Examining the Link Between Social Anxiety and Alcohol Use:

The Role of Post-Event Processing

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ABSTRACT

Examining the Link Between Social Anxiety and Alcohol Use: The Role of Post-Event Processing

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Post-event processing (PEP) involves a negative, self-focused review of one's performance in past social events. PEP is common in social anxiety (SA); by increasing anticipation of failure for future social events, PEP serves to maintain anxiety. Research is needed to clarify the association between SA and PEP in the context of alcohol use, given that although socially anxious individuals are at increased risk of drinking problems, this risk pathway is poorly understood. To help resolve this, the present two studies aimed to assess the role of PEP in the link between SA and alcohol use among two samples of young adults who ranged in SA severity. Study 1 used a 3-week diary (via smartphone) to assess alcohol intoxication during, and PEP after, social events in a sample of individuals (N=92) high (n=40) and low (n=52) in SA. Of interest was the association between PEP and next-event intoxication, and the moderating effect of SA. Compared to the low SA group, those high in SA reported more PEP, similar intoxication, and a positive correlation between PEP and next-event intoxication. In the low SA group PEP and intoxication were unrelated. Multilevel models supported a SA by PEP interaction in the high SA group only. Specifically, increases in PEP corresponded with increases in intoxication at the next event, but only for those moderately high in SA. Study 2 used a lab-based procedure, and participants (N=103) consumed alcoholic (n=52) or non-alcoholic (n=51) beverages, engaged in an anxiety-provoking interaction, and completed follow-up assessments of PEP about the interaction (sent via email). Regression models supported a SA by drinking status interaction in predicting PEP in the alcohol condition only. Specifically, for those who consumed alcohol before the interaction, elevated (baseline) SA was associated with increased PEP, but only for light drinkers. For heavy drinkers in the alcohol condition, SA was unrelated to PEP. These results underscore the importance of PEP, and variables that influence

PEP, in understanding the link between SA and alcohol use. The results are discussed in terms of theoretical and clinical considerations.

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CONTRIBUTION OF AUTHORS

The following thesis is comprised of two manuscripts:

Study 1 (Chapter 2)

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Study 2 (Chapter 4)

Ogniewicz, A.S., O'Connor, R.M. (in preparation). *Post-event processing after drinking: The effect of social anxiety and drinking status.* Manuscript to be submitted for publication.

I am responsible for the conceptualization of the program of research presented in this dissertation, including the two specific studies. With guidance from my supervisor, Dr. Roisin O'Connor, I chose the research questions, study designs, hypotheses, and statistical plans. With assistance from members of the Young Adult and Alcohol Research Lab (see below), I recruited, screened, scheduled, and tested participants. With assistance from Dr. O'Connor and a research collaborator (see below), I conducted all of the statistical analyses, interpreted the results, and wrote this dissertation.

I met with Dr. Roisin O'Connor, regularly, and she provided guidance through each stage of the research project. My committee members, Drs. Mark Ellenbogen and Adam Radomsky, also contributed to this dissertation, beginning with their recommendations for methodological changes, and their approval of my study design and statistical analyses at my dissertation proposal meeting in May, 2014.

For Study 1, I was assisted by the lab manager, Mayesha Khan and my Honours thesis student, Caitlin O'Neill. Mayesha and Caitlin assisted with recruiting participants, collecting and entering data, and compensating participants. I was responsible for exporting the data from an online server (www.fluidsurveys.com) to a statistical software program, screening and cleaning the data, conducting analyses, and interpreting the results with assistance from my supervisor, Dr. Roisin O'Connor. Dr. Emmanuel Kuntsche, who is a research collaborator and a co-author on this manuscript, provided a great deal of guidance in how to run multilevel models in order to test our hypotheses. I wrote the first draft of the manuscript, and in collaboration with Drs. O'Connor and Kuntsche, the manuscript was finalized and submitted for publication.

For Study 2, I was assisted by the lab manager, Mayesha Khan, and by several undergraduate volunteers (Jonathan Dellar-Fernandes, Carina Kesic, Kevin Lacon, Lara Lakhsassi, Nathaniel Moxley-Kelly, Alexander Pearson, Arthi Rajadurai, Edmine Serulien, Amanda Simundic, and Julia Suca). These individuals assisted with recruitment of participants and execution of the in-lab procedures. I provided training and supervision of these tasks, and I served as the primary study experimenter. I was responsible for exporting the data from an online server (www.fluidsurveys.com) to a statistical software program, screening and cleaning the data, conducting analyses, and interpreting the results with assistance from Dr. O'Connor. I wrote the first draft of the manuscript, and with feedback from Dr. O'Connor, I completed the final version which will be submitted for publication.

I also wrote the other parts of this dissertation, with suggestions and feedback from Dr. O'Connor. Study 1 has been submitted for publication, and is written in this dissertation as it appears in the submitted manuscript. Study 2 will be submitted for publication shortly.

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CHAPTER 1:
GENERAL INTRODUCTION

Scope of the Problem: Alcohol Use and Social Anxiety

Alcohol use disorder

Alcohol use disorder (AUD) is one of the most common psychological disorders (Grant et al., 2004; Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Rehm et al., 2015; Wittchen et al., 2011). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), AUD is associated with impaired control related to alcohol use, such as consuming more alcohol than intended or having intense cravings to drink alcohol, making it difficult to focus on other things. Individuals with AUD frequently experience impairment in their social relationships, disruptions in work- and household-related obligations, and medical problems (e.g., liver cirrhosis) as a result of their alcohol consumption. Problematic alcohol use can also result in harm or risk of harm to the individual and/or others, such as causing vehicle accidents as a result of driving while intoxicated. Despite these alcohol-use problems and the potential risks associated with use, individuals often do not receive treatment for their AUD (Grant et al., 2015). Continued drinking increases tolerance to alcohol (i.e., needing more alcohol to achieve the same effects) and, in more severe cases, leads to alcohol withdrawal symptoms, which is the body's response to sudden cessation of alcohol and can be life-threatening (American Psychiatric Association, 2013).

In a recent epidemiological study assessing individuals 18 years and older in the United States, the 12-month and lifetime prevalence rates of AUD were 13.9% and 29.1%, respectively (Grant et al., 2015). Heavy drinking seems to be particularly heightened during young adulthood, a period in which individuals are regularly exposed to social events where alcohol use is the norm; where it is often atypical to abstain from alcohol. Heavy or binge drinking has been defined as four or more standard drinks for females, and five or more standard drinks for males, within a two-hour period (National Institute on Alcohol Abuse and Alcoholism, 2012; Wechsler, Dowdall, Davenport, & Castillo, 1995). According to recent studies, 60.8% of university students reported consuming alcohol in the previous month (Substance Abuse & Mental Health Services Administration, 2012), and 37-44% reported binge drinking at least once in the previous two to four weeks (Hingson, Heeren, Winter, & Wechsler, 2005; Johnston, O'Malley, Bachman, & Schulenberg, 2010; Wechsler et al., 2002). Additionally, national survey data in Canada found

that approximately 83% of young adults (15-24 years old) were currently drinking, or consumed alcohol regularly in the past year. Among past-year drinkers, 46% reported drinking heavily at least once a month, and 14% reported drinking heavily at least once a week (Adlaf, Begin, & Sawka, 2005).

Although drinking in young adulthood has a transitory course, and most individuals (e.g., university students) "mature out" of heavy drinking, a subset do not and experience chronic alcohol use problems in older adulthood (e.g., Marlatt, Larimer, Baer, & Quigley, 1993; Weingardt et al., 1998; Zucker, 1987). Consistent with this, a study looking at the National Household Survey on Drug Use and Health found that the one-year prevalence rate for alcohol or illicit drug disorders is 21% in young adults (18-25 years old), and decreases to 7% in older adults (26+ years old) (Substance Abuse and Mental Health Services Administration, 2005). Evidently, heavy drinking and related problems are common in young adulthood, and a subset of these individuals are at risk for continued heavy drinking, and drinking problems later in life. There is a need to better understand what prevents young adults from "maturing out" of heavy drinking and going on to develop chronic drinking problems. Specifically, what are the factors that influence how young adults experience drinking, and how does this affect the development of early drinking patterns and whether or not these individuals will continue to drink heavily as they move into older adulthood? Given the significant individual and societal costs associated with alcohol use disorders (Hasin, Stinson, Ogburn, & Grant, 2007), these questions are important to address.

Social anxiety disorder

When considering risk factors for the development of AUD and alcohol-related problems, extensive attention has been given to social anxiety disorder (SAD). SAD tends to develop early in life (mean age of 13 years) (Stein & Stein, 2008; Steinert, Hofmann, Leichsenring, & Krus, 2013), and typically precedes the onset of drinking patterns (Davidson, Hughes, George, & Blazer, 1993; Kushner, Sher, & Beitman, 1990). The DSM-5 defines SAD as a persistent fear of social and/or performance situations due to the possibility of being negatively evaluated or scrutinized by others. Individuals with SAD fear that their behaviour, including showing signs and symptoms of anxiety, will result in embarrassment. Suffering individuals often recognize that their fears are excessive or unreasonable; nonetheless, they tend to avoid social situations altogether, or they endure them with high levels of distress and discomfort. According to the

United States National Comorbidity Survey Replication, the 12-month prevalence rate for SAD (using the DSM criteria) is 6.8% among individuals 18-44 years of age (Kessler, Chiu, Demler, & Walters, 2005). In addition to being prevalent, social anxiety (SA) symptoms tends to persist without treatment (Hirsch, Meynen, & Clark, 2004), and may result in significant functional impairment (e.g., social, occupational, academic), and/or the development of other problems, including problematic alcohol use (Buckner, Schmidt, et al., 2008; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992).

Concurrent alcohol use problems and social anxiety

Using national epidemiological data, Grant and colleagues demonstrated that among individuals with a lifetime prevalence of SAD, 48.2% met criteria for AUD (Grant et al., 2005). Moreover, there is research showing that, among socially anxious individuals, the onset of alcohol use problems tends to occur during young adulthood. Lewis and O'Neill (2000) found that college students with problematic drinking indicated having more severe SA compared to non-problematic drinkers. Additionally, prospective studies have shown that adolescents diagnosed with SAD were at increased risk of meeting criteria for AUD in young adulthood relative to those without SAD (Buckner, Schmidt et al., 2008; Buckner, Timpano, Zvolensky, Sachs-Ericsson, & Schmidt, 2008). Thus, the literature suggests that for individuals with elevated SA or a diagnosis of SAD, the risk of developing drinking problems is heightened during university years.

Social anxiety appears to be a risk factor in the development of alcohol use problems, however research investigating the link between SA and alcohol use has yielded mixed findings. On the one hand, correlational research and experimental studies have provided support for a positive association between SA and alcohol use or alcohol-related problems (e.g., Abrams et al., 2001; 2002; Buckner, Eggleston, & Schmidt, 2006; Schneier et al., 2010). On the other hand, several studies have shown that SA is negatively associated with alcohol use and related problems (e.g., Eggleston, Woolaway-Bickel, & Schmidt, 2004; Holroyd, 1978; Stewart, Morris, Mellings, & Komar, 2006), or is unrelated to alcohol use (e.g., Buckner et al., 2006; Gilles, Turk, & Fresco, 2006; Ham, Zamboanga, Bacon, & Garcia, 2009; LaBrie, Pedersen, Neighbors, & Hummer, 2008). Thus, it seems that although socially anxious individuals have an increased risk of developing alcohol-related problems, and particularly during young adulthood, not all socially anxious individuals drink problematically.

When SAD and AUD co-occur, individuals tend to have worse outcomes relative to when only one disorder is present, including a greater likelihood of having depression and other psychological disorders, greater impairment and stress in their social relationships, and increased healthcare utilization (e.g., Buckner, Timpano, et al., 2008; Thomas, Thevos, & Randall, 1999). Understanding the potential mechanisms that link SA and alcohol use is critical to developing effective preventions and treatments that target SAD-AUD comorbidity. Several theories have been proposed to better understand the risk pathway from social anxiety to problem drinking.

Theoretical Background

Theories explaining the SAD-AUD link have considered SA as an antecedent to AUD, alcohol use as an antecedent to SAD, and the concurrent development and/or maintenance of SAD and AUD. The current program of research focuses less on the starting point, and instead focuses on how the co-occurrence may be maintained; thus, the emphasis is on a model of bidirectional reinforcement. Identifying the primary antecedent is beyond the scope of this dissertation, but the focus on mechanisms may lend itself to future investigations. As such, the theories reviewed focus on the effects of alcohol, how they might influence facets of SA, and how alcohol's effects on SA perpetuate drinking, thereby increasing the risk of chronic drinking problems among socially anxious individuals. The theories presented below, include: tension reduction theory, self-medication hypothesis, and the biopsychosocial model of social anxiety and substance use.

Tension reduction theory

The tension reduction theory was first proposed by Conger (1951; 1956) using animal models. The theory suggests that alcohol reduces tension or anxiety by dampening physiological reactions to stress, and that animals and humans consume alcohol for its tension-reducing properties. Consistent with this, studies comparing saline-receiving and alcohol-receiving animals have shown that when animals consumed alcohol they experienced a reduction in the release of stress hormones in response to physical (Pohorecky & Brick, 1987) and psychological (Brick & Pohorecky, 1982) stressors. When applied to SA and alcohol use in humans, the theory suggests that being intoxicated during social events leads to a decrease in the physiological symptoms of anxiety. As a result, anxious individuals are motivated to consume alcohol to reduce tension, which increases their risk of developing AUD (Greeley & Oei, 1999; Kushner et al., 1990). This theory may be particularly relevant to young adults who are frequently

confronted with social events that provoke anxiety, and where alcohol use (including heavy use) is promoted. The tension reducing effects of alcohol during social events may interfere with development of effective coping strategies. Thus, while their non-socially anxious peers may "mature out" of heavy drinking post-university, those high in SA may continue to rely on alcohol as a way to endure distressing social situations. This may put those high in SA at risk for developing AUD.

Self-medication hypothesis

The self-medication hypothesis (Chutuape and de Wit, 1995; Khantzian, 1985; see review by Carrigan & Randall, 2003) stems from the tension reduction theory. Similarly, the self-medication hypothesis implicates the dampening (or anxiolytic) effects of alcohol on physiological symptoms of stress as central to risk. The theory states that alcohol and other substances are particularly appealing to individuals with certain psychological problems, such as anxiety and depression, because alcohol reduces symptoms associated with these problems (e.g., heart rate, subjective distress ratings; Himle et al., 1999). Thus, socially anxious individuals are at risk for continued use or misuse of alcohol if it is consumed for its anxiety-alleviating effects. This theory also proposes that individuals high in SA will be particularly motivated to consume alcohol in anticipation of an anxiety-provoking social situation (review by Carrigan & Randall, 2003; Chutuape & de Wit, 1995). Thus, alcohol is consumed to decrease anxiety and discomfort in the short term, yet it maintains these symptoms in the long term. Like the tension reduction theory, the self-medication hypothesis focuses on the use of alcohol and other substances to, more generally, manage or dampen physiological reactivity and negative affect associated with stress or psychological problems.

Biopsychosocial model of social anxiety and substance use

The biopsychosocial model (Buckner, Heimberg, Ecker, & Vinci, 2013), when applied to alcohol use, proposes that socially anxious individuals are at heightened risk of drinking problems because of alcohol's effects on one or more of its multiple facets. In addition to considering alcohol's effect on physiological arousal and low positive affect during social events, as proposed by the tension reduction theory and self-medication hypothesis, this model also considers the effects on SA-specific facets including evaluation fears, perceived social deficits, and social avoidance. For example, socially anxious individuals may find alcohol appealing if it decreases their thoughts about and fears of being judged by others in social situations.

Summary of theoretical models

Taken together, these theories contribute to our understanding of the SA and drinking link by proposing that alcohol use reduces anxiety during social events, thereby promoting continued alcohol use. Drinking alcohol to alleviate symptoms serves to maintain SA by reinforcing the idea that individuals "need" alcohol to cope with or manage their anxiety. These theories help explain the increased risk of alcohol misuse and AUD among socially anxious individuals; however, what remains unclear is how these theories fit within the extant literature. The extant literature provides inconsistent support for the association between SA and alcohol use among young adults. Certainly this makes sense when the theoretical complexity of SA is considered (i.e., cognitive model, see Clark & Wells, 1995). On the one hand, those high in SA may use alcohol for its anxiolytic effects. However, on the other hand, they may avoid alcohol given the possible negative consequences – including social consequences, such as embarrassing oneself when intoxicated – that those high in SA should be so attuned to. The theoretical complexity and mixed empirical evidence indicate that other variables might influence the association between SA and alcohol use. Specifically, research is needed to investigate the process through which SA influences drinking, including what happens for socially anxious individuals when they drink alcohol, and how this maintains their anxiety and promotes future drinking. Although few studies have empirically investigated process variables, there is accumulating research examining variables that may moderate or mediate the SA-drinking link.

Alcohol Use and Social Anxiety: The Influence of Other Variables

Extant literature

Investigations of moderator and mediator variables were driven by the inconsistent findings on the association between social anxiety and alcohol use (Morris et al., 2005). These findings from the extant literature suggest that SA does not directly influence drinking; rather, the interaction between SA and other variables may determine drinking among socially anxious individuals. Moderators influence the strength and/or direction between the independent and dependent variables, whereas mediators account for the relation between the predictor and criterion variables (Baron & Kenny, 1986). Two variables that have been examined extensively include alcohol outcome expectancies as a moderator, and drinking motives as a mediator.

Alcohol outcome expectancies are the expectations individuals have about the effects of consuming alcohol. Several positive and negative expectancies have been widely cited in the

literature. Positive alcohol expectancies include becoming more social, reducing tension, increasing confidence (i.e., liquid courage), and being more comfortable sexually, and negative alcohol expectancies include impairment in cognitive and behavioural functioning, increasing risk-taking behaviour and aggression, and adopting a more negative self-perception (Fromme, Stroot, & Kaplan, 1993). Socially anxious individuals might be expected to drink more alcohol if they believe that drinking and being intoxicated will result in more positive outcomes and/or fewer negative outcomes (i.e., endorse more positive alcohol expectancies and fewer negative outcome expectancies, respectively); they are expected to drink less alcohol if they believe it will result in fewer positive outcomes and/or more negative outcomes (i.e., endorse fewer positive alcohol expectancies and more negative outcome expectancies, respectively) (Eggleston et al., 2004). According to a review by Morris and colleagues (2005), individuals with SAD, AUD, and comorbid SAD and AUD endorse more positive expectancies about the effects of alcohol compared to those low in SA and those without AUD. When examining expectancies as a moderator in the SAD-AUD link, the literature reveals mixed findings. Using undergraduate student sample (i.e., predominantly young adults), some studies provide support for the moderating role of positive expectancies on drinking among socially anxious individuals, and particularly expectancies that alcohol will reduce anxiety in social situations (e.g., Tran, Haaga, & Chambless,1997), while other studies do not provide support for this (e.g., Eggleston et al., 2004; Lewis & O'Neill, 2000). Moreover, according to a study by Tran and Haaga (2002), negative expectancies are unrelated to drinking among socially anxious individuals.

Studies have also examined the mediating role of drinking motives in explaining the complex relationship between SA and alcohol use. Drinking motives are defined as reasons for consuming alcohol (Kuntsche, Knibbe, Gmel, & Engels, 2006). The four well-established types of drinking motives, initially proposed by Cooper (1994), include enhancement motives, social motives, conformity motives, and coping motives. Enhancement motives refer to drinking alcohol to increase positive mood states and emotions (e.g., sensation seeking; Ham & Hope, 2003), and social motives involve drinking to achieve social affiliation or positive social reward (e.g., establishing and maintaining a friendship); enhancement and social motives are considered to positively reinforce drinking. Conformity motives refer to drinking alcohol in response to social pressures, and coping motives refer to drinking to reduce or avoid negative emotions; conformity and coping motives are considered to negatively reinforce drinking. Studies using

young adult and university student samples have found that motives for drinking mediate the SA-alcohol use link. For example, Buckner and colleagues (2006) found that enhancement motives mediated the positive association between SA symptom severity and alcohol-related problems. Stewart and colleagues (2006), as well as Lewis and colleagues (2008) found that coping and conformity motives mediate the association between fear of negative evaluation (i.e., a primary characteristic of SA) and alcohol-related problems. These studies examined alcohol use problems, but not alcohol use frequency and quantity. In a study that examined both alcohol problems, and frequency and quantity, it was found that coping motives partially mediated the relation between SA and negative consequences of drinking, and between SA and symptoms associated with alcohol dependence; however, drinking motives did not mediate the relation between SA and drinking frequency/quantity (Ham, Zamboanga, Bacon & Garcia, 2009).

Taken together, the findings from the extant literature exploring moderator and mediator variables have been mixed. This research has been firmly rooted in cognitive social learning models of alcohol use (Abrams & Niaura, 1987; Bandura, 1977), suggesting that experiences with (and consequential beliefs about) drinking determine future drinking; however, it remains unclear who with SA is at risk for developing positive beliefs about drinking, and about the benefits of drinking to help cope with anxiety. The piece that remains unresolved is how some individuals high in SA get past their hypervigilance to the potential threats associated with drinking (e.g., embarrassing themselves while intoxicated), and instead focus on the positive effects of alcohol and drink to cope. Understanding this intermediary cognitive mechanism, may lend itself to resolving the SA-alcohol use relation. Post-event processing, which is a well-studied construct from the SA literature, has the potential to fill this gap.

Post-Event Processing

Post-event processing (PEP) is characterized by repeated self-focused negative thinking related to a previous social event (Clark & Wells, 1995). While recalling recent social events, individuals focus on the anxious feelings they experienced during the events, and perceive themselves and their behaviours as significantly more negative than perceived by others (Rapee & Lim, 1992). For instance, after engaging in a social interaction, an individual will recall instances of perceived social failure and think about ways in which he or she could have interacted better. PEP tends to reinforce negative beliefs about and negative impressions of one's own performance, and therefore maintains anxiety about social situations (Brozovich &

Heimberg, 2008; Clark & Wells, 1995). Over time, PEP leads to anticipatory anxiety for social events.

Repetitive negative thinking is common among various psychological disorders; however, the focus of the rumination differs across disorders. Depressive rumination refers to negative thoughts about one's depressive symptoms and the implications of these symptoms (Nolen-Hoeksema, 1991; 2004). It also involves negative appraisal of one's feelings, behaviours, situations, life stresses, and ability to cope, and includes themes of failure to achieve important personal goals (Wells & Matthews, 1994). Worry, which is common in generalized anxiety disorder, is repeated thinking about the future (i.e., "what if" thinking) in an attempt to prevent or avoid potential threat, or prepare ways to cope with negative situations (Beck & Emery, 1985). Worry is distinguishable from PEP and depressive rumination because of its temporal focus on the future rather than the past (Papageorgiou & Wells, 1999).

Depressive rumination and worry are more general negative thought processes, whereas PEP is specific to past social events and social scrutiny, making it common among individuals with elevated SA. Research focused on non-clinical high SA samples (e.g., Edwards, Rapee, & Franklin, 2003; Mellings & Alden, 2000) and clinical SAD samples (e.g., Abbott & Rapee, 2004) has demonstrated that individuals high in SA engage in significantly more PEP compared to those low in SA. Furthermore, studies assessing PEP after social events have found that individuals high in SA engage in more PEP compared to those with other psychological problems, including general anxiety and depression (e.g., Fehm, Schneider, & Hoyer, 2007). Taken together, PEP distinguishes between individuals high and low in SA, and between individuals with SA and other psychological disorders. PEP is a process that occurs between social events, and tends to enhance and maintain SA after one event and prior to the next event.

It is now well-established that PEP is prevalent among socially anxious individuals; however, there is minimal research investigating PEP after social drinking. Based on the tension reduction theory (Conger, 1951; 1956) and the biopsychosocial model (Buckner et al., 2013), the effect of drinking on (increasing or decreasing) PEP, which is an anxiety-maintaining cognitive process (Clark & Wells, 1995), is likely to influence future drinking. Specifically, for some socially anxious individuals, consuming alcohol during social events may result in an increase in their PEP, as they dwell on the perceived negative aspects of their performance while intoxicated. As a result of this heightened PEP, these individuals may drink less (or not drink at

all) at the next social event to prevent further PEP and related anxiety, or they may drink more as a way to cope with their PEP and anxiety. For other socially anxious individuals, consuming alcohol during social events may dampen their PEP after these events if, for example, they believe they performed better or were evaluated more positively by others as a result of being intoxicated. Although these individuals experience less PEP and anxiety after the event and in anticipation of the next event, their beliefs about the need for alcohol to cope is maintained. Consequently, these individuals are likely to use alcohol during the next event, as a way to cope with the situation. Taken together, for socially anxious individuals, being intoxicated during social events may have diverse effects on PEP. PEP, in turn, may differentially influence future drinking. There is some preliminary research supporting the variability in PEP after social drinking events for individuals high in SA. Battista and Kocovski (2010) showed that differences in PEP were influenced by amount of alcohol consumed. Furthermore, Battista and colleagues examined PEP among socially anxious individuals, and found that differences in PEP after a social drinking interaction was mediated by gender (Battista, Pencer, & Stewart, 2016). The current two-study dissertation aimed to further test this conceptual model, by assessing differences in PEP after social drinking, and differences in drinking after PEP among individuals who range in social anxiety severity.

Overview of the Current Project

A major goal of this dissertation was to clarify the role of PEP as a potential mechanism through which SA and problem drinking are linked. Specifically, to test the conceptual model, the studies investigated whether some socially anxious individuals were more likely to engage in PEP after social drinking relative to others, and to investigate what influenced post-drinking PEP. Furthermore, the project investigated the influence of PEP on future drinking, and the risk of heavy drinking patterns across individuals with elevated SA. Heavy drinking patterns often begin during young adulthood, and particularly among university students who are exposed to a high volume of social events in which alcohol use is often available and encouraged. As such, this program of research focused on young adults.

Study 1 aimed to investigate the moderating role of SA severity on the association between PEP following social drinking events and intoxication levels at the next social event. This study used a 21-day ecological momentary assessment design to semi-longitudinally assess participants' social activities, drinking patterns, and related PEP in real time. Study 2 aimed to

assess the interaction between SA severity and drinking habits in predicting PEP related to a lab-based anxiety-inducing social interaction involving alcohol use. For the second study, participants attended an in-lab procedure on a single occasion where they consumed either an alcoholic or non-alcoholic beverage, and engaged in an anxiety-provoking interaction with a study confederate. Using online questionnaires, participants completed a measure of their post-event processing about the lab interaction one and four days after the in-lab procedure.

CHAPTER 2:
POST-EVENT PROCESSING AND ALCOHOL INTOXICATION: THE MODERATING ROLE OF SOCIAL ANXIETY

Introduction

Social anxiety (SA) and alcohol use disorder are two of the most common psychological disorders (Kessler, Chiu, Demler, Merikangas, & Walters, 2005), and they often co-occur (Grant et al., 2005; Morris, Stewart, & Ham, 2005; Stewart & Conrod, 2008). Interventions can be informed by understanding the mechanistic processes that link SA to problem drinking. The aim of the current study was to examine the risk trajectory during young adulthood (e.g., university students), a time when individuals are frequently exposed to social situations where alcohol use is the norm (Schry & White, 2013).

Social Anxiety and Alcohol Use

SA is characterized by marked fear of being negatively evaluated by others in social situations (American Psychiatric Association, 2013; Schultz & Heimberg, 2008). Individuals with SA often fear appearing nervous in front of others (e.g., Morris et al., 2005), and interpret ambiguous social cues as negative (e.g., Alden, Taylor, Mellings, & Laposa 2008; Amir, Beard, & Bower, 2005). Individuals with SA are also found to repeatedly think about and negatively reconstruct their behaviour during recent social events (Brozovich & Heimberg, 2008; Clark & Wells, 1995). Those high in SA tend to avoid social events or endure them with distress (e.g., Clark, 2005; Hofmann, 2007).

According to the self-medication hypothesis (Khantzian, 1985), and tension reduction theory (Conger, 1951), individuals with SA may use alcohol for its anxiolytic effects, thus allowing them to tolerate otherwise emotionally distressing social events (e.g., Abrams, Kushner, Medina, & Voight, 2001). Consistent with this, some evidence supports SA as a positive correlate of alcohol use and related problems (e.g., Buckner, Eggleston, & Schmidt, 2006; Schneier et al., 2010). Additionally, studies have shown that socially anxious participants exposed to an experimentally-induced social stressor drink more than those in a control/neutral condition (e.g., Abrams, Kushner, & Reinertsen, 2002), and that drinking alcohol leads to reduced anxiety (e.g., Abrams et al., 2001).

However, other studies have found the opposite. SA has been found to be a negative correlate of alcohol use and related problems (e.g., Eggleston, Woolaway-Bickel, & Schmidt,

2004; Ham & Hope, 2006; Stewart, Morris, Mellings, & Komar, 2006). Similarly, experimental work found that participants (including those high in SA) consumed less alcohol during a stressful social situation when they were given negative, as opposed to positive evaluations (Holroyd, 1978). Finally, several studies found no association between SA and alcohol use (e.g., Buckner et al., 2006; Gilles, Turk, & Fresco, 2006; Ham, Zamboanga, Bacon, & Garcia, 2009; LaBrie, Pedersen, Neighbors, & Hummer, 2008).

Evidently, empirical investigations of the link between SA and drinking have produced mixed findings. One possible explanation for this is that the majority of studies considered a linear association between SA and alcohol use; in particular, SA is typically considered on a continuum. A study by Crum and Pratt (2001), examining groups of SA and the risk of developing drinking problems a decade later, suggests that this approach may mask findings. They found that those in the subclinical SA group, characterized by an irrational fear of social situations without significant impairment or avoidance, were twice as likely to develop an alcohol use problem compared to those in the clinical-level SA disorder group and those in the non-SA group.

Another potential explanation for the mixed findings is that the association between SA and alcohol use is complex, even within person. On the one hand, those high in SA may be inclined to drink for anxiolytic effects, but on the other hand, their fear of negative alcohol-related social consequences, such as embarrassing themselves when intoxicated, should deter them. As demonstrated in lab-based studies (e.g., Abrams et al., 2002), inducing SA increases drinking. However, it would make sense that regret and anxiety the morning after should curtail future drinking. Understanding the complexity of this risk pathway necessitates a prospective investigation where potential mechanisms are examined across sequential social events.

Post-Event Processing

Post-event processing (PEP) involves negatively biased thinking about one's performance during past social events (Abbott & Rapee 2004; Kocovski, Endler, Rector, & Flett, 2005). PEP occurs immediately after social events and in anticipation of the next event. As a result of PEP, individuals' negative impressions of themselves and negative assumptions about future social events are maintained (Brozovich & Heimberg, 2008; Clark & Wells, 1995; Hofmann, 2007). As shown in clinical (e.g., Abbott & Rapee, 2004; Kocovski & Rector, 2008) and non-clinical student samples (e.g., Mellings & Alden, 2000; Rachman, Grüter-Andrew, &

Shafran, 2000), socially anxious individuals engage in more PEP than non-socially anxious individuals, and their PEP tends to intensify between events (e.g., Dannahy & Stopa, 2007).

The link between PEP and SA is now well-established, however, the literature on PEP in the context of SA and drinking is in its infancy. A study by Battista and colleagues (2014) found individual differences in PEP (four days out) among those high in SA who received alcohol prior to a lab-based social stressor (Battista, Pencer, & Stewart, 2014). This suggests that there might be variability in the level of PEP following drinking events for those high in SA. Returning to the idea of SA being a risk or protective factor, those who are not post-event processing after drinking may be at increased risk of drinking problems, while those who are engaging in PEP may not be at risk. To further complicate the picture, Potter and colleagues found that inducing PEP after a social stressor increased the urge to drink, suggesting that PEP is linked to increased risk of drinking problems for those high in SA (Potter, Galbraith, Jensen, Morrison, & Heimberg, 2016). However, this study assessed PEP after non-alcohol-related social stressors, which would not capture regret associated with alcohol use. Additionally, they assessed immediate urge to drink after PEP, but this cognitive process tends to intensify between events for those with SA (e.g., Dannahy & Stopa, 2007), and thus may differentially affect future drinking if assessed hours later or even the next day.

Taken together, PEP seems to be a critical component of the SA-alcohol risk model. For those high in SA, the morning-after social regret could be a deterrent to future drinking, but on the other hand, it may function to increase anxiety and promote further drinking. To unpack this, we need to consider potential between-person differences over the unfolding, within-person process from one event to the next.

The Current Study

Using ecological momentary assessments, PEP following social events where alcohol may have been involved, and alcohol intoxication at subsequent events were assessed in a sample of young adults who spanned the range of SA. Over three consecutive weeks, participants were prompted daily on their smartphones to record information about the social events they attended the night before. Specifically, each morning they indicated their peak level of intoxication during the previous day's event and current PEP related to the event. The influence of PEP on subjective intoxication at the subsequent social event was of interest. Subjective

intoxication was assessed rather than number of alcoholic drinks consumed since it relies less on the recall of specific details.

Based on Crum and Pratt (2001), who found that risk for alcohol problems depended on a categorical difference in SA severity, we split the current sample into high and low SA groups. First, we examined whether there were group-level differences in PEP which might explain the extant mixed literature. Next, we considered whether SA moderated the effect of PEP on subsequent intoxication, such that for some, high PEP leads to increased drinking.

Materials and Methods

Participants

We over-recruited on high SA. This was done using advertisements (approximately half of the ads) that specified SA as an eligibility criterion and by screening on SA (using *Social Interaction Anxiety Scale;* Mattick & Clarke, 1998). To be eligible for the study, participants must have consumed alcohol at least four times in the previous month and have a touchscreen smartphone with a data plan. Based on recent survey data in Canada, over 80% of 18 to 34 year olds use a smartphone (eMarketer Inc., 2014), thus limiting concern about sampling bias.

The initial sample included 120 English-speaking young adults (18-30 years; 79.20% female) living in Montreal, Quebec. For hypothesis testing with multilevel analyses, only data for participants with a minimum of three social events over the three-week study were used. The final sample included 92 participants (70% aged 18-23, 30% aged 24-30; 80% female). The majority were students (86%), were not living with family (73%), and less than half were working (42%). A comparison of those included and excluded from data analyses revealed no significant differences on SA severity, drinking frequency (assessed at screening), and average PEP scores (all ps>.05).

Across the 92 participants, each reported being intoxicated during at least one social event included in the analyses. Furthermore, 82.6% of participants indicated being intoxicated and/or having alcohol available to them during the first attended event in the 21-day assessment period (which was the first event in the analyses); similar rates were reported in the high and low SA groups (χ^2=.001, p=.98). These findings indicate that the data obtained for the first event were largely based on social drinking events.

Procedure

In response to the advertisements posted on university campuses and online (i.e., Craigslist, Kijiji), individuals contacted the lab. A hyperlink to the online screening was sent by email. Those eligible for the study were directed to a second online questionnaire, which included the consent process and baseline measures. Following this, participants responded to daily text messages on their smartphones for 21 consecutive days (starting on a Tuesday). Each day at 11:00AM participants received a text message that included a hyperlink to a brief questionnaire. They were first asked to indicate whether or not they attended a social event the night before. If yes, participants indicated perceived alcohol intoxication at the event, and current post-event processing related to the event. To minimize recall bias, questionnaires completed after 6:00PM were not included in the analyses; this accounted for less than 3% of the completed questionnaires. This is consistent with previous studies using smartphones for data collection (e.g., Kuntsche & Labhart, 2013). All questionnaires were programmed in *Fluidsurveys*. Participant were compensated up to 5 course credits or $90 (Canadian currency). Compensation was prorated based on the number of completed daily questionnaires.

Material

Social Interaction Anxiety Scale (SIAS). The 20-item SIAS (Mattick & Clarke, 1998) assesses anxiety about social interactions, and was administered as part of the screening process. Participants indicated on a 5-point scale (0=*not at all* to 4=*extremely*) how characteristic each item (e.g., *I have difficulty making eye-contact with others*) was of them. After reverse scoring items 5, 9 and 11, a sum score was derived. The scale demonstrated excellent internal consistency in the current study (α=.95). In previous work, the SIAS has demonstrated excellent internal consistency (α=.93), discriminant validity, and test–retest reliability (r>.90; Brown et al., 1997; Heimberg, Mueller, Hold, Hope, & Leibowitz, 1992; Mattick & Clarke, 1998). The SIAS was used to over-recruit on high SA. A cut score of greater than 34 was used, as it is recommended in the literature and widely used to screen for individuals with probable SA (Heimberg et al., 1992). This resulted in 57.5% of the included sample scoring 35 and above on the SIAS (i.e., high in social interaction anxiety)

Social Phobia Scale (SPS). The 20-item SPS (Mattick & Clarke, 1998), developed as a complimentary measure to the SIAS, assesses fear of overt evaluation and fear of observable anxiety (Carleton et al., 2009). The SPS was administered at baseline, and was used to determine SA grouping for hypothesis testing. Participants indicated on a 5-point scale (0=*not at all* to

4=*extremely*) how characteristic each item (e.g., *I am worried people will think my behaviour is odd)* was of them. A sum score was derived. The scale demonstrated good internal consistency in the current study (α=.94), and has shown good internal consistency (α=.89-.94), discriminant validity, and retest reliability (*r*>.90) in previous studies (Brown et al., 1997; Heimberg et al., 1992). To categorize individuals into high and low SA groups, a recommended and widely utilized cut score of 24 was used (Heimberg et al., 1992). The high SA group included those scoring >24 on the SPS, and the low SA group included those scoring ≤24.

Subjective Intoxication Rating Form (SIRF). The single-item SIRF (Himle et al., 1999; Kushner, Mackenzie, Fiszdon, Valentiner, & Foa, 1996) was administered in the daily 11:00AM survey if a social event was attended the night before. Participants indicated on a visual-analogue scale how intoxicated they felt (0=*Completely sober* to 100=*Completely intoxicated*) the night before. This is an often-used measure of subjective intoxication (e.g., Battista et al., 2014; Battista, MacDonald, & Stewart, 2012).

Post-Event Processing Questionnaire-Revised (PEPQ-R). The 14-item PEPQ-R (McEvoy & Kingsep, 2006; original PEPQ; Rachman et al., 2000) was administered in the daily 11:00AM survey if a social event was attended the night before. Instructions were adapted for the current study such that participants were asked to think about the previous night event when responding. Responses were made on a visual-analogue scale. The first item assessed how much anxiety they were experiencing (1=*none at all* to 100=a *lot*), and all other items assessed how much PEP they were engaging in (0=*not at all* to 100=*very much*). Based on an exploratory factor analysis of the PEPQ-R, conducted by Rachman et al. (2000), and our confirmatory factor analysis (Bentler Comparative Fit Index=.89), three items were excluded from the total (sum) scale score. These items had low loadings and appeared to be less closely linked to the construct of PEP compared to the other 11 items. Similar to previous work (α=.85; Rachman et al., 2000), the 11-item PEPQ-R demonstrated good internal consistency (α=.90-.94 across days included in the analyses) in the current study.

Results

Data Screening

There were no outliers (± |3.29|; Tabachnick & Fidell, 2007) on the variables of interest. All variables had acceptable skew (<3.00) and kurtosis (<10.00) (Kline, 2009). Missing data on the daily surveys occurred for only nine events (i.e., questionnaires that were started but not

completed), on different days within the 21-day cycle, across nine different participants. Maximum likelihood was used as the estimator and accounts for missing data.

Statistical Analyses

Multilevel Models were estimated using Mplus (Muthén & Muthén, 2007); this allowed us to account for the two-level data structure (i.e., within- and between-person). The analyses included data from participants who attended a minimum of three events and therefore provided responses for a minimum of two cycles. Each cycle included a score for PEP the morning after a social event, and scores of subjective intoxication at the subsequent social event. The average response time to the morning surveys (sent at 11:00AM) was 1 hour and 8 minutes (after excluding participants who completed morning surveys after 6:00PM on the day they were sent). Two cycles (three social events) were available for 76% of the sample and three cycles (four social events) were available for 67% of the sample. There was a high rate of drop off beyond this, with only 56% of participants reporting five social events. Accordingly, only those with two or three cycles of data were included in the analyses (N=92).

To assess within-person and cross-level moderation models, the high and low SA groups were examined separately. Within-person regression models were used to examine the effect of PEP (PEPQ-R) after each social event on perceived intoxication (SIRF) at the next social event. Cross-level moderation models were used to evaluate whether the strength of the within-person effect was influenced by the between-person variable of interest, this being baseline SA (SPS).

Preliminary Analyses

Multinomial and binary logistic regressions were completed to determine the association between demographic variables and SA grouping (i.e., high vs. low). Participants in the high and low SA groups (based on SPS cut score) were similarly distributed across age ($\chi^2_{(1)}$=.44, p=.51; high/low SA: 56%/78% 18-24 years), sex ($\chi^2_{(1)}$=.04, p=.83; high/low SA: 82%/81% female), student status ($\chi^2_{(1)}$=1.99, p=.16; high/low SA: 80%/90% students), work status ($\chi^2_{(4)}$=2.95, p=.57; e.g., high/low SA: 60%/56% not working), and ethnic group ($\chi^2_{(6)}$=8.41, p=.21; e.g., high/low SA: 65%/54% European-Canadian). As expected, the high SA group scored significantly higher than the low SA group on SPS and PEPQ-R (Table 1). At the bivariate level, SPS was positively correlated with PEPQ-R in the low, but not high SA group. Independent samples t-tests were used to compare the high and low SA groups on drinking status, assessed at baseline (i.e., the number of drinks consumed during typical and heaviest drinking weeks in the

previous month); no statistically significant differences emerged on the number of standard drinks consumed during a typical drinking week (t=-.615, p>.05) and heaviest drinking week (t=-.132, p>.05).

Table 1

Descriptive Statistics and Bivariate Correlations: Total Sample (N=92), and High (n=40) and Low (n=52) Social Anxiety Groups

	SPS	PEPQ-R	Mean	SD
Total Sample				
1. SPS			23.95	14.78
2. PEPQ-R	0.11^{+}		23.77	18.50
3. SIRF	0.00	0.10	49.65	30.82
High SA (SPS score>24)				
1. SPS			37.70[1]	10.79
2. PEPQ-R	-0.10		26.52[2]	19.54
3. SIRF	-0.07	0.23*	50.71[3]	30.80
Low SA (SPS score≤24)				
1. SPS			13.37[1]	6.25
2. PEPQ-R	0.18*		21.62[2]	17.41
3. SIRF	0.00	-0.03	48.85[3]	30.92

Note. SPS=Social Phobia Scale (baseline SA); PEPQ-R=Post-Event Processing Questionnaire-Revised (the average of 3-4 PEP scores, assessed the morning after a social event); SIRF=Subjective Intoxication Rating Form score (the average of 3-4 perceived intoxication scores, assessed the morning after a social event); [1]difference across high and low SA groups on SPS, t=-12.62, p=.01; [2]difference across high and low SA groups on PEPQ-R, t=-2.15, p=.03; [3]no difference across high and low SA groups on SIRF, t=-.48, p=.63.

^{+}p<.10; $^{*}p$<.05.

Main Effect Models: PEPQ-R and SPS Predicting SIRF

In the high SA group, each unit increase in post-event processing (PEPQ-R) was associated with a significant 0.33-unit increase in subjective intoxication (SIRF) (Table 2). In the low SA group, the association between post-event processing and subjective intoxication was not statistically significant. In both the high and low SA groups, the effect of baseline SA (SPS) on subjective intoxication (SIRF) was not statistically significant.

Cross-Level Moderation Model: SPS Predicting Within-Person Slope

In the high SA group, the higher the post-event processing (PEPQ-R), the higher the subjective intoxication (SIRF) at the next event when baseline SA (SPS) was low (intercept slope in the cross-level moderation model). However, the strength of this relationship decreased with increasing baseline SA severity (SPS) by a factor of .03 per SPS unit, which was significant at the 10%-error level. In contrast, in the low SA group this effect was not significant (Table 2).

Table 2

Main Effect and Cross-Level Moderation Model Results Predicting Subjective Intoxication (SIRF scores) among the High (n=40) and Low (n=52) Social Anxiety Groups

	High SA (SPS score>24)	***Low SA*** (SPS score≤24)
	B[1] (SE)	B[1] (SE)
Main Effect Model		
PEPQ-R (within-person)	0.33* (0.14)	-0.06 (0.15)
SPS (between-person)	-0.18 (0.41)	0.09 (0.41)
Intercept	49.85** (16.58)	48.63*** (6.27)
Cross-Level Moderation Model		
SIRF ON SPS	0.55 (0.47)	0.83 (0.71)
Slope ON SPS	-0.03^{+} (0.02)	-0.03 (0.02)
Intercept		
SIRF	21.57 (19.05)	39.22*** (9.67)
Slope	1.56* (0.65)	0.40 (0.32)

Note. [1]Unstandardized regression coefficients; SE=Standard Error; SPS=Social Phobia Scale (baseline SA); PEPQ-R=Post-Event Processing Questionnaire-Revised (assessed the morning after a social event); SIRF=Subjective Intoxication Rating Form score (assessed the morning after a social event).
$^{+}p<.10$; $^{*}p<.05$; $^{**}p<.01$; $^{***}p<.001$

To interpret the significant results in the high SA group, slopes were plotted to illustrate the nature of the cross-level moderation effect (Figure 1). Within the high SA group, the effect of PEPQ-R on SIRF was plotted at high (+1 *SD*) and low (-1 *SD*) SPS. To permit graphing, low (-1 *SD*), mean, and high (+1 *SD*) scores on PEPQ-R were substituted into the equation for a line. The analyses showed that PEPQ-R is associated with an increase in SIRF but only for those low (-1 *SD* within group) on SPS. Thus, with increased PEP the morning after a social event, those moderately high (-1 *SD* within high group) report an increase in perceived intoxication at the next social event. This effect was not observed for those high (+1 *SD* within the group) on SPS.

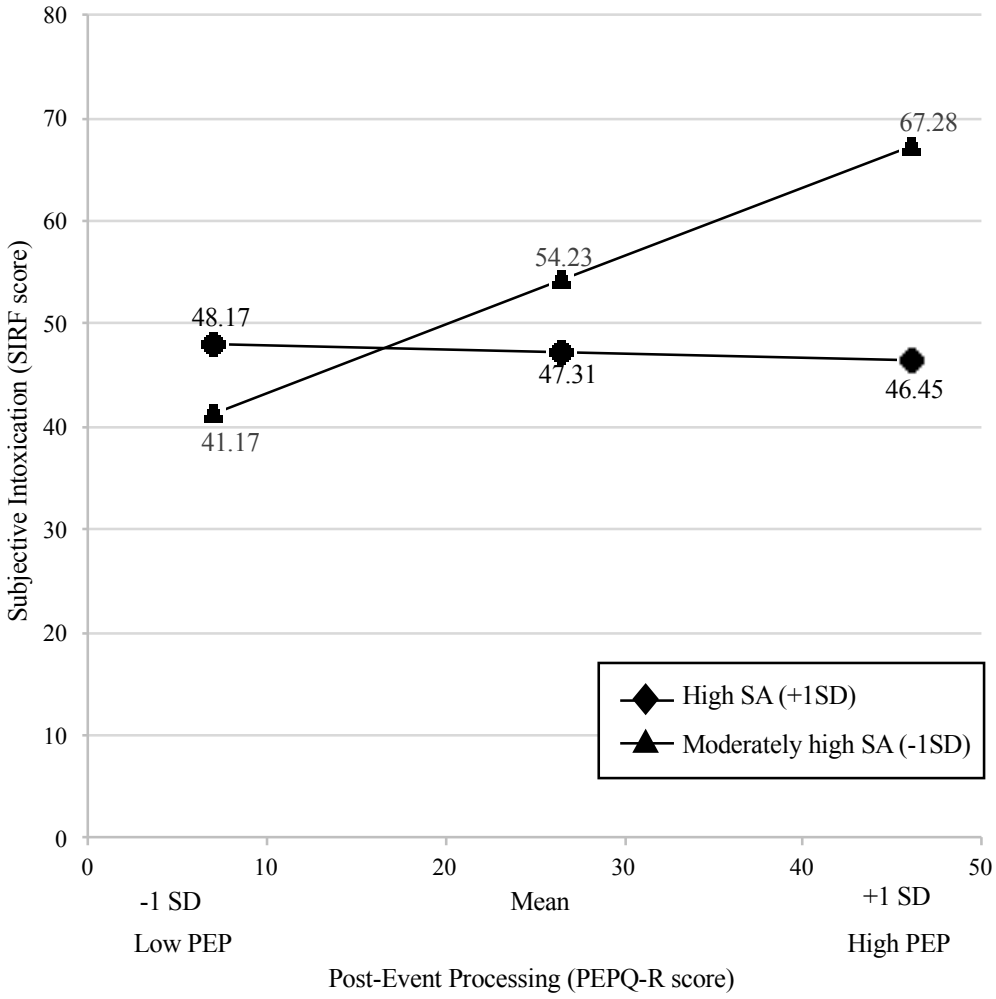

Figure 1. Cross-level moderation with social anxiety severity moderating the relation between post-event processing and intoxication level scores in the high social anxiety group (*n*=40).

Note. SA=Social Anxiety; SPS=Social Phobia Scale (baseline SA); PEPQ-R=Post-Event Processing Questionnaire-Revised (the average of 3-4 PEP scores, assessed the morning after a social event); SIRF=Subjective Intoxication Rating Form score (the average of 3-4 perceived intoxication scores, assessed the morning after a social event).

Discussion

By administering a daily diary methodology via participants' personal smartphones, we examined how post-event processing (the cognitive variable of interest) after social drinking events influenced alcohol use at subsequent events among individuals who span the range of SA severity. Consistent with the literature which has found that high SA is not necessarily predictive of the amount of alcohol consumed (Morris et al., 2005), the results showed that perceived

intoxication did not differ across levels of SA. Furthermore, consistent with theory and research demonstrating that PEP is highly prevalent among those with elevated SA (e.g., Clark & Wells, 1995; Kocovski & Rector, 2008; Rachman et al., 2000), those high in SA reported more PEP after social events compared to those low in SA. However, in the high SA group, more PEP after an event was associated with increased intoxication at the next event, whereas in the low SA group PEP and intoxication were unrelated. Taken together, these initial results suggest that PEP alone is not sufficient for understanding the link between SA and drinking risk. The results suggest that our first speculation – high PEP may deter those high in SA from alcohol use - is not supported.

By splitting into high and low SA groups, and considering the within group interactive effects of PEP and SA, the current study tested and confirmed our second speculation - PEP promotes future drinking for some high in SA. The multilevel modeling analyses revealed that elevated PEP is associated with increased perceived intoxication at the next social event for those moderately high in SA. Specifically, when considering the relatively high SA group, PEP presented as a risk factor for subsequent intoxication, but only for those at the low end of SA within this group. Whereas, when considering the relatively low SA group, PEP was unrelated to subsequent intoxication, and SA severity within this group did not moderate this effect.

By testing the hypothesized model within high and low SA groups, the current study helps to clarify the mixed results in the SA and alcohol use literature. The results are consistent with findings that subclinical SA increases risk for alcohol use problems (Crum & Pratt, 2001). Moreover, they are in line with evidence supporting a curvilinear relation between SA and alcohol use, such that those moderately high in SA were at greater risk for having alcohol problems relative to those high and low in SA (Strahan, Panayiotou, Clements, & Scott, 2011).

A compelling explanation for the increased risk among those moderately high in SA is that their repetitive negative thinking about a previous social event increases feelings of anxiety and thus, when they attend the next social drinking event, they drink again, and more; they become intoxicated in an attempt to decrease anxiety associated with both PEP and the current social event. In this way, their anxiety motivates them towards rather than away from drinking. For all other individuals, alcohol consumption and peak intoxication levels appear to be unrelated to PEP about the previous social event. Understanding the influence of PEP has shown to be important in explaining and clarifying the complex link between SA and drinking.

Additionally, investigations on SA and drinking should separately examine SA severity groups rather than examining SA on a continuum in order to detect a nonlinear relationship.

The results from the current study, when considered within the context of the broader literature, may have clinical implications. It appears that not all socially anxious individuals are at risk of developing alcohol use problems; individuals moderately high in SA who post-event process about social events involving alcohol use are likely to increase their drinking over time, and are therefore, at risk of developing alcohol use disorder. By identifying post-event processors who are moderately high in SA, clinicians can appropriately intervene to prevent problematic drinking, and help clients develop more effective ways to cope with their anxiety. For example, clinicians can help guide these individuals to change the way they think about social events, decrease their use of alcohol as a way to cope with anxiety, and in turn, decrease their risk of developing alcohol use problems. These therapeutic strategies are consistent with what is recommended in the literature for treating concurrent SA and AUD (Mueser, Noordsy, Drake, & Fox, 2003).

A major strength of the current study is the use of ecological momentary assessments via participants' personal smartphones. By using this method, participants could respond to text messages from the study coordinators, and could access the provided hyperlinks immediately or shortly after they were received. This allowed for a high response rate to morning surveys. In addition, by limiting the amount of time between social events and when they provided reports of peak intoxication levels and PEP related to those events, this likely decreased participants' recall bias. Additionally, because participants were able to provide information through their smartphones and were not required to come to the lab, this allowed for a semi-longitudinal (i.e., 21 days) assessment of the link between PEP and drinking. Future research is needed to assess how PEP influences drinking over an even longer period of time, such as one year, and how this link is moderated by baseline SA. Furthermore, the current study only collected data from participants who attended social events, and did not directly investigate the effect of PEP on avoidance of subsequent social events. Given that many researchers have concluded that highly socially anxious individuals avoid social situations and therefore have fewer opportunities to drink alcohol (e.g., Battista, Stewart, & Ham, 2010; Schry & White, 2013), future studies should examine how PEP, specifically, may ultimately result in an avoidance of social drinking events for some individuals.

Despite its notable strengths and relevant clinical implications, the study has limitations. First, a non-clinical sample was used, and SA severity was determined by a questionnaire rather than a clinical diagnostic interview. This study should be replicated with a clinical sample of individuals who are assessed and diagnosed with SAD or subclinical SAD by clinical interview. Second, participants' PEP about a social event was only assessed the morning after the event. Based on previous research demonstrating that for socially anxious individuals PEP intensifies over several days following social events that do not involve drinking (Dannahy & Stopa, 2007), we speculated that for those with elevated SA, PEP would persist leading up to the next social event and consequently, would influence drinking. Future studies should directly assess whether PEP following social drinking events persists several days after. Finally, although participants indicated that alcohol was available at the majority of attended events, non-drinking social events were also included in the analyses. Future studies examining the link between PEP and next-event intoxication might benefit by focusing specifically on social events in which alcohol is available and thus can be consumed.

The current study reveals that individuals, moderately high in SA, who post-event process after social events are at risk of developing drinking problems. The study not only contributes to the existent literature, it also helps explain why the link between SA and alcohol use has been mixed. Although previous studies have made similar attempts to clarify the link between SA and alcohol use, few have examined process variables, their influence on drinking over time, and how these effects differ across the SA continuum. By examining effects of PEP and next-event intoxication across individuals high and low in SA, we found that neither SA severity nor PEP, alone, predict drinking; rather, it is how these variables interact that determines which socially anxious individuals are at risk of drinking problems.

CHAPTER 3:
BRIDGE

The main objective of Study 1 was to identify whether post-event processing (PEP) after social events influences drinking behaviour at the next social event among socially anxious young adults (18-30 years old). As such, we over-recruited participants high in social anxiety (SA). Using their personal smartphones, participants completed questionnaires assessing their PEP and intoxication levels for each social event they attended over three consecutive weeks. Based on theory (e.g., tension reduction theory; Conger, 1951; 1956) and the literature indicating a non-linear association between SA and drinking (e.g., Crum & Pratt, 2001), we expected that for some but not all socially anxious individuals, PEP after social events would lead to an increase in alcohol use at subsequent social events. To detect differences across the SA continuum, we split the sample into high and low SA groups, and examined the moderating effect of SA severity on the association between PEP and next-event intoxication within each group.

Consistent with previous research, the high SA group reported more post-event processing and similar intoxication levels relative to the low SA group. For the high SA group only, a significant positive interaction emerged between PEP and intoxication levels; for participants at the lower end of SA within the relatively high SA group (i.e., those moderately high in SA), elevated PEP after a social event was associated with increased self-reported intoxication at the next social event. For those at the higher end of SA, PEP did not influence next-event intoxication. The results suggest that drinking and risk of drinking problems among socially anxious individuals may depend on both SA severity and PEP.

Study 1 indicates that SA severity moderates the link between post-event processing and next-event drinking. Consistent with the biopsychosocial model of SA and substance use (Buckner et al., 2013), for some socially anxious individuals, their drinking patterns are influenced by PEP. However, what remains unclear from these results is why some socially anxious individuals post-event process more than others following drinking events. These findings warrant further investigation given that individuals with elevated SA have been consistently shown to post-event process after social events, when alcohol use is not involved (e.g., Abbott & Rapee, 2004; Brozovich & Heimberg, 2008). Given that PEP influences drinking for some socially anxious individuals, as shown in Study 1, it is important to identify which

variables influence post-drinking PEP. Are there specific variables that lead socially anxious individuals to post-event process more or less following social drinking events?

According to the cognitive model of social anxiety (Clark & Wells, 1995) and related studies (e.g., Rachman et al., 2000), post-event processing confirms individuals' self-focused beliefs about their poor social abilities and performance. Thus, by understanding how alcohol use interrupts or alters this 'post-mortem' process in SA, we may be able to predict PEP and associated anxiety after social drinking, which influences future drinking behaviour, as demonstrated in Study 1. Therefore, using a lab-based design involving alcohol consumption followed by a social interaction, the aim of Study 2 was to assess the moderating effect of routine drinking patterns in explaining the association between SA and PEP after social drinking. Routine drinking included the amount of alcohol consumed during a typical drinking week and heaviest drinking week in the previous 30 days.

Study 2 focused on young adults (18-24 years old) who ranged in SA severity. Based on the tension reduction theory (Conger, 1951; 1956), which suggests that socially anxious individuals drink if it reduces their anxiety, and avoid drinking if it increases their anxiety, we expected to find differences in PEP after social drinking between routine heavy and light drinkers with elevated SA. For socially anxious individuals, light drinking patterns presumably developed over time in response to their negative experiences with alcohol use, including an increase in PEP (and related anxiety), thus making alcohol use less appealing. Therefore, among light drinkers assigned to the alcohol condition, we expected those with high SA to post-event process more after the social interaction compared to those low in SA. To understand the role of PEP in explaining the association between SA and alcohol use, we need to determine which factors influence PEP after social drinking events.

CHAPTER 4:
POST-EVENT PROCESSING AFTER DRINKING: THE EFFECT OF SOCIAL ANXIETY AND DRINKING STATUS

1. Introduction

1.1. Social Anxiety and Alcohol Use

The association between social anxiety (SA) and alcohol use is complex, as is reflected in a literature that has yielded mixed findings. Although some research supports a positive association between SA and drinking (e.g., Buckner, Eggleston, & Schmidt, 2006; Kessler et al., 1997; Schneier et al., 2010), other research supports a negative association (e.g., Bruch, Heimberg, Harvey, McCann, & Slavkin, 1992; Ham & Hope, 2005, 2006; Stewart, Morris, Mellings, & Komar, 2006) or no association (e.g., Buckner et al., 2006; Gilles, Turk, & Fresco, 2006; Ham, Zamboanga, Bacon, & Garcia, 2009; LaBrie, Pedersen, Neighbors, & Hummer, 2008). One possible explanation for the mixed findings in the extant literature is that, while drinking may dampen anxiety during social events (e.g., tension reduction theory; Conger, 1951; 1956), it may have more variable effects on anxiety after a social drinking event. For some socially anxious individuals, being intoxicated during an event may lead them to dwell on the event and therefore experience increased anxiety, while for others it may lead to a decrease in post-event dwelling and associated anxiety. The degree to which individuals with SA think negatively about past social events, widely referred to as post-event processing, might then influence how much alcohol they drink at the next social event. Thus, the role of post-event processing following social drinking events might help clarify the SA-drinking risk pathway.

1.2. Post-Event Processing and Social Anxiety

Post-event processing (PEP) is common among individuals with social anxiety (e.g., Abbott & Rapee, 2004; Perera, Rowa, & McCabe, 2016; for a review, Brozovich & Heimberg, 2008; Rachman, Grüter-Andrew, & Shafran, 2000). PEP is described as the detailed and negatively self-focused 'post-mortem' review of one's performance in social situations (Clark & Wells, 1995). Individuals with SA have a strong desire to present themselves favourably to others, and have marked insecurity about their ability to do so. They believe that they are likely to behave in an inept and unacceptable manner during social situations, and that their behaviour may negatively impact important life domains, including status, worth, and rejection. Furthermore, they become preoccupied with internal sensations and thoughts that confirm these

negative beliefs, and as a result, they continue to perceive social situations as threatening (Clark & Wells, 1995). PEP tends to become more negative several days after social events for socially anxious individuals (Dannahy & Stopa, 2007), and is therefore one way through which these individuals perseverate on perceived social failures, and on the expectation of failing (or not succeeding) in future social situations (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997). Given the important role of PEP in maintaining SA (Wells & Clark, 1995; Rachman, Grüter-Andrew, & Shafran, 2000), there is growing interest in investigating the effect of PEP on social drinking patterns.

1.3. Post-Event Processing and Alcohol Use

For some individuals with SA, being intoxicated during social events may lead to either an increase in PEP, including attending to perceived social failures while intoxicated and thinking about avoiding similar situations in the future, or a decrease in PEP. PEP after social drinking may, in turn, influence continued drinking and the risk of drinking problems. Few preliminary studies have investigated the role of PEP in explaining the complex SA-drinking link. A recent study conducted by our research team (Ogniewicz, O'Connor, & Kuntsche, under review), assessed the influence of PEP following real-life social events on drinking at the next social event, among younger adults who span the continuum of SA severity. The study assessed participants' PEP and social drinking over three consecutive weeks. The findings indicate that for some socially anxious individuals, PEP influences alcohol consumption in subsequent social events. These findings provide support for the influence of PEP on drinking for some individuals with elevated SA. Other studies have assessed the effect of drinking during social events on PEP. Battista and Kocovski (2010) found that, after controlling for trait SA and trait depression, greater alcohol consumption during a social event was associated with more PEP when assessed three to five days after the event. In another study with an all-male sample, Battista (2007) used a lab-based design involving alcohol consumption or no alcohol consumption, followed by a social interaction with a confederate. The findings showed that although there were no differences between those higher and lower in SA on the amount of typical drinking reported (at baseline), those higher in SA reported greater rumination (i.e., negative thinking) about the lab interaction when assessed one week after, regardless of drinking condition. In addition, when comparing those assigned to the alcohol versus no-alcohol condition, no differences were found in rumination about the lab interaction. Using a similar lab-based methodology and examining the

role of gender, Battista and colleagues (2014) found that females assigned to the alcohol condition engaged in less PEP about the lab interaction when assessed four days later, compared to those assigned to the no-alcohol condition; in contrast, males assigned to the alcohol condition engaged in more PEP compared to those assigned to the no-alcohol condition (Battista, Pencer, & Stewart, 2014).

Taken together, the findings suggest that, in contrast to the well-supported positive association between PEP and SA, there is considerable variability in PEP among socially anxious individuals, after social events that involve alcohol use. More research is needed to identify what influences PEP after social drinking events, and particularly for socially anxious young adults who are frequently exposed to social drinking events, and are at the early stages of potentially developing more chronic drinking problems (Canadian Centre on Substance Use and Addiction [CCSA], 2009).

1.4. The Current Study

The primary goal of the current study was to identify whether routine drinking helps explain the inconsistencies in the relation between SA and PEP after social drinking events. Routine drinking is used in this study to refer to the total amount of standard alcoholic drinks consumed during a typical drinking week and the total amount consumed during the heaviest drinking week in the previous 30 days. Thus, of interest was the potential moderating role of routine drinking (typical week; heaviest week) on the association between SA and PEP. To examine this, a lab-based experiment and follow-up online questionnaires were used. Participants first attended the lab-based component, in which they completed baseline self-report assessments of routine drinking practices and SA, consumed an alcoholic or non-alcoholic beverage (based on random assignment), and then engaged in an anxiety-provoking social interaction with a trained confederate [either at a breath-alcohol concentration (BrAC) of 0.00 or approximately 0.08gm%]. One and four days after the lab procedure, participants completed an assessment of their PEP about the lab interaction (sent via email).

Post-event processing has been shown to intensify several days after social events for socially anxious individuals (Dannahy & Stopa, 2007), therefore we focused on PEP assessed four days after the interaction, while controlling for PEP assessed one day after. Among participants assigned to the alcoholic beverage condition, we expected that, 1) SA would be positively associated with PEP for those who are light drinkers; and 2) SA would be negatively

associated with PEP for those who are heavy drinkers. For participants assigned to the non-alcoholic beverage condition, we expected the relation between SA and PEP to be unaffected by routine drinking practices (i.e., light versus heavy).

2. Method

2.1. Participants

To be eligible for the study, participants: 1) must have consumed alcohol at least once in the previous month, 2) did not have a history of or current problem with alcohol use, 3) were not pregnant, trying to get pregnant, or breastfeeding, 4) were not taking medications for which alcohol consumption is contraindicated, 5) did not have a medical condition that would make alcohol consumption problematic, and 6) were not advised by a physician to not consume alcohol. These criteria were assessed as part of the online screening procedure. The initial sample included 122 individuals aged 18-30 years old. However, given the focus on young adult drinking, the final sample included 103 English-speaking participants (76% women, 88% students, 59% employed) between the ages of 18 (legal drinking age in Quebec) and 24 years old who had complete data. This provided a homogeneous group of young drinkers, consistent with previous similar research among this population (Dawson, Grant, Stinson, & Chou, 2004; SAMHSA, 2005). Two participants that met the age criteria but did not complete the second PEP assessment were excluded from data analyses. Missing data analyses demonstrated that non-completers (n=2) did not differ from completers (n=103) on the variables of interest (p>.05 on all t-tests).

2.2. Procedure

In response to the advertisements posted on university campuses and online (i.e., Craigslist, Kijiji), those interested in participating contacted the lab. A hyperlink to the online screening was sent by email. Those eligible for the study were emailed and informed about the in-lab study procedure, including the possibility of consuming alcohol, and the time commitment required (i.e., approximately 3-6 hours). They were also informed of the two follow-up online questionnaires that would be sent by email. Participants who remained interested, were scheduled for the lab procedure. They were instructed not to take medication and not to consume alcohol for 12 hours prior to the study, and not to eat for two hours prior to the study start time. Due to the possibility of consuming alcohol during the lab study, all scheduled participants were instructed not to drive a vehicle or ride a bicycle after the study.

At the start of the lab procedure, participants provided a baseline BrAC on the Alco-Sensor IV breathalyzer device (Intoximeters, Inc., 1997) to ensure a reading of 0.00gm%. They completed the consent form and baseline questionnaires on a handheld electronic tablet. Next, they were randomly assigned to the alcohol (1:3 ratio of vodka and juice) or no-alcohol (juice only using the same formula) condition. Beverage amount was based on a formula that is widely used in alcohol research (MacDonald, Baker, Stewart, & Skinner, 2000), which accounts for participants' weight (assessed in the lab) and sex. The amount of alcohol given to participants in the alcohol condition aimed to get them to a BrAC of 0.08gm%. For those in the alcohol condition, BrAC levels were assessed throughout the study using the breathalyzer; participants in the non-alcohol condition completed 1-minute filler tasks during this time.

All participants were aware of the beverage condition to which they were assigned, and were given 23 minutes to drink the beverages, with an equal amount of time allotted for each drink. During the drinking and 20-minute absorption period, participants in both conditions were provided magazines with neutral content (e.g., nature, furniture). Next, they were brought into the lab's bar-like room where they engaged in an 8-minute interaction with another individual. All participants were told that the individual was another participant of the study, and was randomly assigned to evaluate his/her communication skills following the interaction. Additionally, participants were informed that the interaction would be video-recorded with their consent (no participants objected), and that the study investigator will evaluate both participants' communication skills at a later time. In reality, the evaluating participant was a trained confederate of the study who rehearsed scripted responses, acted neutral, and did not validate the participants' responses (e.g., no smiling) in an attempt to provoke anxiety about being negatively evaluated. The anxiety-provoking interaction in the lab was adopted from the work of Battista and colleagues (2012; 2014). After the interaction, participants were returned to the other room. Those in the alcohol condition remained in the lab for at least one hour, and until their BrAC decreased to 0.04gm% or below. Those in the no-alcohol condition remained in the lab for one hour to ensure that participants in both conditions had similar experiences.

At 8:00AM the day after and four days after the lab procedure, participants were instructed to complete an online questionnaire assessing their post-event processing about the lab interaction (PEPQ-R). Within a week following the second follow-up email, participants were emailed a debriefing form, and compensation was arranged. Participant received one course

credit or ten dollars (Canadian currency) per hour spent in the lab, and half a credit or five dollars for each completed follow-up questionnaire.

2.3. Materials

2.3.1. Social Phobia Scale (SPS). The 20-item SPS (Mattick & Clarke, 1998) was administered at baseline. Participants indicated on a 5-point scale (0=*not at all* to 4=*extremely*) how characteristic each item (e.g., *I am worried people will think my behaviour is odd)* was of them. A sum score was derived. The scale demonstrated good internal consistency in the current study (α=.90), and has shown good internal consistency (α=.89-.94), discriminant validity, and retest reliability (*r*>.90) in previous studies (Brown et al., 1997; Heimberg, Mueller, Hold, Hope & Leibowitz, 1992).

2.3.2. Daily Drinking Questionnaire (DDQ). The DDQ (Collins, Parks, & Marlatt, 1985) was administered at baseline. Participants indicated the number of standard drinks they consumed each day (Monday through Sunday) during a typical drinking week and during their heaviest drinking week in the previous 30 days. All participants were provided with a description and illustration of what is considered to be a "standard drink" (e.g., 12 oz. of beer [3-5% alcohol]; 1 oz. of hard liquor [40% alcohol]). The measure was developed for and has been used extensively with college populations (e.g., Corbin, McNair, & Carter, 1996). It has demonstrated high test-retest reliability (*r*=.93) when administered to students online (Miller et al., 2002). For the current study, two variables were derived: (1) a total sum of standard drinks consumed during a typical drinking in the past month (DDQ Typ Drk); and (2) a total sum of standard drinks consumed during the heaviest drinking week in the past month (DDQ Hvy Drk).

2.3.3. Post-Event Processing Questionnaire-Revised (PEPQ-R). The 14-item PEPQ-R (McEvoy & Kingsep, 2006; original PEPQ; Rachman et al., 2000) was administered the day after (PEPQ-R1) and four days after (PEPQ-R2) the lab interaction. Instructions were adapted for the current study such that participants were asked to think about the lab-based social interaction (with the "other participant") when responding. Responses were made on a visual-analogue scale. The first item assessed how much anxiety they were experiencing (1=*none at all* to 100=a *lot*), and all other items assessed how much PEP they were engaging in (0=*not at all* to 100=*very much*). Based on an exploratory factor analysis of the PEPQ-R conducted by Rachman et al. (2000), and our research team's confirmatory factor analysis using a sample of young adults (Bentler Comparative Fit Index=.89; Ogniewicz, O'Connor, & Kuntsche, under review), three

items were excluded from the total (sum) scale score. These items have low loadings and appeared to be less closely linked to the construct of PEP compared to the other 11 items. Similar to previous work (α=.85; Rachman et al., 2000), the 11-item PEPQ-R demonstrated good internal consistency in the current study (α=.85 at first follow-up; α=.79 at second follow-up).

3. Results

3.1. Data Analysis Overview

Data were first screened and then preliminary analyses were conducted to examine correlations and alcohol/no-alcohol condition group differences. The hypothesized moderation models were tested using multiple linear regression using Statistical Package for the Social Sciences (IBM Corporation Inc., 2016). Due to limited power to detect a three-way interaction term, the hypothesized models were tested separately for the alcohol (*n*=52) and no-alcohol (*n*=51) conditions. Within each condition, two separate models were run, one with typical drinking week (DDQ Typ Drk) as the moderator, and the second with heaviest drinking week (DDQ Hvy Drk) as the moderator. For each model, PEP about the lab interaction four days out (PEPQ-R2) was regressed on the first order effects of baseline SA severity (SPS) and typical/heaviest drinking (DDQ Typ Drk/DDQ Hvy Drk), and on the two-way interaction term between SA and the drinking variable. Next-day PEP (PEPQ-R1) was controlled for in the models. Predictor variables were centered to facilitate interpretation, and to reduce multicollinearity (Kline, 2010). Supported interaction terms ($p<.05$) in the alcohol and no-alcohol conditions were followed up with tests of simple slopes. The simple slope of SA (SPS) predicting PEP about the lab interaction four days out (PEPQ-R2) were conditioned on high (+1 *SD* above mean) and low (-1 *SD* below mean) levels of the relevant drinking variable (i.e., DDQ Typ Drk, DDQ Hvy Drk). Effect sizes were computed and small, medium, and large effects were $f^2=.02$, $f^2=.15$, and $f^2=.35$, respectively (Cohen, 1988).

3.2. Data Screening

There were no univariate outliers (±|3.29|; Tabachnick & Fidell, 2007) on SPS. There were five outliers in total: two on typical drinking week sum scores (*z*=3.45, 3.85), one on heaviest drinking week sum scores (*z*=3.39), one on PEP scores obtained the day after the lab procedure (*z*=3.36), and one for PEP scores obtained four days after the lab procedure (*z*=3.35). As recommended by Kline (2010), outlier scores were replaced with the next closest score obtained from the sample that was within the acceptable range. All variables had acceptable

skew (<3.00) and kurtosis (<10.00) (Kline, 2009). There were no missing data on the baseline questionnaires and on the PEP questionnaires; therefore, the dataset was not adjusted further.

3.3. Preliminary Analyses

Using independent samples *t*-tests, comparing the alcohol and no-alcohol condition, it was confirmed that the groups did not differ on SA, amount of alcohol consumed during typical and heaviest drinking weeks, and PEP about the lab interaction one day and four days later (all *p*s>.05) (Table 3). Bivariate correlations were completed to examine the association between variables of interest in the alcohol and no-alcohol conditions. Consistent with the literature, SA positively correlated with next-day PEP scores for both the alcohol condition (r=.63, p<.001) and no-alcohol condition (r=.41, p<.01), and with PEP scores four days later for both the alcohol condition (r=.60, p<.001) and no-alcohol condition (r=.29, p<.05). SA scores did not correlate with total amount of alcohol consumed during typical and heaviest drinking weeks in either condition (*p*s>.05). Moreover, the sum of alcohol consumed during a typical drinking week positively correlated with the sum of alcohol consumed during the heaviest drinking week (subscales of the DDQ) for participants in both the alcohol (r=.88, p<.001) and no-alcohol (r=.76, p<.001) condition.

A manipulation check was conducted to assess if the social interaction in the lab increased anxiety in participants. On a scale from 0 (not at all anxious) to 100 (very anxious) participants indicated how anxious they felt after the alcohol absorption/wait period, and during the social interaction in the lab. Anxiety scores were compared, and the results showed that participants' anxiety increased as a result of the interaction (alcohol condition: t=4.491, p<.001; no alcohol condition: t=6.93, p<.001).

Table 3

Descriptive Statistics: Alcohol (n=52) and No-Alcohol (n=51) Condition

	Mean[a]	SD
Alcohol Condition		
1. SPS	16.67	10.93
2. DDQ Typ Drk	6.35	5.57
3. DDQ Hvy Drk	12.06	8.76
4. PEPQ-R1	22.13	18.15
5. PEPQ-R2	15.19	14.08
No-Alcohol Condition		
1. SPS	13.00	9.09
2. DDQ Typ Drk	5.24	4.43
3. DDQ Hvy Drk	11.04	7.17
4. PEPQ-R1	17.96	14.90
5. PEPQ-R2	12.14	12.29

Note. SPS=Social Phobia Scale (baseline SA); DDQ Typ Drk=Daily Drinking Questionnaire sum of alcoholic drinks consumed during a typical drinking week in the past 30 days; DDQ Hvy Drk=Daily Drinking Questionnaire sum of alcoholic drinks consumed during the heaviest drinking week in the past 30 days; PEPQ-R1=Post-Event Processing Questionnaire-Revised, administered 1 day after the lab interaction; PEPQ-R2=Post-Event Processing Questionnaire-Revised, administered 4 days after the lab interaction; [a]Mean differences between the alcohol and no-alcohol condition on the SPS, DDQ subscales, PEPQ-R1 and PEPQ-R2 were not statistically significant, $p>.05$.

3.4. Hypothesis Testing: Typical Drinking Week as Moderator

3.4.1. ***Alcohol condition.*** See Table 4a for a summary of results. Examination of the first order effects supported a positive association between PEP the day after the lab interaction (PEPQ-R1) and PEP four days later (PEPQ-R2) ($p<.001$). Also, SA (SPS) was supported as a positive predictor of PEP four days after the lab interaction (PEPQ-R2) ($p<.05$). Consistent with hypotheses, the two-way interaction between SA (SPS) and typical drinking week (DDQ Typ

Drk) was supported (p<.05; ΔR^2=3.6%, F=5.00, df=47, p=.030). The simple slopes analyses revealed that the effect of SA (SPS) on PEP four days out (PEPQ-R2) conditioned on low (-1 *SD*) typical drinking week (DDQ Typ Drk) was supported (*B[SE]*=.544[.199]; t=2.734, p=.009, f^2=0.371). However, at high (+1 *SD*) typical drinking week (DDQ Typ Drk) this effect was not supported (*B[SE]*=.096[.168]; t=.572, p=.570, f^2=0.019). Specifically, elevated SA was associated with increased PEP four days following the lab interaction, but only for those low on typical drinking (i.e., *light drinkers*) (see Figure 2a).

3.4.2. *No-alcohol condition.* See Table 4a for a summary of results. Only the first order effect of PEP the day after the lab interaction (PEPQ-R1) on PEP four days later (PEPQ-R2) was supported (p<.001). This association was positive. Consistent with hypotheses, the two-way interaction between SA (SPS) and typical drinking week (DDQ Typ Drk) was not supported (p>.05; ΔR^2=0.0%, F=0.00, df=46, p=.961).

3.5. Hypothesis Testing: Heaviest Drinking Week as Moderator

3.5.1. *Alcohol condition.* See Table 4b for a summary of results. Examination of the first order effects supported a positive association between PEP the day after the lab interaction (PEPQ-R1) and PEP four days later (PEPQ-R2) (p<.001). Also, there was a statistical trend for SA (SPS) as a positive predictor of PEP four days after the lab interaction (PEPQ-R2) (p=.058). Consistent with hypotheses, the two-way interaction between SA (SPS) and heaviest drinking week (DDQ Hvy Drk) was supported as a statistical trend (p=.050; ΔR^2=3.0%, F=4.07, df=47, p=.050). The simple slopes analyses revealed that the effect of SA (SPS) on PEP four days out (PEPQ-R2) conditioned on low (-1 *SD*) heaviest drinking week (DDQ Hvy Drk) was supported (*B[SE]*=.497[.197]; t=2.516, p=.015, f^2=0.315). However, at high (+1 *SD*) heaviest drinking week (DDQ Hvy Drk) this effect was not supported (*B[SE]*=.108[.167]; t=.648, p=.520, f^2=0.023). Elevated SA was associated with increased PEP four days following the lab interaction, but only for those low on heaviest drinking (i.e., *light drinkers*) (see Figure 2b).

3.5.2. *No-alcohol condition.* See Table 4b for a summary of results. Only the first order effect of PEP the day after the lab interaction (PEPQ-R1) on PEP four days later (PEPQ-R2) was supported (p<.001). This association was positive. Consistent with hypotheses, the two-way interaction between SA (SPS) and heaviest drinking week (DDQ Hvy Drk) was not supported (p>.05; ΔR^2 = 0.0%, F=0.05, df=46, p=.822).

Table 4a

Effect of SA Scores on Four Day Out PEP: Moderating Role of Typical Drinking Week Scores

Criterion: PEPQ-R2	*B*	*SE*	*t*	*p*	
Predictors	Alcohol Condition (*n*=52)				adj R^2=.631
PEPQ-R1	0.464	0.093	5.021	0.000	
SPS	0.320	0.154	2.072	0.044	
DDQ Typ Drk	0.156	0.262	0.593	0.556	
SPS x DDQ Typ Drk	-0.044	0.020	-2.238	0.030	
	No-Alcohol Condition (*n*=51)				adj R^2=.642
PEPQ-R1	0.677	0.080	8.478	0.000	
SPS	-0.057	0.127	-0.451	0.654	
DDQ Typ Drk	0.204	0.260	0.782	0.438	
SPS x DDQ Typ Drk	-0.001	0.021	-0.049	0.961	

Note. Unstandardized regression coefficients are presented; PEPQ-R1=Post-Event Processing Questionnaire-Revised administered the day after the lab interaction; PEPQ-R2=Post-Event Processing Questionnaire-Revised administered four days after the lab interaction; SPS=Social Phobia Scale (baseline SA); DDQ Typ Drk=Daily Drinking Questionnaire, typical drinking week.

Table 4b

Effect of SA Scores on Four Day Out PEP: Moderating Role of Heaviest Drinking Week Scores

Criterion: PEPQ-R2	*B*	*SE*	*t*	*p*	
Predictors	Alcohol Condition (*n*=52)				adj R^2=.624
PEPQ-R1	0.481	0.092	5.219	0.000	
SPS	0.303	0.155	1.946	0.058	
DDQ Hvy Drk	0.073	0.159	0.456	0.650	
SPS x DDQ Hvy Drk	-0.024	0.012	-2.016	0.050	
	No-Alcohol Condition (*n*=51)				adj R^2=.637
PEPQ-R1	0.694	0.078	8.874	0.000	
SPS	-0.085	0.131	-0.650	0.519	
DDQ Hvy Drk	-0.058	0.155	-0.374	0.710	
SPS x DDQ Hvy Drk	-0.003	0.015	-0.226	0.822	

Note. Unstandardized regression coefficients are presented; PEPQ-R1=Post-Event Processing Questionnaire-Revised administered the day after the lab interaction; PEPQ-R2=Post-Event Processing Questionnaire-Revised administered four days after the lab interaction; SPS=Social Phobia Scale (baseline SA); DDQ Hvy Drk=Daily Drinking Questionnaire, heaviest drinking week.

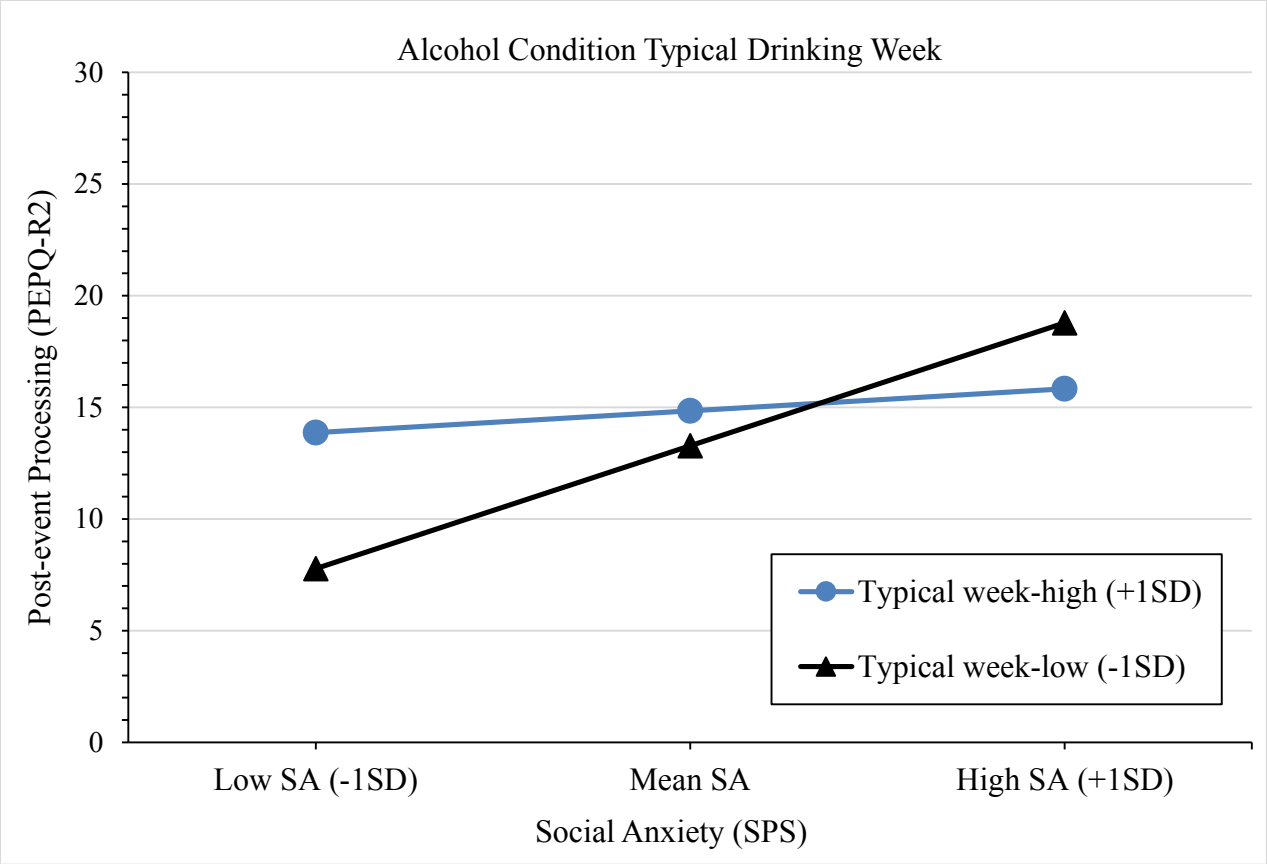

Figure 2a. Simple slopes of SPS scores predicting PEPQ-R2 scores, conditioned on typical drinking week scores for the alcohol condition. *n*=52. SPS=Social Phobia Scale; PEPQ-R2=Post-Event Processing Questionnaire-Revised, administered four days after the lab interaction.

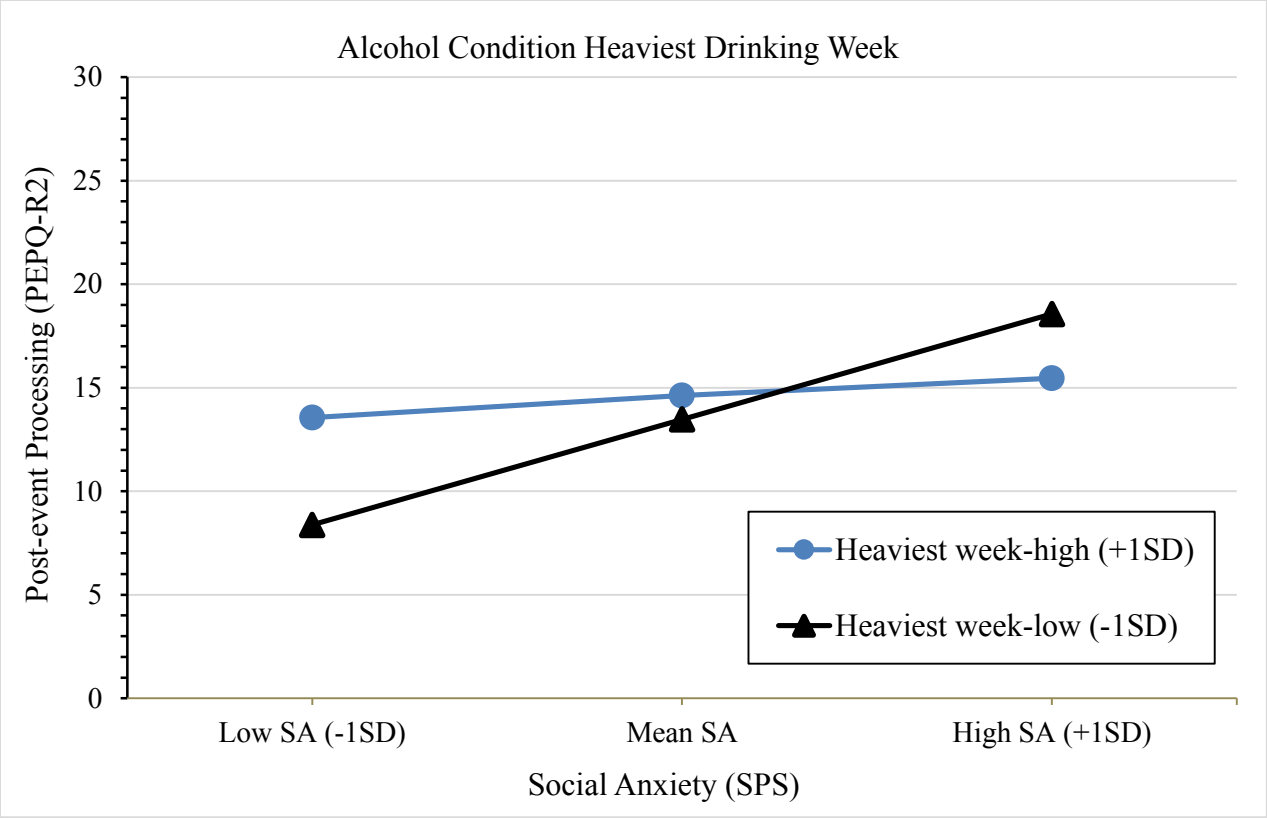

Figure 2b. Simple slopes of SPS scores predicting PEPQ-R2 scores, conditioned on heaviest drinking week scores for the alcohol condition. *n*=52. SPS=Social Phobia Scale; PEPQ-R2=Post-Event Processing Questionnaire-Revised, administered four days after the lab interaction.

4. Discussion

Using an experimental design and follow-up assessments, we examined the effects of SA and drinking status on post-event processing about a lab-based social interaction task when participants were either at a BrAC of 0.00 or (approximately) 0.08gm%. We found that, in both the alcohol and no-alcohol condition, baseline SA was unrelated to the amount of alcohol consumed in the previous month. This is consistent with previous research finding a null association between SA and alcohol use (e.g., Morris et al., 2005). As expected, the more alcohol participants consumed during a typical drinking week, the more they consumed during their heaviest drinking week, demonstrating consistency across these two measures of routine drinking. Previous studies using the same measure of drinking (i.e., DDQ) in university student samples obtained similar results, demonstrating a positive correlation between typical week drinking and heaviest week drinking (e.g., Battista & Kocovski, 2010; Terlecki, Ecker, &

Buckner, 2014). Furthermore, we found that, in both the alcohol and no-alcohol condition, SA was positively correlated with PEP about the lab-based interaction (one day and four days later). This is consistent with previous research indicating that PEP is elevated among socially anxious individuals (for a review, see Brozovich & Heimberg, 2008; Perera et al., 2016).

Of primary interest in this study was whether routine drinking practices moderated the association between SA and PEP. In support of our hypotheses, for those at a BrAC of 0.08gm% during the anxiety-provoking social interaction lab task, baseline SA was positively associated with PEP about the interaction four days out, but this was only true for relatively light drinkers (during typical and heaviest drinking weeks). Indeed, our results might suggest that when light drinkers who are high in SA become intoxicated during social events, they engage in more negative thinking about these events. This effect of SA on subsequent PEP about the task (while at a BrAC of 0.08gm%) was not supported for relatively heavy drinkers (during typical and heaviest drinking weeks). This might suggest that when heavy drinkers who are high in SA become intoxicated during social events, they engage in less negative thinking about these events. Interestingly, when alcohol was not consumed prior to the anxiety provoking social interaction lab task, the effect of SA on PEP four days later was not moderated by drinking status. Thus, this suggests that, the degree to which socially anxious individuals post-event process after non-drinking social events is unrelated to routine drinking practices.

These results seem to fit with our broader conceptual model of risk. The model proposes that drinking patterns develop over time as a result of alcohol's effect on PEP after social drinking events. For individuals with elevated SA, light drinking patterns may have developed in response to increases in PEP following social drinking events, which maintained anxiety and fear of negative evaluation (e.g., cognitive model of SA; Clark & Wells, 1995; Schultz & Heimberg, 2008). Thus, being intoxicated during the study's lab interaction was associated with increased PEP after the interaction, which is what these individuals try to prevent/avoid by typically drinking less alcohol. In contrast, for individuals with elevated SA, heavy drinking patterns may have developed because social drinking had no (or minimal) effect on their PEP (i.e., it neither increased nor decreased PEP). Thus, for heavy drinkers, being intoxicated during the lab interaction did not affect their PEP, regardless of SA severity. Longitudinal research is needed to empirically investigate factors that contribute to the development of routine drinking among socially anxious individuals.

To the author's knowledge, this is the first study to investigate routine drinking as a moderator in the association between SA and PEP after social drinking. Research is needed to investigate the influence of other factors in the link between SA and PEP after drinking, including social (e.g., who attended the social event), cognitive (e.g., beliefs about social drinking), and environmental (e.g., where the event took place) factors. Understanding what influences post-drinking PEP has implications for the development of heavy drinking patterns, and risk of problem drinking among those with elevated SA. This has been shown in recent studies demonstrating that increases in PEP are associated with increases in social drinking among young adults with moderately high levels of SA (Ogniewicz et al., under review), and that PEP after social interactions is associated with increased urge to drink alcohol among socially anxious individuals (Potter et al., 2016). Given that SA is a risk factor for developing alcohol use problems (e.g., Buckner, Schmidt et al., 2008; Buckner, Timpano, et al., 2008; Grant et al., 2005; Lewis & O'Neill, 2000), but the link between SA and drinking is unclear (for a review, see Morris et al., 2005), clarifying the process through which SA leads to problem drinking is necessary. Furthermore, understanding this process, and associated mechanisms, may help prevent and/or treat comorbid SA and alcohol use problems, and reduce the significant personal and societal costs associated with this comorbidity (Hasin et al., 2007). Therefore, the current findings, albeit preliminary, shed light on this risk pathway, indicating that for socially anxious individuals, the bidirectional influence between routine drinking and PEP may influence the development of alcohol use problems.

The results from the current study are consistent with previous studies, demonstrating variability in post-event processing after social drinking for individuals with elevated social anxiety. For example, Battista and Kocovski (2010) found that, among university students, the amount of alcohol consumed during a real-life social event was positively associated with PEP following this event, after controlling for trait social anxiety and depression. Additionally, Battista and colleagues assessed individuals high in SA, and examined the effects of being intoxicated (or not) during a social interaction on PEP about the interaction a few days later. They found a beverage condition by gender interaction. Compared to the no alcohol condition, among those in the alcohol condition PEP after social drinking was lower for females and higher for males (Battista et al., 2014). The current findings, together with previous findings, suggest that, in contrast to the well-supported positive association between SA and PEP after non-

drinking events (Brozovich & Heimberg, 2008), PEP after drinking events is influenced by other variables. These variables help explain why some socially anxious individuals post-event process more following drinking events, while others post-event process less.

Furthermore, the results from the current study have several clinical implications. Specifically, the moderation effect of drinking status in the association between SA and PEP suggests that for socially anxious individuals, drinking routine and post-drinking PEP are associated, and may be mutually reinforcing. As such, individuals may require treatment that targets both SA symptoms and drinking. Consistent with this, studies have shown poorer treatment outcomes for individuals with SA who received treatment for their alcohol use disorder, only (Kushner et al., 2005), and for individuals with alcohol use problems who received treatment for their social anxiety disorder, only (McEvoy & Shand, 2008). As suggested in recent work by Stapinski and colleagues, an integrated problem formulation and integrated therapeutic techniques may be necessary when treating socially anxious clients who drink alcohol regularly (Stapinski et al., 2015). Furthermore, there is preliminary support for interventions combining motivation enhancement therapy and cognitive-behaviour therapy to target the mutually reinforcing relation between anxiety and drinking (Baillie & Sannibale, 2007; Buckner, Ledley, Heimberg, & Schmidt, 2008). Research is needed to test the effectiveness of integrated treatments for SA and alcohol use problems.

In the absence of an empirically supported integrated treatment, clinicians are encouraged to consider the effects of routine drinking patterns on SA symptoms (including PEP), and vice versa. For instance, while PEP is common in SA, serves to maintain anxiety, and is often a target of evidence-based psychological treatments for SA (e.g., Stangier, Heidenreich, Peitz, Lauterbach, & Clark, 2003; Veale, 2003), PEP may increase or decrease after social drinking events. Therefore, clinicians can help clients identify how being intoxicated during social events influences PEP and associated anxiety, identify how PEP after drinking influences routine drinking patterns, and furthermore, prevent the development of problem drinking in socially anxious individuals.

A major strength of the current study is the use of a controlled experimental design. Aside from random assignment to the alcohol or no alcohol condition, all other components of the study were the same for all participants. By developing a controlled design, including a mathematical formula for the amount of alcohol and juice participants' consumed and a

standardized experimental manipulation using trained confederates, we aimed to control for other variables that might explain differences in participants' post-event processing about the lab interaction. Although the use of a controlled lab study is an important first step, future research is needed to assess the moderating role of drinking patterns in the association between SA severity and PEP, in relation to real-life social drinking events for young adults (e.g., university parties). Furthermore, because the study involved alcohol consumption, we implemented restrictive inclusion criteria thereby excluding individuals with current or past drinking-related problems, as well as those with certain medical conditions or on certain medications; it is likely that several socially anxious young adults who consume alcohol were excluded from participating. Using a study design with greater ecological validity would potentially result in a more representative sample of young adults who drink.

The study has a number of notable strengths and clinical implications; however, a few limitations should be acknowledged. First, a non-clinical sample was used, including individuals who range in SA and who denied past and current drinking problems. This study should be replicated with clinical samples of young adults who meet diagnostic criteria for social anxiety disorder. Furthermore, given that this research is intended to ultimately clarify the complex link between SA and drinking problems, future research should include participants with problematic drinking patterns. Nonetheless, SA severity and alcohol use are on a continuum; thus, we may expect to find similar results in clinical samples. A second limitation is the use of a controlled anxiety-provoking social interaction in the lab. It may be that participants' PEP about the lab interaction, during which they were intoxicated, is not representative of how they post-event process after real social drinking events. Future research should investigate PEP after real-life social drinking events. Nonetheless, studies using similar lab-based interactions with a confederate (e.g., Abrams & Wilson, 1979; Battista et al., 2012; 2014; Wilson & Abrams, 1977), have found these interactions to be representative of the types of social situations that provoke anxiety (Battista et al., 2010).

To conclude, the current study provides support for the interactive effect of social anxiety severity and regular drinking patterns on post-event processing after social drinking events. Specifically, elevated SA is associated with more PEP after social drinking, but only for light drinkers. For heavy drinkers, SA and PEP after social drinking appear to be unrelated. These findings are consistent with previous research indicating variability in PEP across socially

anxious individuals, when the PEP is about drinking events (e.g., Battista et al., 2014). Furthermore, the findings stand in contrast to the well-supported positive link between SA and PEP, when the PEP is about social events that do not involve drinking. By examining moderators that influence socially anxious individuals' PEP after drinking, such as routine drinking, we have a better understanding of alcohol's diverse effects on PEP for socially anxious individuals. Furthermore, given that PEP may influence future drinking for socially anxious individuals, as shown in previous research (e.g., Ogniewicz et al., under review; Potter et al., 2016), understanding what influences post-drinking PEP may help in the prevention of drinking problems among socially anxious individuals, and in the development of integrated treatments for SA and problem drinking.

CHAPTER 5:
GENERAL DISCUSSION

This program of research was intended to clarify the complex association between social anxiety and alcohol use in young adulthood. Although theories on the link between SA and alcohol use propose that socially anxious individuals drink to reduce anxiety (e.g., tension reduction theory; Conger, 1951; 1956), research looking at the association between SA and drinking has yielded mixed findings (Morris et al., 2005). To further complicate the picture, longitudinal research has shown that SAD in adolescence is a unique risk factor for the development of alcohol use problems later in life (Buckner et al., 2008), suggesting that socially anxious individuals are at increased risk of alcohol use problems, but the mechanisms underlying this risk pathway are unclear. More research is needed to investigate possible mechanisms, in an effort to prevent these problems at the early stages of their development. An aim of the current dissertation project was to address a particular cognitive process - post-event processing - and to examine its potential role in the development, maintenance, and treatment of social anxiety and co-occurring problem drinking among young adults.

According to cognitive theory (Clark & Wells, 1995), social anxiety is maintained by several cognitive process variables, including post-event processing (PEP). PEP, which involves a detailed and negatively self-focused review of one's social performance, tends to become more negative several days after social events, thus resulting in increased apprehension, anxiety, and avoidance associated with future social events (e.g., Dannahy & Stopa, 2007; Mellings & Alden, 2000; Rachmann et al., 2000). In contrast to the well-supported positive association between SA and PEP after non-drinking social events (for a review, see Brozovich & Heimberg, 2008), there is some evidence for variability in PEP following drinking events, across socially anxious individuals (e.g., Battista et al., 2014). Given the influential role of PEP in maintaining anxiety and influencing social activity, coupled with research demonstrating that being intoxicated influences this post-event cognitive process, the current two-study dissertation aimed to address two relevant research questions: 1) how does post-event processing after social events influence drinking in future social events among socially anxious young adults, and 2) which variables influence post-event processing after social drinking across young adults who range in SA severity.

Summary of findings

Study 1

To assess the influence of post-event processing on next-event social drinking among young adults (18-30 years old), we over-recruited participants high in social anxiety severity who drink alcohol (assessed by self-report questionnaires). All participants *(N*=92) were assessed over a three-week period, during which they used their personal smartphones to record their alcohol intoxication levels and PEP in relation to each attended social event. Previous research indicates that those with subclinical SA differ from those with clinical SA and no SA in the development of alcohol use problems several years later (e.g., Crum & Pratt, 2001). Therefore, for the current study analyses, the sample was split into high and low SA groups based on a widely used questionnaire cut-score. The results indicated that within the high SA group, more PEP following a social event was associated with greater intoxication at the next social event for those lower in SA within this group (i.e., those moderately high in SA). For those higher in SA within the high SA group, and for those lower and higher in SA within the low SA group, PEP did not influence next-event intoxication. Meaning, individuals moderately high in SA who post-event process after social events may progressively drink more during young adulthood, placing them at increased risk of more chronic alcohol use problems. These findings provide support for the notion that for socially anxious individuals, PEP after social events influences alcohol use at subsequent social events.

Study 2

Previous research suggests that not all socially anxious individuals post-event process about social events that involve alcohol (e.g., Battista et al., 2014). To better understand the association between alcohol use during social events and post-event processing about these events, Study 2 assessed the moderation effect of routine drinking patterns. Consistent with tension-reducing related theories which propose that individuals drink more alcohol if it dampens their social anxiety, we expected participants' routine drinking patterns to differentially influence post-drinking PEP across socially anxious individuals. The study recruited participants who span the continuum of SA, drink alcohol regularly and can do so safely (e.g., no contraindicated medical conditions), and are of typical university age (18-24 years old) and therefore at the early stages in the possible development of alcohol use problems. Participants (*N*=103) came to the university lab where they completed questionnaires, consumed alcoholic (*n*=52) or non-alcoholic (*n*=51) beverages, and engaged in an anxiety-provoking social interaction with a confederate of

the study. One day after and four days after the lab interaction, participants completed a measure (sent electronically) that assessed their PEP about the interaction. PEP tends to intensify several days after social events for socially anxious individuals (e.g., Dahanny & Stopa, 2007), thus Study 2 analyses focused on PEP assessed four days after the lab interaction, while controlling for PEP assessed one day after the interaction.

In the alcohol condition, the association between SA severity at baseline and PEP four days after the lab-based interaction was moderated by routine drinking status (i.e., alcohol consumed during typical and heaviest drinking weeks). The results demonstrated that, when intoxicated, being high in SA was associated with more PEP about the interaction, but only for light drinkers. For heavy drinkers who were intoxicated during the interaction, SA severity did not influence PEP. For those who were not intoxicated during the lab interaction, the association between baseline SA and PEP about the social interaction was not influenced by routine drinking practices. These findings suggest that not all individuals with elevated SA are more likely to post-event process after social drinking events (compared to those with less SA); rather, for socially anxious individuals who typically drink less alcohol, being intoxicated during a social events results in more PEP about the event. These findings help explain the mixed results in the literature on the link between SA and PEP after drinking.

Theoretical Contributions

As previously reviewed, several traditional theories propose that individuals with social anxiety are at increased risk of heavy or problem drinking. For example, according to the tension reduction theory (Conger, 1951; 1956) and the self-medication hypothesis (Carrigan & Randall, 2003; Chutuape & de Wit, 1995), anxious individuals consume alcohol to reduce negative anxiety-related emotions and physiological symptoms. The literature, including clinical and non-clinical samples, and experimental and non-experimental designs, does not consistently support this (e.g., Battista et al., 2010; Morris et al., 2005), suggesting that other variables influence this complex association and may warrant inclusion in new theories explaining the link between SA and drinking. The current program of research focused specifically on the role of post-event processing.

Overall, the findings support the influence of PEP on the SA-drinking link, and consequently, help make sense of the inconsistencies in the SA and drinking literature. For those moderately high in SA, the more they post-event process about a previous social event, the more

alcohol they consume at the next event. This makes sense as these individuals seem to be severe enough in SA that they engage in PEP, but not to the extent that they avoid all social events (including those with and without alcohol), as is often the case for individuals with more severe SA (APA, 2013). As a result, they attend the next social event and drink more. By examining high and low SA groups, separately, we were able to detect this finding. When considering these results within the context of existing theory, it seems that for a subset of socially anxious individuals, anxiety and social apprehension is maintained by their PEP, as suggested by cognitive theory (Clark & Wells, 1995), which presumably leads them to drink more at the next social event in attempt to reduce their anxiety, as suggested by the tension reduction theory (Conger, 1956) and the self-medication hypothesis (Carrigan & Randall, 2003; Chutuape & de Wit, 1995).

Moreover, in Clark and Wells' (1995) cognitive model of social anxiety, post-event processing is presented as one of the various psychopathological processes that maintains SA. The other processes include: self-schemata, self-focused attention, in-situation safety behaviours, and anticipatory event processing. The model posits that these processes serve to confirm socially anxious individuals' self-focused belief about being socially inept or unacceptable, and the belief that others will recognize this and evaluate them negatively. Consistent with this, research has demonstrated that more severe SA is linked with more PEP, however, little is known about the effect of SA on PEP after drinking events. A small number of studies have examined PEP after social drinking events, with one study showing a positive correlation between the amount of alcohol consumed and PEP (Battista & Kocovski, 2010), and another study showing variability in PEP across socially anxious individuals (Battista et al., 2014). To the author's knowledge, there are no established theories explaining this variability in PEP, and until now, there have been no studies investigating potential mechanisms through which drinking influences PEP. Based on results of Study 2, it seems that routine drinking influences how much socially anxious individuals post-event process after social drinking events. In other words, the association between SA severity and PEP after drinking is moderated by routine drinking practices. These findings have the potential to influence cognitive models of social anxiety and alcohol use. What remains to be addressed is the influence of alcohol intoxication on the other psychopathological processes in Clark and Wells' cognitive model of SA.

Finally, the results have implications for the biopsychosocial model of social anxiety and substance use comorbidity (Buckner et al., 2013). This theory posits that socially anxious individuals are particularly vulnerable to developing substance use problems because substances may be used to manage one or more of the multiple SA-related facets that are relevant to social events. The facets include physiological arousal and low positive affect which are also covered by tension reduction-related theories (reviewed above), as well as evaluation fears, perceived social deficits, and social avoidance, which are considered SA-specific facets. Through continuous use of substances to manage one or more of these facets during social events, socially anxious individuals are at risk of developing substance use problems. Post-event processing is another SA-related facet, however, it emerges between rather than during social events for socially anxious individuals. Nonetheless, we can draw from this model to understand the current findings, which suggest that the effects of drinking on PEP may determine the link between SA and alcohol use problems. Taken together, these findings have implications for the development or revision of models on SA and alcohol use comorbidity, with the inclusion of PEP as a major SA facet that is affected by social drinking, and affects future drinking.

Clinical Implications

The co-occurrence of social anxiety disorder and alcohol use disorder results in a higher rate of comorbid psychological symptoms, greater impairment in functioning, and greater utilization of the healthcare system, relative to having only one of these disorders (e.g., Buckner, Timpano, et al., 2008; Thomas et al., 1999). The severity of this comorbid presentation warrants continued investigation into the factors that influence it, and how to prevent and treat this comorbidity in a clinical setting. Therefore, the aim of this two-study dissertation project was to address a few practical questions about the effect of PEP on actual (i.e., real-life) drinking, and the effect of routine drinking patterns on PEP after drinking events, with a focus on socially anxious young adults.

Based on the results of Study 1, post-event processing influences drinking for individuals with moderately high levels of SA. Specifically, the more they post-event process after social events, the more intoxicated they become (i.e., the more alcohol they consume) at the next social event. On the one hand, these individuals hold negative beliefs about their social performance, which leads them to post-event process after events; on the other hand, despite the anxiety-maintaining (or exacerbating) effect of PEP, it does not seem to deter them from attending social

events. As such, when they attend these events, they tend to drink more and presumably to help them manage the anxiety that was maintained by PEP, as well as the anxiety associated with the current event. If PEP continues to influence SA and drinking pattern in this way, we can expect these individuals to be at risk of heavy drinking and possibly long-term alcohol use problems. To prevent the development of alcohol use problems, PEP should be targeted in integrated psychological interventions for individuals with SA and drinking problems, and particularly those of university age who are regularly exposed to social events that involve alcohol. Furthermore, although these findings are relevant to a subset of socially anxious individuals, clinicians should assess the link between PEP and social drinking, regardless of SA severity, to ensure that problem drinking is not overlooked. For example, when discussing recent social events with clients, clinicians can assess their PEP about the events and associated anxiety, their urges and/or plans to drink alcohol at the next social event, and reasons for future social drinking (i.e., are they drinking to decrease anxiety and/or PEP). Through a detailed discussion, clinicians have the opportunity to identify when PEP is influencing drinking, and to intervene appropriately to prevent alcohol use problems.

Furthermore, Study 2 investigated the influence of drinking (during typical and heaviest drinking weeks) to help understand which individuals with social anxiety are more likely to post-event process after social drinking events. The results indicate that for more socially anxious individuals with light drinking patterns, being intoxicated during a social event leads to more PEP. In contrast, for less socially anxious light drinkers, being similarly intoxicated during the same event leads to significantly less PEP. In other words, it is not SA, alone, that leads to PEP after a social drinking event, but rather the interaction between SA severity and routine drinking practice. These findings are more nuanced relative to what is presented in cognitive theory (Clark & Wells, 1995) and related research (e.g., for a review, see Brozovich & Heimberg, 2008), which consistently support a positive association between SA and PEP for social events that do not involve drinking. Based on the literature and the current study findings, individuals seeking treatment for SA are likely to post-event process after non-drinking social events, however, their PEP after drinking events will be influenced by how much they typically drink. Clinicians are encouraged to assess clients' routine drinking practices, and the degree to which they post-event process after drinking compared to non-drinking social events. Given that PEP is often a target of cognitive treatments for SA (e.g., Stangier et al., 2003; Veale, 2003), it is

possible that reducing PEP will lead to changes in drinking patterns. Furthermore, reducing routine drinking among socially anxious clients may result in changes to their PEP. By determining how routine drinking influences PEP, and vice versa, clinicians can help clients reduce their SA symptoms and simultaneously monitor and prevent heavy drinking and related problems.

Moreover, in Study 2, participants were classified as either light or heavy drinkers, and the results demonstrate that this routine drinking practice influenced post-drinking PEP for those high in SA. These findings shed light on possible reasons for why socially anxious individuals become either light or heavy drinkers in university. Specifically, the socially anxious light drinkers may have developed this drinking pattern over time because being intoxicated continuously led to more PEP, thereby maintaining or worsening their anxiety. Therefore, for light drinkers who are higher in SA, being intoxicated during the lab interaction resulted in more PEP relative to light drinkers who are lower in SA. In contrast, the socially anxious heavy drinkers may have developed this drinking pattern because alcohol consistently dampened their PEP (i.e., negative reinforcement of alcohol use), resulting in less anxiety and less apprehension for future social events. Thus, for heavy drinkers who were intoxicated during the lab interaction, SA severity had little or no effect on PEP. This hypothesized temporal sequencing warrants empirical investigation. Nonetheless, by considering the possible effects of PEP after social drinking on the development of longer-term drinking patterns, clinicians can help their socially anxious clients prevent more chronic heavy drinking patterns. The implications and suggestions for clinical practice are preliminary, and must be evaluated in future research.

Limitations and Future Directions

Several future directions emerge based on the limitations of this two-study research project. First, the studies focused exclusively on alcohol use and its association with post-event processing and social anxiety. This research should be extended to other substances, and particularly cannabis. Similar to alcohol use, cannabis use is common among young adults, with approximately 30% of young adults between the ages of 18 and 25 years reporting past-year cannabis use (Substance Abuse and Mental Health Services Administration, 2003). Additionally, previous research shows that cannabis use disorder is commonly comorbid with social anxiety disorder (e.g., Agosti, Nunes, & Levin, 2002; Lynskey et al., 2002), and in a recent study by Ecker (2016), baseline post-event processing mediated the relation between SA and cannabis use

problem severity. Although there are similarities in the use of cannabis and alcohol among young adults with SA, it seems that the reasons for using each substance differ (e.g., Simons, Gaher, Correia, Hansen, & Christopher, 2005). Moreover, research shows that alcohol and cannabis use differentially affect how information is recalled (e.g., Ranganathan & D'souza, 2006), which has implications for PEP as it relies on one's recollection of past social events. Thus, it is important to investigate the role of PEP in the SA and cannabis use link. As done in the current program of research, studies should assess the effect of cannabis use during social events on PEP, and the effect of PEP after social events on subsequent cannabis use.

Second, the current research focused, specifically, on post-event processing to help explain the mixed findings in the literature on SA and drinking. The results demonstrate that drinking alcohol during social events has the potential to influence PEP, and in turn, affect next-event drinking. This has important implications for identifying at-risk individuals and preventing problem drinking among socially anxious individuals. Nevertheless, it is possible that other SA-related cognitive processes influence this SA-drinking link. For example, drinking may influence the anxiety-maintaining processes proposed in Clark and Wells' cognitive model, and in particular, anticipatory event processing (AnEP). According to the model, AnEP occurs prior to social events, and thoughts tend to be dominated by recollections of past social failures and predictions of poor performance (Clark & Wells, 1995, p. 74). Studies have shown that AnEP is positively associated with SA (e.g., Laposa & Rector, 2016; Vassilopoulos, 2008), and positively associated with PEP for the same event and for the previous event (e.g., Laposa & Rector, 2016). These findings suggest that, in addition to post-event processing, anticipatory event processing may also be affected by drinking, and may in turn influence drinking patterns over time for individuals with SA. Future research should investigate alcohol's effect on AnEP among other SA-related cognitive processes, to develop a more comprehensive understanding of the risk pathway from SA to problem drinking.

Furthermore, to build on the results of Study 2, which identified the influence of routine drinking patterns on the SA and PEP link, a third area for future research is to investigate other variables that may influence this link. Based on a single study by Battista and colleagues (2014), gender appears to mediate the association between SA severity and PEP after a lab interaction involving alcohol use. However, it remains unclear what it is about gender that mediated this association. Therefore, it may be beneficial to investigate specific gender-related variables, and

how these influence the SA-PEP link in the context of alcohol use. By identifying which variables, in addition to routine drinking patterns, influence PEP after drinking among socially anxious individuals, we can improve interventions for SA and drinking.

A fourth area for future investigation requires a longitudinal study to assess the influence of post-event processing in the development of drinking patterns, among individuals with clinical or subclinical social anxiety. The results from a longitudinal study by Crum and Pratt (2001) demonstrated that subclinical SA at baseline was associated with increased risk of alcohol use problems a decade later. However, the mechanisms underlying this risk pathway were not investigated. Therefore, a similar longitudinal study should be conducted, examining whether PEP and other cognitive process variables influence the development of heavy drinking patterns among individuals with elevated SA. Participants should be assessed starting in adolescence, prior to the legal drinking age, and followed into young adulthood when drinking patterns develop. The findings from a longitudinal design would help determine whether routine drinking patterns among socially anxious individuals, are influenced, in part, by the effects of alcohol on PEP (and other cognitive variables) related to social drinking events.

A fifth and final recommendation for future research is to investigate the effects of modifying PEP on the link between social anxiety and drinking. A recent study by Potter and colleagues (2016) demonstrated that experimentally manipulating PEP influenced the urge to drink among socially anxious individuals; promoting PEP led to an increase in urge, and inhibiting PEP led to a decrease in urge. Although this study was experimental, and did not examine actual drinking in response to PEP, the findings suggest that modifying PEP may influence drinking patterns over time. Given that reducing PEP is a goal of cognitive interventions for social anxiety (Abbott & Rapee, 2004; Price & Anderson, 2011), it is important to understand how this might affect drinking in a clinical context.

Conclusion

This program of research investigated the role of post-event processing in the risk pathway from social anxiety to problem drinking among young adults, early in this risk trajectory. Several questions remain, and future research is needed to investigate factors that may influence drinking among socially anxious individuals. Nonetheless, the current findings provide some clarity. The findings from the first study demonstrate that engaging in more PEP after social events leads to more alcohol use at subsequent social events for individuals with

moderately high levels of SA. To assess which variables influence PEP after social drinking among socially anxious individuals, the second study examined the moderation effect of routine drinking. The results show that among light drinkers, those high in SA engaged in more PEP compared to those low in SA, following a social drinking interaction; meaning, PEP after social drinking interactions is influenced by both SA severity and routine drinking practices. Taken together, it appears that PEP influences future drinking, and is affected by routine drinking among young adults with elevated SA. Although preliminary, the findings have implications for the inclusion of PEP in theories on SA and alcohol use, and sheds light on the importance of addressing PEP after social drinking events in psychological treatments for individuals with SA.

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Appendix A

Post-Event Processing Questionnaire-Revised (PEPQ-R) for Study 1

When answering the following questions, think back to yesterday's social event...

1. How much anxiety are you experiencing?	*None at all* 0	*A lot* 100
2. Now that the event is over, do you find yourself thinking about it a lot?	*Not at all* 0	*Very much* 100
3. Do your memories and thoughts about the event keep coming into your head even though you do not wish to think about it again?	*Not at all* 0	*Very much* 100
4. Do your thoughts about the event interfere with your concentration?	*Not at all* 0	*Very much* 100
5. Are your memories and thoughts about the event welcome to you?	*Not at all* 0	*Very much* 100
6. Do you find it difficult to forget about the event?	*Not at all* 0	*Very much* 100
7. Are you trying to resist thinking about the event?	*Not at all* 0	*Very much* 100
8. If you are thinking about the event over and over again, are your feelings about the event getting worse and worse?	*Not at all* 0	*Very much* 100
9. If you are thinking about the event over and over again, are your feelings about the event getting better and better?	*Not at all* 0	*Very much* 100

10. While thinking about the event, do you view it from your point of view?	*Not at all* 0	*Very much* 100
11. While thinking about the event, do you view it from another person's point of view?	*Not at all* 0	*Very much* 100
12. Do you wish that you could turn the clock back and re-do it, and not just do it again, but do it better?	*Not at all* 0	*Very much* 100
13. As a result of the event, do you now want to avoid similar events; does this event reinforce a decision to avoid similar situations?	*Not at all* 0	*Very much* 100
14. Do you wonder about whether you could have avoided or prevented your behaviour/feelings during the event?	*Not at all* 0	*Very much* 100

Note. Adapted from McEvoy & Kingsep, 2006 and Rachman et al., 2000.

Appendix B

Post-Event Processing Questionnaire-Revised (PEPQ-R) for Study 2

(i) PEPQ-R first assessment

When answering the following questions, think back to yesterday's interaction with another participant (in the lab):

1. How much anxiety are you experiencing?	*None at all* 0	*A lot* 100
2. Now that the interaction is over, do you find yourself thinking about it a lot?	*Not at all* 0	*Very much* 100
3. Do your memories and thoughts about the interaction keep coming into your head even though you do not wish to think about it again?	*Not at all* 0	*Very much* 100
4. Do your thoughts about the interaction interfere with your concentration?	*Not at all* 0	*Very much* 100
5. Are your memories and thoughts about the interaction welcome to you?	*Not at all* 0	*Very much* 100
6. Do you find it difficult to forget about the interaction?	*Not at all* 0	*Very much* 100
7. Are you trying to resist thinking about the interaction?	*Not at all* 0	*Very much* 100
8. If you are thinking about the interaction over and over again, are your feelings about the interaction getting worse and worse?	*Not at all* 0	*Very much* 100

9. If you are thinking about the interaction over and over again, are your feelings about the interaction getting better and better?	*Not at all* 0	*Very much* 100
10. While thinking about the interaction, do you view it from your point of view?	*Not at all* 0	*Very much* 100
11. While thinking about the interaction, do you view it from another person's point of view?	*Not at all* 0	*Very much* 100
12. Do you wish that you could turn the clock back and re-do it, and not just do it again, but do it better?	*Not at all* 0	*Very much* 100
13. As a result of the interaction, do you now want to avoid similar interactions; does this interaction reinforce a decision to avoid similar situations?	*Not at all* 0	*Very much* 100
14. Do you wonder about whether you could have avoided or prevented your behaviour/feelings during the interaction?	*Not at all* 0	*Very much* 100

Note. Adapted from McEvoy & Kingsep, 2006 and Rachman et al., 2000.

(ii) PEPQ-R second assessment

When answering the following questions, think back to the interaction you had a few days ago with another participant (in the lab):

1. How much anxiety are you experiencing?	*None at all* 0	*A lot* 100
2. Now that the interaction is over, do you find yourself thinking about it a lot?	*Not at all* 0	*Very much* 100
3. Do your memories and thoughts about the interaction keep coming into your head even though you do not wish to think about it again?	*Not at all* 0	*Very much* 100
4. Do your thoughts about the interaction interfere with your concentration?	*Not at all* 0	*Very much* 100
5. Are your memories and thoughts about the interaction welcome to you?	*Not at all* 0	*Very much* 100
6. Do you find it difficult to forget about the interaction?	*Not at all* 0	*Very much* 100
7. Are you trying to resist thinking about the interaction?	*Not at all* 0	*Very much* 100
8. If you are thinking about the interaction over and over again, are your feelings about the interaction getting worse and worse?	*Not at all* 0	*Very much* 100
9. If you are thinking about the interaction over and over again, are your feelings about the interaction getting better and better?	*Not at all* 0	*Very much* 100

10. While thinking about the interaction, do you view it from your point of view?	*Not at all* 0	*Very much* 100
11. While thinking about the interaction, do you view it from another person's point of view?	*Not at all* 0	*Very much* 100
12. Do you wish that you could turn the clock back and re-do it, and not just do it again, but do it better?	*Not at all* 0	*Very much* 100
13. As a result of the interaction, do you now want to avoid similar interactions; does this interaction reinforce a decision to avoid similar situations?	*Not at all* 0	*Very much* 100
14. Do you wonder about whether you could have avoided or prevented your behaviour/feelings during the interaction?	*Not at all* 0	*Very much* 100

Note. Adapted from McEvoy & Kingsep, 2006 and Rachman et al., 2000.

Appendix C

Informed Consent Forms for Study 1

(i) CONSENT TO PARTICIPATE IN THE ONLINE SCREENING QUESTIONNAIRE FOR 'SOCIAL SITUATIONS AND DRINKING STUDY'

I understand that I have been asked to participate in an online screening questionnaire for a research project being conducted by Avital Ogniewicz of the Psychology Department of Concordia University (514-848-2424 ext. 2390, Social.drinking@concordia.ca), under the supervision of Dr. Roisin O'Connor of the Psychology Department of Concordia University (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca).

A. PURPOSE

I have been informed that the purpose of the online screening questionnaire is to determine my eligibility to participate in the 'Social Situations and Drinking Study'.

The 'Social Situations and Drinking Study' includes two phases: (1) online baseline questionnaires, and (2) 3 weeks of daily assessments via smartphone, where I will be asked to respond to brief questions about social events I attend.

B. PROCEDURES

I understand that I will be asked to complete a brief online screening questionnaire in order to determine eligibility for the full study titled 'Social Situations and Drinking Study'. I understand that the online screening questionnaire will take no more than 10 minutes to complete and will include questions about demographics (e.g., age, gender), alcohol use, and how I think about social situations. I understand that it will take a few days to process my data and I will be notified of my eligibility by email. Instructions for the smartphone component of the study will be given to me if I am eligible.

I understand that only a 4-digit Participant ID code and not my name will be linked with my online screening questionnaire data. A master list will be used to link data from the online screening questionnaire, online baseline questionnaire, and smartphone assessment questions. The master list will be destroyed upon completion of the study.

There is no compensation for the online screening questionnaire. However, if I am eligible to participate in the full study I will be compensated for participating. If recruited through the Participant Pool I will be given one participant pool credit for completing the initial baseline questionnaire, one credit for each of the 3 weeks of assessment completed, and a bonus credit for completing all 3 weeks of assessment (i.e., up to 5 credits). If I am a community participant, recruited through advertisement, I will be given $15 for completing the initial baseline questionnaires, an additional $25 for each of the 3 weeks of assessment completed (i.e., up to $90).

C. RISKS AND BENEFITS

I understand that I will be asked to provide information regarding my alcohol use and experiences in social situations, which may cause slight discomfort.

I understand that the information obtained from this online screening questionnaire will determine my eligibility for the full study. Participating in the full study may lead to a better understanding of alcohol use and associated contributing factors. Ultimately, this may aid in improving interventions for problematic alcohol use among young adults.

D. CONDITIONS OF PARTICIPATION

• I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.
• I understand that if I choose to withdraw from this screening questionnaire, my data will be deleted.
• I understand that my participation in this online screening questionnaire is confidential (i.e., the researcher will know, but will not disclose my identity).
• I understand that the data from this online screening questionnaire may be published, but results will be reported at the aggregate (group) level, not at the individual level.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS ONLINE SCREENING QUESTIONNAIRE.

BY CLICKING **ACCEPT** I AM CONSENTING TO PARTICIPATE IN THIS ONLINE SCREENING QUESTIONNAIRE.

Please click "Accept" to continue, or "Cancel" if you would not like to continue, then click "Next" below.

Accept ⬭ Cancel ⬭

If at any time you have questions about this study, please contact the study's Principal Investigator Dr. Roisin O'Connor, Department of Psychology, Concordia University, (514-848-2424 x 2248, Roisin.OConnor@Concordia.ca). If at any time you have questions about your rights as a research participant, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ext. 7481 oor.ethics@concordia.ca.

(ii) CONSENT TO PARTICIPATE IN THE SOCIAL SITUATIONS AND DRINKING STUDY

I understand that I have been asked to participate in the research project being conducted by Avital Ogniewicz of the Psychology Department of Concordia University (514-848-2424 ext. 2390, Social.drinking@concordia.ca), under the supervision of Dr. Roisin O'Connor of the Psychology Department of Concordia University (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca).

A. PURPOSE

I have been informed that the purpose of the study is to clarify the association between alcohol use and individual differences (e.g., emotions, thoughts) during and after social events where alcohol is or is not consumed.

B. PROCEDURES

The 'Social Situations and Drinking Study' includes two phases: (1) online baseline questionnaires, where I will be asked about my alcohol use, emotions, and attitudes. This will take approximately 35 minutes to complete; and (2) 3 weeks of daily assessments via smartphone, where I will be asked to respond to brief questions about social events I attend.

- As part of the 3-week event-related assessment component, I will be sent a hyperlink by text message to my smartphone **every evening at 6:00pm**. I agree to click on the hyperlink within the first 15 minutes of arriving at a social event (e.g., gathering with friends/roommates, party, bar, family or work celebration/event). If I forget, I can select on the link as soon as I remember. If I don't attend a social event, I will not click on the hyperlink. This hyperlink will direct me to a brief questionnaire that will take about 1 minute to complete.
- Additionally, I will be sent a hyperlink by text message to my **smartphone every morning at 11:00am**. The hyperlink will direct me to a brief questionnaire that will take me no more than 7 minutes to complete. I agree to click on the hyperlink and complete this morning questionnaire by 2:00pm each day, regardless of whether or not I attended a social event.

I understand that only the 4-digit Participant ID code and not my name will be linked with my data. A master list, which contains my identifying information, will be used for the purpose of assigning compensation and linking my data across study components. The master list will be destroyed upon completion of the study.

I will be compensated as follows: if recruited through the Concordia Participant Pool, I will receive 1 credit for completing baseline questionnaires, 1 credit/week of completed assessments, and 1 bonus credit for completing all 3 weekly assessments (i.e., up to 5 credits). If recruited through other forms of advertisement, I will be given $15 for completing baseline questionnaires,

and $25/week of completed daily assessments (i.e., up to $90).

C. RISKS AND BENEFITS

I understand that there is minimal risk involved if I take part in this study. I understand that I will be asked to provide information regarding my emotions, behaviours, and alcohol use, which may cause slight discomfort.

It is possible that I will not directly benefit from participating in this study. However, I understand that the information obtained for this study may lead to a better understanding of alcohol use patterns in social situations. Ultimately, this may aid in better detecting and/or treating problematic alcohol use among young adults.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences.
- I understand that if I withdraw from the study, I have the option of having my data deleted from the database. If I agree to have my data (that has been collected up until the point of withdrawal) kept in the database, I understand that the abovementioned strategies used to ensure confidentiality will apply.
- I understand that my participation in this online/smartphone study is confidential (i.e., the researcher will know, but will not disclose my identity).
- I understand that the data from online questionnaire study may be published, but results will be reported at the aggregate (group) level, not at the individual level.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT.
I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

BY CLICKING **ACCEPT** I AM CONSENTING TO PARTICIPATE IN THIS STUDY.

Please click “Accept” to continue, or “Cancel” if you would not like to continue, then click “Next” below.

Accept ⬭ Cancel ⬭

If at any time you have questions about the proposed research, please contact the study’s Principal Investigator Dr. Roisin O’Connor, Department of Psychology, Concordia University, (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca). If at any time you have questions about your rights as a research participant, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 oor.ethics@concordia.ca.

Appendix D

Informed Consent Forms for Study 2

(i) CONSENT TO PARTICIPATE IN THE ONLINE SCREENING QUESTIONNAIRE FOR 'THINKING AND DRINKING STUDY'

I understand that I have been asked to participate in an online screening questionnaire for a research project being conducted by Avital Ogniewicz of the Psychology Department of Concordia University (514-848-2424 ext. 2390, think.drink@concordia.ca), under the supervision of Dr. Roisin O'Connor of the Psychology Department of Concordia University (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca).

A. PURPOSE

I have been informed that the purpose of the online screening questionnaire is to determine my eligibility to participate in the '*Thinking and Drinking Study'*.

The study includes two components: (1) Lab session component (completing questionnaires, drinking an alcoholic or non-alcoholic beverage, completing a communications task), and (2) two online follow-up questionnaires (1 and 4 days after the lab session).

B. PROCEDURES

I understand that I will be asked to complete a brief online screening questionnaire (< 10 minutes) assessing my demographics (e.g., age, gender) and alcohol use. I understand that it will take a few days to process my data and I will be notified of my eligibility by email. If eligible, instructions for signing up for the lab session will be emailed to me.

There is no compensation for the online screening questionnaire. However, if I am eligible to participate in the full study I will be compensated for participating. If recruited through the Participant Pool, I will receive 1 course credit for each hour in the lab, plus 0.5 credits for each follow-up assessment completed (i.e., approx. 5 credits). If recruited through other advertisements, I will receive $10 for each hour in the lab, plus $5 for each follow-up assessment completed (i.e., approx. $50).

C. RISKS AND BENEFITS

I understand that I will be asked to provide information regarding my alcohol use, which may cause slight discomfort.

I understand that the information obtained from this online screening questionnaire will determine my eligibility for the full study. Participating in the full study may lead to a better understanding of how alcohol affects thoughts and behaviour. Ultimately, this may aid in improving our understanding of and interventions for problematic alcohol use among young adults.

D. CONDITIONS OF PARTICIPATION

I understand that:

- I am free to withdraw my consent and discontinue participation at any time without negative consequences.
- If I choose to withdraw from this screening questionnaire, my data will be deleted.
- My participation in this online screening questionnaire is confidential (i.e., the researcher will know, but will not disclose my identity).
- The data from this online screening questionnaire may be published, but results will be reported at the aggregate (group) level, not at the individual level.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS ONLINE SCREENING QUESTIONNAIRE.

BY CLICKING **NEXT** I AM CONSENTING TO PARTICIPATE IN THIS ONLINE SCREENING QUESTIONNAIRE.

Please click "Next" to continue, or "Cancel" if you would not like to continue.

Next ⬭ Cancel ⬭

If at any time you have questions about this study, please contact the study's Principal Investigator Dr. Roisin O'Connor, Department of Psychology, Concordia University (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca).

If at any time you have questions about your rights as a research participant, please contact the Manager, Research Ethics, Concordia University (514-848-2424 ext. 7481, oor.ethics@concordia.ca).

(ii) CONSENT TO PARTICIPATE IN THE 'THINKING AND DRINKING STUDY'

I understand that I have been asked to participate in the research project being conducted by Avital Ogniewicz of the Psychology Department of Concordia University (514-848-2424 ext. 2390, think.drink@concordia.ca), under the supervision of Dr. Roisin O'Connor of the Psychology Department of Concordia University (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca).

A. PURPOSE

I have been informed that the purpose of the study is to gain a better understanding of the effects of alcohol on thoughts and behaviour. More specifically, the study aims to examine individuals' emotions and thoughts in relation to tasks completed in the lab.

B. PROCEDURES

<u>In order to take part in the study participants must meet the following inclusion criteria:</u>

- 18 to 30 years old
- Fluent in English
- Must not have participated in the "Gender Differences and Drinking" study
- Do not abstain from alcohol
- Consume at least 1 alcoholic drink/month
- Do not drink more than 35 drinks weekly
- Breath alcohol level (BrAC) must be at 0.00 prior to starting the experiment
- Not pregnant or breastfeeding, or actively trying to get pregnant
- A doctor has not advised against drinking because of a medical condition
- A doctor has not advised against drinking because of medication use
- **Do not have any of the following medical conditions:**
    - Diabetes
    - Liver disease
    - Epilepsy or other neurological
    - Disorders that would impair your ability to carry out the necessary tasks
    - Ulcers or other gastrointestinal problems
    - Pancreatitis
    - Physical impairments that limit psychomotor abilities
    - Have been hospitalized for psychiatric treatment
- **Do not take any of the following medications:**
    - Insulin or other drugs used to control diabetes (e.g., chlorpropamide [Diabinese] metformin [Glucophage], phenformin, or tolbutamide [Orinase])
    - MAO inhibitors (e.g., isocarboxazid [Marplan] or phenelzine [Nardil])
    - Antabuse
    - Anti-fungals (i.e., ketoconazole)

- Antibiotics (e.g., flagyl)
- Drugs used to control blood pressure (e.g., nifedipine or verapamil)
- Drugs used for autoimmune disorders (e.g., methotrexate or procarbazine [Matulane])
- Benzodiazepines (e.g., Valium or Librium)
- Prescription pain medications

I was asked about pregnancy, medications, and medical conditions during the Online Screening Questionnaire. I was also given the opportunity to review the responses I provided in the Online Screening Questionnaire prior to beginning the experiment today, so that I could confirm that I am eligible to participate in this study.

The *'Thinking and Drinking Study'* includes two phases: (1) the lab session component which involves completing questionnaires, drinking an alcoholic or non-alcoholic beverage, and completing a communications task, and (2) two online follow-up questionnaires, to be completed 1 and 4 days after today's lab session.

As part of the lab session component, I will complete questionnaires designed to assess a range of behaviours, thoughts, and experiences (e.g., alcohol use, beliefs about drinking), and questions about my mental and physical health. Next, I will be randomly assigned to consume an alcoholic (vodka and juice) or non-alcoholic (juice only) beverage. After an absorption or wait period, I will engage in a communication task. To ensure my safety, I will be monitored via video camera during the study. In addition, some portions of the study will be video recorded to permit later analyses for which I will be asked to give verbal informed consent.

If assigned to the non-alcohol condition, I will be asked to remain in the lab for one hour after the study tasks. If assigned to the alcohol condition, I will consume alcohol until a breath alcohol level of approximately 0.08 (legal level of intoxication) is reached. At a 0.08 breath alcohol level (approx.), I may experience a slight impairment of balance, speech or reaction time and a reduced sense of caution and reason. I will be required to wait in the lab until my breath alcohol level has decreased to below 0.04 such that it is safe for me to leave the lab (i.e., detoxification). A breathalyser device will be used to assess breath alcohol levels throughout the study. During the wait/detoxification period, I will be provided with snacks and water, and will be permitted to use technological devices (e.g., cell phone, computer), watch movies on the lab television, read, or do work. If assigned to the alcohol condition, I agree to not drive a motor vehicle, ride a bike, or operate dangerous equipment upon leaving the lab session. The lab session of the study will take 3-6 hours, but may run a bit longer due to experimental factors.

For the online follow-up assessments, I will be emailed a hyperlink 1 and 4 days after the lab component, which will direct me to a questionnaire, where I will be asked to reflect on the lab component of the study. Each follow-up assessment will take < 10 minutes to complete.

Within 2 weeks after completing the final follow-up assessment, I will receive compensation for participating. If I terminate without completing all study components, I will be compensated for what I completed up until that point. I understand that only a 4-digit Participant ID code and not my name will be linked with my data. I will be compensated as follows: if recruited through the Participant Pool, I will receive 1 course credit for each hour in the lab, and 0.5 credit for each follow-up assessment completed (i.e., approx. 5 credits). If recruited through other advertisements, I will receive $10 for each hour in the lab, and $5 for each follow-up assessment completed (i.e., approx. $50).

C. RISKS AND BENEFITS

Risks of consuming alcohol: Consuming alcohol, even in small amounts, can present certain risks: (1) Women who are pregnant should not consume alcohol in any amount. Drinking during pregnancy puts the fetus at risk for learning and behavioural problems and abnormal facial features, including risk for fetal alcohol syndrome (FAS) and fetal alcohol spectrum disorders (FASD). Drinking during pregnancy may also increase the risk for pre-term labour. (2) There is risk associated with alcohol consumption by those who are taking medications (prescribed or over-the-counter) or have medical conditions that are contraindicated with alcohol use. (3) Individuals with certain familial and/or genetic backgrounds, including family history of alcohol dependence, are at higher risk for the development of alcohol dependence. (4) There is risk associated with alcohol consumption for those who have a history of adverse responses to alcohol.

Risks of participation: I am asked to disclose information that is sensitive in nature, including my alcohol use, mood, and attitudes. Sometimes answering these types of questions raises concerns for people, because they self-reflect on their behaviour. As such, these questions may make some people uncomfortable. Some of the tasks in the experiment may cause some discomfort for some individuals. Last, risks and discomforts associated with alcohol consumption in the study are experiencing a headache, nausea, dizziness or change in behaviour due to alcohol consumption.

Although I confirm that I meet the inclusion criteria (provided above), I realize that alcohol consumption may have negative effects on my physical and mental health. I agree to withdraw from this study should I become or fear becoming adversely affected by alcohol consumption. If I choose to withdraw from the study, I will be compensated without penalty. If I do become ill from alcohol use, there will be access to security personnel, and I will have the option of being escorted to Concordia's health centre on the Loyola campus or calling a friend/family member to pick me up. Furthermore, after completing or withdrawing from the study I will be provided with a list of mental health resources (e.g., treatment clinics in Montreal, help phone lines) should I feel the need to seek treatment.

Benefits: Notwithstanding the risks, I may benefit from participating in this study; by answering questions, I may learn to recognize how alcohol affects my behaviour. However, it is also possible that I will not directly benefit from participating in this study. Regardless, I understand that the information obtained for this study may lead to a better understanding of the effects of alcohol use on behaviour.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences. However, if at the time of study withdrawal my breath alcohol level is above 0.04, I understand that I will still need to remain in the lab until my breath alcohol level is at or below 0.04.
- I understand that if I withdraw from the study, I have the option of having my data deleted from the database. If I agree to have my data (that has been collected up until the point of withdrawal) kept in the database, I understand that the abovementioned strategies used to ensure confidentiality would apply.
- I understand that my participation in this online and lab study is confidential (i.e., the researcher will know, but will not disclose my identity)
- I understand that the data from the study may be published, but results will be reported at the aggregate (group) level, not at the individual level.

BY SIGNING BELOW I AM INDICATING THE FOLLOWING:

(a) I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT.

(b) I AM CERTIFYING THAT I AM 18 YEARS OLD OR OLDER, THUS OF LEGAL AGE TO CONSENT TO PARTICIPATE IN THIS STUDY AND TO CONSUME ALCOHOL.

(c) I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

(d) I AGREE THAT I had the opportunity to look over and make any necessary corrections to the answers I gave during the online screening regarding my medical background and drinking habits. I am also agreeing that I will not drive myself, ride a bicycle, or operate dangerous equipment once I leave here today, and will not leave the lab until my breath alcohol (BrAC) level is below 0.04% (if assigned to the alcohol condition).

NAME (please print)_____

SIGNATURE_____

DATE_____(mm/dd/yy)

If at any time you have questions about the proposed research, please contact the study's Principal Investigator Dr. Roisin O'Connor, Department of Psychology, Concordia University, (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca).

If at any time you have questions about your rights as a research participant, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 oor.ethics@concordia.ca

Appendix E

Debriefing Form for Study 1

(i) Debriefing email sent to participants receiving cash compensation

Dear (Insert individual's name),

Thank you for participating in the *Social Situations and Drinking Study*. Your time and effort are much appreciated as your responses may help improve our understanding of alcohol use in social situations, and related emotions and behaviours. As indicated, the amount we compensate you reflects the number of days on which you responded to the 11am text message sent that day.

You indicated that you would like to ***pick up your monetary compensation*** from the Concordia University laboratory, located at:
7141 Sherbrooke St. West, Loyola Campus, Room PY-239 (beside the women's washroom)
Click here for a map: http://www.concordia.ca/maps/loyola-campus.html?building=PY

You may pick up your cash <u>this week or next week</u> on <insert day>, anytime between <insert times>. *If these times do not work for you please let me know*.

****Bring a piece of photo ID****

We recognize that reflecting on emotions and behaviours, such as alcohol use, can raise concerns for some people. As such, we have provided a list of resources, below, that you may find helpful if you have concerns about your alcohol use and/or other psychological problems. This list is given to all participants, regardless of the responses made on the study questionnaires.

Regards,
Avital Ogniewicz, M.A. (Ph.D. Candidate)
Young Adult and Alcohol Research Lab
Concordia University
Department of Psychology
7141 Sherbrooke Street West
Montreal, QC H4B 1R6
Phone: 514-848-2424, x2390

<u>RESOURCES</u>

McGill Counselling Clinic
514-398-4641 or 514-398-4241
Children, adolescents, and adults who are experiencing difficulties in an educational, social, vocational or interpersonal context. http://www.mcgill.ca/edu-ecp/clinic/

Université de Montréal - University Clinic of Psychology
514-343-7725

Clinical training and research facilities that provide services (low cost), including psychological assessment, neuropsychological assessment, and individual, couple, and family therapy. Service provided to general public. http://www.psy.umontreal.ca/DEPT/service.html

UQAM - Centre de services psychologiques
514-987-0253
Psychological services for adults, children, and adolescents.
http://www.psycho.uqam.ca/D_CSP/CSP.html

McGill University Health Centre – Allan Memorial Institute, Department of Psychiatry
514-934-1934 ext. 35533
Individual Cognitive Behavioural Therapy. Covered under Medicare. Service delivered in English and French.

CLSC de Notre-Dame-de-Grace-West Montreal, Health and Social Services Centre.
514-484-7878
Referrals for drug and alcohol use issues. Services for other mental health concerns. Covered under Medicare.
http://www.cssscavendish.qc.ca/benevolat/clsc-de-notre-dame-de-grace-montreal-ouest/

Concordia Counselling & Development
Loyola: 514-848-2424 x3555
SGW: 514-848-2424 x3545
Professional Counsellors, accredited Psychotherapists and Psychologists help Concordia students who are experiencing personal difficulties. They help you to clarify issues (e.g., alcohol and drug abuse, relationships, anxiety, depression, loneliness) and find effective ways of dealing with whatever obstacles are impeding your growth and success. http://counselling.concordia.ca/

Foster Addiction Rehabilitation Centre
514-486-1304
Rehabilitation Centre for addictions. Inpatient and outpatient services. Covered under Medicare. Service delivered in English. http://www.pavillonfoster.org/

Drugs and alcohol 24-hour hotline
514-527-2626

Alcoholics Anonymous
514-376-9230

Suicide Action Montreal 24-hour hotline
514-723-4000

(ii) Debriefing email sent to participants receiving an electronic gift card or course credits for compensation

Dear (Insert individual's name),

Thank you for participating in the *Social Situations and Drinking Study*. Your time and effort are much appreciated as your responses may help improve our understanding of alcohol use in social situations, and related emotions and behaviours. As indicated, the amount we compensate you reflects the number of days on which you responded to the 11am text message sent that day.

You will receive your compensation within the next two weeks:

- **If recruited by advertisement, you will receive your gift card by email**
- **If recruited by Concordia pool, you will receive your course credits through the participant pool site**

We recognize that reflecting on emotions and behaviours, such as alcohol use, can raise concerns for some people. As such, we have provided a list of resources, below, that you may find helpful if you have concerns about your alcohol use and/or other psychological problems. This list is given to all participants, regardless of the responses made on the study questionnaires.

Regards,
Avital Ogniewicz, M.A. (Ph.D. Candidate)
Young Adult and Alcohol Research Lab
Concordia University
Department of Psychology
7141 Sherbrooke Street West
Montreal, QC H4B 1R6
Phone: 514-848-2424, x2390

RESOURCES

McGill Counselling Clinic
514-398-4641 or 514-398-4241
Children, adolescents, and adults who are experiencing difficulties in an educational, social, vocational or interpersonal context. http://www.mcgill.ca/edu-ecp/clinic/

Université de Montréal - University Clinic of Psychology
514-343-7725
Clinical training and research facilities that provide services (low cost), including psychological assessment, neuropsychological assessment, and individual, couple, and family therapy. Service provided to general public. http://www.psy.umontreal.ca/DEPT/service.html

UQAM - Centre de services psychologiques
514-987-0253

Psychological services for adults, children, and adolescents.
http://www.psycho.uqam.ca/D_CSP/CSP.html

McGill University Health Centre – Allan Memorial Institute, Department of Psychiatry
514-934-1934 ext. 35533
Individual Cognitive Behavioural Therapy. Covered under Medicare. Service delivered in English and French.

CLSC de Notre-Dame-de-Grace-West Montreal, Health and Social Services Centre.
514-484-7878
Referrals for drug and alcohol use issues. Services for other mental health concerns. Covered under Medicare.
http://www.cssscavendish.qc.ca/benevolat/clsc-de-notre-dame-de-grace-montreal-ouest/

Concordia Counselling & Development
Loyola: 514-848-2424 x3555
SGW: 514-848-2424 x3545
Professional Counsellors, accredited Psychotherapists and Psychologists help Concordia students who are experiencing personal difficulties. They help you to clarify issues (e.g., alcohol and drug abuse, relationships, anxiety, depression, loneliness) and find effective ways of dealing with whatever obstacles are impeding your growth and success. http://counselling.concordia.ca/

Foster Addiction Rehabilitation Centre
514-486-1304
Rehabilitation Centre for addictions. Inpatient and outpatient services. Covered under Medicare. Service delivered in English. http://www.pavillonfoster.org/

Drugs and alcohol 24-hour hotline
514-527-2626

Alcoholics Anonymous
514-376-9230

Suicide Action Montreal 24-hour hotline
514-723-4000

Appendix F

Debriefing Forms for Study 2

(i) Debriefing email sent to participants receiving cash compensation

Dear (Insert participant's name),

Thank you for participating in the *Thinking and Drinking Study*. Your time and effort are appreciated as your responses may help improve our understanding of alcohol's effects on behaviour, thoughts, and interactions.

During the lab component of the study you interacted with another individual who evaluated your performance after the video-recorded interaction. The goal of the interaction was to assess reactions to being evaluated by others, and your thoughts about the lab interaction.

We apologize if this interaction caused you distress. We recognize that reflecting on emotions, thoughts, and behaviours, can raise concerns for some people. As such, we have provided a list of resources, below, that you may find helpful if you have concerns about your alcohol use and/or other psychological problems. This list is given to all participants.

Additionally, if you have problems or concerns, please do not hesitate to contact us. Additionally, you may contact the study's Principal Investigator Dr. Roisin O'Connor, Department of Psychology, Concordia University, (514-848-2424 ext. 2248, Roisin.OConnor@Concordia.ca). If at any time you have questions about your rights as a research participant, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 oor.ethics@concordia.ca.

To receive your cash compensation, you may come to our lab during the following times:
<insert day>, between <insert times>.
Please bring a piece of photo ID

Please let me know when you plan to come. If you cannot make it during these times, let me know and we can find another date and time.

Lab address: 7141 Sherbrooke St. West, Loyola Campus, Room PY-239 (beside the women's washroom). Click here for map: http://www.concordia.ca/maps/loyola-campus.html?building =PY

The amount compensated will reflect the number of follow-up questionnaires you completed, and the amount of time you spent in the lab ($10 per hour in lab and $5 for each follow-up questionnaire completed).

TO MAINTAIN THE INTEGRITY OF THIS STUDY FOR OTHER PARTICIPANTS, WE ASK THAT YOU NOT SHARE WITH YOUR PEERS THE GOALS AND PROCEDURE USED IN THIS STUDY. THANK YOU.

Regards,
Avital Ogniewicz, M.A. (Ph.D. Candidate)
Young Adult and Alcohol Research Lab
Concordia University
Department of Psychology - PY 153.02
7141 Sherbrooke Street West
Montreal, QC H4B 1R6
Phone: 514-848-2424, x2390

RESOURCES

McGill Counselling Clinic
514-398-4641 or 514-398-4241
Children, adolescents, and adults who are experiencing difficulties in an educational, social, vocational or interpersonal context. http://www.mcgill.ca/edu-ecp/clinic/

Université de Montréal - University Clinic of Psychology
514-343-7725
Clinical training and research facilities that provide services (low cost), including psychological assessment, neuropsychological assessment, and individual, couple, and family therapy. Service provided to general public. http://www.psy.umontreal.ca/DEPT/service.html

UQAM - Centre de services psychologiques
514-987-0253
Psychological services for adults, children, and adolescents.
http://www.psycho.uqam.ca/D_CSP/CSP.html

McGill University Health Centre – Allan Memorial Institute, Department of Psychiatry
514-934-1934 ext. 35533
Individual Cognitive Behavioural Therapy. Covered under Medicare. Service delivered in English and French.

CLSC de Notre-Dame-de-Grace-West Montreal, Health and Social Services Centre.
514-484-7878
Referrals for drug and alcohol use issues. Services for other mental health concerns. Covered under Medicare.
http://www.cssscavendish.qc.ca/benevolat/clsc-de-notre-dame-de-grace-montreal-ouest/

Concordia Counselling & Development
Loyola: 514-848-2424 x3555

SGW: 514-848-2424 x3545
Professional Counsellors, accredited Psychotherapists and Psychologists help Concordia students who are experiencing personal difficulties. They help you to clarify issues (e.g., alcohol and drug abuse, relationships, anxiety, depression, loneliness) and find effective ways of dealing with whatever obstacles are impeding your growth and success. http://counselling.concordia.ca/

Foster Addiction Rehabilitation Centre
514-486-1304
Rehabilitation Centre for addictions. Inpatient and outpatient services. Covered under Medicare. Service delivered in English. http://www.pavillonfoster.org/

Drugs and alcohol 24-hour hotline
514-527-2626

Alcoholics Anonymous
514-376-9230

Suicide Action Montreal 24-hour hotline
514-723-4000

(ii) Debriefing email sent to participants receiving an electronic gift card or course credits for compensation

Dear (Insert participant's name),

Thank you for participating in the *Thinking and Drinking Study*. Your time and effort are appreciated as your responses may help improve our understanding of alcohol's effects on behaviour, thoughts, and interactions.

During the lab component of the study you interacted with another individual who evaluated your performance after the video-recorded interaction. The goal of the interaction was to assess reactions to being evaluated by others, and your thoughts about the lab interaction.

We apologize if this interaction caused you distress. We recognize that reflecting on emotions, thoughts, and behaviours, can raise concerns for some people. As such, we have provided a list of resources, below, that you may find helpful if you have concerns about your alcohol use and/or other psychological problems. This list is given to all participants.

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You will receive your compensation within two weeks:

-Participant pool credits will be transferred for those recruited through the Psychology Pool
-e-gift cards will be emailed for those recruited through other advertisements

The amount compensated will reflect the number of follow-up questionnaires you completed, and the amount of time you spent in the lab ($10 or 1 credit per hour in lab and $5 or 0.5 credits for each follow-up questionnaire completed).

TO MAINTAIN THE INTEGRITY OF THIS STUDY FOR OTHER PARTICIPANTS, WE ASK THAT YOU NOT SHARE WITH YOUR PEERS THE GOALS AND PROCEDURE USED IN THIS STUDY. THANK YOU.

Regards,
Avital Ogniewicz, M.A. (Ph.D. Candidate)
Young Adult and Alcohol Research Lab
Concordia University
Department of Psychology - PY 153.02

7141 Sherbrooke Street West
Montreal, QC H4B 1R6
Phone: 514-848-2424, x2390

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Children, adolescents, and adults who are experiencing difficulties in an educational, social, vocational or interpersonal context. http://www.mcgill.ca/edu-ecp/clinic/

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Clinical training and research facilities that provide services (low cost), including psychological assessment, neuropsychological assessment, and individual, couple, and family therapy. Service provided to general public. http://www.psy.umontreal.ca/DEPT/service.html

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514-987-0253
Psychological services for adults, children, and adolescents.
http://www.psycho.uqam.ca/D_CSP/CSP.html

McGill University Health Centre – Allan Memorial Institute, Department of Psychiatry
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514-527-2626

Alcoholics Anonymous
514-376-9230

Suicide Action Montreal 24-hour hotline
514-723-4000

Appendix G

Ethics Approval Certificates

(i) Study 1

CERTIFICATION OF ETHICAL ACCEPTABILITY
FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Avital Ogniewicz

Department: Faculty of Arts and Science\Psychology

Agency: Canadian Institutes of Health Research

Title of Project: Post-Event Processing in Explaining the Link Between Social Anxiety and Alcohol Use

Certification Number: 30003309

Valid From: August 05, 2014 to: August 04, 2015

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee

CERTIFICATION OF ETHICAL ACCEPTABILITY FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Avital Ogniewicz

Department: Faculty of Arts and Science\Psychology

Agency: N/A

Title of Project: Post-Event Processing in Explaining the Link Between Social Anxiety and Alcohol Use

Certification Number: 30003309

Valid From: August 07, 2015 to: August 06, 2016

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee

(ii) Study 2

UNIVERSITÉ Concordia UNIVERSITY

CERTIFICATION OF ETHICAL ACCEPTABILITY
FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Avital Ogniewicz

Department: Faculty of Arts and Science\Psychology

Agency: N/A

Title of Project: Alcohol Expectancies and Post-Event Processing in Explaining the Link Between Social Anxiety and Alcohol Use

Certification Number: 30004121

Valid From: January 13, 2015 to: January 12, 2016

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee

CERTIFICATION OF ETHICAL ACCEPTABILITY FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Avital Ogniewicz

Department: Faculty of Arts and Science\Psychology

Agency: N/A

Title of Project: Alcohol Expectancies and Post-Event Processing in Explaining the Link Between Social Anxiety and Alcohol Use

Certification Number: 30004121

Valid From: January 13, 2016 to: January 12, 2017

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee