with heavy drinking in all three contexts. In contrast, enhanced sexual pleasure AOEs were associated with drinking in the personal-intimate context only (O'Hare, 1998). This study was limited by the cross-sectional design, use of a non-representative high-risk college sample, and a context measure that confounded psychological, interpersonal, and situational drinking contexts. Further, both Zamboanga (2005) and O'Hare (1998) examined the association between positive AOEs and context-specific drinking, which is a different question than that of the present study (context-specific positive AOEs and associations with drinking). Nonetheless, these studies make an important contribution in supporting the idea that AOEs vary by drinking context.

The clear link between AOEs and drinking context prompted the development of the 21-item Expectancy Context Questionnaire (Levine, 1988), a measure of context-specific positive AOEs with 5 subscales: Arousal, Global Positive Affect, Personality Transformation, Social/Sexual Enhancement, and Relaxation. Participants imagine themselves in drinking contexts described by vignettes and then rate AOEs for that context. Vignettes include a social meeting with friends at a bar (Social context) and a date leading up to a possible sexual encounter (Sexual context). A recent study added a third vignette, home alone at the end of a stressful day at the university (Tension context) (MacLatchy-Gaudet & Stewart, 2001). Studies using the Expectancy Context Questionnaire provide further evidence for the importance of addressing context in the measurement of AOEs.

For example, Levine (1988) found that endorsement of positive AOEs differed within-subjects across contexts, and participants scored highest on the AOE subscales that corresponded with the particular context being evaluated (Levine, 1988). In another study of an all-female sample, women showed different types and strength of positive AOEs across the three contexts assessed by the Expectancy Context Questionnaire (MacLatchy-Gaudet & Stewart, 2001). Providing strong support for the premise of the current study that particular AOEs are elicited when imagining a context congruent with those effects, women scored more highly on AOE subscales that corresponded with the particular context being evaluated. Specifically, arousal and social/sexual AOEs were strongest when reported for the sexual context, whereas global positive affect AOEs were strongest in the social context (MacLatchy-Gaudet & Stewart, 2001). Failure to find stronger relaxation AOEs in the tension context may be attributable to the fact that all three vignettes contained tension relevant material, resulting in high mean levels of relaxation AOEs in all three contexts, potentially washing out contextual variation. Importantly, this study found that the association between AOEs and drinking one week later varied depending on context: global positive affect and relaxation AOEs (in the social context) and social/sexual enhancement, arousal, and relaxation AOEs (in the sexual context) were associated with alcohol use one week later. These context-dependent relations between AOEs and drinking behavior provide an excellent foundation for the hypotheses of the current study.

While studies using the Expectancy Context Questionnaire provide strong support for the present study, there are several limitations of these studies. Reliance on samples of women only makes it unclear if the observed relations work similarly across genders. Further, the Expectancy Context Questionnaire was developed as a Master's thesis that was never published as a manuscript subject to peer review. Concerns regarding the psychometric properties of this measure are warranted, as the coefficient alphas for 4 of the 15 Expectancy Context Questionnaire scores did not reach acceptable levels, subscale scores tended to correlate highly with one another within each context, and the subscales demonstrated poor divergent validity with another established measure of AOEs (Alcohol

Expectancy Questionnaire). More broadly, though the 5 subscales appear to measure both high arousal positive and low arousal positive AOEs, this coverage of the full arousal space is inferred rather than established through empirical evaluation. Although there are limitations, existing studies using the Expectancy Context Questionnaire provide a firm foundation for the aims of the present study. Future studies using a validated measure that provides full coverage of positive AOEs, as well as imagined contexts that are orthogonal in terms of physical and social factors, would clarify and build upon this existing literature.

Much in keeping with the methodological approach of the current proposal, a previous study (Ham, Zamboanga, Bridges, Casner, & Bacon, 2013) used a well-established measure of AOEs (Comprehensive Effects Of Alcohol questionnaire; Fromme et al., 1993) and embedded specific contexts of the Drinking Context Scale (O'Hare, 1997) into the instruction set. Drinking Context Scale contexts include convivial, personal-intimate, and negative coping contexts. As expected, AOEs varied across embedded context (with the exception of self-perception), further highlighting the importance of specifying context when measuring AOEs. Additionally, certain context-specific AOEs were associated with retrospective frequency of alcohol use in the identical context. Specifically, increased sexuality and tension reduction AOEs reported for a convivial context were associated with increased frequency of drinking in convivial contexts, increased risk and aggression AOEs for a negative coping context were associated with decreased frequency of use in that context, and decreased negative self-perception and increased cognitive-behavioral impairment AOEs for personal intimate contexts were associated with increased frequency of use within personal-intimate contexts.

Although this evidence provides further support for contextual influences on AOEs, Ham et al. (2013) only examined relations between AOEs and frequency of use in the corresponding/matching contexts, which did not allow for the conclusion that context-specific AOEs are better predictors of use in that context relative to AOEs reported for an unspecified context. Also, the measure of AOEs in this study (Comprehensive Effects of Alcohol questionnaire) does not include number of drinks consumed over a specific timeframe, making it unclear whether differences in AOEs can be attributed to the effects of context or to the effects of ambiguous alcohol doses. Also, the study did not examine quantity of alcohol consumed as an outcome, though a previous study utilizing the same measures and methodological approach found positive and negative AOEs for the three contexts to be positively correlated with hazardous alcohol use (Ham, Zamboanga, & Bacon, 2011). Additionally, the embedded contexts confounded interpersonal, psychological, and situational factors. This limits the negative coping context as it focuses only on negative affect and interpersonal conflict ("If I had a fight with someone, I'm feeling sad, and/or I'm angry"). This study's limited variability in frequency of alcohol use in a negative coping context suggests this drinking context is infrequent for a college student population, and the study failed to find associations between tension reduction AOEs reported for a negative coping context and drinking in that context. Instead, use of a more general low stimulation context that does not emphasize negative affect may be more valid for capturing emerging adult's expectancies for low arousal positive (e.g., tension reduction) effects, such as simply "drinking alone" (one of the contexts to be used in the present study). The Ham et al. (2013) study was also limited by cross-sectional design, preventing explication of the direction of effects. Finally, this study used a college student sample comprised of primarily Hispanic females. Nonetheless, Ham et al. (2011, 2013) took an important step by embedding context into the instructional set of an established AOE measure and their results provided preliminary support that context-specific AOEs are differentially related to alcohol outcomes.

In sum, the extant literature provides preliminary support for the hypotheses that AOEs vary depending on imagined context, and that the association between AOEs and alcohol outcomes depend on the imagined context for which AOEs are reported. However, more work is necessary to clarify these relations. Previous studies used AOE measures that were not developed specifically to capture the full affective space and appear to do so with varying degrees of adequacy. Such measures include the Alcohol Expectancy Questionnaire (Brown et al., 1980; Brown et al., 1987), the Comprehensive Effects of Alcohol questionnaire (Fromme et al., 1993), and the Alcohol Expectancy Multiaxial Assessment (Goldman & Darkes, 2004). Even more notably, these widely used AOE measures do not allow for specification of important aspects of the drinking context such as number of drinks consumed over a specific timeframe, as well as the social drinking context for which alcohol expectancies are reported. The present study is designed to address limitations of previous work, and aims to expand upon the foundation of the existing literature on context specific AOEs and alcohol use. To do this, the current study will utilize an AOE measure that was recently developed in our laboratory to address the limitations of previous measures.

The 22-item Anticipated Effects of Alcohol Scale (AEAS; Morean et al., 2012) comprises a 4-factor structure that provides comprehensive coverage of valence and arousal dimensions, with alcohol effect items categorized into quadrants (high/low arousal crossed with positive/negative valence). Only high and low arousal positive subscales will be utilized in the present study. While these subscales are correlated (r = .650), the magnitude of the correlation is below the established criteria for multicollinearity between factors, though these criteria may vary depending on reliability of the measure ($r > .8 - .9$) (Meyers, Gamst, & Guarino, 2006; Morean et a., 2012; Tabachnick & Fidell, 2001). Further, the AEAS allows specification of the amount of alcohol an individual imagines consuming and the length of the drinking episode. The measure was also created using stringent psychometric evaluation and has demonstrated scalar measurement invariance for BAC limb, sex, and binge drinking status as well as adequate validity and reliability (Morean et al., 2012). Finally, the nature of the AEAS instruction set will make it easy to include specification of a particular drinking context for which the AOEs are reported.

Participants in the current study will report AOEs for an unspecified drinking context, and will then retrospectively report on the contexts they imagined when completing the measure. Then, participants will report AOEs for two social contexts: drinking with friends and drinking alone. Mean differences in AOEs across the three contexts (unspecified, drinking with friends, drinking alone) will be examined. Then, the study will explore the magnitude of the relations between context specific AOEs (high arousal positive and low arousal positive) and alcohol use. Use of the AEAS as the expectancy measure will allow for specification of the alcohol dose (4 drinks for women and 5 drinks for men) and length of the drinking episode (consumed over a two hour period, expectancies for alcohol effects immediately after consuming the drinks) to best isolate the effect of the social context manipulation in each of the analyses.

Demonstration that context specific low arousal positive AOEs are significantly associated with drinking outcomes when reported for a particular social context (e.g. drinking alone) would make an important contribution to the AOE literature. However, questions about the extent to which these effects reflect actual subjective response to alcohol, versus unrealistic expectancies of alcohol's effects, would remain unanswered. It is possible that strong low arousal positive AOEs in certain contexts are simply an accurate reflection of pharmacological response to alcohol in these contexts. Alternatively, they may represent unique learned expectancies above and beyond actual response to alcohol. According to alcohol expectancy theory (Goldman et al., 1999) and in the broader social learning theory framework (Bandura, 1977) AOEs reflect both indirect and direct learning regarding alcohol's effects. These theories postulate that while expectancies are shaped by direct experience of alcohol's pharmacological effects, there is remaining variance in AOEs that can be attributed to other types of learning, such that there are aspects of AOEs that are unique from subjective response to alcohol. This idea that beliefs about alcohol do not accurately reflect subjective experience has been the basis of interventions such as expectancy challenges (Labbe & Maisto, 2011). However, it has been difficult for previous research to adequately delineate the degree of association between AOEs and SR due to lack of comparable measures and exclusion of drinking context in AOE measures. These factors may be minimizing the extent to which these constructs are related. The relation could be clarified by accounting for social drinking context when measuring both AOEs and SR, as well as using parallel measures. Doing so would inform existing theory and provide greater understanding of these risk factors and their interplay.

The factor structures of AOEs and SR have significant overlap, such that both identify positive and negative aspects of individual responses to alcohol. Models of AOEs and SR are consistent in the assertion that increased positive and decreased negative effects confer alcohol-related risk. For example, the well-established Low Level of Response model is consistent with negative expectancy theory in suggesting that attenuated negative effects are associated with increased alcohol use (King, de Wit, McNamara, & Cao, 2011; Schuckit, 1994; Schuckit et al., 2007). However, studies of the low level of response model typically measure a limited range of alcohol effects in an unnatural drinking context, thereby limiting our understanding of the possible profiles of SR that confer alcohol risk. A more recent model of SR, the Differentiator Model (Newlin & Thomson, 1990) incorporates positive SR effects, expanding upon the low level of response model by suggesting that stronger stimulant response to also confers alcohol-related risk. Specially, the differentiator model posits that increased sensitivity to positive, stimulating effects of alcohol and decreased sensitivity to negative, sedating effects of alcohol confers risk. Individuals who experience this risky pattern of SR find alcohol more rewarding because they experience increased pleasurable, stimulating aspects of intoxication and decreased negative SR. Individual differences in the degree to which sedation and stimulation are experienced can help explain risk for negative alcohol-related outcomes (King et al., 2011). In keeping with these findings, recent reviews of the literature provide partial support for both the differentiator model and low level of response model (Morean & Corbin, 2010; Quinn & Fromme, 2011), suggesting both increased positive and decreased negative subjective effects of alcohol are important risk factors.

There is considerable evidence that increased stimulant response confers risk as outlined by the differentiator model. Groups with known risk factors for alcohol-related problems report stronger stimulant effects, with both heavy drinkers and alcoholics showing increased stimulation as compared to social drinkers (King, Houle, de Wit, Holdstock, & Schuster, 2002; King et al., 2011; Quinn & Fromme, 2011; Thomas, Drobes, Voronin, & Anton, 2004). Additionally, individuals with a family history of alcoholism experience greater alcohol induced stimulation, and increased stimulation is associated with negative drinking outcomes (Chung & Martin, 2009; Erblich & Earleywine, 2003; Holdstock, King & de Wit, 2000; King et al., 2002; Pedersen & McCarthy, 2009). Further, the experience of increased stimulation predicts increased within-session consumption (Corbin, Gearhardt, & Fromme, 2008). Importantly, stronger stimulant effects predict higher levels of future binge drinking among heavy drinkers (King et al., 2011).

Thus, both the AOE and SR literatures provide strong evidence that positive effects play a critical role in conferring risk for alcohol use and alcohol-related problems. However, there is an important difference in the types of positive effects examined across the two literatures. Studies of positive AOEs have typically included measurement of both positively reinforcing (e.g., high arousal positive) and negatively reinforcing (e.g., low arousal positive) effects. In contrast, studies of SR have focused nearly exclusively on the positively reinforcing effects (e.g., stimulation), and have failed to capture negatively reinforcing subjective effects, such as relaxation. This is surprising given that both pharmacological and social learning models of risk for AUDs emphasize the significance of low arousal positive effects, such as tension reduction and stress response dampening (Cappell & Greeley, 1987; Conger, 1956; Sher & Levenson, 1982; Young, Oei, & Knight, 1990). Low arousal positive effects may provide reinforcement of alcohol use and individuals who experience strong low arousal positive effects may use alcohol to cope with negative affect or to manage stress. Drinking to cope is a robust predictor of alcohol-related problems (Cooper et al., 1988). Thus, it is critical that studies include this understudied aspect of SR as positive sedative effects are likely positively related to risk for heavy drinking and problems.

Unfortunately, the two most widely used measures of SR do not capture potential negatively reinforcing alcohol effects, a problem highlighted in a recent review of research on SR (Morean & Corbin, 2010). For example, the Biphasic Alcohol Effects Scale (Martin, Earleywine, Musty, & Perrine, 1993) assesses both high and low arousal effects, but the valence of these effects is confounded with level of arousal. The Biphasic Alcohol Effects Scale does an excellent job of capturing high arousal positive (e.g., energized, talkative) and low arousal negative (e.g., down, inactive) effects, but does not capture high arousal negative (e.g., aggressive) or, importantly, low arousal positive effects (e.g., tension reduction). Similarly, the Subjective High Assessment Scale (Schuckit, 1994; Schuckit & Gold, 1988) captures low arousal effects (e.g., sleepy, dizzy) that are likely to be experienced negatively, but fails to capture any positively valenced subjective effects, including low arousal positive effects that may serve as negative reinforcers.

Of course, AOEs and SR are distinct constructs with unique antecedents. While alcohol expectancy theory explains the development of AOEs in terms of social learning, there is evidence that SR has a strong biological basis (Schuckit, 1998; Schuckit, 1999), with levels of SR linked to family history of alcoholism (Newlin & Thomson, 1990; Schuckit, 1998, 1999; Schuckit & Gold, 1988). Previous studies have demonstrated a moderate correlation between AOE and SR. However, interpretation of these findings is difficult as the measures of AOE and SR used are not easily compared. For example, in previous studies measures were opposite in valence (negative SR; positive AOEs), were not validated measures of SR, or captured only a limited range of AOEs (Merrill, Wardell, & Read, 2009; Schuckit et al., 2010). Recent development of parallel measures of AOE and SR allows for a more accurate analysis of the relation between these constructs.

In response to limitations of existing AOE and SR measures, our lab recently developed parallel measures of AOEs (Anticipated Effects of Alcohol Scale (AEAS); Morean et al., 2012), and SR (Subjective Effects of Alcohol Scale (SEAS); Morean, Corbin, & Treat, 2013) designed to measure the full valence by arousal affective space. This is consistent with psychophysiological research which suggests that the pharmacological effects of alcohol are best conceptualized in terms of both arousal and emotional valence (Stritzke, Patrick, & Lang, 1995; Stritzke, Lang, & Patrick, 1996). The SEAS and AEAS were developed using a common set of items with a subgroup of 13 common items identified across the measures, allowing for direct comparisons between AOEs and SR. Similar to the AEAS (discussed previously), the SEAS has undergone rigorous psychometric evaluation to ensure correct interpretation of effects. Specifically, the SEAS has demonstrated scalar measurement invariance by beverage condition and limb of the blood alcohol curve. Additionally, the SEAS subscales demonstrate good internal consistency and the SEAS has demonstrated convergent and divergent validity with existing measures of SR, AOEs, and alcohol use. Of note, Morean et al. (2013) found that negatively reinforcing effects are distinct from sedation as measured by the Biphasic Alcohol Effects Scale, as has been suggested in previous studies (Wiers, 2008). Finally, Morean et al. (2013) demonstrated test-criterion relationships between SEAS scores and cross-sectional alcohol outcomes, and provided evidence for incremental utility of SEAS scores in accounting for variance in cross-sectional alcohol outcomes over commonly used SR measures (Biphasic Alcohol Effects Scale and Subjective High Assessment Scale).

Full coverage of the arousal space for positive effects provided by the AEAS and the SEAS allows for several important advances. Using these parallel measures, understudied aspects of positive SR (low arousal positive) are better captured, allowing for examination of relations between AOEs and SR across the full range of positive effects. Also, by specifying the dose at which participants report on AOEs (e.g., expected effects of alcohol after consuming a specified number of drinks over a specific period of time), AOEs and SR can be compared at equivalent doses. Examining the relation between positive AOE and SR effects using these parallel measures is an important clarification in the literature and may inform intervention approaches focused on these effects.

So far, studies using these parallel measures demonstrate that the magnitude of the correlations between AEAS and corresponding SEAS subscale scores are modest (.38

to .57) (Morean et al., 2013). However, lack of consideration of social drinking context may result in an underestimation of the relation between AOEs and SR. Instruction sets for widely used measures of AOEs (including the AEAS) do not specify the drinking context to be imagined when reporting on expected effects of alcohol, leaving respondents to report AOEs for the drinking context most salient to them. In contrast, SR has traditionally been captured in alcohol administration studies conducted in a solitary setting in a sterile laboratory. It is unknown (though perhaps unlikely) that participant's imagined context for AOEs corresponds to this alcohol administration context. It is important to attend to the context in which SR is measured given a growing literature supporting context effects on SR.

Experiences of alcohol's pharmacological effects may differ by drinking context given their relatively diverse and ambiguous nature. Indeed, there is preliminary evidence that social context influences interpretation of alcohol's non-specific pharmacological effects. Event-contingent recording studies demonstrate that alcohol consumption in social group settings facilitates higher levels of agreeable behaviors and more positive mood (Ann het rot, Russell, Moskowitz, & Young, 2008). Social drinking facilitates reinforcement from consumption by promoting positive affective response, whereas solitary drinking is associated with sedation (Pliner & Cappell, 1974). Similarly, group drinking is associated with increased subjective pleasure and greater sensations of warmth-glow (Sher, 1985). However, lack of placebo control and/or exclusion of validated measures of SR make these previous findings difficult to interpret. One placebo controlled study of male drinkers demonstrated that alcohol consumption is associated with increased coordination of smiling and speech behaviors and improved self-reported bonding as compared to placebo (Kirchner, Sayette, Cohn, Moreland, & Levine, 2006). However, this study did not manipulate social context, so it is unclear to what extent social context was driving the observed differences in SR.

In sum, SR varies across social contexts. Taken together, extant literature suggests that group drinking is associated with stimulating, high arousal positive SR. Conversely, solitary drinking is associated with attenuated high arousal positive SR and increased sedative effects. However, previous studies have not systematically varied social contexts, nor have the effects of social context on SR been explored using a validated measure that captures the full affective space. As such, the drinking contexts that may invoke negatively reinforcing subjective effects (low arousal positive SR) are currently unknown. The present study addresses these limitations by utilizing two alcohol administration social contexts: solitary drinking and group drinking. The first context replicates the typical setting in prior alcohol administration studies. In contrast, the latter context better approximates what may be the more typical drinking context for a sample of emerging adults. Furthermore, use of these two contexts will allow for the greatest differentiation between groups, providing more power in the present study to detect differences in types of positive SR across contexts. While demonstration of context effects on SR is of important theoretical interest in its own right, the current study will measure positive SR across distinct contexts with the goal of examining context effects on relations between positive SR and AOEs.

Study Hypotheses

The current study addresses 4 aims which collectively examine a) the role of context in reporting of AOEs (Aims 1 and 2), b) the extent to which context specific

AOEs uniquely relate to drinking outcomes (Aim 3), and c) the importance of context effects on correspondence between AOEs and SR (Aim 4). Each aim and corresponding hypotheses are outlined below. These aims are addressed in two studies with two separate samples, referred to hereafter as "Study 1" and "Study 2." Aim 1 was addressed in both study 1 and study 2. Aims 2-4 were addressed in study 2 only.

Study 1 and Study 2

Aim 1: It is likely that the majority of emerging adults imagine stimulating group contexts when asked to report on AOEs for an unspecified drinking context, as this population frequently consumes alcohol in these contexts (Harford & Grant, 1987; O'Hare, 1990; Wechsler & McFadden, 1979). Both study 1 and study 2 explicitly explored this hypothesis. The AEAS was administered using instructions that do not specify the social context for which AOEs are reported. Immediately after completing the measure, participants retrospectively reported on the context that they were imagining. Whether participants are imagining any context at all when reporting on expectancies is in itself a novel research question, and to explore the validity of this idea, a response option of "I did not imagine any context" was included and the percentage of participants endorsing this option is reported. Participants were also provided with a comprehensive list of possible drinking contexts from which they endorsed as many imagined contexts as applied, which provided rich data for this exploratory research question. Then, participants selected the most representative retrospective imagined context (or again selected "I did not imagine any context"). This "most representative retrospective imagined context" was dichotomized into "solitary" or "social" and used as the variable of interest for Aim 1 hypothesis 1. Using frequency distributions, it was hypothesized that the majority of participants in both study 1 and study 2 would retrospectively report that they imagined a social, as opposed to a solitary, drinking context. Testing this hypothesis in two separate samples is a strong demonstration of the existence of (typically unmeasured) imagined contexts when reporting AOEs. This aim provides a strong foundation for aims 2, 3, and 4, and also clarifies previous literature by providing information about the nature of the social contexts imagined by participants when reporting on AOEs using traditional expectancy measures that do not specify context.

Study 2

Aim 2: Preliminary evidence suggests that mean levels of AOEs vary depending on the imagined context. Study 2 explored this idea in Aim 2. A particularly significant strength of the present study is the inclusion of the "drinking alone" imagined context, given preliminary evidence that when AOEs are reported for specific contexts that are more likely to elicit low arousal positive effects, these AOEs vary as a function of context (Mulligan Rauch & Becker Bryant, 2000). The present study controlled for alcohol dose by measuring high arousal positive and low arousal positive AOEs for a specified alcohol dose (.08% breath alcohol concentration), which allowed for isolation of the effect of context on AOEs. AOEs were reported for two disparate imagined social contexts "drinking alone" and "drinking with friends" as well as for an unspecified drinking context for a total of three versions of the AEAS.

Aim 2 hypotheses 1 and 2 tested two a priori planned contrasts. First, was hypothesized that for low arousal positive AOEs, the solitary context would differ from the group and unspecified contexts (which would not differ from one another), with higher mean levels of low arousal positive AOEs in the solitary context (hypothesis 1).

Hypothesis 2 was that, for high arousal positive AOEs, the solitary context would differ from the group and unspecified contexts (which would not significantly differ from one another), with higher mean levels of high arousal positive AOEs for the group and unspecified contexts.

Aim 3: Extant literature provides preliminary evidence that context-specific AOEs may have differential relations with alcohol outcomes. Study 2 Aim 3 examined the association between context-specific high arousal positive and low arousal positive AOEs and weekly drinking. Including context when measuring both types of AOEs is important, but use of the "drinking alone" solitary context may reveal particularly important findings regarding low arousal positive AOEs. The association between these theoretically important low arousal positive AOEs and drinking behavior may be understated in previous work due to exclusion of drinking context in expectancy measures. Aim 3 hypotheses 1-4 examined relations between AOEs reported for each of three contexts (unspecified, group, and solitary) and alcohol use. Hypothesis 1 stated that for an unspecified context, high arousal positive AOEs would be significantly associated with weekly drinking, whereas low arousal positive effects would not. Hypothesis 2 stated that for drinking with friends, high arousal positive AOEs would be significantly associated with weekly drinking, whereas low arousal positive effects would not. In contrast, hypothesis 3 stated that for drinking alone, low arousal positive AOEs would be significantly associated with weekly drinking, whereas high arousal positive AOEs would not. Because the statistical significance of effects of high arousal positive and low arousal positive AOEs on alcohol use may differ despite small differences in the magnitude of the effects (e.g. p values of .07 and .03), a supplemental approach compared the standardized regression coefficients for high arousal positive and low arousal positive AOEs within each context to determine if they statistically significantly differed. These analyses were conducted using model comparisons in MPLUS. Finally, after testing each model separately for the three contexts, the 4 context-specific AOE subscales (high arousal positive AOEs for group and solitary; low arousal positive AOEs for group and solitary) were entered into a regression model simultaneously to examine the association of each with weekly drinking above and beyond the others. Subscales for the "unspecified" context were not included given concerns regarding multicollinearity, particularly for the "unspecified" context subscales and the "group" context subscales, as a high correlation among these subscales was anticipated. For this analysis, it was hypothesized that only low arousal positive AOEs for drinking alone and high arousal positive AOEs for drinking with friends would emerge as significantly associated with weekly drinking (hypothesis 4).

Aim 4: The final aim of study 2 explored important questions regarding the extent to which the above relations were driven by pharmacology versus expectancies. In the context of an alcohol administration study, context effects on the relation between positive AOEs and SR were explored. In addition to reporting on AOEs for the three imagined contexts described above, participants underwent an alcohol administration session in which SR was measured in one of two drinking contexts (group drinking context or solitary drinking context). These alcohol administration contexts were intended to correspond to the contexts for which participants reported AOEs. The present study only examined SR effects captured in the drinking context congruent with those effects. In other words, only low arousal positive SR captured in the solitary drinking context, and only high arousal positive SR captured in the group drinking context, were examined as criterion variables. These two aspects of SR were evaluated separately as outcomes. The correspondence between low arousal positive AOEs and low arousal positive SR, as well as correspondence between high arousal positive AOEs and high arousal positive SR, was examined as the present study aims to understand context effects on relations between AOEs and SR that are matched in valence and arousal.

Aim 4 hypothesis 1 examined low arousal positive SR captured in the solitary drinking context as the outcome. It was hypothesized that, in separate models, low arousal positive AOEs for drinking alone would be significantly associated with low arousal positive SR, and while low arousal positive AOEs for drinking in an unspecified context would also be significantly associated with low arousal positive SR, the magnitude of this relation would be much smaller (see Figure 1).

Aim 4 hypothesis 2 examined high arousal positive SR captured in the group drinking context as the outcome. It was hypothesized that, in separate models, high arousal positive AOEs reported for both the unspecified context and drinking with friends would be significantly associated with high arousal positive SR in the group context (see Figure 2). However, it was anticipated that the magnitude of the association for "drinking with friends" high arousal positive AOEs would be slightly larger.

METHOD: STUDY 1, AIM 1

Participants

Study 1 Aim 1 included n=69 participants aged 18-21. The sample included 36% men and 64% women. Participants for Study 1 Aim 1 were recruited from the third generation of an ongoing study of the intergenerational risk for alcoholism (Adult and

Family Development Project; AFDP). Study 1 used a sample recruited primarily as part of a larger pilot study on the effects of an environmental manipulation (distraction) on performance during a simulated driving task. To be eligible for the study, participants had to be between the ages of 18-21, report any use of alcohol, and currently reside in the state of Arizona. Other eligibility criteria specific to the pilot study included owning a phone with texting capability, texting more often than "never," and having driven a motor vehicle in the last year or having ever played a videogame that simulated driving a motor vehicle.

Relevant Survey Measures

AOEs. The 22-item Anticipated Effects of Alcohol Scale (AEAS; Morean et al, 2012) employs an 11-point rating scale (0-"not at all," 10-"very much"). Number of standard drinks is specified in the AEAS as 4 drinks for women 5 drinks for men consumed over a two hour period, to approximate a breath alcohol concentration (BrAC) of .08%. The AEAS includes full coverage of the valence by arousal affective space, 13 overlapping items with the Subjective Effects of Alcohol Scale, and established validity and reliability. High Arousal Positive (e.g., sociable, lively, fun) and Low Arousal Positive (e.g., mellow, calm, relaxed) are the subscales of interest in the present study. While these subscales are correlated ($r = .380$ in study 2), the magnitude of the correlation is well below the established criteria for multicollinearity ($r > .8$) (Meyers et al., 2006; Morean et a., 2012; Tabachnick & Fidell, 2001). The AEAS has previously demonstrated good to excellent internal consistency (Cronbach's alpha values ranging from .79 to .96 across subscales), has established scalar measurement invariance for BAC limb, sex, and binge drinking status, has demonstrated convergence/divergence with alternative AOE measures and mood, and has demonstrated test-criterion relationships with several alcohol-related outcomes (Morean et al.,2012). In Study 1, internal consistency of AEAS subscales was adequate to excellent (high arousal positive subscale α = .932, low arousal positive subscale α = .608). In study 2, internal consistency of AEAS subscales was also excellent (high arousal positive subscale α = .910, low arousal positive subscale α = .825).

The AEAS was first administered using instructions that did not specify a drinking context for which to report alcohol expectancies ("unspecified context"). Immediately following, participants retrospectively reported on the context imagined when completing the measure. Comprehensive options, including "I did not imagine any context" and an "other" open response, were provided: at a bar, small house party, large house party, in a car, while pre-drinking/pre-gaming, while playing a drinking game, at a tailgate/sporting event, at a concert, at home, in a restaurant, during a meal, on a date, with friends, and alone. Participants could endorse multiple retrospective imagined contexts. They then selected the most representative retrospective context, which was dichotomized into "solitary" and "group" drinking and examined for Aim 1 hypothesis 1.

Procedure

Recruitment and Screening.

A subsample of the third generation of the AFDP was recruited by telephone. Interested participants completed a phone screener to determine eligibility. The screener determined if participants met minimum drinking criteria, as well as criteria related to driving and texting behavior.

Laboratory Session.

Eligible participants attended a 2 hour laboratory session. During this session participants completed survey measures, as well as the simulated driving task (which is not of interest in the present study). The comprehensive battery of self-report measures assessed drinking behavior, alcohol expectancies, alcohol-related problems, and a range of other measures of relevance to alcohol response and driving behavior. Surveys were completed online using the Qualtrics program which includes extensive data security and assists with participant tracking. Participants were paid for the surveys upon completion of the session.

METHOD: STUDY 2, AIMS 1, 2, 3, AND 4

Participants

Study 2 Aims 1, 2, 3, and 4 included participants age 21-25. Sample size for Aim 1, 2 and 3 analyses is n = 244. Sample size for Aim 4 analyses (correspondence between SR and AOEs) is n = 122 (n=63 in solitary alcohol challenge context, n=59 in group alcohol challenge context). Study 2 targeted an equal number of men and women, and a sample that was representative of the community with respect to race/ethnicity and of the U.S. population in terms of student status. Participants had to report consuming 4/5 drinks (women/men) on at least one occasion in a typical month to be eligible for the study. Exclusion criteria included contraindications to alcohol, use of psychotropic or prescription pain medications, past month illicit drug use, daily use of marijuana, current alcohol dependence, anxiety, and/or mood disorder, lifetime participation in abstinence-oriented treatment, and current pregnancy/nursing.

Measures: Session 1 (Interview/Survey Session)

Demographic Information. A single questionnaire assessed age, sex, ethnic/racial identity, educational background, academic standing, socio-economic status, and relationship status.

Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV. (AUDADIS-IV; Grant & Dawson, 2000). The AUDADIS-IV assessed current and lifetime diagnoses of alcohol abuse and dependence, mood, and anxiety disorders as defined in the DSM-IV (American Psychiatric Association, 1994). The AUDADIS-IV was designed for use by lay interviewers (rather than trained clinicians) and is appropriate for normative samples. The AUDADIS-IV has undergone more rigorous evaluation than any other fully structured clinical interview. The reliability and validity of the AUDADIS-IV in normative populations has been demonstrated (NESARC; Grant et al., 2003). In study 2, the baseline administration of the AUDADIS-IV was used for eligibility purposes.

Timeline Follow-Back Interview (TLFB; Sobell & Sobell, 1992). Using standardized procedures, an RA presented each participant with a 30-day calendar and asked for daily drinking estimates for each day working backwards in time. To facilitate recall of drinking occasions, participants recorded personally meaningful events for the 30 day period. The TLFB provides measures of drinking frequency, quantity per episode, and estimated BrAC. The outcome of interest in the current study is weekly consumption. The TLFB is considered the gold standard of retrospective estimates of alcohol consumption, with adequate test-retest reliability (r= .92) and positive associations with other indices of drinking frequency/quantity. In Study 2, the TLFB demonstrated excellent internal consistency (Cronbach's α = .892).

Family History of Alcoholism. The Family Tree questionnaire (Mann, Sobell, Sobell, & Pavan, 1985) asks participants to report on the drinking behavior of their immediate family members (parents and siblings), as well as maternal and paternal grandparents. Participants rate each family member using the following 4-point scale: 1 does not drink; 2 social/non-problem drinker; 3 possible problem drinker; 4 definite problem drinker. In the present study, only scores for parents and grandparents (6 items) were used, so that the family history of drinking variable only included adult relatives over the age of 21. A composite family drinking variable was created by dichotomizing those who reported any family member as "possible" or "definite" problem drinker as "family history positive," and those with no family history as "family history negative." In Study 2, the family tree questionnaire with the 6 items of interest demonstrated adequate internal consistency (Cronbach's α = .710).

AOEs. AOEs were measured using the AEAS (Morean et al, 2012). See "Method: Study 1 Aim 1" for a description of the measure.

Typical Drinking Context. Typical drinking context was assessed after administration of the AEAS to avoid potential confounding effects. Participants reported on each of the following contexts using a 7 point Likert scale (1-"never drink in this context," 7 -"always drink in this context"): at a bar, small house party, large house party, in a car, while pre-drinking/pre-gaming, while playing a drinking game, at a tailgate/sporting event, at a concert, at home, in a restaurant, during a meal, on a date, with friends, and alone. In Study 2, the Typical Drinking Context Questionnaire demonstrated adequate to good internal consistency (Cronbach's $\alpha = .773$).

Imagined Drinking Context for AEAS. For Aims 2, 3, and 4, AEAS was modified to specify two imagined social drinking contexts, "drinking with friends" and "drinking alone." Using a within-subjects design, all participants completed the AEAS for both imagined contexts, with order counterbalanced across participants. Participants also completed the unspecified context AEAS (see above) before they completed context-specific versions of the AEAS.

Vividness of Imagined Context for AEAS. After completing the two context specific versions of the AEAS, participants reported on the vividness of the imagined context to capture individual differences in imagery ability. The prompt read "When you imagined ["drinking with friends" or "drinking alone"], how vivid was the image in your mind?" Participants rated vividness of the image on a 5-point Likert scale. The response options were drawn from the Vividness of Visual Imagery Questionnaire (VVIQ). Response options included "No image at all, you only "know" that you are thinking of the social context", "vague and dim", "moderately clear and vivid", "clear and reasonably vivid" and "perfectly clear and as vivid as normal vision." The VVIQ has demonstrated acceptable internal consistency and an interpretable factor solution, and overall, the psychometric properties are acceptable (McAvinue & Robertson, 2007).

Measures: Session 2 (Alcohol Challenge Session)

Subjective Response. The 14-item Subjective Effects of Alcohol Scale (SEAS: Morean et al., 2013) assessed SR for the full affective space. The present study only utilized the 13 items that overlap with the 13 items on the AEAS for substantive analyses, and used the high arousal positive and low arousal positive subscales. These subscales are correlated in the present study (*r*= .205), but magnitude of the correlation is below the established criteria for multicollinearity (*r* > .8) (Meyers et al., 2006; Morean et a., 2012; Tabachnick & Fidell, 2001). SEAS was measured at baseline, ascending limb breath alcohol concentration (BrAC) .06%, peak BrAC, and descending limb BrAC .06%. SR measured at the ascending time point was used for all analyses. Previous research has shown that SEAS scores demonstrate good to excellent internal consistency (Cronbach's alpha values ranging from .80 to .94 across subscales). The SEAS also demonstrates scalar measurement invariance by limb of the blood alcohol curve and beverage condition, convergence/divergence with extant SR measures, alcohol expectancies, and alcohol use, and demonstrates concurrent/incremental utility in accounting for alcohol-related outcomes (Morean et al., 2013). In study 2, internal consistencies for SEAS subscales were good (high arousal positive subscale α = .896, low arousal positive subscale α = .719).

Procedure

Recruitment and Screening.

Participants were recruited by word-of-mouth and flyers that were posted throughout the ASU campus and surrounding community, as well as using Craigslist and Facebook ads. Interested participants completed a phone screener to determine eligibility. The screener determined if participants met minimum drinking criteria (4 drinks for women, 5 drinks for men on at least one occasion in a typical month). The screener assessed for those at risk for alcohol dependence, those who indicated high risk for current anxiety and/or mood disorder, and all other exclusion criteria. Individuals who were screened out due to high risk for alcohol dependence, anxiety, or mood disorder were provided with information about their heightened risk and offered information about treatment resources.

Session 1 (Interview/Survey Session).

Eligible participants attended a 90 minute lab interview/survey session prior to the alcohol-challenge session. Structured clinical interviews (AUDADIS-IV) for alcohol dependence, anxiety, and mood disorders were administered initially, as individuals who met criteria for one or more current diagnoses were excluded from participation. Although the initial phone screener assessed for these disorders, it was expected that the screening process would fail to identify a small number of participants with current diagnoses (< 5%). An interview of alcohol use over the past 30 days was also be completed (TLFB), as was a comprehensive self-report survey.

Session 2 (Alcohol Challenge Session).

Participants returned to the lab 1-2 weeks after the initial session for the alcohol administration protocol. Participants were instructed to abstain from alcohol and drugs 24 hours before the study, to refrain from using nicotine products during the study, and to refrain from eating in the 4 hours preceding the study. Upon arrival, legal drinking age was verified and participants were given a breath alcohol analysis test to ensure a zero breath alcohol concentration (BrAC). Women took a pregnancy test and verified a negative result to continue in the study. Participants then completed baseline measures of subjective response.

Alcohol Administration Contexts. Participants were randomly assigned to consume alcohol in either a solitary context (n=63) or group context (n=59). The larger study from which the present study was drawn assigned participants to consume alcohol in one of two physical contexts as well (a simulated bar or a traditional laboratory), and therefore fully crossed physical by social context for a four cell design. However, study 2 collapsed across physical context, and examined differences between social drinking contexts only. Physical context was included as a covariate in the statistical analyses involving SR. Participants in the solitary context drank either alone in a lab (office rooms devoid of alcohol-related stimuli, equipped with a camera feed allowing participants to remain alone while being monitored by staff) or alone in a bar (lounge seating, an entertainment system, and a backlit bar). Participants in the group context completed procedures in groups of 3-4 in one of the two physical settings described above.

Alcohol Administration. Although the broader study included a placebo control condition, study 2 focused exclusively on participants who were randomly assigned to the alcohol condition. Individual doses based on participants' gender and weight were calculated to achieve a target BrAC of .08%. Beverages contained a 1:3 mixture of 80 proof vodka to mixer. Participants had 6 minutes to consume each of 3 beverages, with a one minute break between each beverage, for a total alcohol administration period of 20 minutes. After finishing the last drink participants engaged in an 8 minute absorption period. SR measure was given when breathalyzers determined an ascending limb BrAC of .06%. SR measure was repeated at peak BrAC and at a descending limb BrAC of .06%. Participants were debriefed, paid for participation in session 1 and 2, and driven home via taxi when BrAC was at a .03% or below.

DATA ANALYTIC PLAN

Preliminary Analyses

Before conducting the primary analyses, distributions of all variables were examined for outliers and assumptions of normality. In the event that a variable was non-normally distributed, log transformations were used. Indices of multicollinearity were also considered. Criteria for multicollinearity between factors is between $r > .80$ (Meyers, Gamst, & Guarino, 2006) and $r > .90$ (Tabachnick & Fidell, 2001), as correlations > .8-.9 are indicative of likely problems with the correlation matrix manipulation (Tabachnick & Fidell, 2001). Further, tolerance (1 minus the amount of variance in the independent variable explained by all of the other independent variables) and VIF (the reciprocal of the tolerance statistic) were also examined to ensure that correlations among the independent variables did not create problems in the analyses. All models were assessed for multicollinearity using the following criteria: a variance inflation factor for a given subscale above 5 or a tolerance values less than .2 (e.g., Chatterjee, Hadi, & Price, 2000). Power analyses are reported below and were determined using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007).

Confirmatory Factor Analysis

Prior to examining the primary hypotheses of interest, data from the AEAS and the SEAS were subjected to a confirmatory factor analysis (CFA) to confirm the four factor structure of each of the measures. AEAS and SEAS effects assessed on the ascending limb (to a peak BrAC of .08) were the effects of interest. CFA analyses were conducted using Mplus 6.1 (Muthén & Muthén, 2010) using robust maximum likelihood (MLR) estimation (as this estimation method is robust to non-normality), with missing data handled by full information maximum likelihood (FIML) estimation (Muthén & Muthén, 2010). Missing data was expected to be minimal given the study design, and any missing data was presumed to be missing at random or missing completely at random. FIML estimation is demonstrated to be superior under ignorable missing data conditions (missing completely at random and missing at random), with FIML estimates showing less bias and greater efficiency relative to other methods (Enders & Bandalos, 2001). The model fit was evaluated using the Satorra-Bentler scaled (mean-adjusted) chi-square goodness of fit test, where the usual normal-theory chi-square statistic is divided by a scaling correction to better approximate chi-square under non-normality (the appropriate chi-square test when using MLR estimation) (Satorra, 2000). Model fit was also evaluated using the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). Goodness of model fit was assessed using the following criteria: CFI and TLI indices > .95 (Hu & Bentler, 1999), RMSEA < .08 (Browne & Cudek, 1993; MacCallum, Browne, & Sugawara, 1996), and SRMR < .08 (Hu & Bentler, 1999).

Measurement Invariance (MI) of the factor structure of the AEAS across imagined contexts (drinking alone and drinking with friends) was assessed. MI of the factor structure of the ascending SEAS across drinking contexts (solitary and group) was also assessed. In both cases, increasingly restrictive tests evaluated configural, metric, and scalar invariance. These types of invariance form a nested hierarchy, represented by increasing levels of cross-group equality constraints imposed on factor loading and item intercept parameters (Gregorich, 2006).

First, it is important to establish that a similar global latent factor structure is shared across groups when no equality constraints are in place. Each latent factor should be associated with the same items across groups, the item loadings should be significant in each group, and the correlations between latent factors should not be so strong as to indicate collinearity. If a model with these specifications fits well in both groups, then configural invariance is supported (Gregorich, 2006).

Next, it is important to establish that the corresponding factor loadings are equal across groups, or in other words, that the strength of the relations between the latent factors and their items is comparable across groups. This level of invariance (metric) provides evidence that corresponding factors have the same meaning across groups (Gregorich, 2006). Therefore, metric invariance was tested by imposing equality constraints on corresponding factor loadings across the contexts, and fitting the factor model to sample data from each context simultaneously.

Finally, it is important to establish that item intercepts are invariant across groups. This level of invariance (scalar) provides evidence that comparisons of group means are meaningful. In the present study, this will ensure that differences in factor scores in each context reflect true differences in latent factor means, rather than measurement bias (Chen, 2008; Steenkamp & Baumgartner, 1998; Widaman & Reise, 1997). Therefore, assuming metric invariance, scalar invariance was tested by additionally imposing equality constraints on corresponding item intercepts across the two contexts, and fitting the factor model to sample data from each context simultaneously.

Change in model fit was evaluated using the statistical cutoffs suggested by Chen (2007). Specifically, noninvariance of the metric model exists when the decrement in model fit from the configural to metric model exceeds SRMR ≥ .030, or RMSEA ≥ .015, or CFI ≥ -.010. Noninvariance of the scalar model exists when there is a change in fit from the metric to the scalar model in CFI ≥ -.010, accompanied by a change in SRMR ≥ .010 or a change in RMSEA ≥ .015. Demonstration of scalar invariance allows for meaningful comparisons of group means by ensuring any observed group differences in mean subscale scores reflect true latent differences rather than discrepancies in factor structure.

Study 1 and Study 2

Aim 1: Retrospective Imagined Context Frequency for Unspecified AEAS

The analyses for Aim 1 were descriptive in nature. First, a frequency table that provides the full information about the contexts imagined by participants is provided. The response option "I did not imagine any context" is included in this frequency table. Next, participants endorsed their "most representative imagined context." A frequency table that provides the full information about the most representative imagined contexts is also provided. Then the contexts endorsed as the most representative imagined context (forced single choice) were dichotomized into "solitary" or "group" drinking. Aim 1 hypothesis 1 for both study 1 and study 2 was that the majority (>50%) of participants would report imagining a group context rather than a solitary context when reporting AOEs for an unspecified context.

Study 2

Aim 1: Retrospective Imagined Context Frequency for Unspecified AEAS

Aim 1 was also conducted in study 2.

Aim 2: Differences in AOE Means by Context

Aim 2 included one within-subjects factor "imagined context" that had three levels: unspecified, solitary, and group. A priori study hypotheses were tested using dependent *t*-tests for planned contrasts. Hypothesis 1 was that low arousal positive AOEs reported for the solitary context would differ significantly from low arousal positive AOEs reported for the group and unspecified contexts (which would not differ from one another), with higher mean levels of low arousal positive AOEs for the solitary context. Hypothesis 2 was that high arousal positive AOEs reported for the solitary context would significantly differ from high arousal positive AOEs reported for the group and unspecified contexts (which would not significantly differ from one another). Specifically, higher mean levels of high arousal positive AOEs were expected for the group and unspecified contexts than for the solitary context. Standardized mean difference effect size estimates (Hedges' g) are reported for the significant comparisons.

Power analyses were conducted using G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007). These a priori power analyses indicated that to detect a small to medium effect size (.35) at the .05 alpha level with .80 power, the required sample size would be *n*= 67. The present study was adequately powered for Aim 2 analyses as the sample size was *n*= 244.

Aim 3: Relations between Context Specific AOEs and Weekly Drinking

Proposed analyses for Aim 3 utilized multiple regression analyses in Mplus 6.1 (Muthén & Muthén, 2010) with robust maximum likelihood estimation (as this method is robust to non-normality), and missing data was handled by full information maximum likelihood (FIML) estimation (Muthén & Muthén, 2010). Aim 3 hypotheses 1-3 used three regression models, one for each imagined context (unspecified, drinking alone, drinking with friends) and simultaneously tested the relation between high arousal positive and low arousal positive AOEs and weekly drinking for each context. Aim 3, hypothesis 4 entered high arousal positive and low arousal positive for group, and high arousal positive and low arousal positive for solitary, simultaneously into the regression model to examine associations with weekly drinking. Age, gender, and race were included as control variables in each of the models given established relations between these variables and alcohol use. Race was created as a dichotomous variable comparing non-Hispanic Caucasians to all other racial groups.

Power analyses for these models were conducted using G*Power 3.1.2 (Faul, Erdfelder, Lang, & Buchner, 2007). Previous studies have found that expectancies account for approximately 15% of the variance in cross sectional alcohol use (Jones et al., 2001), and as such, an *f*-squared effect size of .1764 was used for power analyses. These a priori power analyses indicated that to detect an effect size of .1764 at the .05 alpha level with .80 power, the required sample size would be *n*= 79. The present study was adequately powered for Aim 3 analyses as the sample size was *n*= 244.

Aim 3, hypothesis 1 examined the relation between AOEs reported for the unspecified context and weekly drinking. It was hypothesized that high arousal positive AOEs for the unspecified context, but not low arousal positive AOEs for the unspecified context, would be significantly associated with weekly use controlling for covariates. Aim 3, hypothesis 2 examined the relation between AOEs reported for the group context and weekly drinking. It was hypothesized that high arousal positive AOEs for the drinking with friends context, but not low arousal positive AOEs for the drinking with friends context, would be a significantly associated with weekly use controlling for covariates. Aim 3, hypothesis 3 examined the relation between AOEs reported for the solitary context and weekly drinking. It was hypothesized that low arousal positive AOEs for drinking alone, but not high arousal positive AOEs for drinking alone, would be a significantly associated with weekly use controlling for other covariates.

After completion of the three separate regression models by context, beta weights for high arousal positive and low arousal positive within each context were directly compared. A chi square difference test was used to compare the models with beta weights freely estimated and beta weights constrained to be equal. It was hypothesized that the chi square difference test would be significant for all three contexts. In other words, it was hypothesized that the beta weights for low arousal positive and high arousal positive AOEs would be significantly different from each other in each of the three contexts. In the unspecified and drinking with friends contexts, the beta for high arousal positive AOEs was expected to be larger than the beta for low arousal positive AOEs. In contrast, in the solitary context, the beta for low arousal positive AOEs was expected to be larger than the beta for high arousal positive AOEs.

Hypothesis 4 was tested by entering all 4 context-specific AOE subscales (high arousal positive for group and solitary; low arousal positive for group and solitary) into one simultaneous entry regression model. Covariates included gender, age, and race. Hypothesis 4 was that only high arousal positive AOEs for group and low arousal positive AOEs for solitary would emerge as significantly associated with weekly drinking, above and beyond the other context-specific AOE subscales and covariates.

Aim 4: Context Effects on the Association between AOEs and SR

The effect of context on the relation between AOEs and SR was explored using 4 separate multiple regression models in SPSS. We initially examined a broad range of potential covariates that have previously demonstrated associations with the SR outcomes of interest: TLFB weekly drinking, family history of alcohol problems, physical context, vividness of imagined context for AOEs, gender composition of the group (for the group drinking context), group size (for the group drinking context), participant gender, age, and race. Variables in the models that were significantly associated with SR were included in the final models.

A priori power analyses for these models were conducted using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). A previous study examined correspondence between unspecified context AEAS and SEAS subscales (Morean et al., 2013). The correlation between high arousal positive SR and high arousal positive AOEs was approximately .45. The correlation between low arousal positive SR and low arousal positive AOEs was approximately .51. These correlations were squared and used in power calculations to determine the required sample size for each of the models at a .05 alpha level and .80 power. For analyses of low arousal positive effects, required sample size was 49. For analyses of high arousal positive effects, the required sample size was 64. The present study was approximately adequately powered for Aim 4 analyses as total N = 122 (n=63 in solitary context, n=59 in group context).

The first two regression models tested hypothesis 1. Hypothesis 1 was comprised of two separate regression analyses examining relations between low arousal positive AOEs for the unspecified and drinking alone contexts and low arousal positive SR. It was hypothesized that low arousal positive AOEs for drinking alone would be significantly related to low arousal positive SR captured in the solitary drinking context, and while low arousal positive AOEs for the unspecified context would also be significantly related to low arousal positive SR controlling for covariates, the magnitude of this relation would be much smaller (see Figure 1).

The second set of two regression models tested hypothesis 2. These regression models examined the association between high arousal positive AOEs in the unspecified and drinking with friends contexts with high arousal positive SR captured in the group drinking context. Hypothesis 2 was that high arousal positive AOEs for drinking with friends would be significantly associated with high arousal positive SR captured in the group drinking context, and high arousal positive AOEs for the unspecified context would also be significantly associated with high arousal positive SR, controlling for covariates (see Figure 2), but that the magnitude of the first relation would be slightly larger.

RESULTS

Preliminary Analyses

Analyses began with examination of the distributions of all variables for outliers and assumptions of normality. This examination revealed three extreme outliers on the total monthly drinks variable (268, 440, and 504 drinks in a month). These cases were three interquartile ranges from the nearest edge of the box in the boxplot and had standardized z-score values much greater than 3. Rather than exclude these cases from analyses, these three total monthly drinking values were winsorized. This process replaces outlier values with one higher than the highest valid value in the dataset.

Specifically, the highest valid value (not an outlier) on total monthly drinks was 184 drinks in one month, so the three outliers were given a value of 185. Then, all "total monthly drinks" values were divided by 4.286 to create the "weekly drinking" outcome variable of interest.

Four extreme outliers (3 standard deviations below the mean and three interquartile ranges from nearest edge of box in the boxplot) were identified for the high arousal positive subscale on the unspecified context AEAS measure. Three extreme outliers were also identified for the high arousal positive subscale on the "drinking with friends context" AEAS measure. However, on the AEAS measure, responses are constrained to a scale of 0-10. The outlier values were all on the low end of the scale (close to zero). These outlier responses were determined to be meaningful and possible responses on this subscale. Therefore, these values were included in analyses and were not winsorized. No other variables of interest had outliers.

Next, examination of assumptions of normality revealed that weekly drinking was positively skewed (skew = 2.304). This variable was log transformed for all subsequent analyses (skew = .069). Three variables were slightly negatively skewed: High arousal positive AOEs for unspecified context (skew = -.636), high arousal positive AOEs for drinking with friends (skew = -.620), and vividness ratings for the imagined drinking with friends context (skew = -.842). However, as these skew values were minimal, it was determined that no transformation was necessary for these variables. In regression models, all independent variables (when computed using a summary score approach) were mean centered for ease of interpretation.

Confirmatory Factor Analysis: AEAS

CFA for AEAS collapsed across drinking contexts.

Data from the 22-item AEAS collapsed across the "drinking alone" and "drinking with friends" contexts was subjected to a confirmatory factor analysis (CFA) to confirm the four factor structure of the measure. For each factor, the highest loading item (as demonstrated in the measurement development paper: Morean et al., 2012) defined the factor metric: the factor loading was set to 1.0. It was expected that the high arousal positive and low arousal positive factors would correlate, as would the high arousal negative and low arousal negative factors. When correlations among latent factors were freely estimated in the CFA, these were indeed the only two latent factors that were significantly correlated. Therefore, these latent factors were allowed to correlate in all subsequent CFA models collapsed across context groups. All other latent factors were not allowed to correlate. Robust maximum likelihood estimation was specified.

The goodness-of-fit indices for the CFA indicated fair model fit, χ^2 (207) = 706.394, SRMR = .089, RMSEA = .071, TLI = .893, CFI = .904. However, modification indices indicated that allowing three correlated errors would improve model fit: items 9 (fun) and 10 (lively) (M.I. = 41.381), items 12 (aggressive) and 6 (rude) (M.I. = 35.208), and items 3 (demanding) and 14 (anxious) (M.I. = 20.339). When these three pairs of correlated errors were included in the CFA, goodness-of-fit indices indicated a slight improvement in model fit, χ^2 (204) = 621.661, SRMR = 0.087, RMSEA = 0.065, TLI = 0.909, CFI = 0.920. No remaining modification indices for correlated errors were over 20, so model modification ceased. See Table 1 for the factor loadings for this final CFA for the AEAS collapsed across contexts.

CFA for AEAS drinking with friends context.

Data from the 22-item AEAS reported for the "drinking with friends" context was subjected to a confirmatory factor analysis (CFA) to confirm the four factor structure of the measure using the same approach specified above. It was hypothesized that the high arousal positive and low arousal positive factors would correlate, as would the high arousal negative and low arousal negative factors. However, when correlations among latent factors were freely estimated in the CFA, high arousal negative and high arousal positive also correlated significantly (r =.179, p =.004), as did low arousal negative and high arousal positive factors (r =.214, p =.001). Therefore, these latent factors were also allowed to correlate in all subsequent CFA and measurement invariance models for "drinking with friends." All other latent factors were not allowed to correlate.

The goodness-of-fit indices for this CFA indicated fair model fit, χ^2 (205) = 532.280, SRMR = .079, RMSEA = .082, TLI = .879, CFI = .893. However, modification indices indicated that allowing two correlated errors would improve model fit: items 9 (fun) and 10 (lively) (M.I. = 46.946) and items 12 (aggressive) and 6 (rude) (M.I. = 44.304). When both pairs of correlated errors were included in the CFA, goodness-of-fit indices indicated a slight improvement in model fit, χ^2 (203) = 463.589, SRMR = 0.075, RMSEA = 0.073, TLI = 0.903, CFI = 0.915. No remaining modification indices for correlated errors were over 20, so model modification ceased. See Table 2 for factor loadings for this final CFA for the AEAS for drinking with friends.

CFA for AEAS drinking alone context.

Data from the 22-item AEAS reported for the "drinking alone" context was subjected to a confirmatory factor analysis (CFA) to confirm the four factor structure of the measure. It was hypothesized that the high arousal positive and low arousal positive factors would correlate, as would the high arousal negative and low arousal negative factors. When correlations among latent factors were freely estimated in the CFA, these were indeed the only two latent factors that were significantly correlated. Therefore, these latent factors were allowed to correlate in all subsequent CFA and measurement invariance models for "drinking alone." All other latent factors were not allowed to correlate.

The goodness-of-fit indices for this CFA indicated fair model fit, χ^2 (207) = 506.462, SRMR = .090, RMSEA = .078, TLI = .884, CFI = .896. However, modification indices indicated that allowing correlated errors for items 9 (fun) and 10 (lively) would improve model fit (M.I. = 21.571). When this correlated error was included in the CFA, goodness-of-fit indices indicated a slight improvement in model fit, χ^2 (206) = 488.006, SRMR = 0.090, RMSEA = 0.076, TLI = 0.890, CFI = 0.902. No remaining modification indices for correlated errors were over 20, so model modification ceased. See Table 2 for factor loadings for this final CFA for the AEAS for drinking alone.

Measurement invariance of AEAS across drinking contexts.

Measurement invariance of the AEAS across the drinking with friends context and the drinking alone context was assessed using the CFA approach to measurement invariance. This approach involves evaluating configural, metric, and scalar invariance respectively. These types of invariance form a nested hierarchy, represented by increasing levels of cross-group equality constraints imposed on factor loading and item intercept parameters (Gregorich, 2006).

Each participant provided responses to the AEAS for both the drinking with friends context and the drinking alone context (i.e., within-subjects data for the two groups of interest for invariance). As such, a series of specialized syntax commands were specified within Mplus to account for the dependent sampling nature of the data. Within the “variable” section of the Mplus syntax, CLUSTER = ID was entered to indicate that the data were clustered by participant. Also, the analysis type was specified as complex to ensure the clustered nature of the data was taken into account when computing standard errors and tests of model fit.

Configural Model.

A two-group CFA model was specified in Mplus to fit the four-factor model to the AEAS for drinking with friends and the AEAS for drinking alone simultaneously. Maximum likelihood estimation with robust standard errors and chi-squares was used (ESTIMATOR = MLR in Mplus) as all observed dependent variables were continuous. The factor loadings of the four factor metrics (the items that had the highest loading for each factor) were set to 1.0. Factor means were set to zero. As noted above in the CFA models for the AEAS in each context separately, some latent factor correlations were allowed in one drinking context and not the other, and some differential correlated errors were allowed by drinking context (please see sections above). All remaining model parameters (e.g., factor loadings, intercepts, variances) were freely estimated. The configural model evidenced fair fit to the data, χ^2 (409) = 948.088, SRMR = .083, RMSEA = .074, TLI = .897, CFI = .909. All items significantly loaded onto their respective factors in the drinking with friends context and the drinking alone context. While there were significant correlations among latent factors, the magnitudes of these correlations were well below the established criteria for multicollinearity ($r < .80$, Meyers et al., 2006; $r < .90$, Tabachnick & Fidell, 2001). Adequate fit of the configural model indicates that when no equality constraints are in place, a similar global latent factor structure is shared across contexts.

Metric model.

Next, the factor loadings of identical items on the AEAS drinking with friends and the AEAS drinking alone were constrained to be equal. For example, the factor loadings of "talkative" in each drinking context were set to be equal. The latent factor means were set to zero. Based on the series of statistical cutoffs outlined by Chen (2007), the metric model did not evidence significant decrement in fit, χ^2 (427) = 984.054, SRMR = .085, RMSEA = .074, TLI = .898, CFI = .906, when compared to the configurally invariant model (ΔSRMR = .002, ΔRMSEA =.000, ΔCFI= -.003, ΔTLI= .001). Thus, the strength of the relationships of the latent factors to their specified items (e.g., factor loadings) was comparable across drinking contexts.

Scalar model.

Next, factor loadings and intercepts of identical items on the AEAS drinking with friends and AEAS drinking alone were constrained to be equal. Based on the series of statistical cutoffs outlined by Chen (2007), the scalar model evidenced no significant decrement in model fit, χ^2 (445) = 1139.438, SRMR = .092, RMSEA = .081, TLI = .878, CFI = .882, when compared to the model testing metric invariance (ΔSRMR = .007, ΔRMSEA =.007, ΔCFI= -.024, ΔTLI= -.02). While there was a change in CFI ≥ -.010, this was not accompanied by a change in SRMR ≥ .010 or a change in RMSEA ≥ .015. Therefore, the item's origins (intercepts) were invariant across contexts. Please see Table

3 for a summary of tests of measurement invariance of the AEAS across drinking contexts.

Computation of AEAS factor scores.

As demonstrated in the CFA, the strength of the relations between individual items and the latent factors varies across items. In other words, the size of the factor loadings varies across items on a subscale, such that some items are more "important" than others. However, a summary scale approach to scoring (which computes subscale scores from raw item responses), gives all items on a factor an equal "weight" or importance. To better reflect differential relations between items and latent factors, factor scores derived from the CFA provide information about participant's position on each factor based on their responses to the items that comprise the subscale (Morean et al., 2012). Factor scores from the scalar invariant model derived within Mplus were saved and used as the independent variables in analyses examining relations with weekly drinking (Aim 3), in addition to using a summary scale approach. This allowed for comparison of the results of the two approaches.

Confirmatory Factor Analysis: SEAS

CFA for SEAS collapsed across drinking contexts (full sample).

Data from the 14-item SEAS collapsed across the "solitary" and "group" drinking contexts was subjected to a confirmatory factor analysis (CFA) to confirm the four factor structure of the measure in the full sample (N = 122) using the same procedures used for the AEAS, described above. It was expected that the high arousal positive and low arousal positive factors would significantly correlate, as would the high arousal negative and low arousal negative factors. However, when correlations among latent factors were freely estimated in the CFA, the high arousal positive and low arousal negative subscales were also significantly correlated (*r* = .192, *p* = .039). Therefore, these latent factors were also allowed to correlate in all subsequent CFA and measurement invariance models for the SEAS. All other latent factors were not allowed to correlate. The goodness-of-fit indices for this CFA indicated good model fit, χ^2 (74) = 116.114, SRMR = .074, RMSEA = .068, TLI = .926, CFI = .940. No problems were indicated in the modification indices. See Table 4 for factor loadings for this final CFA for the SEAS collapsed across drinking contexts.

Measurement invariance of SEAS across drinking contexts.

Measurement invariance of the SEAS across the group context and the solitary context was assessed using the CFA approach to measurement invariance, evaluating configural, metric, and scalar invariance respectively.

Configural Model.

A two-group CFA model was specified in Mplus to fit the four-factor model to data from the SEAS in the group context and the SEAS in the solitary context simultaneously. Maximum likelihood estimation with robust standard errors and chi-squares was used (ESTIMATOR = MLR in Mplus) as all observed dependent variables were continuous. The factor loadings of the four factor metrics (the items that had the highest loading for each factor) were set to 1.0. Factor means were set to zero. As noted above in the CFA model for the SEAS, the following latent factors were allowed to correlate: high arousal positive and low arousal positive, high arousal negative and low arousal negative, high arousal positive and low arousal negative. All other latent factors were not allowed to correlate. All remaining model parameters (e.g., factor loadings, intercepts, variances) were freely estimated. The configural model evidenced relatively poor fit, χ^2 (148) = 242.011, SRMR = .095, RMSEA = .102, TLI = .857, CFI = .884. Given the relatively poor fit of this configural model, modification indices were examined, and indicated that allowing correlated errors between items 3 (secure) and 1 (demanding) in the solitary context only would improve the model fit (M.I. = 16.775). This modified configural model evidenced somewhat better fit, χ^2 (147) = 218.836, SRMR = .097, RMSEA = .090, TLI = .890, CFI = .911. No other problems of any substantial magnitude were identified by the modification indices. Further, all items significantly loaded onto their respective factors in the group context and the solitary context. While there were some significant correlations among latent factors, the magnitudes of these correlations were well below the established criteria for multicollinearity ($r < .80$, Meyers et al., 2006; $r < .90$, Tabachnick & Fidell, 2001). Therefore, while the configural model did not fit as well as would be desired, there was no indication of a different global latent factor structure across contexts. As such, increasingly restrictive tests of measurement invariance were conducted.

Metric Model.

Next, the factor loadings of identical items on the SEAS in the group context and the SEAS in the solitary context were constrained to be equal. For example, the factor loadings of "talkative" in each drinking context were set to be equal. The latent factor means were set to zero. Based on the series of statistical cutoffs outlined by Chen (2007), the metric model did not evidence significant decrement in fit, χ^2 (157) = 221.384, SRMR = .099, RMSEA = .082, TLI = .908, CFI = .921, when compared to the configurally invariant model (ΔSRMR = .002, ΔRMSEA = -.008, ΔCFI= .010, ΔTLI= .018). In fact, the model fit actually *improved* when factor loadings were constrained to equality across contexts. Thus, metric invariance was supported: the strength of the relationships of the latent factors to their specified items (e.g., factor loadings) was comparable across drinking contexts.

Scalar Model.

Finally, factor loadings and intercepts of identical items on the SEAS in the group context and SEAS in the solitary context were constrained to be equal. Latent factor means were allowed to be freely estimated. Based on the criteria outlined by Chen (2007), the scalar model evidenced no significant decrement in model fit, χ^2 (167) = 234.191, SRMR = .100, RMSEA = .081, TLI = .910, CFI = .917, when compared to the model testing metric invariance (ΔSRMR = .001, ΔRMSEA = -.001, ΔCFI= -.004, ΔTLI= .002). Therefore, the item's origins (intercepts) were invariant across contexts. Please see Table 5 for a summary of tests of measurement invariance of the SEAS across drinking contexts.

Study 1

Aim 1: Retrospective Imagined Context Frequency for Unspecified AEAS

Aim 1 explored the nature of imagined drinking contexts when participants completed expectancies for an unspecified context. First, participants retrospectively endorsed as many contexts as applied from a list. The most commonly endorsed contexts included: 82.6% with friends, 65.2% small house party, 50.7% while playing a drinking game, and 49.3% large house party. Only 2.9% endorsed drinking alone as an imagined context, and 0% of participants reported that they did not imagine any context. See Figure 3 for a frequency table that provides the full information about the contexts imagined by participants. Next, participants endorsed which was the "most representative imagined context" (forced single choice). See Figure 4 for a frequency table that provides the full information about the most representative contexts. These responses were then dichotomized into "solitary" or "group" drinking contexts. Aim 1 hypothesis 1 (for both study 1 and study 2) was that the majority (>50%) of participants would report imagining a group context rather than a solitary context when reporting AOEs for an unspecified social context. This hypothesis was supported, with 97.1% reporting they imagined a group context, as compared to 2.9% who reported they imagined a solitary context.

Study 2

Aim 1: Retrospective Imagined Context Frequency for Unspecified AEAS

The nature of imagined drinking contexts when participants completed an unspecified context measure of expectancies (Aim 1) was also examined in Study 2. When participants first retrospectively endorsed as many contexts as applied from a list, the most commonly endorsed contexts included: 81.6% with friends, 72.5% at a bar, 69.3% small house party, and 44.3% at home. Drinking alone was endorsed as an imagined drinking context by 7.8% of participants. Only 1.6% reported that they did not imagine any context. See Figure 5 for a frequency table that provides the full information about the contexts imagined by participants. Next, participants endorsed which was the "most representative imagined context" (forced single choice). See Figure 6 for a frequency table that provides full information about the most representative contexts. These responses were then dichotomized into "solitary" or "group" drinking contexts. Consistent with study hypotheses, 93.7% reporting they imagined a group context, as compared to 6.3% who imagined a solitary context.

Aim 2: Differences in AOE Means by Context

Hypothesis 1 was that low arousal positive AOEs reported for the solitary context would differ significantly from low arousal positive AOEs reported for the group and unspecified contexts (which would not differ from one another), with higher mean levels of low arousal positive AOEs for the solitary context. This hypothesis was partially supported: as hypothesized, low arousal positive AOEs for solitary ($\bar{x}$= 6.19, SD = 2.03) were significantly higher than low arousal positive AOEs for group ($\bar{x}$=5.65, SD = 2.17), t(237) 4.075= , p <.001 , Hedges' g = .2574, and low arousal positive AOEs for solitary ($\bar{x}$= 6.19, SD = 2.03) were significantly higher than low arousal positive AOEs for unspecified ($\bar{x}$= 5.92, SD = 1.98), t(237) = 2.150 , p =.033 , Hedges' g = .1343. However, contrary to hypotheses, low arousal positive AOEs for unspecified ($\bar{x}$= 5.93, SD = 1.97) were significantly different from low arousal positive AOEs for group ($\bar{x}$=5.65, SD = 2.17), t(239) = 2.931, p = .004, Hedges' g = .129, with a significantly higher mean in the unspecified context.

Hypothesis 2 was that high arousal positive AOEs reported for the solitary context would significantly differ from high arousal positive AOEs reported for the group and unspecified contexts (which would not significantly differ from one another). Specifically, higher mean levels of high arousal positive AOEs were expected for the group and unspecified contexts than for the solitary context. This hypothesis was partially supported: as hypothesized, high arousal positive AOEs for group ($\bar{x}$= 7.24, SD = 1.72) were significantly higher than high arousal positive AOEs for solitary ($\bar{x}$=4.83, SD = 2.27), t(238) 16.95= , p <.001 , Hedges' g = 1.19, and high arousal positive AOEs for unspecified ($\bar{x}$= 6.83, SD = 1.62) were significantly higher than high arousal positive

AOEs for solitary ($\bar{x}$= 4.83, SD = 2.27), $t(238) = 13.31$, $p < .001$, Hedges' $g = 1.01$. However, contrary to the hypothesis, high arousal positive AOEs for group ($\bar{x}$= 7.25, SD = 1.72) were significantly different from high arousal positive AOEs for unspecified ($\bar{x}$=6.83, SD = 1.62), $t(239) = 5.65$, $p < .001$, Hedges' $g = .2515$, with a significantly higher mean in the group context.

Aim 3: Relations between Context Specific AOEs and Weekly Drinking

Before exploring Aim 3 hypotheses 1-4, correlations among variables of interest were examined (see Table 6). Aim 3 hypotheses were explored using regression analyses in Mplus with robust maximum likelihood estimation and with missing data handled by FIML estimation (Muthén & Muthén, 2010). No variables in the analyses exhibited problems with multicollinearity (tolerance values >.2 and VIF values < 4). Standardized betas are reported in the text, with unstandardized regression coefficients and standard errors in Tables 7-10. First, summary scale scores were used as independent variables in the analyses. Then, supplemental analyses were conducted in which factor scores derived from the scalar invariant model in Mplus were used as independent variables in the analyses.

The first model tested Aim 3 hypothesis 1, that high arousal positive AOEs for the unspecified context, but not low arousal positive AOEs for the unspecified context, would be significantly associated with weekly use, with age, race, and gender as covariates in the analysis. As hypothesized, low arousal positive AOEs for the unspecified context were not significantly associated with weekly drinking, $\beta = -.102$, $p = .147$. However, contrary to the hypothesis, high arousal positive AOEs for the unspecified context were also not associated with weekly drinking, $\beta = .000$, $p = .999$. See Table 7 for full regression model results.

The second model tested Aim 3, hypothesis 2 that high arousal positive AOEs for the drinking with friends context, but not low arousal positive AOEs for the drinking with friends context, would be significantly associated with weekly use controlling for age, gender, and race. As hypothesized, low arousal positive AOEs for the drinking with friends context were not significantly associated with weekly drinking, $\beta = .007$, $p = .921$. However, contrary to the hypothesis, high arousal positive AOEs for the drinking with friends context were also not associated with increased weekly drinking, $\beta = .007$, $p = .922$. See Table 8 for full regression model results.

The third model tested Aim 3, hypothesis 3 that low arousal positive AOEs for drinking alone, but not high arousal positive AOEs for drinking alone, would be a significantly associated with weekly use controlling for age, gender, and race. As hypothesized, high arousal positive AOEs for drinking alone were not significantly associated with weekly drinking, $\beta = -.078$, $p = .325$. However, contrary to the hypothesis, low arousal positive AOEs for drinking alone were also not associated with increased weekly drinking, $\beta = .017$, $p = .797$. See Table 9 for full regression model results.

It was proposed that a chi-square difference test would be used to compare the above models with beta weights freely estimated for high arousal positive and low arousal positive within each context, and beta weights constrained to be equal for high arousal positive and low arousal positive within each context. This analysis was proposed as a test to ensure that differences in subscale statistical significance within each model (i.e., *p* values) were capturing a meaningful, substantive difference rather than a statistical artifact. However, the three separate regression models by context (hypotheses 1-3) indicated essentially no relation between either of the AOE subscales and weekly drinking, across the three contexts. As such, these model comparisons were not conducted.

The final model tested Aim 3 hypothesis 4, that only high arousal positive AOEs for group and low arousal positive AOEs for solitary would emerge as significant correlates of weekly drinking, above and beyond the other context specific AOE subscales and covariates. Contrary to hypothesis, neither high arousal positive AOEs for group (β = .042, p = .617) nor low arousal positive AOEs for solitary (β = -.012, p = .871) were significantly associated with weekly drinking in the model. See Table 10 for full model results.

As mentioned previously, use of factor scores from the AEAS scalar invariant model would better reflect the differential relations between items and their latent factors. This approach is superior to the summary scale approach, which gives all items on a factor an equal "weight" or importance. Thus, Aim 3 hypotheses 2 and 3 were replicated in Mplus using factor scores as the independent variables. Aim 3 hypothesis 1 (relations of AOE subscales from the unspecified context with weekly drinking) could not be tested using this approach, as the unspecified context AEAS was not involved in CFA tests of measurement invariance, and therefore no factor scores were available for this measure. The results of the supplemental analyses for Aim 3, hypotheses 2 and 3 were equivalent to the results obtained using summary scores. See Tables 11 and 12 for results of regression models using factor scores.

Aim 4: Context Effects on the Association between AOEs and SR

Before exploring Aim 4 hypotheses 1-2, correlations among variables of interest were examined separately by alcohol administration context (as this is how hypotheses were tested) (see Tables 13 and 14). Next, the effect of context on the relation between AOEs and SR was explored using 4 separate multiple regression models in SPSS. Initially, a broad range of potential covariates that have previously demonstrated associations with the SR outcomes of interest were examined: TLFB weekly drinking, family history of alcohol problems, physical context, vividness of imagined context for AOEs, gender composition of the group (for the group drinking context), group size (for the group drinking context), participant gender, age, and race. Only variables in the models that were significantly associated with SR were included in the final models and are reported here. No variables in the analyses exhibited problems with multicollinearity (tolerance values $>.2$ and VIF values < 4). Standardized betas are reported in the text, with unstandardized regression coefficients and standard errors in Tables 15-18.

The first two regression models tested Aim 4 hypothesis 1. It was hypothesized that low arousal positive AOEs for drinking alone would be significantly related to low arousal positive SR captured in the solitary drinking context, and while low arousal positive AOEs for the unspecified context would also be significantly related to low arousal positive SR captured in the solitary drinking context controlling for covariates, the magnitude of this relation would be much smaller. This hypothesis was partially supported. Low arousal positive AOEs for drinking alone were significantly related to low arousal positive SR ($\beta = .197$, $p = .033$), and low arousal positive AOEs for the unspecified context were also significantly related to low arousal positive SR ($\beta = .246$, p

= .008). However, contrary to hypotheses, the magnitude of the relation was larger for low arousal positive AOEs in the unspecified context. See Tables 15 and 16 for the full results of the regression models.

The second set of two regression models tested Aim 4 hypothesis 2. It was hypothesized that high arousal positive AOEs for drinking with friends would be significantly associated with high arousal positive SR captured in the group drinking context, and high arousal positive AOEs for the unspecified context would also be significantly associated with high arousal positive SR captured in the group drinking context (controlling for covariates), but that the magnitude of the first relation would be slightly larger. Contrary to the hypothesis, neither high arousal positive AOEs for drinking with friends ($\beta = .034$, $p = .780$) nor high arousal positive AOEs for the unspecified context ($\beta = -.005$, $p = .965$) were significantly related to high arousal positive SR in their respective models (controlling for baseline high arousal positive SR and gender composition, the only significant covariates). See Tables 17 and 18 for full results of the regression models.

DISCUSSION

Previous literature demonstrates that positive AOEs are consistent longitudinal predictors of later alcohol use (Jones et al., 2001); however, exclusion of solitary drinking contexts in the measurement of AOEs may have resulted in an underestimation of the importance of low arousal positive effects (e.g. calm, mellow). The current study aimed to clarify the literature on the association between AOEs and drinking outcomes by examining the role of drinking context in expectancy measurement, with a particular focus on whether low arousal positive AOEs would emerge as significantly associated with alcohol use when reported for certain drinking contexts (e.g., solitary). This would represent an important extension of the expectancy literature. The failure to account for potential contextual influences has also limited our ability to understand the unique effects of expectancies relative to subjective responses to alcohol consumption. It is possible that relations between AOEs and drinking behavior simply reflect individual differences in subjective responses to alcohol, such that expectancies accurately reflect one's actual experience when drinking. Unfortunately, it has been difficult in previous studies to accurately examine the degree of correspondence between AOEs and SR (for both high arousal positive and low arousal positive effects) due to a lack of corresponding measures and inconsistency in the drinking context for which effects are measured. While this issue is particularly relevant for low arousal positive effects, it extends to high arousal positive effects as well. The present study addressed this important question by exploring relations between AOEs and SR when drinking context was held constant across parallel measures of these constructs. Understanding which of these factors drives relations between alcohol effects and drinking behavior has important implications for intervention, as there are well established prevention/treatment approaches that address both AOEs and SR to alcohol.

To address the questions outlined above, the current study included 4 aims. Collectively these aims examined the role of context in reporting of AOEs (Aims 1 and 2), the extent to which context specific AOEs uniquely relate to drinking outcomes (Aim 3), and the importance of context effects on correspondence between AOEs and SR (Aim 4). Before exploring these aims and associated hypotheses, the present study took several approaches to psychometric evaluation of the Anticipated Effects of Alcohol Scale

(AEAS) and the Subjective Effects of Alcohol Scale (SEAS). This included confirmatory factor analysis (CFA) to confirm the four factor structure of each measure, and tests of measurement invariance of each measure across the two drinking contexts of interest (drinking alone and drinking with friends).

After psychometric evaluation of the AEAS and the SEAS, four primary aims were addressed. The first aim examined the role of social context in reporting of AOEs. While the most typical drinking context for emerging adults is stimulating group contexts, whether participants are imagining this, or any context at all, when reporting on expectancies was a novel research question. It was hypothesized that the majority of participants in both study 1 and study 2 would retrospectively report that they imagined a social, as opposed to a solitary, drinking context when reporting on AOEs. Results in both studies supported this hypothesis. These findings are important for several reasons. First, that participants are imagining any context when reporting on unspecified AOE measures has not been demonstrated in the literature to date. Second, this is an important clarification of the previous expectancy literature which has employed AOE measures that do not specify the context: most emerging adults were presumably reporting AOEs for social drinking contexts in these studies. This suggests that there is very little existing literature on expectancies for other drinking contexts. These findings highlight a significant gap in the literature and an important area for future study.

Further, the emphasis in previous literature on high arousal positive AOEs as having higher mean levels than other types of expectancy effects, and as being more consistent predictors of later drinking behavior, may be attributable to participants having imagined a social context when reporting on AOEs. If AOEs were measured for a wider variety of drinking contexts, other types of AOEs might emerge as having higher means (as well as significant relations with drinking behavior).

Aim 2 pursued this idea by testing mean differences in AOEs reported for a solitary, social, and unspecified context. Aim 2 tested two hypotheses. Hypothesis 1 was that low arousal positive AOEs reported for the solitary context would differ significantly from low arousal positive AOEs reported for the group and unspecified contexts (which would not differ from one another), with higher mean levels of low arousal positive AOEs for the solitary context. Hypothesis 2 was that high arousal positive AOEs reported for the solitary context would significantly differ from high arousal positive AOEs reported for the group and unspecified contexts (which would not significantly differ from one another), with higher mean levels of high arousal positive AOEs for the group and unspecified contexts than for the solitary context.

Findings were partially consistent with hypotheses in that low arousal positive AOEs were highest for the solitary context, and high arousal positive AOEs were highest for the social context. Contrary to hypotheses, the unspecified context and the "drinking with friends" social context significantly differed from one another on both low arousal positive and high arousal positive AOE outcomes. Specifically, for high arousal positive effects, the social context had a significantly higher mean than the unspecified context. Conversely, for low arousal positive effects, the unspecified context had a significantly higher mean than the social context.

Although these mean differences were not hypothesized, the findings fit well with the proposed direction of effects. The unspecified context represents a wide variety of imagined contexts, though the majority represents some version of a "social" setting. This resulted in mean expectancy levels that fell somewhere between the mean levels of the social and solitary contexts. The significant mean differences between the unspecified and social contexts likely reflect the fact that much greater variability exists in the "unspecified" imagined context. As demonstrated in Aim 1, some participants imagined something vastly different than a "drinking with friends/social" context when reporting on the unspecified measure (e.g., drinking alone, drinking with a meal). Furthermore, even for participants whose "unspecified" imagined context approximated the "drinking with friends" social context, variability on a large number of other factors was likely present in the unspecified context. For example, greater variability may exist in the composition of individuals in the imagined group context (e.g., a combination of family, significant other, co-workers, close friends, friends of friends), physical contexts may be more variable when no specific prompt is given, and the number of people present in the imagined context may be more variable. It was beyond the scope of this study to measure and attempt to account for this level of variability. However, the extent of variability in "unspecified" imagined contexts and the ways that these variables might impact mean levels of AOEs are important considerations for future research.

Despite the small departure from hypothesized effects, the observed mean differences in high arousal positive and low arousal positive AOEs across the three contexts highlights the importance of specifying context when measuring expectancies. The use of AOE measures that do not specify context has limited previous studies in capturing a wider range of AOEs (low arousal positive, high arousal negative, low arousal negative) that emerge for contexts that are not highly stimulating or social in nature. Such drinking contexts may be less frequent for emerging adults, and therefore less salient when reporting on an unspecified expectancy measure. Nonetheless, understanding the AOEs that emerge for these less frequent drinking contexts may still be quite important. First, certain AOEs may have stronger relations with drinking outcomes when reported for a particular drinking context. For instance, the present study sought a more thorough understanding of which contexts evoke low arousal positive AOEs, and whether these context-specific AOEs are associated with later drinking behavior. If so, this would be consistent with prominent models of risk for alcohol problems that emphasize the shift from positive to negative reinforcement of alcohol use (Robinson & Berridge, 1993; Koob, 2006), and would augment these models by demonstrating that a shift towards negatively reinforcing effects may be associated with changes in drinking contexts.

Second, beyond associations with drinking outcomes, there are other scenarios in which measuring context specific AOEs may have important implications. For example, previous literature has demonstrated increased low arousal negative AOEs later in drinking episodes (descending limb of the blood alcohol curve), as well as for higher doses of alcohol (Dunn & Earleywine, 2001; Earleywine & Martin, 1993; George & Dermen, 1988). Stronger endorsement of these expectancies may serve as a protective factor against driving while intoxicated, as the individual attributes the experience of these effects to alcohol consumption. Conversely, someone who does not expect low arousal negative effects for higher doses of alcohol or on the descending limb may instead attribute the experience of these effects to “being tired” or “not feeling well” and may be more likely to drive while intoxicated. Thus, examination of mean levels of AOEs for many different contexts, including (but not limited to) social contexts, physical contexts, interpersonal contexts, mood states, and dose and duration of the drinking episode may have important personal, as well as public health, implications.

When examined together, the results of Aim 1 (from both study 1 and study 2) and Aim 2 raise interesting issues regarding the role of age in context specific expectancies. In Aim 1, the older participants of study 2 (mean age = 22.54) more frequently endorsed having imagined a solitary context on the unspecified measure (6.3%). In comparison, among the younger study 1 participants (mean age = 19.37), only 2.9% imagined a solitary context. Further, Aim 2 results demonstrated significantly higher means levels of low arousal positive AOEs than high arousal positive AOEs for these solitary contexts. Taken together, the salience of solitary drinking settings that are associated with increased low arousal positive expectancies may increase as participants get older and have a longer, heavier drinking history.

There may be several mechanisms driving these findings. Increased age may simply be a proxy for length of drinking history, and increased endorsement of solitary contexts (and associated low arousal positive AOEs) may reflect an increase in risk via a shift from drinking for positive reinforcement to drinking for negative reinforcement. Another possibility is that, rather than representing a risky shift, the association between endorsement of solitary contexts and age is less pathological and more closely related to aging (e.g., less likely to leave the home, more responsibility, less energy). Finally, increased drinking in solitary contexts that are associated with low arousal positive AOEs with increasing age/longer drinking history may represent an intersection of these two mechanisms. It may be that variables related to normative aging, as well as a risky shift towards drinking for negative reinforcement with increasing drinking history, are both at play.

Regardless of the underlying mechanisms, the observations related to age in Aim 1 and 2 are consistent with literature demonstrating that the types of expectancies endorsed, as well as the relative importance of positive versus negative expectancies, differ with age (Leigh & Stacey, 2004; Pabst, Baumeister, & Kraus, 2010; Satre & Knight, 2001). For instance, social learning theory predicts increased negative expectancies with increasing age because a longer drinking history makes the experience of negative outcomes more likely (Leigh & Stacy, 2004). Indeed, expectancies related to impairment are associated with drinking outcomes but only in participants aged 30 or older, such that increased negative expectancies act as a protective factor in older populations (Pabst et al., 2010). With regard to low arousal positive effects, one study demonstrated that AOEs related to tension reduction were associated with alcohol outcomes, but only in participants over 30 (Nicolaia, Moshagenb, & Demmelc, 2012). The findings of aims 1 and 2 of the present study, as well as previous literature, suggest that, when exploring hypotheses related to low arousal positive effects, drinking context, and relations with drinking outcomes, careful attention to factors such as age and length of drinking history is warranted.

After exploring mean differences in AOEs by context, association between high arousal positive and low arousal positive AOEs for each of the three contexts (unspecified, drinking alone, and drinking with friends) and weekly drinking were examined. Including context when measuring both types of AOEs is important, but it was hypothesized that use of the "drinking alone" solitary context would reveal particularly important findings regarding low arousal positive AOEs. Hypothesis 1 stated that, for an unspecified context, high arousal positive AOEs would be significantly associated with weekly drinking, whereas low arousal positive effects would not. Hypothesis 2 stated that, for drinking with friends, high arousal positive AOEs would be significantly associated with weekly drinking, whereas low arousal positive effects would not. In contrast, hypothesis 3 stated that for drinking alone, low arousal positive AOEs would be significantly associated with weekly drinking, whereas high arousal positive AOEs would not. Finally, it was hypothesized that only low arousal positive AOEs for drinking alone and high arousal positive AOEs for drinking with friends would emerge as significantly associated with weekly drinking (hypothesis 4) when the 4 context-specific AOE subscales were entered simultaneously in a regression model.

None of the Aim 3 hypotheses were supported. There was no relation between high arousal positive AOEs or low arousal positive AOEs and drinking behavior for any of the three contexts. One explanation for these very surprising findings is the relatively restricted range of drinking behavior in this study. In order to participate in the study, participants had to be heavy enough drinkers to qualify for an alcohol challenge (report consuming 4 drinks for women, 5 drinks for men on at least one occasion in a typical month), but could not drink so heavily that they had any significant problems (e.g., DSM-V criteria for alcohol dependence, previous participation in abstinence-oriented alcohol treatment). As a result, the variability in drinking behavior was relatively restricted in this study, particularly as compared to previous studies of relations between AEAS subscales and drinking behavior (Morean et al., 2012). Furthermore, the current sample reported very strong positive expectancies, particularly for the high arousal positive subscale.

Most mean scores for both high arousal positive and low arousal positive AOEs were well above 5 on the 0-10 scale. Notably, means were high even when expectancy subscales were reported for contexts that were incongruent (e.g., high arousal positive AOEs reported for drinking alone context: mean = 4.83 (2.27)). As can be seen in the scatterplots displayed in Figures 7-12, a linear relation between AOE subscales in each context and weekly drinking was not evident. The lack of linear relation between AOEs and drinking behavior may be attributable to the restricted range of both the weekly drinking variable as well as the AOE variables in the current sample. Nonetheless, the current findings are inconsistent with an extensive and robust literature supporting positive AOEs as one of the most consistent correlates and longitudinal predictors of drinking behavior (Brown, Christiansen & Goldman, 1987; Christiansen & Goldman, 1983; Fromme, Stroot & Kaplan, 1993; Fromme & D'Amico, 2000; Goldman, 1999; Jones et al., 2001). This is particularly true when studied in samples endorsing a range of drinking behavior, from non-drinkers to problem drinkers. Given this, it is quite possible that, in samples with a wider range of drinking behavior, the mean differences in AOEs across contexts that were observed in this study will translate into unique relations between context-specific AOEs and drinking outcomes.

However, it is also possible that the strength of relations between expectancies and drinking behavior may not vary by context even in samples with greater heterogeneity in expectancies and drinking behavior. Consistent relations between cognitive variables and substance use behaviors have been demonstrated across contexts in other literatures. Specifically, in the smoking cessation literature on situational self-efficacy, studies show that a measure of general self-efficacy predicts smoking cessation outcomes just as well as (or better than) a situation-specific measure of self-efficacy (Gwaltney, et al., 2001). It is possible that a higher order factor, such as self-control, drives the consistent relation between these variables across contexts. Specifically, self-control may act as a confounding variable that does not differ by context and that drives self-efficacy as well as smoking behavior. Those higher in self-control may endorse a higher level of self-efficacy uniformly across situations, and those higher in self-control may be less likely to relapse to smoking regardless of situation.

A similar type of underlying, "third variable" might lead to a consistent degree of relation between AOEs and drinking behaviors across contexts. One possible factor is the behavioral activation system (BAS), a biologically-based temperament system oriented to reinforcement, reward sensitivity, and approach behavior (Gray 1975, 1987). Increased BAS activity is associated with sensitivity to reinforcement, and therefore may play a critical role in expectancy learning (Wardell, Read, Colder, & Merrill, 2012). BAS sensitivity may be associated with both high arousal and low arousal positive expectancies, as both are types of reinforcement learning. However, the BAS may be most sensitive to learning about positive reinforcement (high arousal positive AOEs), as the BAS is believed to underlie reward sensitivity and approach behavior. Additionally, the BAS is associated with drinking behavior (Hundt, Kimbrel, Mitchell, & Nelson-Gray, 2008). Thus, the BAS may drive consistent relations between AOEs and drinking behavior across contexts. For example, those higher in BAS activity may both endorse positive AOEs and drink more heavily regardless of context.

Another possible underlying factor that might drive consistent relations between AOEs and drinking behavior across contexts is sensation seeking. Sensation seeking is the preference for physiologically arousing and novel experiences and the willingness to take social, physical, and financial risks to obtain this arousal (Bardo et al., 2007; Borsari, Murphy, & Barnett, 2007). Sensation seeking might drive relations specifically for high arousal positive effects, as a preference for arousal and novelty would likely influence learning regarding the introduction of a positive reward, rather than learning regarding a negative reinforcement mechanism. Sensation seeking is significantly associated with drinking behavior as well (Borsari et al., 2007; Stacy et al., 1993). Thus, sensation seeking may drive a consistent relation between AOEs and drinking across contexts, as those higher in sensation-seeking may endorse increased high arousal positive AOEs and drink more, regardless of context.

The idea that personality traits may contribute to alcohol-related learning (e.g., AOEs) has received support in the literature. For example, the Acquired Preparedness Model (APM) postulates that the presence of certain traits predisposes individuals to differentially attend to outcomes of alcohol-related behavior, thus enabling differential learning about these outcomes. Consistent with the theory, studies of the APM have demonstrated differential learning of positive alcohol expectancies associated with certain personality traits, including sensation seeking and BAS activity (Scott & Corbin, 2014; Wardell et al., 2012). Further, it is possible that personality characteristics moderate the relation between AOEs and drinking behavior and the extent to which they differ across contexts. For example, a three way interaction between BAS, positive AOEs, and drinking context seems plausible. For individuals high in BAS activity, the relation between positive AOEs and drinking behavior may be consistent across contexts, whereas for individuals low in BAS activity, the relation between positive AOEs and drinking behavior may vary depending on context. If future studies of the relation between AOEs and drinking behavior fail to find differences in these relations across contexts, exploration of trait-like third variables that may drive consistency of these relations across context, or that may moderate these relations, will be important to consider and explore.

Beyond trait characteristics, other factors might drive a consistent relation between AOEs and drinking behavior across contexts. For example, individuals with depression and/or anxiety may expect increased low arousal positive effects (negative reinforcement) regardless of context. Further, individuals with an Alcohol Use Disorder may expect high levels of reinforcement (both negative and positive) in all contexts. Models of habit formation support this idea, postulating that behavior transitions from specific to automatic over time. Habits can be defined as behavioral tendencies to repeat well practiced actions given recurring circumstances. In other words, the habitual-system drives the selection of behavior based on stimulus-response associations (Wood, Tam, & Witt, 2005). Beliefs about outcomes of alcohol use may begin as differentiated across context, and engagement in drinking behavior may vary across contexts as well. However, according to models of habit formation, the relation between AOEs and drinking behavior may become less specific and more automatic/generalized across settings as alcohol problems develop. In the end, problem drinkers may expect reinforcement all the time in all situations, and drink frequently across a range of situations, reflecting an automatic and overlearned stimulus-response association. These mechanisms were unlikely to be the cause of consistent relations between expectancies and drinking behavior in the current study given the relatively modest levels of typical alcohol consumption. Nevertheless, an understanding of whether depression, anxiety, and/or alcohol use disorder may act as factors that drive consistent relations between AOEs and drinking behavior across contexts will be an important question should future studies fail to find contextual influences.

The likelihood of finding context specific effects might also differ for high arousal positive or low arousal positive AOEs across earlier stages of alcohol involvement. There is evidence in the literature that AOEs are relatively unidimensional in very early adolescence (before the initiation of drinking behavior or coinciding with it) (Dunn and Goldman, 1998; Miller et al., 1990). We would not expect differences by context at this stage of alcohol involvement. Following early drinking experiences, we might expect to see context effects emerge for the relation between high arousal positive AOEs and drinking behavior. Lighter drinkers are likely drinking in contexts more conducive to positive reinforcement from alcohol (social drinking contexts), and therefore may have a stronger association between high arousal positive AOEs and drinking behavior for these contexts than for others. Among individuals with longer drinking histories, such as the ones in the present study, relations between high arousal positive AOEs and drinking behavior may become undifferentiated across contexts. Individuals at this stage may have increased the strength of the relation between positively reinforcing expectancies and drinking behavior via experience with alcohol, and may expect these effects across all contexts. In support of this idea, participants in the current study endorsed high mean levels of high arousal positive AOEs, even for contexts that appeared to be incongruent with these effects (e.g., drinking alone context: mean = 4.83 (2.27)). However, individuals at this level of involvement may not be heavy enough drinkers to have begun drinking for negative reinforcement, and as such, we may not see a strong relation between low arousal positive AOEs and drinking behavior, regardless of context. However, as individuals move to increasingly higher levels of alcohol involvement, we might expect relations between low arousal positive AOEs and drinking behavior to emerge for heavy (but not dependent) samples, reflecting a shift to negative reinforcement. Those with a heavier and longer drinking history have consumed alcohol in more diverse contexts, and if they are beginning to drink for negative reinforcement, may have developed AOEs regarding which contexts are likely to elicit these effects. Finally, at the stage of alcohol dependence, individuals would likely have strong relations between both positive and negative reinforcement and drinking behavior across all contexts, as described above. The present study may have been unable to detect context effects on one or both AOE subscales even if the AOE and drinking relation had emerged, because the study excluded light drinkers as well as heavy drinkers, eliminating the groups in which context effects might be the most prominent (see Table 19). This is another strong argument for inclusion of a wide range of drinking behavior in future studies of context effects on relations between AOEs and drinking behavior.

Even if context specific relations between positive AOEs and drinking outcomes were identified in the analyses related to Aim 3, we would not know if these relations were driven by expectancies or individual differences in subjective response to alcohol's pharmacological effects. To address this question, Aim 4 examined context effects on the correspondence between low arousal positive AOEs and low arousal positive SR, as well as correspondence between high arousal positive AOEs and high arousal positive SR. Aim 4 hypothesis 1 examined low arousal positive SR captured in the solitary drinking context as the outcome. It was hypothesized that, in separate models, low arousal positive AOEs for drinking alone would be significantly associated with low arousal positive SR, and while low arousal positive AOEs for drinking in an unspecified context would also be significantly associated with low arousal positive SR, the magnitude of this relation would be much smaller. Aim 4 hypothesis 2 examined high arousal positive SR captured in the group drinking context as the outcome. It was hypothesized that, in separate models, high arousal positive AOEs reported for both the unspecified context and drinking with friends would be significantly associated with high arousal positive SR in the group context. However, it was anticipated that the magnitude of the association for high arousal positive AOEs would be slightly larger in the "drinking with friends" context.

Aim 4 Hypothesis 1 was partially supported. Low arousal positive AOEs for both drinking alone and the unspecified context were significantly related to low arousal positive SR. This finding is consistent with previous literature demonstrating that the low arousal positive quadrant has the highest degree of correspondence between SR and AOEs: expected low arousal positive effects are actually underestimated compared to true low arousal positive SR on the ascending limb, and expected and experienced low arousal positive effects on the descending limb are generally accurate (Morean, Corbin, & Treat, In press). In other words, for low arousal positive effects, participant's expectancies appear to be relatively accurate reflections of actual SR.

Contrary to study hypotheses, the magnitude of the relation between low arousal positive SR and low arousal positive AOEs in the unspecified context was actually larger than the magnitude of the relation between low arousal positive SR and low arousal positive AOEs in the drinking alone context. This finding was quite surprising given the mismatch in contexts. One possible explanation is that subjective response to alcohol will more closely align with expectations based on drinking contexts in which participants have significant experience. The majority of the sample did not report drinking in solitary settings with regularity. In fact, most did not report drinking at all in solitary contexts. Therefore, reports of low arousal positive AOEs for solitary settings may be based on generic, stereotyped, or contrived ideas regarding what experiences one might have, or thinks one "should" have, in this setting. In contrast, reports of low arousal positive AOEs for an unspecified setting were likely based on the actual experience of these effects in a context brought to mind by the participant. Similarly, reports of low arousal positive SR for the solitary alcohol administration setting, as unfamiliar as it may have been, were also reports of the participant's actual, current experience. As a result, the stronger association may be attributable to a higher degree of similarity between actual experiences (despite some key differences in the experiences), versus "guesses" about what an experience would be like. This also suggests that, for those who do drink more frequently in solitary contexts, a higher correlation between low arousal positive AOEs and SR for solitary contexts might emerge and may be stronger than low arousal positive AOEs for an unspecified context, as reports of AOEs for solitary contexts would be based on actual experience. Replication of this aim in samples with higher rates of solitary drinking, as well as in samples who have never consumed alcohol alone, would be an interesting test of this hypothesis. As these results were not hypothesized in the current study, this finding certainly warrants further investigation.

Aim 4 hypothesis 2 was not supported. Neither high arousal positive AOEs for drinking with friends nor high arousal positive AOEs for the unspecified context were significantly related to high arousal positive SR captured in the group drinking context. This failure to find linear relations is likely attributable to a restriction of range problem, as was observed for Aim 3. Specifically, the mean scores on each of the measures of interest were well over 5 (mean high arousal positive AOEs for drinking with friends = 7.81 (1.50), mean high arousal positive AOEs for unspecified =7.32 (1.58), mean high arousal positive SR for group = 6.55 (1.85)), see scatterplot Figures 13-14. If more variability was present on either or both of the measures, a linear relationship may have been more likely to emerge.

Of note, high arousal positive SR evidenced slightly more variability than high arousal positive AOEs for both contexts, as is evident upon examination of Figures 13-14. This suggests that, although the majority of the participants expected a great deal of high arousal positive effects, this was not an accurate reflection of the high arousal positive SR effects many participants actually received during the alcohol challenge. This observation is consistent with previous literature examining the degree of correspondence between high arousal positive expectancies and SR, which has identified overestimation of expectancies relative actual experiences of these effects (Morean, Corbin, & Treat, In press). A possible explanation for the observed difference between expectations and experiences of these effects is the degree of indirect learning that occurs for high arousal positive effects. At least in the United States, alcohol consumption is widely considered to result in a number of high arousal positive effects, including increased and more enjoyable social interaction, decreased inhibition, closer interpersonal relationships, and the experience of fun and reward. Alcohol-related media frequently showcases high arousal positive outcomes both in the movies and in advertisements for alcohol. These cultural norms and media portrayals may partially explain overestimation of high arousal positive effects. Importantly, overestimation of positive effects is associated with negative alcohol-related outcomes. For example, overestimation of high arousal positive effects evidences a trend level association with more frequent driving while intoxicated. It may be that the expectation of stronger high arousal positive effects partially masks experiences of alcohol-induced impairment, leading to faulty conclusions about driving ability (Morean et al., in press). Overestimation of high arousal positive expectancies has important implications for treatment efforts. Specifically, it provides support for context-specific expectancy challenges focused on high arousal positive effects, and/or suggests that cognitive therapy more generally is indicated and may be effective given the presence of distorted beliefs. However, this assertion would be even stronger if a relation between context-specific high arousal positive AOEs and drinking behavior had emerged.

Although the current study provides important information about context specific AOEs, there are a number of limitations that must be considered. To start, a restriction of range in several key variables (weekly drinking, AOEs, and SR - each to a lesser degree respectively) likely limited the ability to detect several of the hypothesized relations. The sample in the present study reported lower levels of drinking than some other alcohol challenge studies. The study design may have contributed to this. Participants were aware that they would complete interview and survey measures at session 1, and that it was possible that they would be found ineligible at continue on to session 2 of the study (alcohol administration) based on their responses. Though they were not aware of specific ineligibility criteria, participants may have nonetheless been motivated to under-report the extent of drinking behavior at session 1. This would have contributed to lower mean levels of weekly drinking, as well as restricted range of drinking behavior. As such, an important future direction will be to use weekly drinking data reported on the TLFB at the 6 month follow-up of this study. When there is no possibility of being ruled out of the follow-ups, participants may report a wider range of drinking behavior. If so, relations between AOE subscales and drinking behavior may be more likely to emerge, and testing the hypothesized differential relationships by context more feasible.

Examination of the relation between high arousal positive and low arousal positive AOEs and weekly drinking 6 months later also allows for temporal ordering of the predictors and outcomes. This is important as previous research has provided support for reverse direction of effects, demonstrating that heavier drinkers endorse more positive expectancies (Southwick et al., 1981). Use of a longitudinal design would provide support for the hypothesized direction of effects in the present study (increased positive expectancies are associated with subsequent increases in drinking behavior).

In addition, future studies should explore context specific relations between AOEs and drinking behavior using non-alcohol challenge samples. Such samples might provide greater variability in both AOEs and drinking behavior. Thus, use of different types of samples, at differing levels of alcohol involvement, might allow for more likely detection of relations between AOEs, SR, and drinking behavior, allowing for identification of any context specific relations.

Another limitation of the current study is the use of only a social context manipulation. Of course, AOEs and SR would be expected to vary across a much wider range of drinking contexts. For example, the present study collapsed across physical context, but there may be important differences in mean levels of AOEs, and relations with SR and drinking behavior, across physical contexts. Indeed, previous literature shows variability of both AOEs and SR by physical aspects of context. For instance, drinking in a naturalistic context (as compared to an ecologically invalid context) is associated with increased positive euphoric effects, even when dose and timing of drinks are held constant (Lindman, 1982). Similarly, studies using ecological momentary assessment have shown that drinking in bars is associated with more self-reported vigor than drinking in other contexts (Ray et al., 2010). Further, a meta-analysis of Balanced-Placebo Design studies found physical setting of alcohol consumption moderated both pharmacological and expectancy effects (McKay & Schare, 1999). A study in our own laboratory found a beverage condition by physical context interaction for low arousal positive effects, such that alcohol (relative to placebo) was associated with stronger low arousal positive effects in the laboratory context only (Corbin, Scott, Boyd, Menary, & Enders, 2015). Future studies can expand upon the present study by examining hypotheses using physical context manipulations, or by fully crossing physical and social contexts to further differentiate the aspects of context that drive any observed differences in AOEs and SR.

Future research should also go beyond simplistic models that address individual aspects of context (i.e. social or physical) to explore the universe of possible drinking contexts which are likely to simultaneously vary along a variety of dimensions. For example, an exploratory piece of the current study (that was not included in the primary aims) allowed for open-ended responses regarding participant’s imagined contexts after reporting on the unspecified context AOE measure. The prompt read "Please report what particular drinking context you imagined when reporting on these alcohol effects." The degree of variability in these open-ended responses was striking. A few example responses were "close friends and random people", "with my family", "talking and laughing", "meeting new people", "house party", "garage", "desert", "dark lighting", "afternoon", "people coming and going", "swimming", "playing cards", "dancing", and "a party last weekend." These open-ended responses were informally categorized into 6 categories that approximately captured the themes that emerged. The categories were people (number, relationship), aspects of interpersonal interaction, location, aspects of environment, activities, and specific events. This demonstrates the highly complex nature, and seemingly infinite possible combinations, of drinking contexts. It will be important for future research to more thoroughly study the universe of possible drinking contexts using both qualitative and quantitative approaches. The present study's methodical approach was strong from an experimental perspective, as manipulation of social drinking contexts using two extremes allows for clear and defined tests of hypotheses. However, from an ecological perspective, drinking behavior occurs in much more complex contexts, with variability on a multitude of contextual factors.

Another potential limitation involved the focus on a single drinking outcome in Aim 3 (weekly drinking). Of course, there are a number of other important drinking behaviors, including drinks per drinking day, frequency of drinking, frequency of binge drinking, alcohol-related problems, and negative consequences. These outcomes may show differential relations with context-specific AOEs. In particular, a high correspondence between frequency of binge drinking would be expected, as AOEs are reported for a binge quantity on the AEAS. However, such relations were not observed in post-hoc exploration of these outcome variables. Again, this may be due to limited variability in drinking behavior within this sample.

Additionally, previous studies have demonstrated relations between context-specific expectancies and context-specific drinking (Ham et al., 2011; 2013). The situational-specificity hypothesis can be used as a conceptual framework to better understand why alcohol use behaviors might differ across settings. According to this hypothesis, drinking behavior varies across contexts because of the association between certain cognitions regarding the effects of alcohol and cues presented by a situation (Wall et al. 2000, 2001). Post-hoc tests conducted in the data from the current study suggested promise for this approach, particularly for relations between high arousal positive AOEs reported for drinking with friends and for the unspecified context, and frequency of drinking in social settings. However, previous studies examining context-specific drinking as the outcome have had a number of limitations. For example, priming may inflate the degree of relation among the variables. After asking participants to report on AOEs for a social context, asking participants to report on frequency of drinking in these contexts within the same session may increase the likelihood that participants endorse drinking in these contexts, or may prime them to make a connection between these measures. Future studies pursuing context-specific drinking as an outcome can expand upon the previous literature by using longitudinal designs, or at a minimum, counterbalancing the order of questions. Understanding whether context-specific AOEs are associated with increased frequency or quantity of consumption in parallel contexts as compared to dissimilar drinking contexts is an interesting direction for future research.

A potential limitation specific to the study 1 sample is that many of the participants were very light drinkers. Mean number of drinks per week was 1.96 (3.24). However, mean drinks per drinking day was 4.70 (2.59), suggesting that, although participants did not drink frequently, they drank heavily when they did drink. This is consistent with the developmental stage of participants in this sample, who were between the ages of 18 and 21. Access to alcohol is more difficult given that many are under the legal age for alcohol purchase, and therefore, drinking may be sporadic but heavy when it does occur. Nonetheless, when reporting on AOEs using the AEAS, it is certain that some of the participants were reporting AOEs for a BAC they did not drink to regularly. However, as is clear in the literature on expectancy theory, the acquisition of AOEs occurs partially through indirect learning (Jones et al., 2001). The role of vicarious learning of AOEs is supported by literature demonstrating that children endorse AOEs prior to initiation of drinking, and positive AOEs contribute to the initiation of alcohol use (Dunn & Goldman, 1998). As such, even though some of the participants in this sample may not have had regular experience with alcohol consumption up to a BAC of .08, it is likely that they nonetheless held expectancies about the effects of alcohol at this BAC, and these expectancies are relevant to their drinking behavior.

A final limitation of the study relates to the modest model fits in the CFA analyses. The CFA models for the AEAS in particular evidenced only fair fit at best in both contexts, failing to meet at least one (or more) of the goodness-of-fit model criteria (CFI and TLI indices > .95, RMSEA and SRMR indices < .08). Indication that allowing differential correlated errors in different contexts would improve model fit may actually be indicative of slightly different underlying factor structures across contexts.

Some of the correlated errors within a particular context seemed consistent with theory regarding potential contextual influences on these constructs. For example, in the AEAS CFA for the "drinking with friends" context, modification indices indicated that allowing two pairs of correlated errors (fun and lively, aggressive and rude) would improve model fit. Not only do these pairs of items load onto the same subscales (each pair are indicators of the same latent factor), but the nature of the effects is such that they are likely to be elicited in social, interpersonal interactions. As such, correlated errors for these items in a "drinking with friends" context make some sense. However, two pairs of latent factors (high arousal negative and high arousal positive, low arousal negative and low arousal positive) also correlated significantly in this context. This finding was not hypothesized, and why these latent factors would only be correlated in a "drinking with friends" context cannot be easily explained theoretically. Further, modification indices indicated that allowing correlated errors for items fun and lively would improve model fit in the AEAS CFA in the "drinking alone" context. Correlated errors for these items when reported for a solitary drinking context cannot be easily explained in terms of theory. Similarly, tests of configural invariance for the SEAS suggested the addition of correlated errors for the items secure and demanding, but only in the solitary context. Again, there is not a clear theoretical explanation for this statistical finding. It will be important for future research to further investigate measurement differences across contexts for the AEAS, and to explore whether the differences are systematic and/or can be explained in terms of theory.

Despite the less than optimal model fit, replication of four factor structures of AEAS and SEAS in this study is an important addition to the existing literature on these measures. In particular, the current sample was comprised of much lighter drinkers compared to previous studies, with 8.40 mean drinks per week. In contrast, the sample used in the SEAS measurement development paper reported a mean of 13.93 weekly drinks (Morean et al., 2013), and mean weekly drinks were between 15.37 and 19.54 across the AEAS measurement development samples (Morean et al., 2012). The current study further validates these two measures by replicating the four factor structure, and expands previous literature by validating within a more moderately drinking young adult sample.

The current study also demonstrated scalar measurement invariance of both the AEAS and the SEAS across solitary and group drinking contexts. However, consistent with the CFAs above, the configural models for both the SEAS and AEAS evidenced only fair fit to start. It was determined for the purposes of this study that there was no clear indication of a different global latent factor structure across contexts, and as such, increasingly restrictive tests of measurement invariance were conducted. However, this fair fit at the configural level does suggest some evidence of measurement variance across contexts. Again, it will be important for future studies to investigate if real differences in measurement exist across contexts, and if so, the nature of these differences. Even so, the present study's demonstration of scalar measurement invariance of both the AEAS and the SEAS across social and solitary drinking contexts is an important addition to the literature. Previous studies demonstrated measurement invariance of the SEAS by limb of the blood alcohol curve and beverage condition (Morean et al., 2013), and measurement invariance of the AEAS by gender, binge drinking status, and limb of the blood alcohol curve (Morean et al., 2012). Measurement invariance is critical for making valid comparisons of mean levels of expectancies and SR across groups. It ensures that the underlying construct is measured similarly across groups of interest, so that mean differences between groups reflect true latent differences rather than measurement differences. Specifically, previous literature suggests that expectancies and subjective effects vary across drinking context, but because measurement invariance was not established for the measures used, it was possible that these differences could be attributed to systematic measurement bias or differences in factor structure across context. Establishing scalar measurement invariance by drinking context in the present study allows for confident interpretation of mean differences in AOEs and SR across context as true mean differences. These psychometric advancements for the AEAS and SEAS bolster what are already psychometrically sound measures, developed using conceptual and statistical advances in measurement development.

Finally, a potentially very interesting future direction is to use implicit AOE measures in the examination of context effects on AOEs and relations to SR and drinking outcomes. Implicit measures of expectancies might be more sensitive to contextual influences, and context-specific implicit AOEs might evidence stronger associations with drinking behavior and SR. Specifically, the very nature of implicit AOEs is that they are automatically cued by things in the environment. In contrast, explicit AOEs are more stable, cognitive constructs. Generally, modest correlations are observed between explicit and implicit measures of AOEs (Larsen et al., 2012). Thus, it is quite possible that implicit context specific AOEs would have significant relations with alcohol outcomes and SR that are different (and potentially stronger) in magnitude than relations with explicitly reported AOEs. Implicit measures are typically formal measures of attentional bias (e.g., the Stroop Task) (Stroop, 1935) and memory associations using reaction time measures (e.g., the Implicit Association Test) (Greenwald et al., 1998). Use of the IAT and Stroop Task in tests of context effects on expectancies, and on relations with drinking outcomes and SR, is an important direction for future study.

Despite a number of limitations that may stimulate interesting and exciting ideas for future study, the results of the current study reveal several important findings. First, this study was the first to our knowledge to demonstrate that participants are imagining contexts when reporting on measures of AOEs that do not specify the context, and to begin to explore the nature of these contexts. Finding significant mean differences in high arousal positive and low arousal positive AOEs across contexts is also an important finding and this study is the first to show mean differences across context using the AEAS. Also, the use of clear, easily definable social drinking contexts (solitary and group) is a strength of the experimental design, permitting easy replication and subsequent exploration of the universe of important drinking contexts. An additional strength of the study was the psychometric evaluation, and further validation, of the AEAS and SEAS. Demonstration of scalar measurement invariance of each measure by drinking context allows for confident interpretation of mean score comparisons across these contexts. The findings demonstrated in Aims 1 and 2 suggest that further investigation of the relation between context-specific AOEs and drinking outcomes/SR is warranted. It is our hope that this study will stimulate future studies to test these hypotheses in samples with a wider range of drinking behavior, or at different stages of alcohol involvement, to understand whether mean level differences in context specific AOEs are important in understanding alcohol related outcomes.

REFERENCES

Abrams, D.B. & Niaura, R.S. (1987). Social learning theory. In H.T. Blane and K.E. Leonard (Eds.), *Psychological Theories of Drinking and Alcoholism* (pp. 131-172), New York: Guilford Press.

Anderson, K. G., Smith, G. T., & Fischer, S. F. (2003). Women and acquired preparedness: personality and learning implications for alcohol use. *Journal of Studies on Alcohol, 64,* 384–392.

Ann het Rot, M., Russell, J.J., Moskowitz, D.S., & Young, S.N. (2008). Alcohol in a social context: Findings from event contingent recording studies of everyday social interactions. *Alcoholism: Clinical and Experimental Research, 32,* 459-471.

Bandura, A. (1977). *Social Learning Theory.* Oxford, England: Prentice-Hall. Brown, S.A., Christiansen, B.A., & Goldman, M.S. (1987). The Alcohol Expectancy Questionnaire: an instrument for the assessment of adolescent and adult alcohol expectancies, *Journal of Studies on Alcohol, 48,* 483–491.

Bardo, M. T., Williams, Y., Dwoskin, L. P., Moynahan, S. E., Perry, I. B., & Martin, C. A. (2007). The sensation seeking trait and substance use: Research findings and clinical implications. *Current Psychiatry Reviews, 3,* 3–13.

Barnow, S., Schultz, G., Lucht, M., Ulrich, I., Preuss, U. W., & Freyberger, H. J. (2004). Do alcohol expectancies and peer delinquency/substance use mediate the relationship between impulsivity and drinking behaviour in adolescence? *Alcohol and Alcoholism, 39,* 213–219.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107,* 238–246.

Booth, P.G. (2006). Idiosyncratic patterns of drinking in long-term successful controlled drinkers. *Addition Research and Theory, 14,* 25-33.

Borsari, B., Murphy, J. G., & Barnett, N. P. (2007). Predictors of alcohol use during the first year of college: Implications for prevention. *Addictive Behaviors, 32,* 2062–2086.

Bouchery, E.E., Harwood, H.J., Sacks, J.J., Simon, C.J., & Brewer, R.D. (2011). Economic costs of excessive alcohol consumption in the U.S., 2006. *American Journal of Preventative Medicine, 41,* 516-524.

Bourgault, C., & Demers, A. (1997). Solitary drinking: Risk factor for alcohol-related problems? *Addiction, 92,* 303-312.

Brown, S.A. (1985). Context of drinking and reinforcement from alcohol: Alcoholic patterns. *Addictive Behaviors, 10,* 191-195.

Browne, M. W., & Cudek, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CT: Sage.

Brown, S.A., Goldman, M.S., Inn, A., & Anderson, L.R. (1980). Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *Journal of Consulting and Clinical Psychology, 48,* 419-426.

Cappell, H. & Greeley, J. (1987). Alcohol and tension reduction: an update on research and theory. In H.T. Blane & K.E. Leonard (Eds.), *Psychological Theories of Drinking and Alcoholism.* New York, NY: Guilford Press.

Carey, K.B. (1995). Alcohol-related expectancies predict quantity and frequency of heavy drinking among college students. *Psychology of Addictive Behaviors, 9,* 236-241.

Carter, J.A., McNair, L.D., Corbin, W.R., & Black, D.H. (1998). Effects of priming positive and negative outcomes on drinking responses. *Experimental and Clinical Psychopharmacology, 6,* 399-405.

Cashin, J. R., Presley, C. A., & Meilman, P. W. (1998). Alcohol use in the greek system: Follow the leader? *Journal of Studies on Alcohol, 59(1),* 63-70.

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14,* 464–504.

Chen, F. F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology, 95,* 1005–1018.

Christiansen, B.A., & Goldman, M.S. (1983). Alcohol- related expectancies versus demographic/background variables in the prediction of adolescent drinking, *Journal of Consulting and Clinical Psychology,* 51, 249-257.

Christiansen, B.A., Smith, G.T., Roehling, P.V., & Goldman, M.S. (1989). Using alcohol expectancies to predict adolescent drinking behavior after one year. *Journal of Consulting and Clinical Psychology, 57,* 93-99.

Christiansen, M., Vik, P.W., & Jarchow, A. (2002). College student heavy drinking in social contexts versus alone. *Addictive Behaviors, 27,* 393-404.

Chung, T., & Martin, C.S. (2009). Subjective stimulant and sedative effects of alcohol during early drinking experiences predict alcohol involvement in treated adolescents. *Journal of Studies on Alcohol and Drugs, 70,* 660-667.

Conger, J.J. (1956). Reinforcement theory and the dynamics of alcoholism. *Quarterly Journal of Studies on Alcohol, 17*, 296-305.

Conners, G.J., O'Farrell, T.J., Cutter, H.S., & Thompson, D.L. (1986). Alcohol expectancies among male alcoholics, problem drinkers, and non-problem drinkers. *Alcoholism: Clinical and Experimental Research, 10,* 667-671.

Cooper, M. L., Russell, M., & George, W. H. (1988). Coping, expectancies, and alcohol abuse: A test of social learning formulations. *Journal of Abnormal Psychology, 97,* 218-230.

Corbin, W.R., Gearhardt, A., & Fromme, K. (2008). Stimulant alcohol effects prime within session drinking behavior. *Psychopharmacology, 197,* 327-337.

Corbin, W. R., Iwamoto, D. K., & Fromme, K. (2011). A comprehensive longitudinal test of the acquired preparedness model for alcohol use and related problems. *Journal of Studies on Alcohol and Drugs, 72,* 602–610.

Corbin, W.R., Scott, C., Boyd, S.J., Menary, K.R., & Enders, CK. (2015). Contextual Influences on Subjective and Behavioral Responses to Alcohol. *Experimental and Clinical Psychopharmacology, 23,* 59-70.

Corcoran, K.J., & Michels, J.L. (1998). A prototype analysis of psychological situations through the lens of alcohol expectancies and gender. *Addictive Behaviors, 23,* 685-691.

Corcoran, K.J., & Parker, P.S. (1991). Alcohol expectancy questionnaire tension reduction scale as a predictor of alcohol consumption in a stressful situation. *Addictive Behaviors, 16,* 129-137.

Cranford, J.A., McCabe, S.E., & Boyd, C.J. (2006). A new measure of binge drinking: Prevalence and correlates in a probability sample of undergraduates. *Alcoholism: Clinical and Experimental Research, 30,* 1896-1905.

Demers, A., & Bourgault, C. (1996). Changing society, changing drinking: Solitary drinking as a non-pathological behaviour. *Addiction, 91,* 1505-1516.

Demmel, R., Klusener, J., & Rist, F. (2004). Anticipated levels of alcohol induced sedation and stimulation in relation to estimated blood alcohol concentration. *Journal of Studies on Alcohol, 65,* 22–26.

Dunn, M. E., & Earleywine, M. (2001). Activation of alcohol expectancies in memory in relation to limb of the blood alcohol curve. *Psychology of Addictive Behaviors, 15,* 18–24.

Dunn, M.E., & Goldman, M.S. (1998). Age and drinking-related differences in the memory organization of alcohol expectancies in 3rd, 6th, 9th, and 12th grade children. *Journal of Consulting and Clinical Psychology, 66,* 579-585.

Dunn, M. E., & Earleywine, M. (2001). Activation of alcohol expectancies in memory in relation to limb of the blood alcohol curve. *Psychology of Addictive Behaviors, 15,* 18–24.

Earleywine, M. (1994). Confirming the factor structure of the Anticipated Biphasic Alcohol Effects Scale. Alcoholism: *Clinical and Experimental Research, 18,* 861–866.

Earleywine, M., & Martin, C.S. (1993). Anticipated stimulant and sedative effects of alcohol vary with dosage and limb of the blood alcohol curve. *Alcoholism: Clinical and Experimental Research, 17,* 135-139.

Enders, C.K. & Bandalos, D.L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8,* 430-457.

Erblich, J., & Earleywine, M. (2003). Behavioral undercontrol and subjective stimulant and sedative effects of alcohol intoxication: Independent predictors of drinking habits? *Alcoholism: Clinical and Experimental Research, 27,* 44-50.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175-191.

Fromme, K., & D'Amico, E.J. (2000). Measuring adolescent alcohol outcome expectancies, *Psychology of Addictive Behaviors,* 14, 206–212.

Fromme, K., Stroot, E.A., & Kaplan, D. (1993). Comprehensive effects of alcohol: development and psychometric assessment of a new expectancy questionnaire, *Psychological Assessment,* 5, 19–26.

Fu, A. T., Ko, H. C., Wu, J. Y., Cherng, B. L., & Cheng, C. P. (2007). Impulsivity and expectancy in risk for alcohol use: Comparing male and female college students in Taiwan. *Addictive Behaviors, 32,* 1887–1896.

Garbutt, J.C., Kranzler, H.R., O'Malley, S.S., Gastfriend, D.R., Pettinati, H.M., Silverman, B.L., … Ehrich, E.W. (2005). Efficacy and tolerability of long-acting injectable naltrexone for alcohol dependence. *JAMA: Journal of the American Medical Association, 293,* 1617-1625.

George, W.H., & Dermen, K.H. (1988). Self-reported alcohol expectancies for self and other as function of behavior type and dosage set. *Journal of Substance Abuse, 1,* 71-78.

Goldman, M.S. (1994). The alcohol expectancy concept: Applications to assessment, prevention, and treatment of alcohol abuse. *Applied and Preventative Psychology, 3,* 131-144.

Goldman, M.S., & Darkes, J. (2004). Alcohol expectancy multiaxial assessment: A memory network-based approach. *Psychological Assessment, 16,* 4-15.

Goldman, M.S., Del Boca, F.K., & Darkes, J. (1999). Alcohol expectancy theory: The application of cognitive neuroscience. In K.E. Leonard & H.T. Blane (Eds.), *Psychological theories of drinking and alcoholism* (pp. 203-246). New York, NY: Guilford Press.

Goldman, M.S., Greenbaum, P.E., & Darkes, J. (1997). A confirmatory test of hierarchical expectancy structure and predictive power: Discriminant validation of the Alcohol Expectancy Questionnaire. *Psychological Assessment, 9,* 145-157. Grant, B.F., Dawson, D., 2000. The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV). National Institute on Alcohol Abuse and Alcoholism, Rockville, MD.

Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Dugour, M. C., & Pickering, R. P. (2004). The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991-1992 and 2001- 2002. *Drug and Alcohol Dependence, 74,* 223–234.

Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Kay, W., & Pickering, R. (2003). The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug and Alcohol Dependence, 71,* 7-16.

Gregorich, S.E. (2006). Do self-report instruments allow meaningful comparisons across diverse population groups? Testing measurement invariance using the confirmatory factor analysis framework. *Medical Care, 44(11),* 78-94.

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology, 74,* 1464–1480.

Gray, J. A. (1975). Elements of a two-process theory of learning. London, U.K.: Academic Press.

Gray, J. A. (1987). The neuropsychology of emotion and personality. In S. M. Stahl, S. D. Iversen, & E. C. Goodman (Eds.), *Cognitive neurochemistry (pp. 171–190).* New York: Oxford University Press.

Gwaltney, C.J., Shiffman, S., Norman, G.J., Paty, J.A., Kassel, J.D., Gnys, M… Balabanis, M. (2001). Does smoking abstinence self-efficacy vary across situations? Identifying context-specificity within the relapse situation efficacy questionnaire. *Journal of Consulting and Clinical Psychology, 69,* 516-527.

Ham, L.S., Zamboanga, B.L., & Bacon, A.K. (2011). Putting thoughts into context: Alcohol expectancies, social anxiety, and hazardous drinking. *Journal of Cognitive Psychotherapy: An International Quarterly, 25,* 47-60.

Ham, L.S., Zamboanga, B.L., Bridges, A.J., Casner, H.J., & Bacon, A.K. (2013). Alcohol expectancies and alcohol use frequency: Does drinking context matter? *Cognitive Therapy and Research, 37,* 620-632.

Harford, T. C. (1984). Situational factors in drinking: A developmental perspective on drinking contexts. In P. M. Miller & T. D. Nirenberg (Eds.), *Prevention of alcohol abuse* (pp. 119-156). New York: Plenum.

Harford, T.C., & Grant, B.F. (1987). Psychosocial factors in adolescent drinking contexts. *Journal of Studies on Alcohol, 48,* 551-557.

Harford, T. C., Wechsler, H., & Seibring, M. (2002). Attendance and alcohol use at parties and bars in college: A national survey of current drinkers. *Journal of Studies on Alcohol, 63(6),* 726-733.

Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: Changes from 1998 to 2001. *Annual Review of Public Health, 26,* 259–279.

Holahan, C.J., Moos, R.H., Holahan, C.K., Cronkite, R.C., & Randall, P.K. (2001). Drinking to cope, emotional distress, and alcohol use and abuse: A ten-year model. *Journal of Studies on Alcohol, 62,* 190-198.

Holdstock, L., King, A.C., & de Wit, H. (2000). Subjective and objective responses to ethanol in moderate/heavy and light social drinkers. *Alcoholism: Clinical and Experimental Research, 24,* 789-794.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.

Hundt, N. E., Kimbrel, N. A., Mitchell, J. T., & Nelson-Gray, R. O. (2008). High BAS, but not low BIS, predicts externalizing symptoms in adults. *Personality and Individual Differences, 44(3),* 563–573.

Jones, B.T., Corbin, W., & Fromme, K. (2001). A review of expectancy theory and alcohol consumption. *Addiction, 96,* 57-72.

Kahler, C.W., Strong, D.R., & Read, J.P. (2005). Toward efficient and comprehensive measurement of the alcohol problems continuum in college students: The brief young adult alcohol consequences questionnaire. *Alcoholism: Clinical and Experimental Research, 29,* 1180 1189.

Kidorf, M., Sherman, M.F., Johnson, J.G., & Bigelow, G.E. (1995). Alcohol expectancies and changes in beer consumption of first-year college students. *Addictive Behaviors, 20,* 225 231.

King, A.C., de Wit, H., McNamara, P.J., & Cao, D. (2011). Rewarding, stimulant, and sedative alcohol responses and relationship to future binge drinking. *Archives of General Psychiatry, 68,* 389-399.

King, A.C., Houle, T., de Wit, H., Holdstock, L., & Schuster, A. (2002). Biphasic alcohol response differs in heavy versus light drinkers. *Alcoholism: Clinical and Experimental Research, 26,* 827-835.

Kirchner, T.R., Sayette, M.A., Cohn, J.F., Moreland, R.L., & Levine, J.M. (2006). Effects of alcohol on group formation among male social drinkers. *Journal of Studies on Alcohol, 67,* 785-793.

Knight, J.R., Wechsler, H., Kuo, M., & Seibring, B.S. (2002) Alcohol abuse and dependence among U.S. college students. *Journal of Studies on Alcohol and Drugs, 63,* 263–270.

Koob, G.F. (2006). The neurobiology of addiction: A hedonist Calvanist view. In Miller, W.R. & K.M. Carroll (Eds.), *Rethinking Substance Abuse: What the Science Shows and What We Should Do About It (pp. 61-77).* New York: Guilford Publications, Inc.

Labbe, A.K., & Maisto, S.A. (2011). Alcohol expectancy challenges for college students: A narrative review. *Clinical Psychology Review, 31,* 673-683.

Lang, A. R., Patrick, C. J., & Stritzke, W. G. K. (1999). Alcohol and emotional response: A multidimensional-multilevel analysis. In K.E. Leonard & H. T. Blane (Eds.), *Psychological theories of drinking and alcoholism (2nd ed.)* (pp. 328-371). New York, NY: Guilford Press.

Larsen, H., Engels, R. C. M. E., Wiers, R. W., Granic, I., & Spijkerman, R. (2012). Implicit and explicit alcohol cognitions and observed alcohol consumption: Three studies in (semi)naturalistic drinking settings. *Addiction, 107,* 1420–1428.

Leeman, R.F., Toll, B.A., Taylor, L.A., & Volpicelli, J.R. (2009). Alcohol-induced disinhibition expectancies and impaired control as prospective predictors of problem drinking in undergraduates. *Psychology of Addictive Behaviors, 23,* 553-563.

Leigh, B.C., & Stacey, A.W. (2004). Alcohol expectancies and drinking in different age groups. *Society for the Study of Addiction, 99,* 215-227.

Levine, B. (1988). *Situational variations in alcohol expectancies.* Unpublished Master's thesis, University of South Florida, Tampa.

Lewis, B.A., & O'Neill, H.K. (2000). Alcohol expectancies and social deficits relating to problem drinking among college students. *Addictive Behaviors, 25,* 295-299.

Lindman, R. (1982). Social and solitary drinking: Effects on consumption and mood in male social drinkers. *Physiology and Behavior, 28,* 1093-1095.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1,* 130–149.

MacLatchy-Gaudet, H.A., & Stewart, S.H. (2001). The context-specific positive alcohol outcome expectancies of university women. *Addictive Behaviors, 26,* 31-49.

Mann, R.E., Sobell, L.C., Sobell, M.B., & Pavan, D. (1985). Reliability of a family tree questionnaire for assessing family history of alcohol problems. *Drug and Alcohol Dependence, 15,* 61-67.

Marks, D.F. (1973). Visual imagery differences in the recall of pictures. *British Journal of Psychology, 64,* 17-24.

Martin, C.S., Earleywine, M., Musty, R.E., Perrine, M.W., & Swift, R.M. (1993). Development and validation of the biphasic effects of alcohol scale. *Alcoholism: Clinical and Experimental Research, 17,*140-146.

Mays, D., Usdan, S., Arriola, K.J., Weitzel, J.A., & Bernhardt, J.M. (2009). Development and validation of the retrospective alcohol context scale. *The American Journal of Drug and Alcohol Abuse, 35,* 109-114.

McAvinue, L.P. & Robertson, I.H. (2007). Measuring visual imagery ability: A review. *Imagination, Cognition, and Personality, 26,* 191-211.

McCarthy, D. M., Kroll, L. S., & Smith, G. T. (2001). Integrating disinhibition and learning risk for alcohol use. *Experimental and Clinical Psychopharmacology, 9,* 389–398.

Mckay, D., & Schare, M.L. (1999). The effects of alcohol and alcohol expectancies on subjective reports and physiological activity: A meta-analysis. *Addictive Behaviors, 24,* 633-647.

Merrill, J.E., Wardell, J.D., & Read, J.P. (2009). Is expectancy reality? Associations between tension reduction beliefs and mood following alcohol consumption. *Experimental and Clinical Psychopharmacology, 17,* 434-444.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). Applied multivariate research: Design and interpretation. Thousand Oaks, CA: Sage.

Miller, P.W., Smith, G.T., & Goldman, M.S. (1990). Emergence of alcohol expectancies in childhood: A possible critical period. *Journal of Studies on Alcohol*, 51, 343-349.

Mohr, C. D., Armeli, S., Tennen, H., Carney, M. A., Affleck, G., & Hromi, A. (2001). Daily interpersonal experiences, context, and alcohol consumption: Crying in your beer and toasting the good time. *Journal of Personality and Social Psychology, 80,* 489–500.

Morean, M.E., & Corbin, W.R. (2010). Subjective response to alcohol: A critical review of the literature. *Alcoholism: Clinical and Experimental Research, 34,* 385-395.

Morean, M.E., Corbin, W.R., & Treat, T.A. (2012). The anticipated effects of alcohol scale: Development and psychometric evaluation of a novel assessment tool for measuring alcohol expectancies. *Psychological Assessment, 24,* 1008-1023.

Morean, M. E., Corbin, W. R., & Treat, T. A. (2013, May 6). The Subjective Effects of Alcohol Scale: Development and Psychometric Evaluation of a Novel Assessment Tool for Measuring Subjective Response to Alcohol. *Psychological Assessment, 25,* 780-795.

Mulligan Rauch, S.A., & Becker Bryant, J. (2000). Gender and context differences in alcohol expectancies. *The Journal of Social Psychology, 140,* 240-253.

Muthen, L. K., & Muthen, B. O. (2010). MPLUS user's guide (6th ed.) Los Angeles, CA: Muthen & Muthen.

Newlin, D.B., & Thomson, J.B. (1990). Alcohol challenge with sons of alcoholics: A critical review and analysis. *Psychological Bulletin, 108,* 383-402.

O'Hare, T. M. (1990). Drinking in college: Consumption patterns, problems, sex differences, and legal drinking age. *Journal of Studies on Alcohol, 51,* 536–541.

O'Hare, T.M. (1997). Measuring excessive alcohol use in college drinking contexts: The drinking context scale. *Addictive Behaviors, 22,* 469-477.

O'Hare, T.M. (1998). Alcohol expectancies and excessive drinking contexts in young adults. *Social Work Research, 22,* 44-50.

O'Hare, T. (2001). The drinking context scale: A confirmatory factor analysis. *Journal of Substance Abuse Treatment, 20,* 129-136.

O'Hare, T.M., & Sherrer, M.V. (1997). Drinking problems, alcohol expectancies, and drinking contexts in college first offenders. *Journal of Alcohol and Drug Education, 43,* 31-45.

O'Malley, S.S., Garbutt, J.C., Gastfriend, D.R., Dong, Q., & Kranzler, H.R. (2007). Efficacy of extended-release naltrexone in alcohol dependent patients who are abstinent before treatment. *Journal of Clinical Psychopharmacology, 27,* 507-512.

Pabst, A., Baumeister, S.E., & Kraus, L. (2010). Alcohol-expectancy dimensions and alcohol consumption at different ages in the general population. *Journal of Studies on Alcohol and Drugs, 71(1),* 46-53.

Pedersen, S.L., & McCarthy, D.M. (2009). An examination of subjective response to alcohol in African Americans. *Journal of Studies on Alcohol and Drugs, 70,* 288-295.

Peterson, J.B., Conrod, P., Vassileva, J., Gianoulakis, C., & Pihl, R.O. (2006). Differential effects of naltrexone on cardiac, subjective, and behavioural reactions to acute ethanol intoxication. *Journal of Psychiatry and Neuroscience, 31,* 386-393.

Pliner, P., & Cappell, H. (1974). Modification of affective consequences of alcohol: A comparison of social and solitary drinking. *Journal of Abnormal Psychology, 83,* 418-425.

Quinn, P.D., & Fromme, K. (2011). Subjective response to alcohol challenge: A quantitative review. *Alcoholism: Clinical and Experimental Research, 35*, 1759-1770.

Ray, L.A., Miranda, R., Tidey, J.W., McGeary, J.E., Mackillop, J., Gwaltney, C.W., … Monti, P.M. (2010). Polymorphisms of the u-opioid receptor and dopamine D4 receptor genes and subjective responses to alcohol in the natural environment. *Journal of Abnormal Psychology, 119,* 115-125.

Read, J.P., Merrill, J.E., Kahler, C.W., & Strong, D.R. (2007). Predicting functional outcomes among college drinkers: Reliability and predictive validity of the Young Adult Alcohol Consequences Questionnaire. *Addictive Behaviors, 32,* 2597-2610.

Read, J.P, Wood, M.D., Lejuez, C.W., Palfai, T.P., & Slack, M. (2004). Gender, alcohol consumption, and differing alcohol expectancy dimensions in college drinkers. *Experimental and Clinical Psychopharmacology, 12,* 298-308.

Robinson, T.E., & Berridge, K.C. (1993). The neural basis of drug craving: An incentive sensitization theory of addiction. *Brain Research Reviews, 18,* 247-291.

Robinson, T.E. & Berridge, K.C. (2000). The psychology and neurobiology of addiction: An incentive sensitization view. *Addiction, 95,* S91-S117.

Roehrich, L., & Goldman, M.S. (1995). Implicit priming of alcohol expectancy memory processes and subsequent drinking behavior. *Experimental and Clinical Psychopharmacology, 3,* 402-410.

Russell, J.A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology, 39,* 1161-1178.

Satorra, A. (2000). Scaled and adjusted restricted tests in multi-sample analysis of moment structures. In Heijmans, R.D.H., Pollock, D.S.G. & Satorra, A. (eds.), Innovations in multivariate statistical analysis. A Festschrift for Heinz Neudecker (pp.233-247). London: Kluwer Academic Publishers.

Satre, D.D. & Knight, B.G. (2001). Alcohol expectancies and their relationship to alcohol use: Age and sex differences. *Aging and Mental Health, 5,* 73-83.

Schuckit, M.A. (1994). Low level of response to alcohol as a predictor of future alcoholism. *The American Journal of Psychiatry, 151,* 184-189.

Schuckit, M.A. (1998). Biological, psychological, and environmental predictors of alcoholism risk: A longitudinal study. *Journal of Studies on Alcohol, 59,* 485-494.

Schuckit, M.A. (1999). New findings on the genetics of alcoholism. *JAMA: Journal of the American Medical Association, 281,* 1875-1876.

Schuckit, M.A., & Gold, E.O. (1988). A simultaneous evaluation of multiple markers of ethanol/placebo challenges in sons of alcoholics and controls. *Archives of General Psychiatry, 45,* 211-216.

Schuckit, M.A., Smith, T.L., Danko, G.P., Pierson, J., Hesselbrock, V., Bucholz, K.K., … Chan, G. (2007). The ability of the self-rating of the effects of alcohol (SRE) scale to predict alcohol-related outcomes five years later. *Journal of Studies on Alcohol and Drugs, 68,* 371-378.

Schuckit, M.A., Smith, T.L., Trim, R.S., Tolentino, N.J., & Hall, S.A. (2010). Comparing structural equation models that use different measures of level of response to alcohol. *Alcoholism: Clinical and Experimental Research, 34,* 861-868.

Scott, C. & Corbin, W.R. (2014). Influence of Sensation Seeking on Response to Alcohol Versus Placebo: Implications for the Acquired Preparedness Model. *Journal of Studies on Alcohol and Drugs, 75,* 136–144.

Scott-Sheldon, L.A.J., Terry, D.L., Carey, K.B., Garey, L., & Carey, M.P. (2012). Efficacy of expectancy challenge interventions to reduce college student drinking: A meta-analytic review. *Psychology of Addictive Behaviors, 26,* 393-405.

Senchak, M., Leonard, K.E., & Greene, B.W. (1998). Alcohol use among college students as a function of their typical social drinking context. *Psychology of Addictive Behaviors, 12,* 62-70.

Setiawan, E., Pihl, R.O., Cox, S.M.L, Gianoulakis, C., Palmour, R.M., Benkelfat, C., & Leyton, M. (2011). The effect of naltrexone on alcohol's stimulant properties and self-administration behavior in social drinkers: Influence of gender and genotype. *Alcoholism: Clinical and Experimental Research, 35,* 1134-1141.

Settles, R. F., Cyders, M., & Smith, G. T. (2010). Longitudinal validation of the acquired preparedness model of drinking risk. *Psychology of Addictive Behaviors, 24,* 198–208.

Sher, K.J. (1985). Subjective effects of alcohol: The influence of setting and individual differences in alcohol expectancies. *Journal of Studies on Alcohol, 46,* 137-146.

Sher, K.J., & Levenson, R.W. (1982). Risk for alcoholism and individual differences in the stress-response-dampening effect of alcohol. *Journal of Abnormal Psychology, 91,* 350-367.

Sher, K.J., Wood, M.E., Richardson, A.E., & Jackson, K.M. (2005). Subjective effects of alcohol I: Effects of the drink and drinking context. In K.J. Sher, M.D. Wood, A.E. Richardson, & K.M. Jackson (Eds.), *Mind Altering Drugs: The Science of Subjective Experience* (86-134). New York, NY: Oxford University Press.

Sher, K.J., Wood, M.D., Wood, P.K., & Raskin, G. (1996). Alcohol outcome expectancies and alcohol use: a latent variable cross-lagged panel study. *Journal of Abnormal Psychology,* 105, 561–574.

Smith, G.T & Goldman, M.S. (1994). Alcohol expectancy theory and identification of high risk adolescents. *Journal of Research on Adolescents, 4*(2), 229-247.

Smith, G.T., Goldman, M.S., Greenbaum, P.E., & Christiansen, B.A. (1995). Expectancy for social facilitation from drinking: the divergent paths of high-expectancy and low expectancy adolescents. *Journal of Abnormal Psychology, 104,* 32-40.

Sobell, L.C., & Sobell, M.B. (1992). Timeline follow-back: A technique for assessing self-reported alcohol consumption. In *Measuring Alcohol Consumption: Psychosocial and Biochemical Methods* (pp.41-72). Totowa: NJ: Humana Press.

Southwick, L.L., Steele, C.M., Marlatt, G.A., & Lindell, M.K. (1981). Alcohol-related expectancies: defined by phase of intoxication and drinking experience. *Journal of Consulting and Clinical Psychology, 49,* 713-721.

Stacy, A. W., Newcomb, M. D., & Bentler, P. M. (1993). Cognitive motivations and sensation seeking as long-term predictors of drinking problems. *Journal of Social and Clinical Psychology, 12,* 1–24.

Steenkamp, J.-B. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross national consumer research. *Journal of Consumer Research, 25,* 78–90.

Stein, K.D., Goldman, M.S., & Del Boca, F.K. (1997). *Happy hour: The relative effects of alcohol expectancies and positive mood on drinking behavior.* Paper presented at the Annual Meeting of the Research Society on Alcoholism, San Francisco.

Stritzke, W. G., Lang, A. R., & Patrick, C. J. (1996). Beyond stress and arousal: A reconceptualization of alcohol-emotion relations with reference to psychophysiological methods. *Psychological Bulletin, 120,* 376– 395.

Stritzke, W. G., Patrick, C. J., & Lang, A. R. (1995). Alcohol and human emotion: A multidimensional analysis incorporating startle-probe methodology. *Journal of Abnormal Psychology, 104,* 114–122.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18,* 643–662.

Tabachnick, B. G., & Fidell, L. S. (Eds.). (2001). Using multivariate statistics (4th ed.). Needham Heights, MA: Allyn & Bacon.

Talbott, L.L., Umstattd, M.R., Usdan, S.L., Martin, R.J., & Geiger, B.F. (2010). Validation of the drinking context scale (DCS-9) for use with non-adjudicated first-year college students. *Addictive Behaviors, 35,* 510-512.

Thomas, S.E., Drobes, D.J., Voronin, K., Anton, R. (2004). Following alcohol consumption, non-treatment seeking alcoholics report greater stimulation but similar sedation compared with social drinkers. *Journal of Studies on Alcohol, 65,* 330-335.

Thombs, D.L. (1993). The differentially discriminating properties of alcohol expectancies for female and male drinkers. *Journal of Counseling and Development, 71,* 321-325.

Wall, A., Hinson, R., McKee, S., & Goldstein, A. (2001). Examining alcohol outcome expectancies in laboratory and naturalistic bar settings: A within-subject experimental analysis. *Psychology of Addictive Behaviors, 15,* 219–226.

Wall, A., McKee, S. A., & Hinson, R. E. (2000). Assessing variation in alcohol outcome expectancies across environmental context: An examination of the situational-specificity hypothesis. *Psychology of Addictive Behaviors, 14,* 367–375.

Wardell, J.D., Read, J.P., Colder, C.R., & Merrill, J.E. (2012). Positive alcohol expectancies mediate the influence of the behavioral activation system on alcohol use: A prospective path analysis. *Addictive Behaviors, 37,* 435-443.

Wechsler, H., Dowdall, G. W., Davenport, A., & Castillo, S. (1995). Correlates of college student binge drinking. *American Journal of Public Health, 85,* 921–926.

Wechsler, H., & McFadden, M. (1979). Drinking among college students in New England: Extent, social correlates, and consequences of alcohol use. *Journal of Studies on Alcohol, 40,* 969-996.

Wells, S., Graham, K., Speechley, M., & Koval, J.J. (2005). Drinking patterns, drinking contexts and alcohol-related aggression among late adolescent and young adult drinkers*. Addiction, 100,* 933-944.

Wells, S., Mihic, L., Tremblay, P.F., Graham, K., & Demers, A. (2008). Where, with whom, and how much alcohol is consumed on drinking events involving aggression? Event-level associations in a Canadian national survey of university students. *Alcoholism: Clinical and Experimental Research, 32(3),* 522-533.

Widaman, K. F., & Reise, S. P. (1997). Exploring the measurement invariance of psychological instruments: Applications in the substance use domain. In S. G. West (Ed.), The science of prevention: Methodological advances from alcohol and substance abuse research (pp. 281–324). Washington, DC: American Psychological Association.

Wiers, R. W. (2008). Alcohol and drug expectancies as anticipated changes in affect: Negative reinforcement is not sedation. *Substance Use and Misuse, 43,* 429–444.

Wood, W., Tam, L., & Witt, M.G. (2005). Changing circumstances, disrupting habits. *Journal of Personality and Social Psychology, 88,* 918–933.

Young, R.M., Oei, T.P.S., & Knight, R.G. (1990). The tension reduction hypothesis revisited: An alcohol expectancy perspective. *British Journal of Addiction, 85,* 31-40.

Zamboanga, B.L. (2005). Alcohol expectancies and drinking behaviors in Mexican American college students. A*ddictive Behaviors*, 30, 673-684.

APPENDIX A

TABLES AND FIGURES

Table 1.
Confirmatory Factor Analysis: AEAS subscale Item Factor Loadings When the Four-Factor AEAS Model was Fit in the Full Sample Collapsed across Contexts (N = 240)

Items by Subscale	Estimate	*SE*	Estimate/*SE*	StdXY
High Arousal Positive				
Lively	1.000			
Sociable	.993	.028	35.065	.895
Carefree	.522	.056	9.307	.499
Fun	1.014	.018	55.098	.936
Attractive	.707	.041	17.187	.649
Funny	.999	.028	35.322	.894
Talkative	1.052	.033	31.955	.878
Confident	.908	.037	24.533	.857
Happy	.951	.034	27.648	.892
High Arousal Negative				
Demanding	1.000			
Moody	.860	.060	14.278	.683
Rude	.689	.070	9.782	.708
Aggressive	.689	.070	9.795	.672
Anxious	.886	.074	11.963	.739
Low Arousal Positive				
Mellow	1.000			
Relaxed	1.188	.132	8.975	.878
Calm	1.154	.096	12.067	.816
Low Arousal Negative				
Wobbly	1.000			
Woozy	1.025	.038	26.984	.882
Dizzy	1.043	.043	24.156	.886
Ill	.627	.068	9.229	.697
Drunk	.711	.053	13.319	.600

Note. Bolded AEAS items are factor metric items. AEAS= Anticipated Effects of Alcohol Scale; *SE*= standard error; Est./*SE* = a ratio of the factor estimate and the standard error; StdXY = standardized factor loading.

Table 2.

Confirmatory Factor Analysis: AEAS Subscale Item Factor Loadings When the Four-Factor AEAS Model was Fit to "Drinking with Friends" Context and "Drinking Alone" Context Data

	Drinking With Friends (*n* = *240*)				Drinking Alone (*n*= *239*)			
Items by Subscale	Estimate	*SE*	Estimate/*SE*	StdXY	Estimate	*SE*	Estimate/*SE*	StdXY
High Arousal Positive								
Lively	1.000				1.000			
Sociable	.967	.037	26.229	.876	.998	.058	17.257	.842
Carefree	.720	.085	8.456	.506	.560	.089	6.324	.487
Fun	1.005	.022	45.702	.916	1.052	.039	27.247	.908
Attractive	.806	.071	11.420	.550	.742	.070	10.607	.651
Funny	1.027	.051	20.205	.829	1.052	.053	19.720	.880
Talkative	.985	.043	22.887	.878	.995	.059	16.803	.800
Confident	.965	.047	20.424	.827	.997	.060	16.564	.837
Happy	.975	.047	20.740	.893	1.013	.058	17.340	.854
High Arousal Negative								
Demanding	1.000				1.000			
Moody	.813	.092	8.793	.701	.991	.070	14.226	.715
Rude	.676	.103	6.588	.687	.859	.067	12.875	.823
Aggressive	.830	.104	8.004	.716	.699	.109	6.383	.719
Anxious	.702	.115	6.105	.619	.871	.085	10.204	.655
Low Arousal Positive								
Mellow	1.000				1.000			
Relaxed	1.092	.136	8.034	.834	1.312	.158	8.310	.918
Calm	1.193	.106	11.242	.837	1.131	.127	8.917	.819
Low Arousal Negative								
Wobbly	1.000				1.000			
Woozy	1.022	.045	22.697	.900	1.026	.048	21.332	.869
Dizzy	1.087	.043	25.465	.899	1.003	.063	16.032	.875
Ill	.584	.071	8.269	.697	.664	.078	8.551	.700
Drunk	.681	.066	10.375	.551	.744	.054	13.739	.657

Note. Bolded AEAS items are factor metric items. AEAS= Anticipated Effects of Alcohol Scale; *SE*= standard error; Est./*SE* = a ratio of the factor estimate and the standard error; StdXY = standardized factor loading.

Table 3.
Evaluation of AEAS Measurement Invariance by Drinking Context (Solitary n = 239; Social n =240)

		Model Fit Indices			
Level of MI Established		CFI	TLI	RMSEA	SRMR
Configural Invariance					
	Step 1. Model fit	.909	.897	.074	.083
Metric Invariance					
	Step 1. Model fit	.906	.898	.074	.085
	Step 2. Δ in fit from configural model	-.003	.001	.000	.002
Scalar Invariance					
	Step 1. Model fit	.882	.878	.081	.092
	Step 2. Δ in fit from metric model	-.024	-.02	.007	.007

Note. MI = measurement invariance; CFI = Bentler's comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual.

Table 4.

Confirmatory Factor Analysis: SEAS subscale Item Factor Loadings When the Four-Factor SEAS Model was Fit in the Full Sample Collapsed across Contexts (N = 122)

Items by Subscale	Estimate	*SE*	Estimate/*SE*	StdXY
High Arousal Positive				
Fun	1.000			
Lively	.857	.062	13.860	.834
Funny	.834	.080	10.484	.790
Talkative	.728	.077	9.505	.721
High Arousal Negative				
Demanding	1.000			
Rude	1.067	.123	8.694	.868
Aggressive	1.154	.203	5.677	.818
Low Arousal Positive				
Mellow	1.000			
Secure	.900	.264	3.415	.520
Relaxed	1.139	.267	4.263	.808
Calm	1.338	.243	5.513	.785
Low Arousal Negative				
Woozy	1.000			
Dizzy	.875	.091	9.595	.818
Wobbly	.926	.089	10.419	.903

Note. Bolded SEAS items are factor metric items. SEAS= Subjective Effects of Alcohol Scale; *SE*= standard error; Est./*SE* = a ratio of the factor estimate and the standard error; StdXY = standardized factor loading.

Table 5.
Evaluation of SEAS Measurement Invariance by Drinking Context (Solitary n = 63; Social n = 59)

		Model Fit Indices			
Level of MI Established		CFI	TLI	RMSEA	SRMR
Configural Invariance					
	Step 1. Model fit	.911	.890	.090	.097
Metric Invariance					
	Step 1. Model fit	.921	.908	.082	.099
	Step 2. Δ in fit from configural model	.010	.018	-.008	.002
Scalar Invariance					
	Step 1. Model fit	.917	.910	.081	.100
	Step 2. Δ in fit from metric model	-.004	.002	-.001	.001

Note. MI = measurement invariance; CFI = Bentler's comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual.

Table 6. *Aim 3: Correlations among Variables of Interest (N = 236-244)*

	Mean(SD) / %	HAP AOEs Unspecified	LAP AOEs Unspecified	HAP AOEs Friends	LAP AOEs Friends	HAP AOES Alone	LAP AOEs Alone	Weekly Drinking (log)	Age	Gender
HAP AOEs Unspecified	6.83 (1.60)									
LAP AOEs Unspecified	5.92 (1.96)	.378**								
HAP AOEs Friends	7.25 (1.72)	.763**	.281**							
LAP AOEs Friends	5.65 (2.17)	.309**	.748**	.373**						
HAP AOES Alone	4.83 (2.27)	.328**	.348**	.420**	.399**					
LAP AOEs Alone	6.19 (2.03)	.397**	.532**	.479**	.524**	.504**				
Weekly Drinking (log)	8.40 (7.64)	-.031	-.107	.012	-.004	-.076	-.022			
Age	22.54 (1.29)	.075	.175**	.108	.182**	.145*	.154*	-.039		
Gender	66 % men	-.018	-.017	-.045	-.169**	-.140*	-.079	-.175**	-.082	
Race	54.7 % Non-Hispanic Caucasian	.026	-.039	-.028	-.146*	-.153*	-.053	.243**	-.185**	.159*

Note. Mean and SD used raw variables, correlations used log transformed as indicated. HAP AOEs unspecified = high arousal positive AOEs for unspecified context; LAP AOEs unspecified = low arousal positive AOEs for unspecified context; HAP AOEs friends = high arousal positive AOEs for drinking with friends context; LAP AOEs friends = low arousal positive AOEs for drinking with friends context; HAP AOEs alone = high arousal positive AOEs for drinking alone; LAP AOEs alone = low arousal positive AOEs for drinking alone; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 7. *Aim 3 Hypothesis 1*: *Regression Analysis of the Relation between Unspecified Context AOEs and Weekly Drinking (log)*
n = 244

Independent Variable	B	SE	β
HAP AOEs	.000	.002	.000
LAP AOEs	-.005	.004	-.102
Age	.003	.014	.012
Gender	-.143**	.038	-.219**
Race	.171**	.037	.275**

Note. HAP AOEs = high arousal positive AOEs for unspecified context; LAP AOEs = low arousal positive AOEs for unspecified context; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 8. *Aim 3 Hypothesis 2: Regression Analysis of the Relation between AOEs for Drinking with Friends Context and Weekly Drinking (log)*
n = 244

Independent Variable	B	SE	β
HAP AOEs	.000	.001	.007
LAP AOEs	.000	.003	.007
Age	-.002	.014	-.007
Gender	-.142**	.038	-.218**
Race	.172**	.037	.276**

Note. HAP AOEs = high arousal positive AOEs for drinking with friends context; LAP AOEs = low arousal positive AOEs drinking with friends context; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 9. *Aim 3 Hypothesis 3: Regression Analysis of the Relation between AOEs for Drinking Alone and Weekly Drinking (log)*
n = 244

Independent Variable	B	SE	β
HAP AOEs	-.001	.001	-.078
LAP AOEs	.001	.003	.017
Age	.000	.014	.000
Gender	-.148**	.038	-.226**
Race	.166**	.038	.267**

Note. HAP AOEs = high arousal positive AOEs for drinking alone context; LAP AOEs = low arousal positive AOEs for drinking alone context; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 10. *Aim 3 Hypothesis 4*: *Regression Analysis of the Relation between AOEs for Drinking Alone, AOEs for Drinking with Friends, and Weekly Drinking (log)*
n = 244

Independent Variable	B	SE	β
HAP Friends AOEs	.001	.002	.042
LAP Friends AOEs	.002	.003	.032
HAP Alone AOEs	-.001	.001	-.092
LAP Alone AOEs	-.001	.004	-.012
Age	-.001	.014	-.004
Gender	-.146**	.038	-.223**
Race	.167**	.038	.268**

Note. HAP Friends AOEs = high arousal positive AOEs for drinking with friends context; LAP Friends AOEs = low arousal positive AOEs drinking with friends context; HAP Alone AOEs = high arousal positive AOEs for drinking alone context; LAP Alone AOEs = low arousal positive AOEs for drinking alone context; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 11. *Supplemental Aim 3 Hypothesis 2: Regression Analysis of the Relation between AOE Factor Scores for Drinking with Friends Context and Weekly Drinking (log)*
n = 240

Independent Variable	B	SE	β
HAP AOEs	.002	.034	.004
LAP AOEs	-.002	.022	-.007
Age	.001	.014	.005
Gender	-.149**	.038	-.231**
Race	.169**	.038	.273**

Note. HAP AOEs = AOE factor scores on high arousal positive for drinking with friends context; LAP AOEs = AOE factor scores on low arousal positive drinking with friends context; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 12. *Supplemental Aim 3 Hypothesis 3: Regression Analysis of the Relation between AOE Factor Scores for Drinking Alone and Weekly Drinking (log)*
n = 240

Independent Variable	B	SE	β
HAP AOEs	-.024	.026	-.076
LAP AOEs	-.003	.023	-.009
Age	.003	.014	.015
Gender	-.155**	.038	-.240**
Race	.164**	.038	.265**

Note. HAP AOEs = AOE factor scores on high arousal positive for drinking alone context; LAP AOEs = AOE factor scores on low arousal positive drinking alone context; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian).
** p <.01, *p < .05.

Table 13. *Aim 4: Correlations among Variables of Interest in the Solitary Alcohol Administration Context (N = 23-65)*

	Mean (SD) / %	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. HAP SR	5.96 (2.17)																
2. LAP SR	6.92 (2.04)	.396**															
3. HAP AOEs	7.23 (1.80)	.294*	.450**														
4. LAP AOEs	5.92 (1.96)	.130	.424**	.328**													
5. HAP AOEs Friends	7.64 (1.88)	.248	.229	.744**	.239												
6. LAP AOEs Friends	5.46 (1.98)	.275*	.421**	.356**	.710**	.306*											
7. HAP AOES Alone	4.72 (2.50)	.185	.236	.189	.449**	.235	.397**										
8. LAP AOEs Alone	5.78 (1.86)	.056	.345**	.329**	.506**	.391**	.267*	.396**									
9. Weekly Drinking (log)	8.24 (7.80)	.019	-.054	.036	-.145	-.012	-.096	-.193	-.079								
10. Age	22.4 (1.2)	.078	-.034	.076	.197	.067	.176	.189	.320*	-.227							
11. Gender	68.3 % male	-.135	.085	.033	.010	-.076	-.215	.088	.006	-.229	-.056						
12. Race	63.5 % Non-Hispanic Caucasian	-.185	-.067	.041	-.105	-.079	-.310*	-.161	.041	.164	-.246	.305*					
13. Family Hx	47.6 % FH+	-.183	-.071	.039	-.081	.016	-.241	-.194	-.015	.241	-.078	.033	.129				
14. Physical Context	52.4 % Lab	-.014	-.042	-.116	-.179	-.248	-.053	-.142	-.132	.093	.109	-.036	.195	-.082			
15. Vividness friend	4.18 (.723)	.010	.059	.154	-.128	.052	-.099	.431*	.106	-.055	.238	.042	-.023	.004	-.083		
16. Vividness alone	2.62 (1.23)	.081	.104	-.006	-.401*	.101	-.370	-.142	.161	-.125	-.028	-.129	-.160	.202	.160	.147	
17. BAC	.067 (.012)	.231	.174	.209	.038	.138	.205	.116	.093	-.008	.055	-.167	-.031	-.109	.241	-.257	.272

Note. Mean and SD used raw variables, correlations used log transformed as indicated. HAP SR = high arousal positive subjective response measured in the solitary drinking context on the ascending limb; LAP SR = low arousal positive SR measured in the solitary drinking context on the ascending limb; HAP AOEs = high arousal positive AOEs for unspecified context; LAP AOEs = low arousal positive AOEs for unspecified context; HAP AOEs friends = high arousal positive AOEs for drinking with friends context; LAP AOEs friends = low arousal positive AOEs for drinking with friends context; HAP AOEs alone = high arousal positive AOEs for drinking alone; LAP AOEs alone = low arousal positive AOEs for drinking alone; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian); family hx= family history of alcohol problems (coded negative family history = 0, positive family history = 1); physical context = physical context of alcohol administration (coded bar = 1, laboratory = 0); vividness friend= vividness of imagined context when imagined drinking with friends; vividness alone = vividness of imagined context when imagined drinking alone; BAC = Breath alcohol concentration measured on the ascending limb.
** p <.01, *p < .05.

Table 14. *Aim 4: Correlations Among Variables of Interest in the Group Alcohol Administration Context (N = 25-59)*

	Mean (SD) / %	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. HAP SR	6.55 (1.85)																		
2. LAP SR	6.51 (1.81)	.089																	
3. HAP AOEs	7.32 (1.58)	-.023	-.087																
4. LAP AOEs	6.27 (1.68)	-.218	.272*	.398**															
5. HAP AOEs Friends	7.81 (1.5)	.092	.024	.560**	.126														
6. LAP AOEs Friends	6.01 (1.86)	-.215	.308*	.263*	.619**	.414**													
7. HAP AOES Alone	4.64 (2.29)	.186	.215	.007	.044	.026	.149												
8. LAP AOEs Alone	6.75 (1.91)	-.138	.252	.358**	.458**	.380**	.532**	.346**											
9. Weekly Drinking (log)	7.27 (6.71)	.097	.068	.139	-.055	.285*	.097	.115	.050										
10. Age	22.51 (1.19)	-.237	-.087	-.013	.085	.065	.072	-.105	-.026	-.001									
11. Gender	69.5 % Male	.046	-.249	.137	-.137	.010	-.232	-.284*	-.077	-.149	-.191								
12. Race	45.8 % Non-Hispanic Caucasian	-.092	.062	.060	.109	.057	-.106	-.165	.003	.135	-.136	.278*							
13. Family Hx	51.7 % FH+	-.010	.162	.057	.035	.164	.190	.118	.043	-.034	.332*	-.203	.002						
14. Physical Context	57.6 % Lab	-.153	-.141	-.324*	-.187	-.120	.025	.019	-.185	-.122	-.021	-.196	-.030	.111					
15. Gender comp	57.6 % all men, 16.9% all women, 25.4% mixed	-.223	.105	-.032	.206	-.025	.227	.256	.052	.064	.240	.837**	-.267*	.005	.218				
16. Group size	74.6% 2 people, 25.4% 3 people	-.104	-.028	.096	.061	.096	.192	.153	.073	.115	-.021	-.218	.089	.222	.208	.301*			
17. Vividness friend	4.08 (.845)	.254	.052	.157	-.273	.061	-.004	.179	.297	.102	-.214	.170	-.264	-.014	-.455*	-.170	-.051		
18. Vividness alone	3.0 (1.06)	-.059	.278	.030	-.292	-.070	-.158	-.027	.186	.182	-.159	.088	.000	-.225	-.225	-.088	.088	.313	
19. BAC	.067 (.011)	.119	.171	.075	.195	.095	.358**	.271*	.057	.107	-.119	-.156	-.007	.154	-.042	.086	.100	.123	-.493*

Note. Mean and SD used raw variables, correlations used log transformed as indicated. HAP SR = high arousal positive subjective response measured in the group drinking context on the ascending limb; LAP SR = low arousal positive SR measured in the solitary drinking context on the ascending limb; HAP AOEs = high arousal positive AOEs for unspecified context; LAP AOEs = low arousal positive AOEs for unspecified context; HAP AOEs friends = high arousal positive AOEs for drinking with friends context; LAP AOEs friends = low arousal positive AOEs for drinking with friends context; HAP AOEs alone = high arousal positive AOEs for drinking alone; LAP AOEs alone = low arousal positive AOEs for drinking alone; weekly drinking log = TLFB weekly drinking log transformed; gender coded (1= men, 2 = women); Race coded (1 = Non-Hispanic Caucasian, 0 = non-Caucasian); family hx= family history of alcohol problems (coded negative family history = 0, positive family history = 1); physical context = physical context of alcohol administration (coded bar = 1, laboratory = 0); Gender comp = gender composition of participant groups, coded all women = 0, mixed gender = 1, all men = 2; group size = size of group for alcohol administration, coded two people = 0, three people = 1; vividness friend= vividness of imagined context when imagined drinking with friends; vividness alone = vividness of imagined context when imagined drinking alone; BAC = Breath alcohol concentration measured on the ascending limb.

** p <.01, *p < .05

Table 15. *Aim 4 Hypothesis 1*: *Regression Analysis of the Relation between Low Arousal Positive AOEs for Drinking Alone and Low Arousal Positive SR in a Solitary Drinking Context*
n = 61

Independent Variable	B	SE	β
LAP AOEs Alone	.070*	.032	.197*
Baseline LAP SR	.707**	.094	.675**

Note. Only significant covariates included. LAP AOEs Alone = low arousal positive AOEs for drinking alone context; Baseline LAP SR = low arousal positive subjective response measured pre-alcohol administration.
** p <.01, *p < .05.

Table 16. *Aim 4 Hypothesis 1*: *Regression Analysis of the Relation between Low Arousal Positive AOEs for Unspecified Context and Low Arousal Positive SR in a Solitary Drinking Context*

n = 62

Independent Variable	B	SE	β
LAP AOEs Unspecified	.085**	.031	.246**
Baseline LAP SR	.665**	.094	.636**

Note. Only significant covariates included. LAP AOEs Unspecified = low arousal positive AOEs for unspecified drinking context; Baseline LAP SR = low arousal positive subjective response measured pre-alcohol administration.

** p <.01, *p < .05.

Table 17. *Aim 4 Hypothesis 2*: *Regression Analysis of the Relation between High Arousal Positive AOEs for Drinking with Friends and High Arousal Positive SR in a Group Drinking Context*
n = 55

Independent Variable	B	SE	β
HAP AOEs Friends	.011	.038	.034
Baseline HAP SR	.409**	.111	.451**
Gender Composition	-.745*	.295	-.309*

Note. Only significant covariates included. HAP AOEs Friends = high arousal positive AOEs for drinking with friends context; Baseline HAP SR = high arousal positive subjective response measured pre-alcohol administration; Gender composition = gender composition of participant groups, coded all women = 0, mixed gender = 1, all men = 2; ** p <.01, *p < .05.

Table 18. *Aim 4 Hypothesis 2*: *Regression Analysis of the Relation between High Arousal Positive AOEs for Unspecified Drinking Context and High Arousal Positive SR in a Group Drinking Context*
n = 57

Independent Variable	B	SE	β
HAP AOEs Unspecified	-.002	.034	-.005
Baseline HAP SR	.409**	.109	.451**
Gender Composition	-.759*	.287	-.316*

Note. Only significant covariates included. HAP AOEs Unspecified = high arousal positive AOEs for drinking in an unspecified context; Baseline HAP SR = high arousal positive subjective response measured pre-alcohol administration; Gender composition = gender composition of participant groups, coded all women = 0, mixed gender = 1, all men = 2; ** $p < .01$, *$p < .05$.

Table 19. *Levels of Alcohol Involvement and Possible Context-specific Relations between AOEs and Drinking Behavior*

Level of alcohol involvement	**Possible context-specific relation between AOEs and drinking behavior**
Early adolescence/pre-drinking	-Undifferentiated across context
Light drinker*	-Relation between HAP AOEs and drinking behavior, with context effects on this relation -No relation between LAP AOEs and drinking behavior
Moderate drinker (current sample)	-Relation between HAP AOEs and drinking behavior, but no context effects -No relation or weak relation between LAP AOEs and drinking behavior, no context effects
Heavier drinker*	-Relation between HAP AOEs and drinking behavior, but no context effects -Relation between LAP AOEs and drinking behavior, with context effects on this relation
Alcohol dependent/AUD	Relations between HAP AOEs and LAP AOEs and drinking behavior, but no context effects

Note. HAP AOEs = high arousal positive AOEs; LAP AOEs = low arousal positive AOEs; * = levels of alcohol involvement where detection of context effects may be most likely.

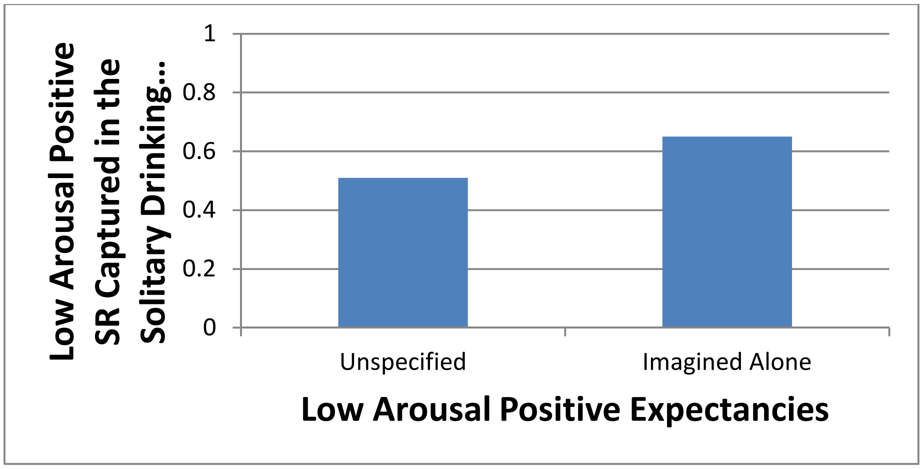

Figure 1. Aim 4 Hypothesis 1: Hypothesized relations between Low Arousal Positive AOEs and Low Arousal Positive SR

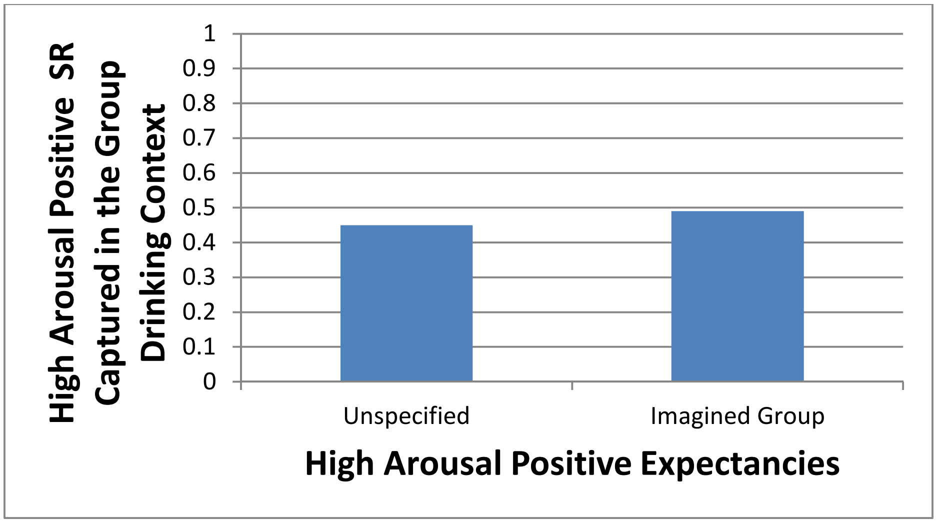

Figure 2. Aim 4 Hypothesis 2: Hypothesized relations between High Arousal Positive AOEs and High Arousal Positive SR

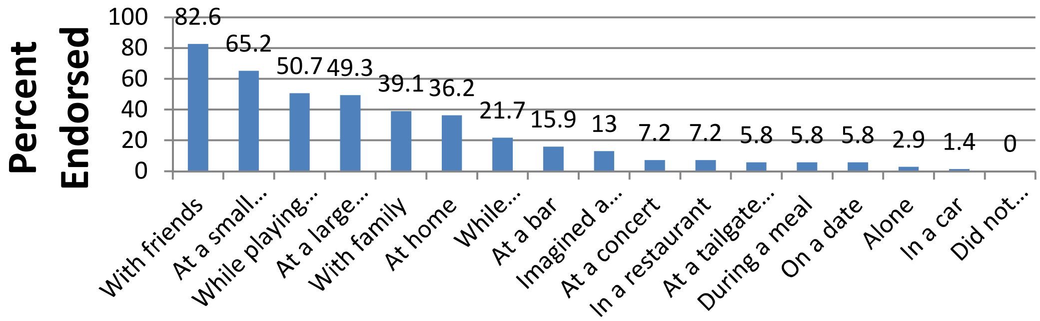

Figure 3. Study 1 Aim 1: Imagined Contexts When Reporting on Unspecified AEAS (endorse as many as apply)

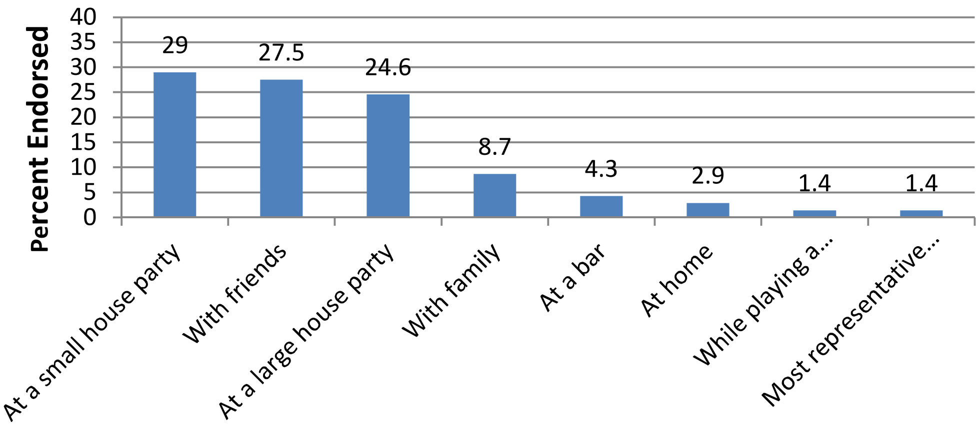

Figure 4. Study 1 Aim 1: "Most Representative" Imagined Context (Choose One)

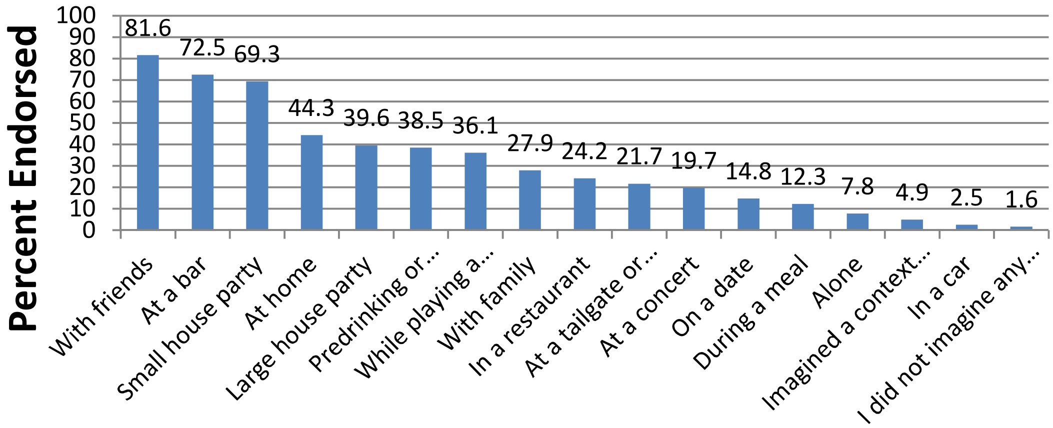

Figure 5. Study 2 Aim 1: Imagined Contexts When Reporting on Unspecified AEAS (endorse as many as apply)

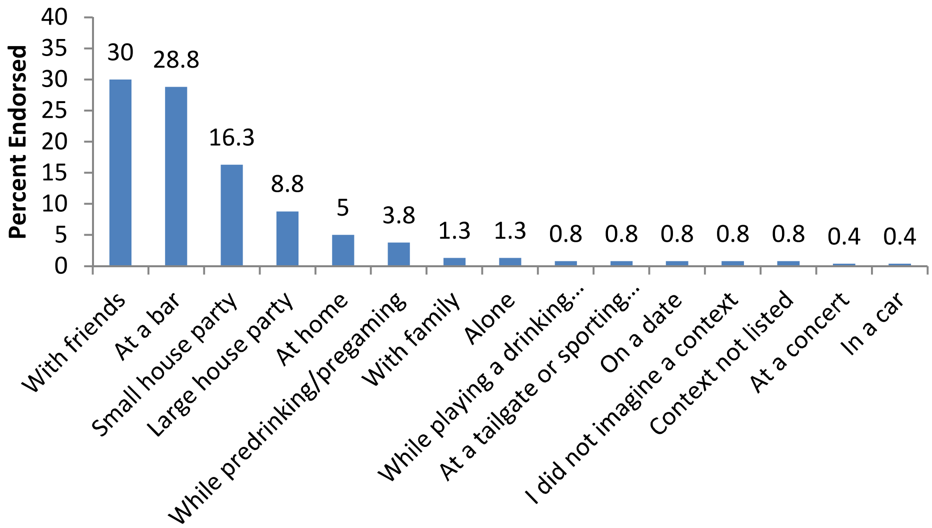

Figure 6. Study 2 Aim 1: "Most Representative" Imagined Context (Choose One)

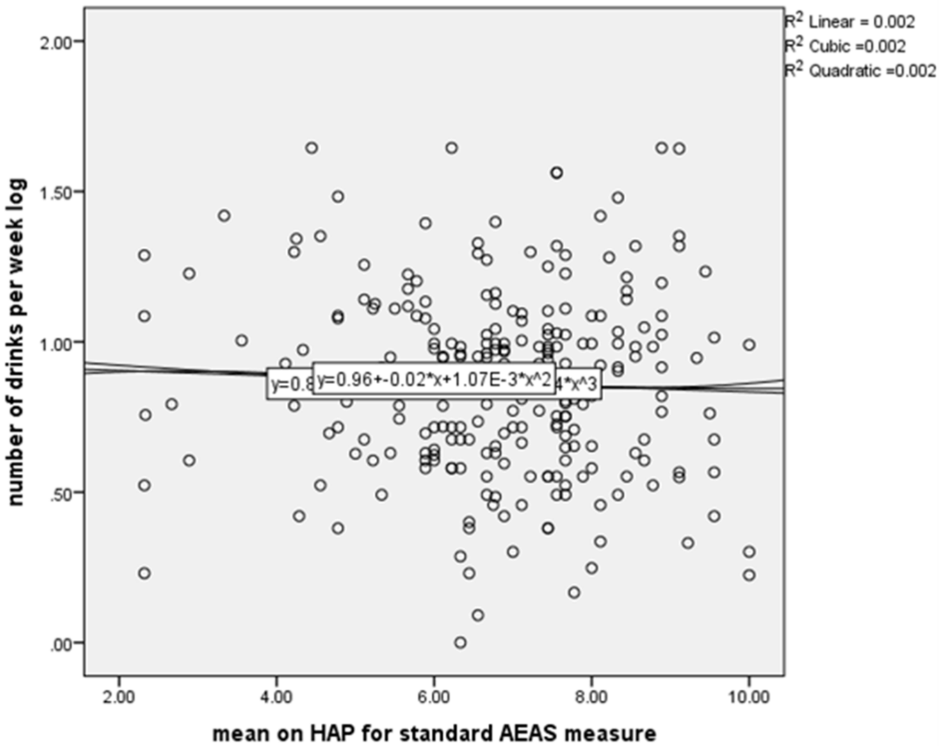

Figure 7. Scatterplot between Weekly Drinking and Mean High Arousal Positive AOEs for the Unspecified Context

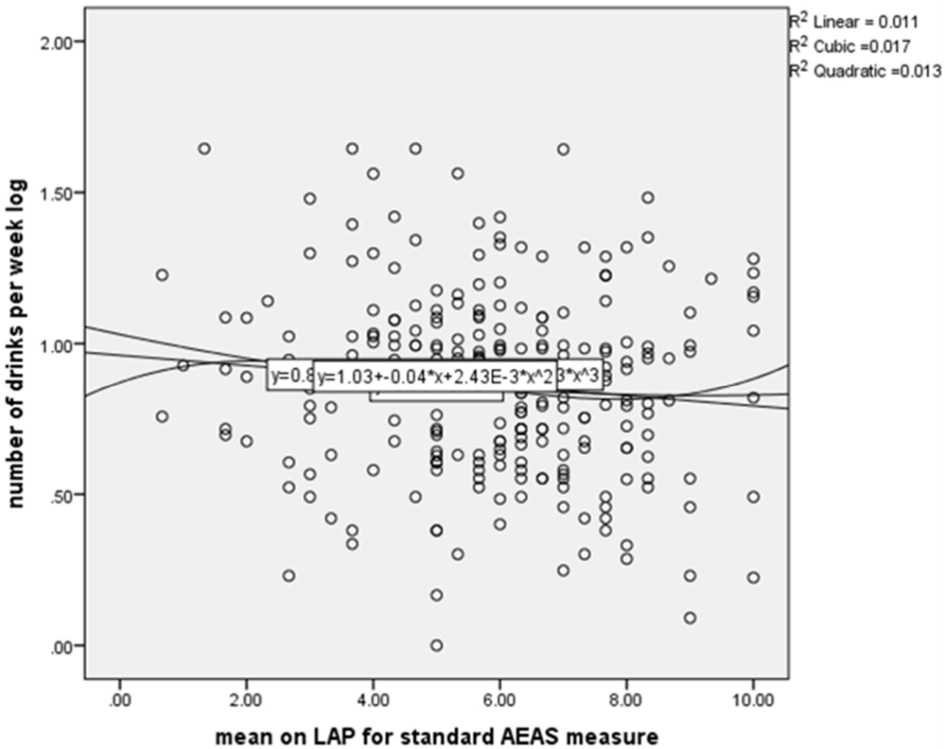

Figure 8.Scatterplot between Weekly Drinking and Mean Low Arousal Positive AOEs for the Unspecified Context

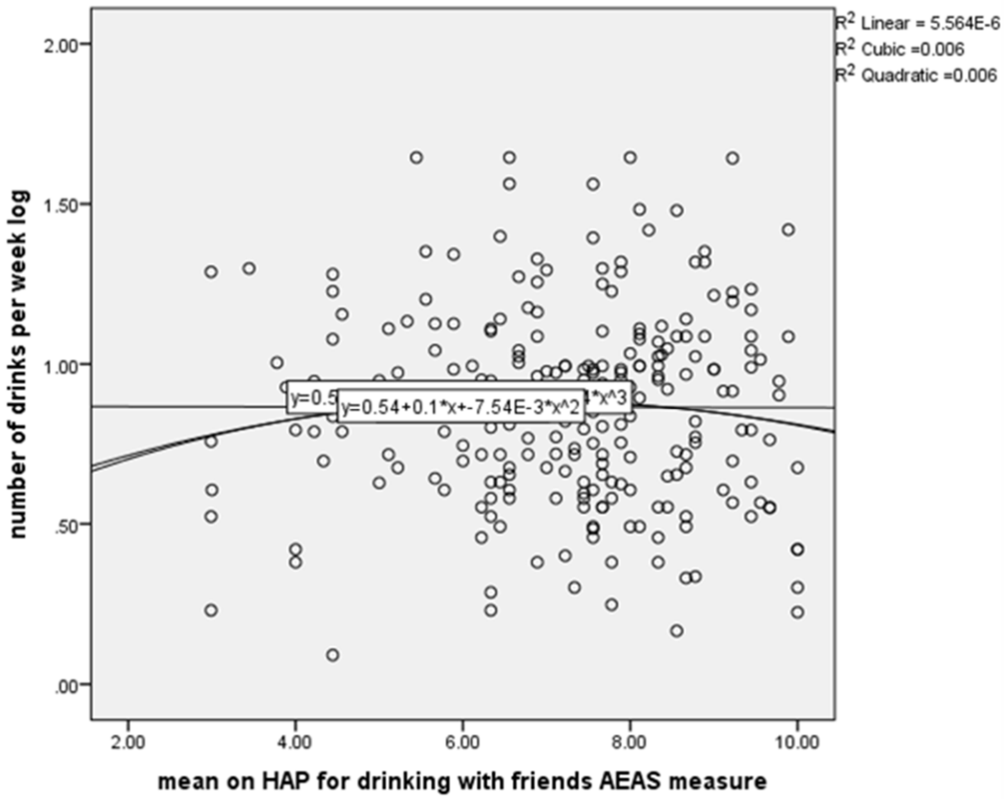

Figure 9. Scatterplot between Weekly Drinking and Mean High Arousal Positive AOEs for the Social Context

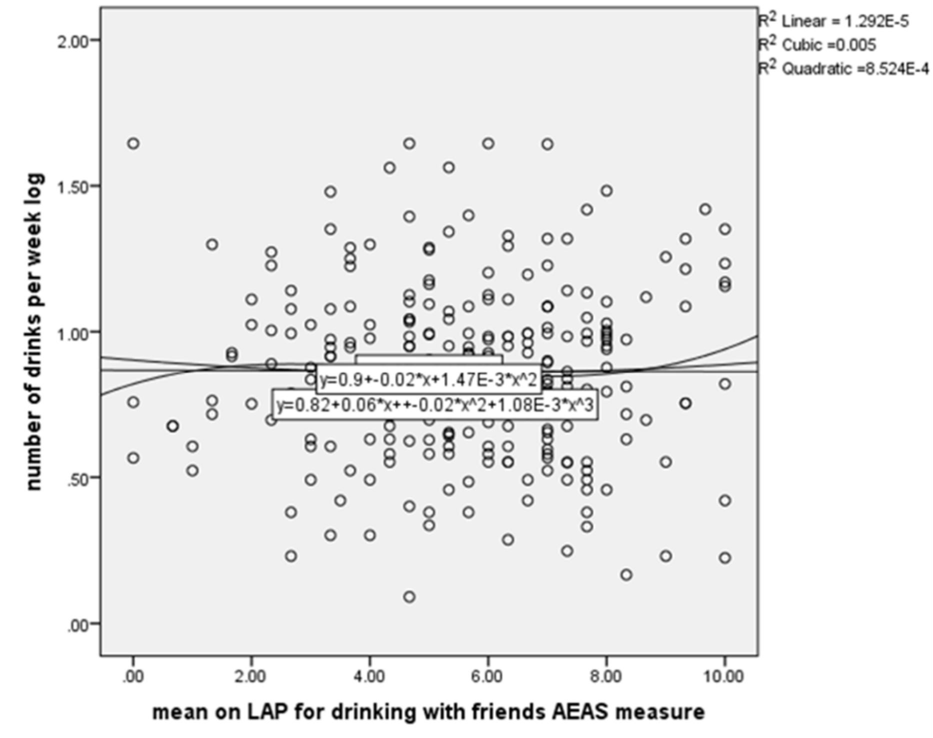

Figure 10. Scatterplot between Weekly Drinking and Mean Low Arousal Positive AOEs for the Social Context

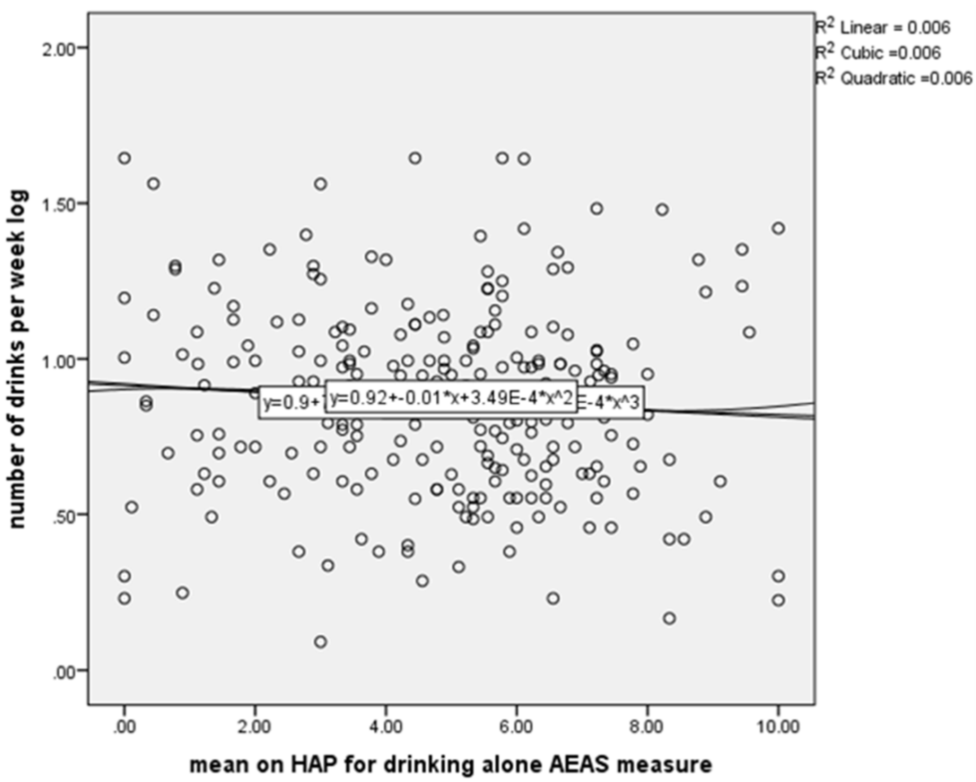

Figure 11. Scatterplot between Weekly Drinking and Mean High Arousal Positive AOEs for the Solitary Context

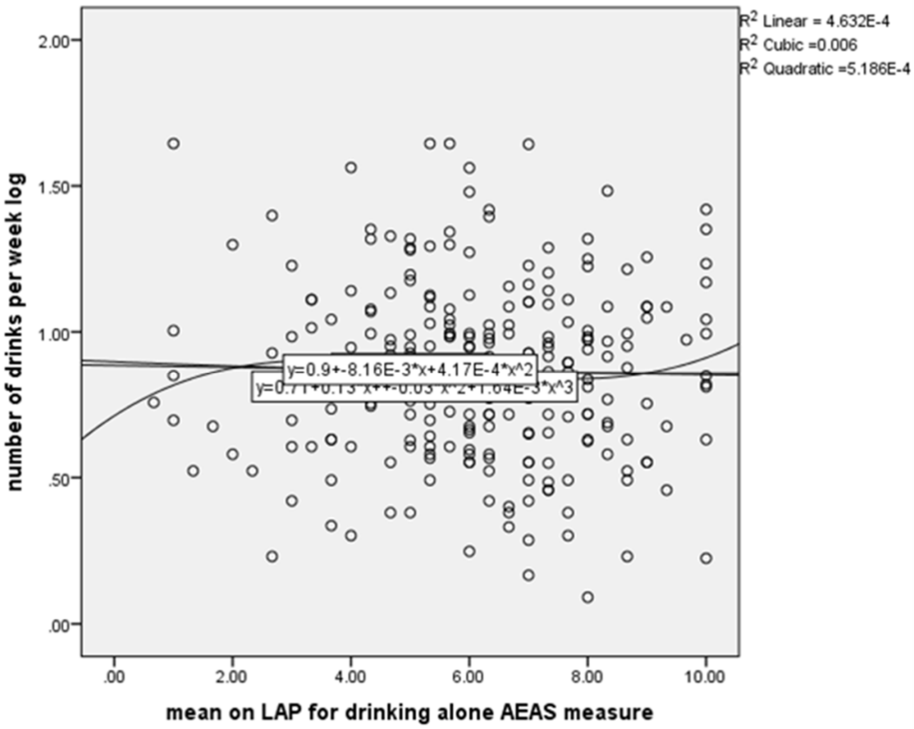

Figure 12. Scatterplot between Weekly Drinking and Mean Low Arousal Positive AOEs for the Solitary Context

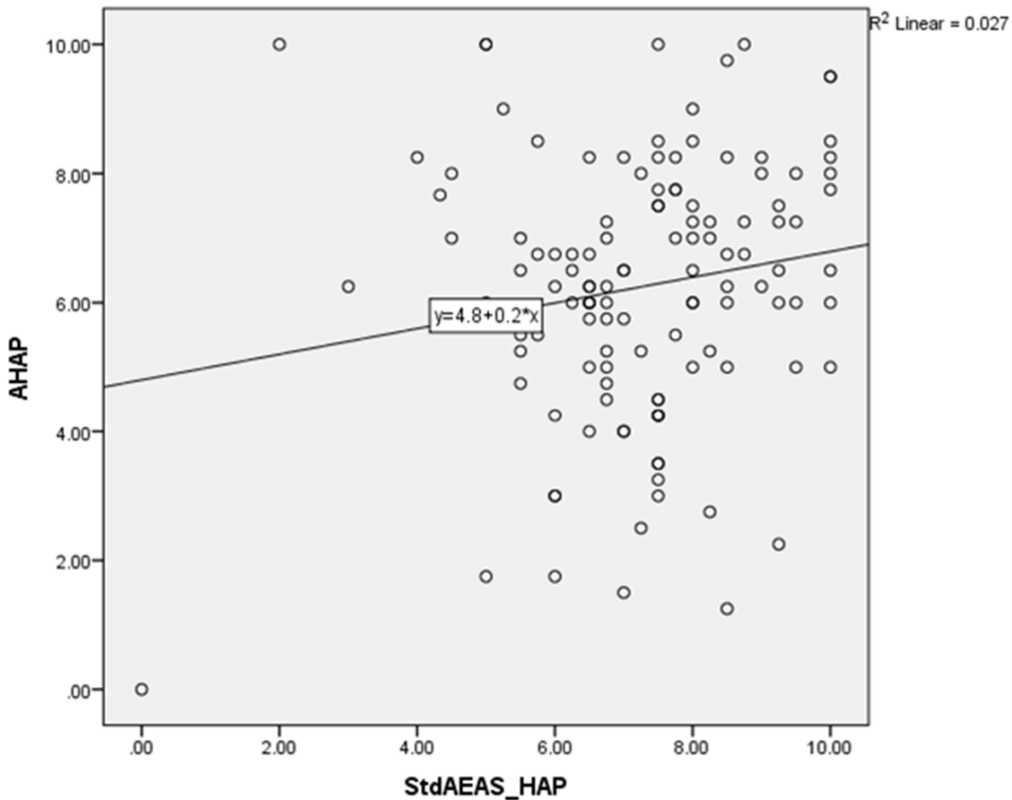

Figure 13. Scatterplot between High Arousal Positive SR in a Group and Mean High Arousal Positive AOEs for the Unspecified Context

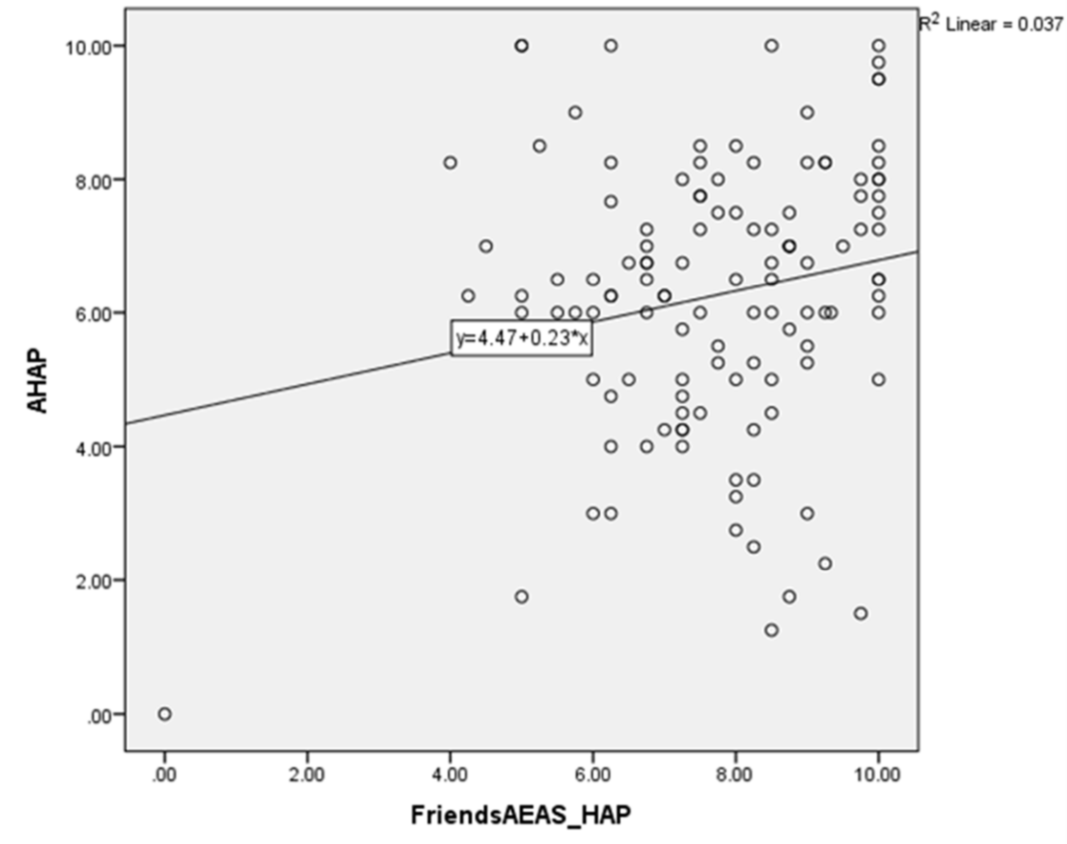

Figure 14. Scatterplot between High Arousal Positive SR in a Group and Mean High Arousal Positive AOEs for the Drinking with Friends Context