

A MULTI-METHOD INVESTIGATION OF THE EFFECTS OF ALCOHOL ON
DEPRESSION IN UNDERGRADUATE STUDENTS WHO DRINK TO COPE WITH
DEPRESSION

by

Marie-Eve Couture

Submitted in partial fulfilment of the requirements
for the degree of Doctor of Philosophy

at

Dalhousie University
Halifax, Nova Scotia
August 2017

© Copyright by Marie-Eve Couture, 2017

To the many courageous struggling individuals I met along the way who, unbeknownst to them, inspired me to pursue this career and propelled me to keep going when it felt hopeless.

Thank you.

Table of Contents

List of Tables	vii
List of Figures	viii
Abstract	ix
List of Abbreviations and Symbols Used	x
Acknowledgments	xii
Chapter 1. Introduction	1
Alcohol Use in Undergraduate Students	1
Depression in Undergraduate Students	2
Depression and Alcohol Misuse Comorbidity	4
Epidemiological Findings	5
Theoretical Perspectives	6
Alcohol Use as Self-Medication for Depression	7
Theoretical Perspectives	7
Evidence for Reinforcing Effects of Alcohol on Depression	12
Negative Mood Induction Studies	12
Daily Process Studies	13
Relevant Characteristics of Depression	16
Alcohol Effects on Affective Processes of Depression	21
Alcohol Effects on Cognitive Processes of Depression	23
Other Effects of Alcohol on Depression	25
Aims of the Present Dissertation	26
Chapter 2. Study 1: A Qualitative Study of the Perceived Effects of Alcohol on Depressive Symptoms among Undergraduates Who Drink to Cope with Depression	30

Abstract	30
Introduction.....	31
Method	36
Participants.....	36
Materials	38
Procedure	42
Data Analytic Strategy	44
Results.....	45
Affective	46
Cognitive.....	49
Behavioural.....	53
Saturation	55
Discussion	56
Effects of alcohol on affective symptoms of depression	56
Effects of alcohol on cognitive symptoms of depression	58
Effects of alcohol on behavioural symptoms of depression	63
Limitations and Future Directions	64
Chapter 3. Prologue to Study 2	71
Chapter 4. Study 2: Effects of Alcohol and Expectancy on Mood and on Recall of Self-Relevant Negative Information in Coping-With-Depression-Motivated Drinkers ...	73
Abstract	73
Introduction.....	75
Method	83
Participants.....	83

Materials	86
Procedure	91
Results.....	94
Descriptive Statistics.....	94
Correlations among Baseline Variables.....	95
Manipulation Checks	96
BAC Readings	98
Effects of Alcohol Administration on Mood Ratings.....	99
Test of Schematic Relevance of Word Stimuli.....	101
Recall of Negative Self-Relevant Information	101
Relationship between Recall and Mood	104
Discussion.....	105
Alcohol's Effects on Cognitive Processes	105
Alcohol's Effects on Mood.....	107
Subjective Intoxication	109
Conclusions, Limitations, and Future Directions	110
Chapter 5. General Discussion.....	127
Summary of Findings.....	128
Study 1: A Qualitative Study of the Perceived Effects of Alcohol on Depression among Undergraduates Who Drink to Cope with Depression.....	128
Study 2: Effects of Alcohol and Expectancy on Mood and on Recall of Self-Relevant Information in Coping-With-Depression-Motivated Drinkers.....	129
Integration of Study Findings	132

Implications, Limitations, and Directions for Future Research	134
Theoretical Implications	134
Clinical Implications.....	141
Limitations	145
Conclusion	148
References.....	151
Appendix A: Lifestyles Questionnaire (LQ).....	184
Appendix B: Demographics Questionnaire (DQ).....	187
Appendix C: Semi-Structured Interview	190
Appendix D: Consent Form for Study 1	193
Appendix E: Codebook for Study 1	198
Appendix F: Consent Form for Study 2.....	202

List of Tables

Table 2.1	Summary table of themes and associated subthemes for effects of alcohol on symptoms of depression: consistency across participants and theme description	67
Table 4.1	Set of nondepressed and depressed content adjectives (Derry & Kuiper, 1981)	115
Table 4.2	Demographic characteristics of the sample across experimental conditions	116
Table 4.3	Correlations among baseline and demographics variables	119
Table 4.4	Means and standard deviation estimates of subjective intoxication ratings over time points of the experiment, by motive and beverage conditions	121
Table 4.5	Means and standard deviation estimates of BAC readings over time points of the experiment, by motive and beverage conditions.....	122
Table 4.6	Means and standard deviation estimates of positive mood scores over time points of the experiment, by motive and beverage conditions	123
Table 4.7	Means and standard deviations of words correctly recalled by CWDM and EM participants in the no alcohol condition, by processing instruction (self-relevant vs. semantic) and word content (depressed vs. non-depressed).....	124
Table 4.8	Means and standard deviations of words correctly recalled by CWDM and EM participants in the placebo condition, by processing instruction (self-relevant vs. semantic) and word content (depressed vs. non-depressed).....	125
Table 4.9	Means and standard deviations of words correctly recalled by CWDM and EM participants in the alcohol condition, by processing instruction (self-relevant vs. semantic) and word content (depressed vs. non-depressed).....	126

List of Figures

Figure 1.1	Pictorial representation of the three primary models of comorbidity between depression and alcohol use (adapted from Stewart et al., 2016)	28
Figure 1.2	Pictorial representation of a hypothesized model of comorbidity depicting a vicious cycle between depression and alcohol use (adapted from Stewart et al., 2016).....	29
Figure 2.1	Pictorial representation of the themes and subthemes emerging from the present study's thematic analysis	70

Abstract

The self-medication hypothesis has been proposed as one potential explanation for the comorbidity between alcohol use and depressive disorders. More recent work investigating drinking motives (theorized to be the most proximal factors to alcohol use) has found that some individuals report using alcohol to cope with depression. Despite epidemiological and experimental evidence supporting the tenets of the self-medication hypothesis for alcohol use and depression, the reinforcement mechanisms underlying this relationship remain unclear. This is due, in part, to the varied effects of alcohol on mood (some of which are experienced as pleasant and some as aversive). To increase our understanding of the effects of alcohol on various components and correlates of depression, my dissertation research aimed to: (1) identify, via qualitative methods, specific effects of alcohol on depressive affect, cognition, and behaviour that might be reinforcing for individuals who report using alcohol to cope with depression (Study 1), and (2) to experimentally examine the effects of alcohol (compared to placebo and to a no-alcohol condition) on positive mood, depressed mood, and recall of self-relevant depressed information of coping-with-depression motivated drinkers compared to an enhancement motivated (EM) drinker comparison (Study 2). In Study 1, undergraduate students reporting high coping-with-depression drinking motives (CWDM) reported several effects of alcohol on affective, cognitive, and behavioural depressive symptoms. They described most of these as providing relief from depressive symptoms but also reported some effects as involving a worsening of depressive symptoms. Study 2, revealed that, relative to the EM comparison group, CWDM participants in the no alcohol condition displayed greater biased processing recall of self-relevant depressed-content adjectives; this bias was eliminated in CWDM who received alcohol and attenuated in CWDM who received placebo. This pattern suggests that both expectancy and pharmacological effects of alcohol affect processing of self-relevant information in CWDM drinkers. With respect to mood, Study 2 results showed that all participants experienced increases in positive mood after alcohol consumption relative to baseline but no change in depressed mood. Taken together, findings from my dissertation highlight the numerous potential effects of alcohol on various symptoms related to depression, particularly affective and cognitive symptoms, many of which might be reinforcing for individuals who drink to cope with depression. Findings also highlight the complex, and at times contradictory, effects of alcohol on mood. In light of the present findings, it is important that future research investigate multiple potential pathways underlying the relationship between depression and alcohol use, including reciprocal relations between the two phenomena. In addition, the present findings have important clinical implications for the treatment of comorbid depression and alcohol misuse.

List of Abbreviations and Symbols Used

ACT	Acceptance and Commitment Therapy
ANOVA	Analysis of variance
APA	American Psychiatric Association
AUDIT	Alcohol Use Disorder Identification Test
BA	Behavioural activation
BT	Behavioural therapy
BAC	Blood alcohol concentration
BAI	Beck Anxiety Inventory
BDI-II	Beck Depression Inventory-II
CBT	Cognitive behavioural therapy
CCHS	Canadian Community Health Survey
CIHR	Canadian Institutes of Health Research
CWAM	Coping-with-anxiety motives
CWDM	Coping-with-depression motives
DBT	Dialectical Behavior Therapy
DMQ-R	Drinking Motives Questionnaire-Revised
<i>DSM-IV</i>	Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
<i>DSM-5</i>	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
DQ	Demographics Questionnaire
ECA	Epidemiologic Catchment Area
EM	Enhancement motives
<i>F</i>	Computed value of ANOVA
GABA	gamma-Aminobutyric acid
HPA	Hypothalamic-pituitary-adrenal
IAT	Implicit Association Test
ICC	Intraclass correlation coefficient
LQ	Lifestyles Questionnaire
<i>M</i>	Mean
MDD	Major depressive disorder
MDE	Major depressive episode
<i>N</i>	Total sample size
<i>n</i>	Subsample size
NCS	National Comorbidity Survey
NESARC	National Epidemiological Survey on Alcohol and Related Conditions
NIAAA	National Institute on Alcohol Abuse and Alcoholism
NLAES	National Longitudinal Alcohol Epidemiologic Survey
OR	Odds ratio
<i>p</i>	Probability of Type I error

PDD	Persistent depressive disorder
<i>r</i>	Pearson product-moment correlation
RCT	Randomized controlled trial
REM	Rapid eye movement
<i>SD</i>	Standard deviation
<i>SE</i>	Standard error
SEM	Structural equation modeling
SLT	Social Learning Theory
<i>t</i>	Computed value of <i>t</i> test
U.S.	United States
VAS	Visual Analogue Scale
<i>Z</i>	Standard score
α	Alpha co-efficient; index of internal consistency
χ^2	Chi-square statistic

Acknowledgments

I would first like to thank Dr. Sherry Stewart, my dissertation supervisor, for her expert feedback and for her patience during the process of completing my graduate studies. Thank you for taking me on as a student and for illuminating the path for me when I was unable to see it. Thank you also to the members of my dissertation committee, Drs. Simon Sherry and Jennifer Stamp, whose guidance was instrumental in developing and completing this dissertation. I would also like to thank Dr. Jennifer Merrill, my external examiner, for taking the time to be involved in my dissertation defence.

Completing this dissertation would not have been possible without the help of research assistants and volunteers. I would like to extend my deepest gratitude to Rebecca Pearson and Jacob Halloran for their assistance with thematic data analysis and to Dr. Sean Mackinnon for consulting with me about getting started with qualitative research. I would also like to thank Shaunda Jesso, Lily Duong, Anam Hamza, Renata Hall, and Erin Ring who assisted with data collection. Finally, thank you to Pam Collins for her assistance with everything involved with working in the lab, as well as to Jennifer Swansburg for her help with data collection and for being a dependable and boundless source of support.

I feel very fortunate to have worked with many talented clinicians in Halifax who played a key role in my professional development and who helped remind me why I chose this profession. I would like to extend specific thanks to Drs. Paul Freeman, Andrew Starzomski, and Jacqueline Cohen—your mentorship during my residency year has had a profound impact on my early career as a clinician. I would also be remiss not to thank my colleagues at the Borderline Personality Disorder Treatment Program: the aforementioned Dr. Cohen, Dr. Deborah Parker, Renè Murray, Maria Glowacka, Kerri Bojman, Emilee Burgess, Jessica Heidebrecht, and Marlene Furey. Thank you for your flexibility, patience, and friendship during the past year and, in true DBT fashion, for balancing me out with validation and consultation when I needed it.

I would also like to thank my fellow graduate students for their friendship and support over the years. Thank you in particular to those who started this journey with me, Jenn, Katie, Jeff, Therese, and Ainsley. I have cherished our times together in and out of the surly bonds of graduate school and feel lucky to count you among my friends for life. I would also like to thank my co-residents who were alongside me as I worked to finish this journey, namely the aforementioned Katie and Ainsley along with Holly, Mel, Karen, and Constance. Thank you for your support during the challenging and rewarding year that was residency. Halifax has not been the same without you.

Last but not least, thank you to my family who supported me unreservedly before any of us truly knew what I was getting into. Merci Maman et Papa de m'avoir inculqué une passion pour l'apprentissage et d'avoir toujours cru en moi. Merci aussi à ma soeur Josée-Anne, mon frère Maxime, mon beau-frère Emmanuel, et ma filleule Aurélie pour votre amitié. Je vous aime tous énormément. Finally, thank you Graham for the love and the laughter you bring to my life. I look forward to returning to humanity with you once this is all over.

Chapter 1. Introduction

The present dissertation focuses on improving our understanding of the relationship between alcohol use and depressed mood. The two manuscripts included in this dissertation present findings from both qualitative and quantitative studies of potential mechanisms through which alcohol could be reinforcing for individuals who experience depression. Participants in both studies are undergraduate students who report being motivated to drink alcohol to cope with depression, a group for whom the relationship between depression and alcohol is particularly relevant. The first study's aims are broader in that it uses qualitative data to obtain a rich description of coping-with-depression-motivated drinkers' experiences of alcohol's effects and to propose hypotheses about the effects of alcohol on various aspects of depression (affective, behavioural, and cognitive). In turn, the second study specifically focuses on the effect of alcohol on one of the cognitive processes associated with depressed mood. The following introductory chapter outlines relevant background information for these studies and presents a rationale for this research.

Alcohol Use in Undergraduate Students

Alcohol is the most prevalently used substance among Canadian undergraduate students. According to the Canadian Campus Survey (Adlaf, Demers, & Gliksman, 2005), 85.7% of undergraduate students used alcohol in the past year and 77.1% in the past month. Alcohol tends to be used heavily by this age group. Indeed, the same survey reported that 32% of undergraduate students described engaging in binge drinking as their typical pattern of alcohol use (i.e., usual consumption of more than 5 drinks on the days they drink). Adlaf et al. (2005) also found that in the same sample, 31.6% of undergraduate students endorsed experiencing at least one symptom of alcohol

dependence. These findings are consistent with work done in the United States which found that rates of binge drinking tend to peak between ages 18 to 22 years (Patrick & Schulenberg, 2011) and that one of every five undergraduate students who binge drinks meets *DSM-IV*¹ (APA, 1994) diagnostic criteria for alcohol dependence (Knight et al., 2002). It is noted that epidemiological work from the United States has found that the rates of *DSM-IV* (APA, 1994) alcohol dependence diagnoses were highest among individuals aged between 18 to 29 years (Grant et al., 2004); more recent work using *DSM-5* (APA, 2013) diagnostic criteria for alcohol use disorder has found the same (Grant et al., 2015). Apart from risking developing an alcohol-use disorder, undergraduate students who use alcohol also report experiencing a variety of other alcohol-related problems, including hangover (53.4%), memory loss (25.4%), missing classes (18.8%), as well as more hazardous consequences such as unplanned sexual relations (14.1%) and alcohol-related physical assault (10%) (Adlaf et al., 2005).

Depression in Undergraduate Students

Depression is a broad construct that has been defined in the literature at times as depressed mood and at other times as depressive disorders (i.e., syndromes comprised of symptoms that include sad mood, anhedonia, changes in behaviours like sleep and eating, suicidal thoughts, hopelessness, and worthlessness (Flett, Vredenbug, & Krames, 1997). In the present dissertation, the term depression will be used as a global term meant to

¹ Please note that much of the terminology used to identify alcohol use and mood disorders in the following sections is taken from the *DSM-IV* (APA, 1994) unless otherwise noted because these correspond to what has been used to define these conditions in the work cited. Several changes were made to the diagnostic criteria for alcohol use disorders in *DSM-5* (APA, 2013), including most significantly the combination of the *DSM-IV* (APA, 2013) criteria for alcohol abuse and alcohol dependence into a single alcohol use disorder category (see Hasin et al., 2013). Few changes were made to the diagnostic criteria for depressive disorders from *DSM-IV* (APA, 1994) to *DSM-5* (APA, 2013), though it is noted that the diagnosis of dysthymia has been renamed persistent depressive disorder (see Uher, Payne, Pavlova, & Perlis, 2013).

capture both diagnoses of depressive disorders and of elevated depressive symptoms such as depressed mood, as has been done in prior work (e.g., Hyde, Mezulis, & Abramson, 2008). Aside from the symptoms noted above, depressed individuals consistently exhibit a number of characteristics, including interpersonal difficulties, negative cognitive patterns, reduced enjoyment of and engagement in pleasurable activities, and increased stressors prior to the development of their depression (see Lewinsohn, Hoberman, & Rosenbaum, 1988, for a review). While depressed and anxious mood and disorders are similar in that they both feature negative mood, depression is differentiated from anxiety in that it (but not anxiety) features low positive mood (Watson, Clark, & Carey, 1988a; Watson, Clark, & Tellegen, 1988b); further, anxiety is differentiated from depression in that it (but not depression) features physiological hyperarousal symptoms (Clark & Watson, 1991; see Clark, Steer, & Beck, 1994, for a review). In addition, depression and anxiety can be differentiated by the types of cognitions endorsed by depressed and anxious individuals (e.g., Clark, Beck, & Stewart, 1990). Indeed, individuals with depressive disorders endorsed more hopelessness, lower self-worth, and more loss and failure-related thoughts than individuals with anxiety disorders. In turn, individuals with anxiety disorders endorsed more thoughts related to anticipated harms and dangers than individuals with depressive disorders (Clark et al., 1990).

Similar to alcohol misuse, depressive symptoms are another difficulty encountered by undergraduate students at a higher rate than among the general population (Ibrahim, Kelly, Adams, & Glazebrook, 2013). Canadian estimates suggest that 31% of undergraduate students report feeling unhappy or depressed (Adlaf et al., 2005). Similar estimates are found in studies of American undergraduate students where an estimated 31

to 33.5% (Gress-Smith, Roubinov, Andreotti, Compas, & Luecken, 2015; Ibrahim et al., 2013) of undergraduate students report at least mild depressive symptoms and an estimated 8% meet *DSM-IV* (APA, 1994) diagnostic criteria for either major depressive disorder (MDD) or dysthymic disorder (Blanco et al., 2008). Similarly to their heavily drinking peers, undergraduate students who are depressed are at higher risk for experiencing associated negative consequences (e.g. decrease in GPA; Hysenbegasi, Hass, & Rowland, 2005).

Depression and Alcohol Misuse Comorbidity

Of particular relevance for the present dissertation is the co-occurrence of depression and alcohol-related problems among undergraduate students. Studies have found a positive relationship between depressive symptoms and quantity of alcohol used per occasion (Graham, Massak, Demers, & Rehm, 2007) and between depressive symptoms and alcohol-related problems (e.g., missing class; Camatta & Nagoshi, 1995; Martens et al., 2008; Nagoshi, 1999) in undergraduate students. In the general population, comorbid depressive disorders and alcohol dependence is associated with poorer outcomes than either disorder alone, including more frequent relapse to alcohol misuse (e.g., Glenn & Parsons, 1991; Sabourin & Stewart, 2009; Swendsen & Merikangas, 2000).

Given the impairment experienced by depressed individuals (including undergraduate students) who use alcohol, it is particularly important to study the mechanisms underlying this relationship to improve interventions designed to reduce both problems. The following sections will review epidemiological findings related to

depression and alcohol use disorder comorbidity in the general population as well as various models that have been proposed as potential explanations for this comorbidity.

Epidemiological Findings

Several epidemiological surveys have estimated the prevalence of comorbid alcohol use disorders and depressive disorders, as defined by the *DSM-IV* (APA, 1994; i.e., major depressive episode or MDE, MDD, or dysthymic disorder). These include the Epidemiologic Catchment Area study (ECA; Regier et al., 1990), the National Comorbidity Survey (NCS, Kessler et al., 1996), the National Longitudinal Alcohol Epidemiologic Survey (NLAES; Grant & Harford, 1995), the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant et al., 2004; Hasin, Stinson, Ogburn, & Grant, 2007), and the Canadian Community Health Survey: Mental Health and Well-Being (CCHS 1.2; Rush et al., 2008). Consistent across these studies was that the presence of depression (MDE, MDD, or dysthymic disorder depending on the study) significantly increased the odds of alcohol dependence (ORs ranging from 1.9 to 4.2) and that the presence of alcohol dependence significantly increased the odds of MDD or dysthymic disorder (ORs ranging from 1.4 to 3.7). More recently, a longitudinal epidemiological study by Swendsen and colleagues (2010) found that the presence of dysthymic disorder and of alcohol abuse (as defined by the *DSM-IV*; APA, 1994) at Time 1 predicted a diagnosis of alcohol dependence at Time 2, suggesting that these comorbid difficulties might progressively worsen with time. It is noted that the diagnostic criteria for alcohol use disorders have changed with the release of the *DSM-5* (APA, 2013); yet, epidemiological work has continued to find evidence of comorbidity between depression and alcohol use disorders in that the presence of either MDD or persistent depressive

disorder (PDD; formerly dysthymic disorder) significantly increased the risk of having a comorbid alcohol use disorder (ORs ranging from 1.2 to 1.4) (Grant et al., 2015).

Theoretical Perspectives

Stewart, Grant, Mackie, and Conrod (2016) have proposed three primary models that could explain the depression-alcohol use comorbidity. The first two models involve direct causation between the two disorders. In the first of these, alcohol use could be causing depression (Schuckit, 2006). For instance, alcohol dependence might lead to hypothalamic-pituitary-adrenal (HPA) axis dysregulation (Koob & Le Moal, 2005), which has been implicated in the development of depression (Pariante & Lightman, 2008). Alternately, alcohol consumption could indirectly result in depression via the experience of alcohol-related problems (e.g., academic or interpersonal difficulties; Swendsen & Merikangas, 2000). The second model posits that depression could be causing alcohol use (e.g., via a self-medication process; Khantzian, 1997). As this model and its associated theories are most relevant to the present dissertation, these will be reviewed in more detail below. The third model proposes that a common variable (Stewart & Conrod, 2008; e.g., maternal alcohol use or parental abuse; Merikangas, Stevens, & Fenton, 1996) could be linked to the development of both depressive symptoms and alcohol misuse without the need for a direct causal link between the two disorders.

Stewart et al. (2016) highlight that any of these models might be responsible for the onset of comorbid depression and alcohol problems in a given individual. However, they emphasize that once both disorders are present, the processes involved in maintaining the comorbidity might be different than those that led to their onset. They

propose a fourth model that might account for the comorbidity between both disorders in which each disorder maintains and/or exacerbates the other in a vicious cycle over time. For instance, an individual might begin misusing alcohol to cope with depression (i.e., self-medication process; Khantzian, 1997) but as his/her alcohol use increases, the negative consequences of the alcohol misuse might accentuate his/her symptoms of depression (i.e., alcohol-induced process; Schuckit, 2006), which s/he might, in turn, continue to self-medicate with alcohol, and so on.

While there is certainly a body of evidence supporting alcohol-induced depression leading to the onset of comorbidity of both disorders among some individuals (Schuckit, 2006), the present dissertation explores the self-medication processes that may at least in part underlie the alcohol use-depression comorbidity. The self-medication hypothesis for comorbid alcohol use and depression (Khantzian, 1997) and other related theories (e.g., social learning theory, Abrams & Niaura, 1987; motivational models of alcohol use, Cooper 1994) have been widely studied, with a large body of research supporting that some individuals report drinking to cope with depression. Despite this, alcohol's effects on depressive symptoms are still poorly understood. The following section will review the self-medication hypothesis and other theories relevant to the present dissertation.

Alcohol Use as Self-Medication for Depression

Theoretical Perspectives

The self-medication hypothesis of substance abuse was first articulated by Khantzian (1985) and was primarily based on clinical observations of individuals with substance use disorders. He posits that substances of abuse (including alcohol) help individuals with emotional disorders (including depression) relieve or control painful

emotions. The self-medication hypothesis does not discount the influence of other factors (e.g., physiological effects of substances on aversive emotional states, genetic predispositions to developing substance abuse problems). However, it does emphasize the importance of psychological factors, primarily of aversive mood states, as important determinants of whether a person will use, which substance a person will use, become dependent upon, and/or relapse to using after a period of abstinence.

As part of his self-medication hypothesis, Khantzian (1985, 1997) posited that individuals develop a preferred substance (or “drug of choice”) after experimenting with various substances and learning that a specific one is appealing because it improves their specific aversive affective states. Social learning theory (SLT; Abrams & Niaura, 1987; Bandura, 1977) similarly posits that alcohol use is maintained by reinforcement and conditioned responding. However, unlike Khantzian’s self-medication hypothesis (which draws on psychodynamic theory to explain the reinforcing effects of alcohol for individuals who are depressed), SLT emphasizes cognitive factors, such as expectancies about alcohol’s effects, as predictors of an individual’s likelihood of drinking. SLT proposes that an individual is influenced to drink, in part, by beliefs or expectancies about the effects of alcohol which are learned via interactions with his/her social environment (e.g., exposure to individuals who modeled various drinking behaviours; Biddle, Bank, & Marlin, 1980). As an individual experiments with alcohol use, these experiences can also help shape the alcohol expectancies of that individual (Cox & Klinger, 1988). Expectancies about alcohol use, in turn, help shape an individual’s motivations for alcohol use which, in turn influences whether an individual will drink or not in a given circumstance.

Indeed, motivational models of alcohol use propose that individuals use alcohol to obtain certain valued effects (e.g., changes in affect; Cox & Klinger, 1988). They also propose that the drinking behaviours of individuals with different drinking motives will vary in terms of the antecedents and the consequences of that behaviour (Cooper, 1994). Drinking motives have been proposed as the most proximal factor to alcohol use through which other factors (including expectancies, personality characteristics, genetic factors, etc.) exert their influence on drinking behaviour (Cooper, 1994)². Cox and Klinger (1988) proposed a motivational model of alcohol use that classified motives along two dimensions: valence (positive or negative) and source (internal or external) of the effects the individual hopes to obtain by drinking. In other words, an individual might be motivated to drink either to obtain a positive outcome or avoid a negative outcome; additionally, an individual might be motivated to drink to obtain an internal reward (e.g., change an aversive emotional state) or an external reward (e.g., avoid rejection from peers). Crossing the valence and source dimensions yields four distinct drinking motives: enhancement motives (positive valence and internal source; e.g., drinking to enhance positive mood), social motives (positive valence and external source; e.g., drinking to socialize with others), coping motives (negative valence and internal source; e.g., drinking to regulate aversive feelings), and conformity motives (negative valence and external source; e.g., drinking to avoid social censure) (Cooper, 1994; Cox & Klinger, 1988). Cooper (1994) showed that each drinking motive was reliability related to a

² While explicit influences on drinking behaviour (e.g., drinking motives) are emphasized in this overview of the literature, implicit processes also influence alcohol use. For example, attentional bias toward alcohol-related cues has been linked with increased urges to drink and is one of many types of implicit cognitive processes that have been linked with substance use (see Wiers & Stacy, 2006 for a review). Conditioning processes are also linked with substance use behaviours (e.g., after repeated substance use, cues associated with the substance, such as the smell of alcohol, can elicit conditioned responses; see Drummond, 2001 for a review).

distinct pattern of antecedents and of consequences. Of particular relevance to this present dissertation, Cooper (1994) found that individuals who drank to cope with negative affect were at higher risk of experiencing alcohol-related problems than individuals who drank for social or enhancement motives.

A large body of research has investigated the links between various drinking motives and drinking behaviour (e.g., frequency, quantity, and pattern of alcohol use) and between drinking motives and drinking-related problems. Cooper, Kuntsche, Levitt, Barber, and Wolf (2016), in their review of twenty-eight large sample studies of the associations between drinking motives and indicators of alcohol use and misuse, concluded that coping motives for drinking were the most maladaptive of all drinking motives. Indeed, coping motives were consistently associated with drinking-related problems. These associations emerged both in cross-sectional studies and in longitudinal studies, the latter of which showed that coping motives preceded the development of drinking problems later in life (Cooper et al., 2008; Holahan, Moos, Holahan, Cronkit, & Randall, 2001). Interestingly, this consistent pattern emerged despite inconsistent associations between coping motives and frequency and quantity of alcohol use in the literature, suggesting this pattern of alcohol use may be particularly maladaptive regardless of the dose of alcohol consumed (Cooper et al., 2016).

To refine Cooper's (1994) coping motives construct, more recent work by Grant, Stewart, O'Connor, Blackwell, and Conrod (2007b) separated this drinking motive into two types depending on the negative affect the drinker is attempting to regulate by consuming alcohol: coping-with-anxiety and coping-with-depression motives (CWAM and CWDM, respectively). Grant et al. (2007b) found that CWAM and CWDM were

predictive of distinct patterns of drinking. Specifically, they found that CWDM (but not CWAM) were predictive of higher typical quantity of drinks consumed per occasion (over and above the effects of demographic variables and other drinking motives). This finding is consistent with evidence cited earlier in this chapter linking depressive symptoms with higher quantities of alcohol consumed per drinking occasion (Graham et al., 2007). Grant et al. (2007b) also found that stronger CWDM (but not stronger CWAM) at Time 1 predicted higher number of drinks consumed per week at Time 2. With respect to alcohol-related problems, consistent with Cooper's (1994) findings, CWDM at Time 1 were significantly positively related to drinking problems. However, unlike the patterns observed when coping motives are studied as a general construct and unlike CWAM, Grant et al. (2007b) found that CWDM were not directly predictive of alcohol-related problems. Instead, they were indirectly predictive of alcohol-related problems via their association with higher alcohol use. Taken together, the findings that individuals with stronger CWDM drink at higher doses and experience more alcohol-related problems than individuals endorsing other drinking motives are consistent with the epidemiological findings reported earlier in the chapter linking depressive disorders and alcohol use disorders.

Given the high degree of impairment experienced by individuals who drink to cope with negative affect, including depression, it is particularly important to gain a better understanding of the reinforcing effects these individuals experience from drinking in order to improve the interventions designed to treat comorbid depression and alcohol use disorders. The section below summarizes what is known to date about the

mechanisms underlying drinking to cope with depression (or alcohol use as self-medication for depression), with an emphasis on experimental findings.

Evidence for Reinforcing Effects of Alcohol on Depression

A necessary condition for demonstrating self-medication for depressive symptoms with alcohol is to first establish that individuals do drink alcohol in response to depressed mood. Evidence from mood induction studies and daily diary studies can be used to investigate whether individuals drink alcohol in response to depressed mood; relevant findings from studies utilizing these methodologies are summarized below.

Negative Mood Induction Studies. Mood induction methods include a variety of techniques used to elicit various moods in the laboratory. These techniques include guided imagery and music, both of which have been demonstrated to be effective in inducing a target mood among participants in a laboratory setting. Once a mood state is elicited, it is possible to investigate the link between mood and alcohol use by measuring the effect of mood induction on a variety of drinking-relevant outcomes, including desire to drink, latency to drink, quantity of alcohol consumed, and alcohol preference (over alternative beverages). Several mood induction studies have investigated the link between induced depressed mood and subsequent alcohol use outcomes among individuals already dependent on alcohol. These studies (Cooney, Litt, Morse, Bauer, & Gaupp 1997; Litt, Cooney, Kadden, & Gaupp, 1990; Rubonis et al., 1994) found alcohol-dependent individuals, particularly those experiencing higher anxious and depressive symptoms (Litt et al., 1990) and women (Rubonis et al., 1994), reported an increased desire to drink following induction of negative mood. This increase occurred regardless of whether or not alcohol was introduced as an external cue for the participant (e.g., by being given an

alcoholic drink to observe and smell during the mood induction), emphasizing the importance of emotional states as an internal cue linked with alcohol craving.

Similar mood induction studies have also been conducted on non-dependent users of alcohol. Willner, Field, Pitts, and Reeve (1998) found comparable results to the work done with alcohol-dependent individuals in that depressive mood induction led to increases in alcohol craving. Interestingly, while Willner and colleagues (1998) found that depressed mood led to increased cravings for alcohol, a subset of their female participants also showed decreased liking for alcohol. In addition, a set of studies by Birch and colleagues (2004, 2008) found different effects of depressed mood induction on attention to alcohol-related stimuli and on activation of relief-related alcohol expectancies, both at an implicit and at an explicit level of processing; indeed, while Birch et al. (2004) found that coping motivated drinkers who underwent depressed mood induction reported increased explicit relief-related alcohol expectancies, Birch et al. (2008) did not find this effect for implicit relief-related alcohol expectancies and also did not find evidence that coping-motivated drinkers who underwent depressed mood induction paid greater attention to alcohol-related stimuli. These paradoxical effects of depressed mood induction on alcohol-related outcomes illustrate the complex relationship between depression and alcohol use and could suggest that the associations between depressed mood and drinking behaviour occur mainly at an explicit rather than implicit level of processing, at least among undergraduate student drinkers.

Daily Process Studies. Daily process methods are used to gather moment-to-moment and event-dependent data on the drinking habits and contexts of individuals. Some of this work has allowed researchers to determine whether there is a link between

an event or mood state experienced earlier in the day and later behaviour, allowing for both linking of the two phenomena and establishment of the temporality of the effect. One of these studies by Park, Armeli, and Tennen (2004) found that individuals drank more on days that had events perceived as relatively more stressful, as well as on days in which they engaged in less problem-focused coping strategies and days in which they experienced more negative (and positive) affect. In a set of daily process studies by Todd, Armeli, Tennen, Carney, and Affleck (2003) when hand-held computers were used (to ensure data collection closer to real-time), an association was found between weekday sad mood and weekend drinking, and this association was positively moderated by coping drinking motives; this result was not replicated in a study using paper-and-pencil diaries requiring more retrospective self-report, however. Another daily process study by Mohr and colleagues (2005) found that daytime negative moods predicted evening drinking. More recent daily process work by Armeli, Conner, Cullum, and Tennen (2010) found that month-level depressed mood was related to drinking frequency and quantity; in addition, they found that the strongest positive association between depressed mood and number of drinks per day occurred among those with both high coping motives and low social and enhancement motives. Taken together, these studies suggest that there is evidence for a relationship between depressed mood at time 1 and later alcohol use.

However, some other daily process studies have failed to find an association between negative mood states and later alcohol consumption. For instance, Swendsen and colleagues (2000) did not find that sadness or a broader measure of negative affect predicted same-day alcohol consumption; a daily process study by Grant, Stewart, and Mohr (2009) also did not find a correlation between daily depressed mood and daily

amount of alcohol consumed, though they did find a positive correlation between daily depressed mood and baseline levels of alcohol-related problems. In addition, Hussong, Galloway, and Feagans (2005) found that individuals high in coping motives reported less drinking on days in which they experienced greater sadness. The above study by Grant et al., (2009) refined this work by investigating two types of coping motives (CWDM and CWAM) as mediators of the associations between negative emotion and alcohol consumption. Interestingly, Grant et al. (2009) found that while low CWDM drinkers decreased their drinking on days where they also endorsed higher depressed mood, high CWDM drinkers did not change their alcohol use on days of higher depressed mood. As noted by Swendsen and colleagues (2000), these inconsistencies do not necessarily suggest that there is no self-medication process underlying comorbid depression and alcohol use. Rather, they might point to evidence for the complexity of the mechanisms underlying this relationship and to evidence that depression is also sometimes caused by problem drinking, as noted earlier in this chapter (e.g., Merikangas & Gelernter, 1990; Merikangas et al., 1996). Hussong et al. (2005) also note that there might be individual differences in time lag between the experience of a depressed mood state and subsequent alcohol consumption which are not typically captured in studies utilizing daily process methods. A recent short-term, multi-wave longitudinal research study that used a 7-day timeframe for measurements found support for the self-medication hypothesis in that depressive symptoms predicted binge drinking over a 1-week period (Mushquash et al., 2013). Ultimately, these differing results have important implications for the need to more clearly understand coping motives for drinking and the

mechanisms that underlie the self-report of self-medication effects of alcohol on depression (Hussong et al., 2005).

Separate from the issue of temporality of depressed mood and alcohol use, another necessary condition for establishing that alcohol is used by some to self-medicate depression is that the substance is effective in producing an effect on depression that is sought out by depressed individuals. In his revision of the self-medication hypothesis, Khantzian (1997) proposed that alcohol is used by depressed individuals because of its effect on “those parts of the self that are cut off from self and others by rigid defenses that produce feelings of isolation and emptiness” (p. 233). He acknowledged that alcohol and other central nervous system depressants “are not good antidepressants” (p. 233), and hypothesized that these substances instead “create the illusion of relief because they temporarily soften rigid defenses and ameliorate states of isolation and emptiness that predispose to depression” (p. 233). Indeed, as will be reviewed below, alcohol’s effects on the affective, cognitive (i.e., what Khantzian termed “rigid defenses” and what cognitive-behavioural oriented practitioners might refer to as cognitive distortions), and behavioural (e.g., social withdrawal) correlates of depression are wide-ranging and complex. The following section will first describe the relevant affective, cognitive, and behavioural characteristics of depression. Then, experimental evidence of alcohol’s effects on the affective and cognitive processes linked with depression will be emphasized below, as these are the focus of study in the present dissertation.

Relevant Characteristics of Depression. As noted earlier, depression is characterized by the presence of high dysphoric affect and low positive affect (Watson et al., 1988a; Watson et al., 1988b); in addition, clinical diagnoses of depressive disorders

describe several other potential symptoms experienced by depressed individuals, such as anhedonia, changes in behaviours like sleep and eating, suicidal thoughts, hopelessness, and worthlessness (Flett et al., 1997). Many models have been proposed to explain the onset and maintenance of depression. Some of these will not be described in detail as they are outside of the scope of the present dissertation; these include psychoanalytic theories (e.g., Bibring, 1953; Freud, 1917/1986), the learned helplessness model (e.g., Abramson, Seligman, & Teasdale, 1978; Seligman, 1975), and models involving HPA axis hyperactivity (e.g., Pariante & Lightman, 2008). More relevant to the present dissertation are cognitive and behavioural perspectives on depression.

Beck's cognitive theory of depression (Beck, 1976; Beck, Rush, Shaw, & Emery, 1979) has greatly influenced contemporary thinking about depression (Gotlib & Joormann, 2010; Pyszczynski & Greenberg, 1987). Beck (1976) conceptualizes depressive symptoms as emotions, behaviours, and negative automatic thoughts that are problematic and reciprocally linked; in other words, changes in any one of the elements of depression (emotions, behaviours, or automatic thoughts) is expected to produce changes in the others. He places particular emphasis on schemas (memory representations that lead individuals to filter stimuli in a way that is consistent with these schemas) in his theory. He theorizes that depressed individuals have schemas that feature themes of loss, failure, worthlessness, and rejection, which in turn biases their processing of information in the environment such that stimuli is interpreted in a negative way that is consistent with the underlying schemas (Beck, 1976). These schemas are conceptualized as the predisposing factors that lead to the various symptoms (i.e., dysphoria, anhedonia) of depression when they are activated, usually by a stressor such as a loss (Beck, 1976;

Pyszczynski & Greenberg, 1987)³. Indeed, this theory of depression is an example of the diathesis-stress formulation of depression as stress plays an important role in activating negative schemas (Beck, 2008; Scher, Ingram, & Segal, 2005). Once the negative schemas have been activated, the depressed individual generates negative thoughts about the self, the world, and the future (these three types of negative thoughts theorized to be generated by depressed individuals are termed the “cognitive triad” by Beck, 1976). Several tenets of Beck’s model have received empirical support (see Haaga, Dyck, & Ernst, 1991 for a review); for instance, depressed individuals tend to endorse more negative thoughts (e.g., Dohr, Rush, & Bernstein, 1989) and more negative self-descriptive information (e.g., Derry & Kuiper, 1981) than nondepressed individuals. These observable negative thoughts are, in turn, theorized to reflect that a related, underlying schema is activated in this individual.

In addition to being linked with schemas and negative thoughts, depression is also theorized to be maintained by faulty information processing, including cognitive distortions (e.g., errors in thinking that maintain negative self-schemas; Beck et al., 1979). Other theories emphasize biases in other aspects of information processing (e.g., attention and recall). For instance, many theorists have suggested that self-focused attention, particularly to negative aspects of the self, plays a role in maintaining depression (Ingram, 1990; Lewinsohn, Hoberman, Teri, & Hautzinger, 1985; Nolen-Hoeksema, 1991; Pyszczynski & Greenberg, 1987). According to these theories, the self

³ It is noted that these theorized links between predisposing cognitive factors (i.e., schemata) and symptoms of depression after these are activated by a stressor, are not necessarily causal. In later versions of his cognitive theory of depression, Beck acknowledges that while all depressed individuals show similar negative cognitions, this theorized causal pathway applies only to some people (Beck, 1987; Haaga, Dyck, & Ernst, 1991; Spangler, Simons, Monroe, & Thase, 1997).

is a schema that influences how an individual processes self-relevant information (Derry & Kuiper, 1981); this is evidenced by the finding that individuals generally tend to recall more information that is self-relevant (Rogers, Kuiper, & Kirker, 1977). It is thought that depressed individuals incorporate depressed content into their self-schema more so than others (Derry & Kuiper, 1981). Experimental studies support this theory by showing that depressed individuals show superior recall for depressed self-relevant content (over non-depressed, non-self-relevant content) than non-depressed individuals, suggesting that depressed individuals are biased to encode and/or retrieve more negative self-focused information (Derry & Kuiper, 1981; Kuiper, MacDonald, & Derry, 1983; Rogers et al., 1977; Smith & Greenberg, 1981). Other manipulations of self-focus (e.g., being hospitalized in a room with and without a mirror; Gibbons et al., 1985) also show positive associations between self-focus and depressed mood.

Another more recent related body of work has looked at a rumination, a specific type of self-focused attention. Rumination is defined as repeated passive focus on one's distress and on the potential causes and consequences of this distress; Nolen-Hoeksema, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). It is theorized (see Response Styles Theory; Nolen-Hoeksema, 1991) to be linked, and has later been experimentally linked, with depression by increasing the likelihood that depressed individuals will use negative thoughts to understand their circumstances (e.g., Lyubomirsky & Nolen-Hoeksema, 1995), by interfering with problem-solving (e.g., Lyubomirsky & Nolen-Hoeksema, 1995), and by reducing the likelihood that individuals will engage in behaviours that are positively reinforcing (e.g., Lyubomirsky & Nolen-Hoeksema, 1993). Like self-focused attention generally, rumination specifically has been linked with

depressed mood among depressed individuals; in addition, rumination has been linked with worsening of depressed mood and with the onset of depressive episodes (Just & Alloy, 1997; Nolen-Hoeksema & Morrow, 1993; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Spasojević & Alloy, 2001). In contrast, externally-focused attention and distraction have typically been linked with lowered depressed mood (Fennell, Teasdale, Jones, & Damle, 1987; Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema & Morrow, 1993). Rumination has been argued to have a unique relationship to depression, over and above its relationships to other factors that have been linked with depression (e.g., neuroticism, pessimism, and perfectionism; see Nolen-Hoeksema et al., 2008, for a review).

Aside from the affective and cognitive characteristics of depression described above, depression is also often accompanied by behavioural changes. Behavioural perspectives on depression emphasize the reduced frequency of activity as central to the development of depressive disorders. For example, Lewinsohn (1975) proposed that depression results from a low rate of positive reinforcement in one's environment due to a variety of possible factors (e.g., lack of availability of positive reinforcers or lack of skills to access them). Once this occurs, an individual begins to reduce the frequency of their behaviours, including behaviours that might be positively reinforcing (e.g., engaging in pleasurable activities), which in turns, makes positive reinforcement even less likely (MacPhillamy & Lewinsohn, 1974). Instead, a depressed individual's withdrawal from activities might be reinforced (e.g., through increased attention from loved ones), further promoting reduced engagement in positively reinforcing behaviours (Pyszczynski & Greenberg, 1987). Cross-sectional work links depression with interpersonal problems; for

example, individuals experiencing depressive symptoms spend less time at social events and more time alone and in intimate settings (e.g., with family members or romantic partners; Baddeley, Pennebaker, & Beevers, 2013). Other work elaborates on a potential mechanism underlying interpersonal problems in depression. Specifically, Coyne (1976) suggests that depressed individuals tend to seek reassurance from others. Because these individuals are prone to doubting reassurances from loved ones, they soon seek further reassurance, with both variables maintaining one another in a vicious cycle. This cycle is theorized to be aversive to others and eventually elicits rejection, which further reinforces depression. Many studies support this theory (see Joiner, Alfano, & Metalsky, 1993, for a review).

Alcohol Effects on Affective Processes. Alcohol has sometimes been described as a “dirty drug” because of its widespread effects on various neural systems underlying various emotional states (Sher & Grekin, 2007). Indeed, alcohol has been found to have effects on several neurotransmitters, (namely dopamine, norepinephrine, and GABA; e.g., Weiss & Koob, 1991; Fromme & D’Amico, 1999), as well as effects on opioid peptides (e.g., Kranzler & Anton, 1994) and as a beta-blocker (e.g., Sher, 1987). These widespread effects of alcohol partially explain its varying and sometimes opposing effects on mood; indeed, alcohol is associated with both euphoria and dysphoria, as well as with increased arousal and with sedation (Sher & Grekin, 2007). Alcohol is also associated with analgesic effects that might be reinforcing for drinkers (Sher & Grekin, 2007). However, the results of studies of alcohol-induced mood changes are broadly in agreement with respect to the dose-dependent effects of alcohol on mood: mood is enhanced at low doses of alcohol, as evidenced by self-reports of happiness, relaxation,

and/or euphoria; in contrast, individuals report more aversive mood states at higher doses (for reviews, see Davidson & Ritson, 1993; Freed, 1978; Russell & Mehrabian, 1975; Sher & Grekin, 2007; and Tucker, Vuchinich, & Sobell, 1982). Further complicating the study of alcohol's effects on mood are findings suggesting that these effects also differ based on whether blood alcohol concentration (BAC) is rising or descending. A review of the effects of ascending and descending BAC limbs broadly suggest that while BAC is rising, alcohol typically produces stimulating effects; in contrast, when BAC is descending, BAC produces sedating effects (Holdstock & de Wit, 1998). Taken together, these effects suggest that the most reinforcing effects of alcohol on depression-relevant mood occur at low doses and while one's BAC is rising.

It should be noted that while there are general patterns of dose-dependent and BAC-dependent effects on mood that are broadly observed in drinkers, several other relatively static factors influence an individual's susceptibility to intoxication and to the effects of alcohol on mood. These include genetic variations, metabolic factors, personality traits, and cognitive functioning (Ramchandani, Bosron, & Li, 2001; Ramchandani, Kwo, & Li, 2001; for a review, see Sher & Wood, 2005). Furthermore, an important real-world consideration when assessing alcohol's impact on mood is its frequent use in conjunction with other substances, including nicotine, caffeine, marijuana, and cocaine (Sher, Wood, Richardson, & Jackson, 2005). Some of these alcohol/drug interactions appear to lead to reduced levels of intoxication (e.g., interactions with nicotine) while others appear to lead to increased levels of intoxication (e.g., interactions with marijuana) (Sher et al., 2005; Sher & Grekin, 2007). Finally, it is also noted that some non-pharmacological aspects of drinking (e.g., beliefs about the effects of alcohol

consumption or “expectancies”; context in which alcohol is used) can also affect alcohol’s impact on mood (Sher & Grekin, 2007).

Since alcohol’s effects on mood are influenced by dose, individuals high in CWDM are of particular interest since they drink in greater quantities than individuals motivated to drink for other reasons (Grant et al., 2007b). This finding is somewhat puzzling given the evidence that high doses of alcohol tend to have a negative impact on mood. It is possible that the positive affective effects experienced by a CWDM drinker while their blood alcohol concentration is rising are reinforcing enough to explain the use of alcohol as a coping strategy for depressed mood. However, it is also possible that alcohol also exerts reinforcing effects for CWDM drinkers on cognitive processes associated with depression (see below).

Alcohol Effects on Cognitive Processes. Alcohol consumption has been conceptualized by some theorists as being involved in disrupting one’s attention, which might be reinforcing for a depressed individual who tends to engage in excessive self-focused attention. Indeed, according to the attention-allocation or “alcohol myopia” theory, alcohol is said to result in a narrowing of one’s scope of attention, leading one to only attend to the most immediate and salient cues available in the environment (Steele & Josephs, 1990). Steele and Josephs (1998; 1990) have shown that consuming alcohol in the presence of neutral or pleasant stimuli can lead to an anxiolytic effect; in contrast, consuming alcohol in the absence of neutral or pleasant distraction can lead to worsening of anxious mood. A study investigating the combined effects of alcohol and distraction on a more general measure of negative mood also found improvement in mood in participants who engaged in both activities (Steele, Southwick, & Pagano, 1986).

Other theorists have proposed that alcohol might provide an escape from painful self-awareness (e.g., Baumeister, Heatherton, & Tice, 1994), including the self-focused cognitive processes that characterize depression. Hull's (1981) self-awareness theory proposes that alcohol disrupts the tendency by self-aware individuals (including depressed individuals) to encode and subsequently retrieve negative information about the self. A series of experiments by Hull and colleagues support the theory that alcohol disrupts general self-evaluation processes in highly self-aware individuals (Hull, Levenson, Young, & Sher, 1983; Hull & Young, 1983). Work specifically focused on disruption of negative self-evaluations found that men who consumed alcohol endorsed fewer negative self-evaluations after receiving negative feedback than men who consumed placebo (Yankovsky, Wilson, Adler, Hay, & Vrana, 1986). More recent work by Aramakis, Khamba, MacLeod, Poulos, and Zack (2012) showed that alcohol led to disruptions in an individual's implicit negative self-relevant associations (as measured by reaction times on the Implicit Association Task [IAT]). However, none of these studies investigated the effects of alcohol on the negative self-evaluative processes of depressed individuals. To address this limitation, Stephens and Curtin (1995) compared the impact of alcohol versus placebo on recall of self-relevant negative information in depressed versus non-depressed individuals. They found that depressed (but not non-depressed) participants who consumed placebo showed increased recall of negative self-relevant information; this bias was eliminated among depressed participants who consumed alcohol. While Stephens and Curtin's (1995) work in particular sheds some light on the potential effects of alcohol on cognitive processes that might be perceived as reinforcing

for depressed individuals, the effect of expectancy on recall of negative self-relevant information is unclear.

Other Effects of Alcohol on Depression. Given evidence that depressive symptoms are linked with interpersonal difficulties (Beach, Jones, & Franklin, 2009), it is possible that depressed individuals drink, in part, to cope with interpersonal stressors (Reyno, Stewart, Brown, Horvath, & Wiens, 2006) and/or with loneliness (Castellanos-Ryan & Conrod, 2012). While cross-sectional work has found associations between depressive symptoms and solitary drinking (Keough, O'Connor, Sherry, & Stewart, 2015), the temporality of these phenomena and the impact of solitary drinking on subsequent mood remains unclear.

Other work has highlighted that depressed individuals might still drink in social situations which could have an impact on their depressive symptoms. Armeli and colleagues (2010) found that the link between depressed mood and drinking frequency was moderated by social and enhancement drinking motives. They propose that some individuals (perhaps persons high in extroversion and sensation seeking) might seek out social situations when experiencing depressed affect; for undergraduate students, social situations often involve drinking, which could in turn have reinforcing effects for individuals experiencing depressed mood. Consistent with this hypothesis are findings that suggest that drinking in a group context leads to experiencing more positive affective effects of alcohol, while drinking alone leads to experiencing more aversive mood effects of alcohol (Doty & de Wit, 1995; Pliner & Cappell, 1974; Sher, 1985; Warren & Raynes, 1972). Overall, the effects of alcohol on the behavioural correlates of depression (e.g.,

social withdrawal) remain unclear and, along with the effects of alcohol on the affective and cognitive symptoms of depression, warrant further study.

Aims of the Present Dissertation

Alcohol has a variety of effects on the user, including several effects that might be experienced as reinforcing for individuals who drink to cope with depression. However, the mechanisms underlying the use of alcohol as self-medication for depression are poorly understood given the vast and paradoxical effects of alcohol on mood. More specifically, the negative effects of alcohol on mood when it is used at high doses are particularly perplexing in the context of evidence that individuals who drink to cope with depression tend to drink at higher doses and experience more negative consequences from alcohol use than individuals who report drinking for other reasons. It is particularly important to increase our understanding of drinking to cope with depression among undergraduate students given the elevated prevalence of both harmful drinking behaviours and depressive symptoms in this group.

The aim of the present dissertation was to identify specific effects of alcohol on depressed mood that might be reinforcing for individuals who are motivated to use alcohol to cope with depression in an attempt to clarify the complex relationship between alcohol use and depression. To do so, I first explored a variety of possibilities by asking individuals who endorse high levels of drinking to cope with depression motives to describe the various effects of alcohol they have experienced when they have used it to cope. This first study used thematic analysis to identify common themes found in interviews of a sample of such undergraduate drinkers as they described the effects they experience from alcohol that are associated with their drinking to cope with depression.

The effects they described were wide-ranging and included impacts on affective, cognitive, and behavioural symptoms of depression. This study served as the first manuscript in my dissertation (Study 1; see Chapter 2).

I then conducted an experimental study that selectively examined one potential reinforcing property of alcohol when consumed to cope with depression. Drawing upon theory proposing that alcohol is used by depression sufferers in part for self-medication purposes (Khantzian, 1997) and that this might include relief from painful self-awareness (Baumeister et al., 1994; Hull, 1981), my second study specifically examined the effects of alcohol (compared to placebo and to a no-alcohol condition) on the positive mood, depressed mood, and recall of self-relevant depressed information of coping-with-depression motivated drinkers. This study served as the second manuscript in my dissertation (Study 2; see Chapter 4).

Together, these two manuscripts describe an investigation of various potential explanations for the use of alcohol for self-medication of depression despite its paradoxical effect on mood. The results of these studies have important implications for future research into coping motives for drinking, as well as important clinical implications for the treatment of comorbid depression and alcohol misuse (see Chapter 5).

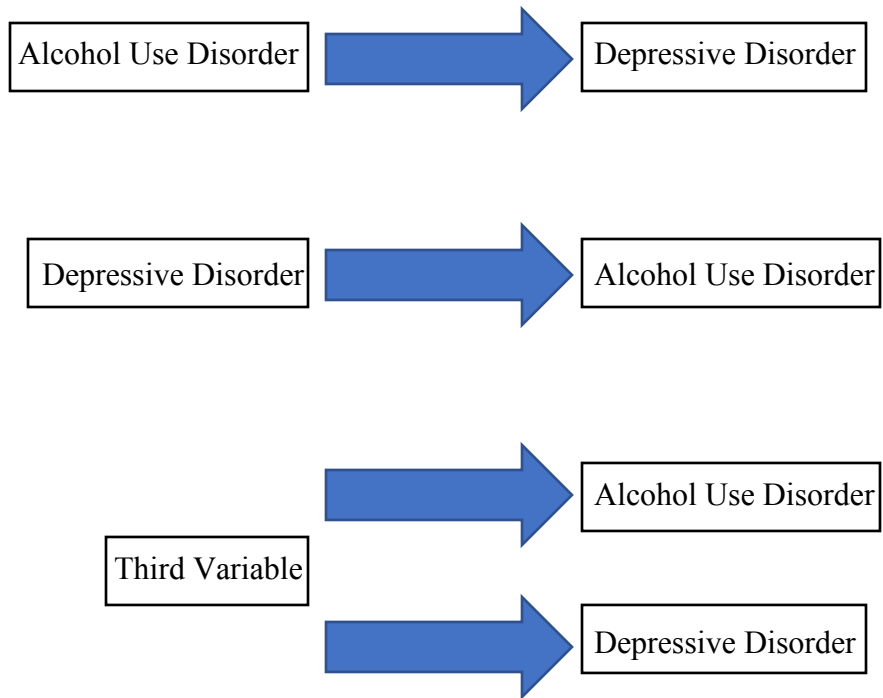


Figure 1.1. Pictorial representation of the three primary models of comorbidity between depression and alcohol use (adapted from Stewart et al., 2016)

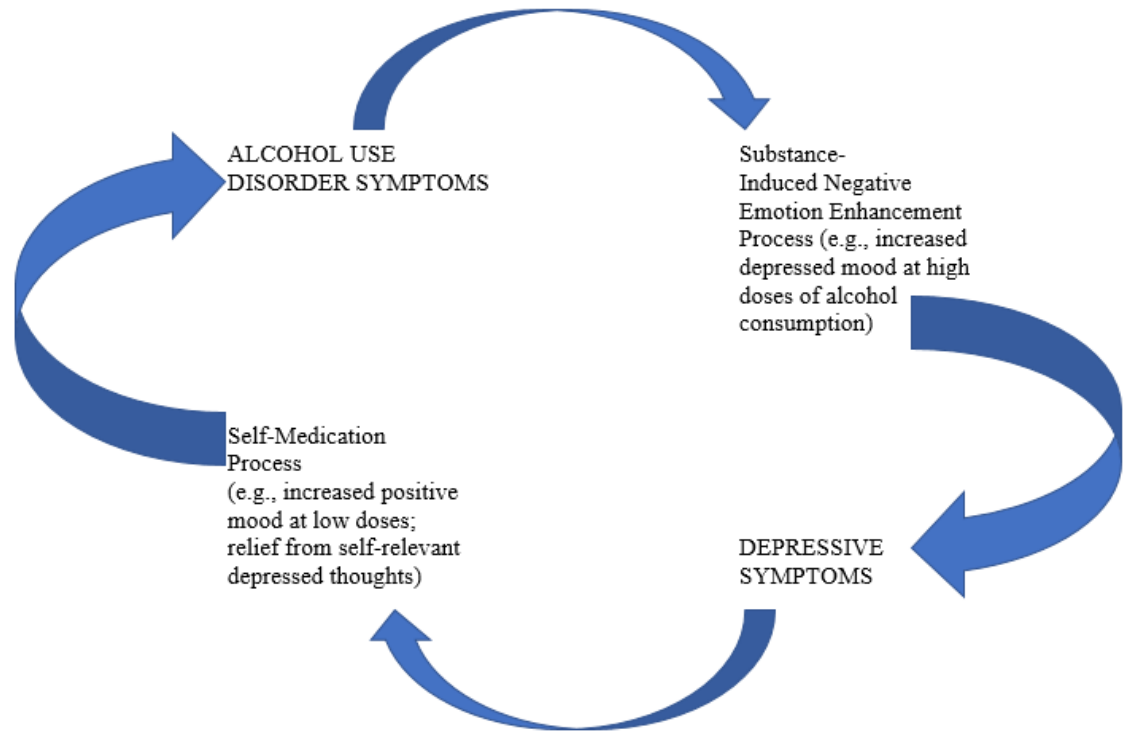


Figure 1.2. Pictorial representation of a hypothesized model of comorbidity depicting a vicious cycle between depression and alcohol use (adapted from Stewart et al., 2016)

Chapter 2. Study 1: A Qualitative Study of the Perceived Effects of Alcohol on Depressive Symptoms among Undergraduates Who Drink to Cope with Depression

Abstract

Heavy drinking is prevalent among undergraduate students and is linked with drinking to cope with depression motives for drinking. Drinking to cope with depression remains poorly understood given that alcohol has been shown to have aversive effects on mood when consumed at high doses. Using semi-structured qualitative interviews, the present study examined the perceived effects of alcohol on depressive symptoms as reported by undergraduate students who report high levels of drinking to cope with depression.

Sixteen undergraduate coping-with-depression-motivated drinkers (9 women, 7 men) reported on their experiences of drinking to cope with depression. Thematic analysis was conducted to identify themes and subthemes in the data; this analysis was supplemented with analyses of variance which examined the characteristics (demographics, alcohol use patterns, and depressive symptoms) of individuals who endorsed each subtheme.

Undergraduate students reported several effects of alcohol on affective, cognitive, and behavioural depressive symptoms. While the majority of the effects they described were perceived as providing relief from depressive symptoms, some of the effects reported were perceived as worsening depressive symptoms. Theoretical and clinical implications, as well as directions for future research, are described.

Introduction

There is evidence that alcohol alters mood in both reinforcing and aversive ways (Davidson & Ritson, 1993; Martens et al., 2008; Raimo & Schuckit, 1998; Sher & Grekin, 2007). Depression and alcohol use disorders are frequently co-morbid (Raimo & Schuckit, 1998). Moreover, some drinkers report drinking to regulate negative emotions including depression (Cooper, Frone, Russell, & Mudar, 1995). The reasons why people drink alcohol to cope with depression, given the evidence that drinking can lead to dysphoria at high doses (Sher & Grekin, 2007), are poorly understood. The present study aimed to identify common and specific ways in which alcohol affects the depressive symptoms and features of individuals who report being highly motivated to use it to cope with depression by identifying themes in qualitative interview data.

Epidemiological studies conducted in the United States suggest that unipolar depression and alcohol use disorders frequently co-occur in the same individual; indeed, 20.5% of treatment-seeking individuals diagnosed with alcohol dependence also met diagnostic criteria for major depressive disorder (Grant et al., 2004). The data also suggest that the presence of depression significantly increases one's odds for developing an alcohol use disorder in one's lifetime, and vice versa. Alcohol abuse and dependence (now known as alcohol use disorder in the *DSM-5*; APA, 2013) are associated with a 1.2- to 3.7-fold increase in one's risk for developing a mood disorder, while dysthymic disorder (now known as persistent depressive disorder in the *DSM-5*; APA, 2013) and major depressive disorder increase one's risk for developing alcohol use disorders by 1.3 to 4.2 times (Regier et al., 1990; Kessler et al., 1996; Grant & Harford, 1995; Grant et al., 2015; Hasin et al., 2005). Other research extends these findings by highlighting that the

risk of developing major depressive disorder or dysthymic disorder are significantly increased for most drinkers, even if they do not meet diagnostic criteria for an alcohol use disorder (Dawson, Grant, Stinson, & Chou, 2005).

The association between depression and alcohol misuse is particularly important to study in undergraduate students, a population that shows the highest rates of alcohol use and experience many alcohol-related problems (Kandel, Chen, Warner, Kessler, & Grant, 1997; Kandel & Logan, 1984). In Canada, 77.1% of students report using alcohol in the past month, with 41.1% of them disclosing at least 2 binge drinking episodes (5 or more drinks in the same drinking occasion) during that period (Adlaf et al., 2005). Undergraduate students also experience elevated stress and dysphoric mood. As emerging adults, they are likely to experience stress and other psychological problems during this period of transition to adulthood, coinciding with undergraduate studies, wherein they are developing their identities and experiencing many changes in their lives (Arnett, 2010; Hicks & Heastie, 2008). Indeed, 29.2% of Canadian undergraduates report elevated psychological distress (Adlaf et al., 2005), with 9% reporting experiencing concurrent high distress and harmful drinking (i.e., binge drinking and/or alcohol-related problems; Garlow et al., 2008). Research conducted with American college students has also found positive associations between depressive symptoms and alcohol misuse (e.g., Pedrelli et al., 2011) and between depressive disorders and alcohol dependence (Dawson et al., 2005), with some showing a specific positive association between depressive symptoms and drinking-related problems (Geisner, Larimer, & Neighbors, 2004; Weitzman, 2004).

Despite the consistent finding that depression and alcohol misuse are highly comorbid, in both the general population and among university students, the causes of this are still poorly understood. The large body of research on drinking motives (i.e., self-reported reasons for drinking; see Cooper et al., 2016, for a review) suggest that people drink to achieve desired effects, including reinforcing mood-altering effects (Cooper et al., 1995). The drinking motives that capture the use of alcohol to modulate positive and negative affective states, unlike other motives for drinking (e.g., to celebrate special occasions), are positively correlated with heavy drinking and drinking-related problems (e.g., Cooper et al., 1995; Grant et al., 2007b; Stewart, Zvolensky, & Eifert, 2002). In particular, coping motives for drinking (i.e., drinking to alleviate aversive feelings, including depressed mood) have been identified as particularly risky motives for use because they are consistently significantly positively associated with drinking-related problems (see Cooper et al., 2016 for a review). This positive association between coping motives for drinking and drinking-related problems remains significant across the literature despite an inconsistent association between coping motives and frequency and quantity of alcohol consumed. This suggests that drinking to cope is particularly maladaptive behaviour regardless of the dose of alcohol consumed (Cooper et al., 2016).

Recent work supports the validity of separating the coping drinking motives construct into two types, coping-with-anxiety and coping-with-depression motives (CWAM and CWDM, respectively), according to the aversive mood state the drinker is motivated to regulate. Indeed, Grant et al. (2007b) found that CWDM (but not CWAM) were positively associated with quantity of alcohol consumed per occasion, over and above the effects of other variables (e.g., other drinking motives) in their model. Grant et

al. (2007b) also found that CWDM, like coping motives more generally, are positively associated with drinking-related problems, but only through their association with higher alcohol use. Taken together, these findings highlight the uniquely problematic consequences of drinking to cope with depression compared with other motives for drinking, including coping with anxiety motives.

Despite the large body of research investigating coping motives for drinking, these motives, particularly CWDM, remain poorly understood. Indeed, it is puzzling that individuals who report being highly motivated to drink to cope with depression drink alcohol in greater quantities than their peers, given research that suggests alcohol has paradoxical effects on mood. Specifically, alcohol both enhances positive mood at low doses and increases dysphoria at high doses (Davidson & Ritson, 1993; Freed, 1978; Gilman, Ramchandri, Davis, Bjork, & Hommer, 2008; Russell and Mehrabian, 1975). The reasons for drinking endorsed by coping-motivated drinkers suggest that these individuals use alcohol not just to improve their mood but also for other negative reinforcement reasons (e.g., to forget problems; see Cooper, 1994); however, the specific effects of alcohol on characteristics of depression other than depressed mood (e.g., cognitive distortions) are unclear.

Furthermore, current theoretical models proposed to explain this comorbidity generally require further study. Specifically, a recent model proposed to describe the relationship between comorbid depression and alcohol use disorder (Stewart et al., 2016) suggests that both self-medication processes (e.g., Khantzian, 1997) and alcohol-induced disturbances (e.g., Schuckit, 2006) act in concert to maintain the presence of both disorders. In other words, individuals might learn to use alcohol to manage symptoms of

depression; over time, particularly as their alcohol use increases, these individuals might experience more depressed mood or impairments in functioning that affect depressed mood. With a worsening of depressed mood, these individuals might turn to alcohol to self-medicate this worsening affective state, and so on, in a vicious cycle. To my knowledge, only one study has been conducted to investigate the bidirectional effects of alcohol use and depressed mood (Mushquash et al., 2013); more work is clearly needed to identify potential hypotheses that might explain the interplay between depressed mood and alcohol use.

The purpose of the present study was to identify commonly reported positive and negative effects of alcohol when it is used to cope with depression through thematic analysis of semi-structured interview data collected from university students who report high levels of coping-with-depression-motivated (CWDM) drinking relative to their peers. Inherent in selecting CWDM drinkers for this study is an emphasis on identifying the mechanisms underlying drinking to cope with depression that are most important to this group to shift the focus of subsequent research to the outcomes that are most important to this category of drinker. This approach is consistent with recent emphasis on patient-oriented research, a movement in clinical research with an emphasis on, among other factors, an increase in engagement of affected individuals in the research process (CIHR, 2011; Sacristán, 2013). The specific consequences of alcohol, both positive and negative, self-generated by coping-with-depression-motivated drinkers may facilitate the generation of hypotheses about the mechanisms underlying co-morbid depression and alcohol misuse that have the greatest potential clinical significance, which could subsequently be tested empirically. Qualitative research methods have numerous

advantages, including that they allow researchers to address research questions that do not lend themselves easily to quantification (e.g., the nature of individual experiences of alcohol's impact on mood) and yield rich descriptive data that are useful for hypothesis generation and exploratory research (Barker, Pistrang, & Elliott, 2002).

ANOVAs and chi-square tests were then used to identify commonalities (in terms of demographic characteristics, alcohol use, and depression symptoms) among individuals who endorsed particular subthemes. Gender, age, frequency of alcohol use, typical quantity of alcohol used, and symptoms of depression were explored as potential correlates of the themes reported by the CWDM participants in this study. Mixed methods allow researchers to develop a greater understanding of a phenomenon compared to the use of either qualitative or quantitative methods in isolation (Barker et al., 2002; Creswell & Plano Clark, 2006).

Method

Participants

Participants were 16 university students (9 women; 7 men) identified as high in coping-with-depression motives (CWDM) on the Modified Drinking Motives Questionnaire - Revised (DMQ-R) who also reported having consumed alcohol in the previous 30 days. None of the interested individuals who made contact and were deemed eligible declined to participate. Participants ranged in age from 18 to 25 years old ($M = 20.86$; $SD = 2.16$). Participants ranged in year of undergraduate university study from 1 to 4 ($M = 2.00$; $SD = 1.07$). Participants were predominantly Caucasian (81.3%). At the time of their participation, 30% of participants were in a monogamous romantic relationship. Participants' scores on the Beck Depression Inventory-II (BDI-II; Beck,

Steer, & Brown, 1996) ranged from 5 (minimal depression) to 34 (severe depression), with a mean of 19.81 ($SD = 7.97$) which is close to the cut-off score (20) corresponding to moderate depression on the BDI-II (Beck et al., 1996). More specifically, 4 participants (25% of the sample) scored below the level indicative of mild depression (i.e., below a score of 13), 1 (6.2% of the sample) scored at a level indicative of mild depression (i.e., scores of 14 to 19), 9 (56.3% of the sample) scored at a level indicative of moderate depression (i.e., scores of 20 to 28), and 2 (12.5% of the sample) scored at a level indicative of severe depression (i.e., scores of 29 or above). Participants reported consuming alcohol an average of 1.81 times per week ($SD = 1.17$), with an average typical quantity of 5.91 ($SD = 2.31$) standard drinks per drinking occasion. Using the definition of binge drinking proposed by the National Institute on Alcohol Abuse and Alcoholism (NIAAA, 2004; i.e., 4 drinks consumed in a single drinking occasion for women and 5 for men), 75% of the sample reported being binge drinkers on their typical drinking occasions (57.1% of male participants and 88.9% of female participants).

Participants were selected based on their summed scores on the coping-with-depression motives subscale of the Modified DMQ-R (Grant et al., 2007b) and on their alcohol consumption in the past 30 days (to ensure that participants would have recent drinking experiences to draw from when asked to describe experiences of drinking to cope with depression during the semi-structured interview). Specifically, eligible participants scored at least one standard deviation above the mean of their peers⁴ on the coping-with-depression subscale and had their highest subscale z-score on the coping-with-depression subscale. This procedure for selecting participants who score high on a

⁴ In this case, the comparison group of peers was from a database of $N = 767$ surveyed students who had consumed alcohol in the past month collected between September 2012 and March 2013.

particular drinking motive was used in prior studies (e.g. Grant, Stewart, & Birch, 2007a). The cutoff score for inclusion for CWDM drinkers on the CWDM subscale was 18 ($Z = 1.03$). CWDM drinkers in this study had scores on the coping-with-depression motives subscale ranging from 18 ($Z = 1.03$) to 41 ($Z = 4.94$) ($M = 28.31$, $SD = 6.65$). Their scores on measures of the other drinking motives from the Modified DMQ-R (Grant et al., 2007b), as assessed on the day of the interview, were as follows: $M = 17.25$ ($SD = 4.30$) for social motives, $M = 15.81$ ($SD = 4.79$) for enhancement motives, $M = 12.81$ ($SD = 3.60$) for coping-with-anxiety motives, and $M = 7.63$ ($SD = 2.87$) for conformity motives. Scores on these drinking motives were not retained at the screening phase of the study.

Materials

Lifestyles Questionnaire (LQ; Appendix A). The LQ is an author-compiled questionnaire that asks about a number of behaviours (drinking, tobacco smoking, caffeine use, illicit substance use, exercise, gambling, Internet use, and listening to music) that participants may have engaged in over the last 30 days. Embedded in the questionnaire is the question “How often did you consume alcohol in the past 30 days?” which was used to ensure that our participants met our drinking inclusion criteria. The other questions were included to reduce the salience of the alcohol-related question in order to increase accuracy of responses (Sobell & Sobell, 1990; Babor, Brown, & Del Boca, 1990).

Demographics Questionnaire (DQ; Appendix B). The DQ is an-author compiled questionnaire that assesses participants’ demographic characteristics, including age, year of university, gender, ethnicity, annual salary of family-of-origin, relationship

status, and typical alcohol use patterns (cf. Stewart, Peterson, & Pihl, 1995) embedded among items querying other lifestyle behaviours (tobacco smoking, caffeine use, and exercise) to reduce their salience (Sobell & Sobell, 1990; Babor et al., 1990). This measure was included to describe the sample and to determine whether the prevalence of various themes differed as a function of alcohol use frequency or quantity. Participants were asked in an open-ended format how many times per week, per month (if less than once per week), or per year (if less than once per month) they drink alcohol. They were also asked in an open-ended format how many standard alcoholic beverages they drink per typical drinking occasion.

Modified Drinking Motives Questionnaire-Revised (Modified DMQ-R; Grant et al., 2007b). The Modified DMQ-R is a 28-item, self-report questionnaire that yield scores on five subscales representing the motives for alcohol consumption (i.e. social, enhancement, conformity, coping-with-anxiety, and coping-with-depression). It was adapted from Cooper's (1994) Drinking Motives Questionnaire-Revised (DMQ-R) and separates the original coping motives subscale into separate subscales tapping anxiety versus depression management scales (Grant et al., 2007b). Each subscale contains three to nine items. Respondents are asked to rate how often they drink for each particular reason (e.g. 'To numb my pain') on a scale of 1 ('Almost Never/Never') to 5 ('Almost Always/Always'). The Modified DMQ-R possesses excellent psychometric properties, including a robust five-factor structure (Grant et al., 2007b) and subscale internal consistencies ranging from .61 to .91 (with the best internal consistency estimates being for the EM and CWDM subscales; Grant et al., 2007b). The internal consistency estimate of the CWDM subscale administered in the present study on the day of the

interview was excellent, $\alpha = .92$. The Modified DMQ-R was used during screening to identify individuals who primarily drink to cope with depression. It was also re-administered on the day of the participant's appointment to confirm the stability in participants' CWDM. The Modified DMQ-R was also used to guide the administration of the semi-structured interview by allowing the interviewer to ask participants only about coping with depression drinking motive items they endorsed on the questionnaire on either occasion at which they completed it. The intraclass correlation coefficient (ICC) between coping-with-depression drinking motives subscale scores at screening and at the time of experiment was significant ($p < .05$) and in the good range (.62; Cicchetti, 1994), comparable to the ICC observed for this scale in Grant et al. (2007b).

Beck Depression Inventory (BDI-II; Beck et al., 1996). The BDI-II is a 21-item self-report questionnaire assessing depressive symptoms. Respondents are asked to rate the extent to which they experienced specific depressive symptoms (e.g. 'Past failure') in the past two weeks on a scale of 0 (e.g. 'I do not feel like a failure') to 3 (e.g. 'I feel I am a total failure as a person') corresponding to severity of the symptom. The BDI-II is widely used to screen for depressive symptoms in adults of all ages, has been extensively validated, and has excellent psychometric properties (Beck et al., 1996). The internal consistency estimate for the BDI-II is .93 (Beck et al., 1996). On the test-day in the present study, the Cronbach's alpha of the BDI-II was .81. The BDI-II was used to describe the sample's degree of depressive symptomatology and to determine whether the prevalence of various themes in the interview differed as a function of depression severity.

Semi-structured interview (Appendix C). Participants completed a semi-structured interview with the first author. This interview asked them to elaborate on their alcohol use frequency and quantity; the settings and triggers for their drinking; descriptions of specific instances when they drank to cope with depression; and descriptions of the effects they experienced from using alcohol to cope with depression. The interview guide was author-compiled. Although the interview guide was not pilot tested, it was briefly reviewed with a colleague with expertise in qualitative interviewing. The guide featured both interview questions used in previous qualitative studies (Clark, Jones, Cook, Tian, & Moss, 2013; Mushquash, Stewart, Comeau, & McGrath, 2008) and questions based on the content of the coping-with-depression motives subscale of the Modified DMQ-R (Grant et al., 2007b). Based on the observation that interviewers who ask participants to open-endedly describe their alcohol first before asking more detailed questions about their use built better rapport with their interviewees (see Clark et al., 2013), the first part of the interview asked participants to describe their alcohol use and what influences their drinking, in general. The next phase of the interview asked participants about their motivations for drinking (using the Comprehensive Drinker Profile; Marlatt & Miller, 1984). Specifically, these questions asked participants in a general fashion to reflect on their drinking motives, their internal and external triggers to drink, and the negative consequences of their drinking. These questions were used in a prior qualitative study of drinking motives conducted in our laboratory (see Mushquash et al., 2008). The last phase of the interview asked participants to elaborate on the reasons for drinking to cope with depression they endorsed (i.e. all reasons rated with responses other than 'Never') when completing the Modified Drinking Motives Questionnaire-

Revised (Modified DMQ; Grant et al., 2007b). For each endorsed item, they were asked to describe, in detail, the last time they drank for that specific reason, by describing their thoughts, feelings, and behaviours prior to drinking, during the drinking episode, and after drinking. This sequential procedure for inquiring about recent drinking episodes was selected to provide temporal coherence to the participants' stories and to allow them to discuss the affective, cognitive, and behavioural effects of alcohol in relation to their depressive symptoms. Participants were prompted for additional detail when needed (e.g. "What were your thoughts before you started drinking?"). Participants were encouraged not to describe the same drinking occasion twice when possible to maximize the richness of the data and minimize the likelihood of coding the same story more than once for the same theme. The responses provided during this last phase of the interview were used for data analysis in the present study. Most of the interviews lasted approximately 60 minutes, with a range of 33-109 minutes. The interviews were audio-recorded and later transcribed by a trained research assistant. A portion of these transcripts ($N = 10$; 62.5%) were also proofread for accuracy by the author and transcription errors were minimal and minor (e.g., mistakes in recording filler words and nonverbal sounds uttered by the participants). When a mistake was identified, the relevant words were corrected and highlighted in the document to signal that a change had been made. The procedure utilized for transcription and proofreading has been used in past qualitative research (e.g., Mackinnon, Sherry, & Pratt, 2013).

Procedure

We followed standard recommendations for reporting qualitative research – specifically, the COREQ guidelines (Tong, Sainsbury, & Craig, 2007). Participants were

undergraduate students from Dalhousie University recruited through flyers, the psychology department subject pool, and advertisements on kijiji.ca. A subset of the participants (7 individuals) also participated in Study 2 (see Chapter 4 of this dissertation). Potential participants completed the screening questionnaires (LQ and Modified DMQ-R) either via e-mail or on the psychology department subject pool website. Only participants who reported having consumed alcohol in the past 30 days *and* who were identified as coping-with-depression-motivated drinkers (i.e., individuals with their highest subscale z-score on the coping-with-depression motives subscale who also scored at least one standard deviation above a comparison sample of their peers; see Birch et al., 2004 and Grant et al., 2007a for other studies using this procedure) were invited to participate. After giving their consent to participate in the study (see Appendix D for consent form), eligible participants completed the DQ, the Modified DMQ-R, and the BDI-II in the laboratory, followed by the semi-structured interview. For the last phase of the interview, the interviewer selected only the items the participant endorsed on the Modified DMQ-R (i.e., any responses to the CWDM items rated with a response other than 'Never'), either on the day of participation and/or during screening. All interviews were conducted by the dissertation author, a female graduate student in clinical psychology (B.A., Ph.D. Candidate) who had studied qualitative methods as part of standard coursework in research methods as well as through her own reading and consultation with a colleague who was experienced in these methods. Participants were debriefed after completing the interview and were compensated by receiving (their choice of either, or a combination of) bonus points toward their grade in an eligible psychology

course at Dalhousie University or a financial honorarium. The study was approved by the Social Sciences and Humanities Research Ethics Board at Dalhousie University.

Data Analytic Strategy

Qualitative analysis was performed using Braun and Clarke's (2006) approach to thematic analysis. Thematic analysis is used to identify patterns (or themes) within written or spoken data. Two coders (author and a trained research assistant) first familiarized themselves with the data by reading all transcripts closely and identified all instances where effects of drinking alcohol were mentioned in the context of drinking that was motivated by CWD. The author then compared the passages identified by each coder and consulted with the other coder to resolve any discrepancies in the passages identified. The first author then completed the remainder of the qualitative analysis using Microsoft Word and Microsoft Excel to organize the data coding. No other software was used to code and analyse the data. At the start of the coding process, the passages where effects of alcohol consumption were mentioned were split up into data items, which are smaller, distinct sections of text given equal weight in the analysis. The author identified 1,179 data items at this stage. The author assigned each of these a short description that summarized its content. After the first pass through these codes, the author removed 156 data items from the analysis, as these corresponded to effects of alcohol unrelated to using alcohol to cope with depression (e.g. dangerous consequences of binge drinking), leaving 1,023 data items at this stage. After multiple passes through the data, the author collated these data items into categories that began to summarize the data in a meaningful and complete way. This process was repeated until a set of themes was produced that could fully account for every data item. After the full set of themes and subthemes

emerging from the data were identified, a codebook was produced by the author summarizing each theme and subtheme and outlining instructions for a second coder to be able to identify when each theme is present in the data (as recommended by Boyatzis, 1998; see Appendix E). A second trained research assistant then used the code book to independently code the data items identified in the interview transcripts. The percentage of agreement between this coder and the author on the presence of the themes was 79.05%, which is deemed above the value considered necessary for this type of research (70%; Boyatzis, 1998). All discrepancies between the two coders were then resolved (as recommended by Boyatzis, 1998) and the resultant consensus codes were used in all reported analyses.

Thematic analysis was supplemented with analyses of variance (ANOVAs) and chi-square tests (for categorical variables) to identify differences in alcohol use frequency and/or quantity, age, gender, and BDI-II scores between individuals who did versus did not endorse a particular subtheme.

Results

Findings from both the qualitative thematic analysis (Braun & Clarke, 2006) and the quantitative ANOVAs are presented below. Findings from the thematic analysis (i.e., themes and subthemes) are organized below under three overarching domains: Affective, Cognitive, and Behavioural. Each domain contains themes, which in turn contain subthemes. Themes and subthemes were given short names based on practices seen in published research (e.g., Mackinnon et al., 2013) and on published guidelines for conducting thematic analysis (Boyatzis, 1998; Braun & Clarke, 2006). Themes and subthemes are described in Table 2.1 and data are presented for consistency in

endorsement within the sample (i.e., number and percentage of participants who discussed each theme and subtheme). A visual depiction of the themes and subthemes can be found in Figure 2.1. In addition, themes and subthemes are summarized below along with illustrative quotes from the interview transcripts selected to reflect the content of each subtheme. Care was taken to choose quotes that were representative of what most participants expressed. Any statistically significant quantitative findings emerging from the ANOVAs conducted to explore differences in age, gender, alcohol use frequency, alcohol use quantity, and BDI-II scores between individuals who did and did not endorse each subtheme are highlighted within each subtheme. If no quantitative findings are presented with a given subtheme, this means that no significant differences emerged between those who did versus did not endorse this subtheme on any of these five variables of interest.

Affective

Immediate. This theme refers to participants' subjective experience of how alcohol impacted their affective states during a drinking occasion. This theme comprises three subthemes described in more detail below, including Improvement, Worsening, and Unpredictability.

Improvement. All participants (100.0%) reported noticing an *improvement* in their mood in the relatively short-term (i.e., the same evening) after drinking:

It was mostly just the numbness that was making me happy 'cause I didn't really feel any other pain going on in my body. It was great, I was mostly just... it was just a lot of positive emotions, really hard to describe... I just felt happy I guess is the best I can describe it, I don't really know the

words... Before I was incredibly anxious, I was nervous, depressed, like, my entire body hurt, so there was physical pain on top of that... Then, there were stresses from school, social anxiety on top of that too, so it was just like a whole mess of bad. (Participant #11, Female, age 19).

Worsening. Paradoxically, most participants (62.5%) reported noticing times when their mood *worsens* in the relatively short-term (i.e., the same evening) after drinking:

I get to a point like where I'm just too gone, I get really irritable, like I go from very talkative, loving, and like loving to talk to everybody to just, pissed... I get very angry and like not necessarily violent or anything like that but just annoyed, like little things will bother me and I'll snap back and I'm just, I'm ready for bed. Like, I just seem cranky and tired like a kid... When I drank too much and it's late at night, I get cranky like a kid, like I need to go to bed (Participant #8, Female, age 19).

ANOVA revealed that those who endorsed the subtheme of *Worsening* were significantly heavier drinkers (i.e. greater typical alcohol quantity ($F_{(1,14)}=9.26, p < .01$) than those who did not endorse this subtheme.

Unpredictability. A sizable minority (43.8%) of participants expressed the belief that they cannot predict whether their mood will improve or worsen in the relatively short-term (i.e., the same evening) after drinking:

Well, this can go both ways, 'cause if I'm in a bad mood it can either go a bad way or a good way depending on how the night goes. Like if I had been in a bad mood the night that we were stuck in line with all those

people I probably would have just, like, gotten really mad and just started crying like, I should go home. But usually, if everything goes right, or everything goes to what we had planned... then it's just like 'Oh my gosh, this is fun! Oh, my mood's a lot better 'cause I'm having fun instead of sitting at home doing homework!' or something (Participant #4, Female, age 21).

ANOVA revealed that those who endorsed the subtheme of *Unpredictability* were significantly younger ($F_{(1,14)}=5.72, p < .05$) than those who did not endorse this subtheme. In addition, a chi-square test showed a relationship between sex and endorsement of the *Unpredictability* subtheme, $\chi^2(1, N = 16) = 9.68, p = .02$. Women were more likely to endorse this subtheme than men, with 77.8% of women and 0.0% of men endorsing this *Unpredictability* subtheme.

Delayed. This theme refers to participants' subjective experience of how alcohol impacted their affective states after a drinking occasion (more specifically, the next day). This theme comprises two subthemes described in more detail below: Temporary and Maintenance.

Temporary. Most of the study's participants (75.0%) reported that while they noticed improvement in their mood while they were drinking, this effect was merely *temporary*:

I'd say that with depression it's a temporary thing because you can, like, have a good time with people when you drink but then the next day you feel like depression can hit you again... so it kind of has like that temporary effect (Participant #2, Male, age 20).

ANOVA revealed that those who endorsed the subtheme of *Temporary* scored significantly higher on the BDI-II ($F_{(1,14)}=5.43, p < .05$) than those who did not endorse this subtheme.

Maintenance. In contrast, half of participants (50.0%) reported that the improvement in their affect that they experienced while drinking can be *maintained* into the next day:

I think there was some relief [the next day] 'cause I'm, I don't really like, let out emotion, so when I do [as she did while drinking] it's kind of like a big relief (Participant #14, Female, age 18).

Cognitive

Cognitive Functioning. This theme refers to participants' reports of their cognitive processes and function being impacted by alcohol consumption. This theme comprises three subthemes described in more detail below, including Working Memory, Task-oriented, and Memory.

Working Memory. All participants (100.0%) reported that their capacity to hold multiple pieces of information in *working memory* was reduced after alcohol consumption:

My mind doesn't race as much when I'm drinking [as when sober]. So like, if I'm out, I'm focused on being out. If I'm home with people or, like, at someone's house with others, I'm focused on that situation. I'm not focused on everything else. I'm focused on what's in front of me (Participant #16, Male, age 21).

Task-oriented. Just over half (56.3%) of the participants reported a belief that their *concentration* and *problem-solving* abilities are improved after drinking:

[While drinking] I was thinking about how to resolve, like, what was making me sad and how I could fix that... I find if, like, I am depressed or stressed out, there are things going on in my head but if I sit down and... [drink] beers, that I can more, it's easier for me to break down the situation and understand it better... Sounds weird but it helps me like, plan out things... It keeps my mind off from freaking out or whatever... So it just calms me down in that moment where I'm better able to think about a problem, understand what I need to do... It's strange but alcohol's made someone do better decisions [laughs] (Participant #3, Male, age 21).

ANOVA revealed that those who endorsed the subtheme of *Task-oriented* were significantly lighter drinkers (i.e., lower typical alcohol quantity, $F_{(1,14)}=5.88, p < .05$) than those who did not endorse this theme.

Memory. Just over half (56.3%) of participants highlighted their experience of *memory loss* as a result of drinking:⁵ This subtheme includes descriptions of memory losses that were unintended as well as of memory losses that were sought out by the drinker.

⁵ It is noted that one participant (Male, age 21) reported two data items related to the *Cognitive* theme that did not fit into any of the cognitive subthemes. Specifically, this participant reported on two occasions that if he is reminded of a painful memory, he is more likely to ruminate about it when he is intoxicated compared to when he is sober; no other participants reported on similar tendencies. It is noted that this participant supplied multiple data items consistent with the *Task-oriented* and *Memory* subthemes, suggesting that those subthemes are more typical of his experience of the effects of alcohol on his cognitive functioning than his two mentions of increased rumination when intoxicated. As a result, these two data points provided by this individual were not deemed significant enough to warrant defining a new subtheme. However, this outlier is mentioned to promote analytic rigour, as recommended by some researchers who use qualitative methods and thematic analysis (e.g., McPherson & Thorne, 2006; Phoenix & Orr, 2017).

When I black out, I don't remember anything, so not only am I forgetting what I'm doing at that moment, I'm assuming I'm forgetting what has happened to me in the past (Participant #1, Female, age 21).

ANOVA revealed that those who endorsed the subtheme of *Memory* were significantly more frequent drinkers ($F_{(1,14)}=6.80, p < .05$) than those who did not endorse this subtheme.

Cognitive Appraisals. This theme refers to the different ways participants report interpreting or *appraising* information about the past, the future, society, other people, and themselves while they are drinking. This theme comprises three subthemes described in more detail below, including Optimism, Indifference, and Acceptance.

Optimism. All participants (100.0%) reported that alcohol consumption helped them adopt a more *positive outlook* on life:

If I drink and I'm having not the best body image day, I feel decent about it after or if I'm having a confidence problem with something, I feel a little better about it [while drinking]. Especially in retrospect after a bad day of grades or something, I realize [while drinking] that I'm not an idiot, it's fine, everybody has bad test grades and it's not the end of the world... It [alcohol] just helps reinforce the most positive things too, like if I'm having a good day, it reminds me of why I'm having such a good day, like if I do really, really well on a test or if I, like, bought myself something amazing and I want to just play it, or play with it, or wear it, it just helps me realize... it sort of, like, positively reinforces the thoughts I already have. Like when I finally beat a video game... [which] took a long time, I

was pretty pleased with myself , and, like, those thoughts kind of were continued throughout the night (Participant #11, Female, age 19).

Indifference. Half of participants (50.0%) described feeling emotionally *detached* from their negative circumstances while drinking:

Not really caring anymore. That was probably the first time I didn't care anymore, was when I got drunk after a fight with my parents. Just go get drunk and not care about anything... [gives an example] I sat down in Cuba with this guy... and we just had a conversation about communism for like, two and a half hours. Turns out we both got sunburnt and we didn't care! We just kind of sat there and were like, 'yup, it's going to hurt tomorrow' (Participant #6, Male, age 19).

Acceptance. Just over one-third (37.5%) of participants reported being able to engage in non-judgmental *acceptance* of their difficulties when consuming alcohol:

I've been drinking pretty steadily and it's kind of helped me cope with [a recent romantic relationship break-up]... I don't think about it as much and I'm more accepting of the thoughts and I kind of can just hang out with friends... When I drink, I'll be a lot more accepting of things that are upsetting me... I've been told that, you know, you can't act like the world is out to get you all the time (Participant #15, Female, age 20).

ANOVA revealed that those who endorsed the subtheme of *Acceptance* were significantly older on average than those who did not endorse this subtheme ($F_{(1,14)}=7.65$, $p < .05$).

Behavioural

The themes below include effects of alcohol on behaviour, including both physiological responses and interpersonal behaviours.

Interpersonal. This theme refers to participants' reports of the effects of alcohol on their interactions with others. This theme comprises two subthemes described below: Socializing and Support.

Socializing. The large majority (93.8%) of participants reported an increase and/or an improvement in their social contacts when drinking:

Since I came to university I haven't really made [friends]... like I don't live in the university area. I just come to class and I go home, so I haven't really made any friends or, like, study friends at school, so my friend group is basically at the bar and, like, my roommate who also came with me from home... So being there [at the bar] and, like, drinking there is kind of just like a big part of my social life right now (Participant #1, Female, age 21).

Support. Half of participants (50.0%) reported being more likely to seek support from others while drinking compared to when sober⁶:

⁶ It is noted that two participants (Females, ages 18 and 19) mentioned withdrawing from others when drinking (on one occasion each), and two other participants (Male, age 19 and Female, age 21) reported experiencing increased conflict with others while drinking (on one occasion each). All four participants also supplied multiple data items consistent with the Socializing and/or Support subthemes, suggesting that those subthemes are more typical of their experience of the effects of alcohol on their contacts with others than are withdrawal and conflict. As a result, these data points were not deemed significant enough to warrant defining a new subtheme. However, these outliers are mentioned to promote analytic rigour as recommended by some researchers who use qualitative methods and thematic analysis (e.g., McPherson & Thorne, 2006; Phoenix & Orr, 2017).

Basically, psychologists are our friends. That's what we are doing. Sometimes, we are sitting down and perhaps drink[ing] a little... and [we] tell each other about our problems and, like, even the most personal problems... and try to think of a resolution... It's easier to tell people about your problems when you are a little inebriated because, as I said, it unleashes people's tongues and emotions (Participant #5, Female, age 25).

Physiological. This theme refers to participants' reports of the physiological effects of alcohol.⁷

Sleep. Four participants (25.0% of participants; all women) stated their belief that alcohol improves their sleep:

It [alcohol] helps me sleep as well. The past few weeks, I have been having trouble sleeping, like I've woken up at, like, 3 in the morning and just couldn't get back to sleep... The alcohol's helped with that as well (Participant #15, Female, age 20).

A chi-square test showed a relationship between sex and endorsement of the *Sleep* subtheme, $\chi^2(1, N = 16) = 4.15, p = .04$. Women were more likely to endorse this subtheme than men, with 44.4% of women and 0.0% of men endorsing the *Sleep* subtheme.

⁷ The inclusion of a second physiological subtheme, Pain, was considered, given that three separate participants mentioned alcohol had physical pain-relieving properties and that depression is often accompanied by physical complaints (e.g., back pain; Simon, VonKorff, Piccinelli, Fullerton, & Ormel, 1999). However, upon closer examination of the relevant passages, only one participant reported using alcohol to relieve the kinds of physical aches typically reported by depressed individuals; the other two participants reported using alcohol to relieve acute pain from an identifiable cause (e.g., sports injury) unrelated to depression. Given the context of these reports, these data points were not deemed prominent enough by the author to warrant defining a new subtheme. However, these outliers are mentioned to promote analytic rigour as recommended by some researchers who use qualitative methods and thematic analysis (e.g., McPherson & Thorne, 2006; Phoenix & Orr, 2017).

Saturation

To examine whether we had been successful at achieving thematic saturation, we examined whether any new themes emerged in the last three participants' interviews. This procedure was based on guidelines by Francis et al. (2010). They recommend starting thematic analysis with a sample size of ten, conducting the analysis, then collecting data from three more participants and conducting thematic analysis with those new data. If new themes emerge, they recommend collecting and analyzing data from three more participants, and so on, with data collection ceasing when no new themes emerge. Examination of the themes (including of the outliers noted in the footnotes above) revealed that no new themes emerged after the 13th participant, suggesting we have successfully reached thematic saturation with the 16 participants interviewed in the present study.

Discussion

Using qualitative methods, I identified several important themes that enhance understanding of the effects of alcohol on symptoms and features of depression among university students who drink to cope with depression. Participants' perspectives about the particular ways in which alcohol is reinforcing when used to cope with depression, as well as how alcohol serves to maintain depression, allowed me to hypothesize several potential mechanisms that may help explain the complex relationship between alcohol misuse and depression. Of note, students reported varied effects of alcohol which map onto all types of symptoms of depression described in Beck's (1976) classic cognitive theory of depression (affective, cognitive, and behavioural symptoms). Below, I summarize major findings and offer ideas for future clinical and research directions.

Effects of alcohol on *affective* symptoms of depression

Coping-with-depression-motivated drinkers reported varying effects of alcohol on their affective states. In the present study, these were classified under two themes: effects that occur in the short-term (while or immediately after drinking) and effects that occur in the longer-term (the day after drinking). In terms of the more immediate effects, all drinkers reported experiencing some instances of mood improvement after drinking, whether through improvements in their positive affect, and/or decreases in or numbing of their negative affect. Paradoxically, however, most of them also reported experiencing some instances of mood worsening after drinking, with a subset of these individuals espousing the belief that they are unable to predict whether they will experience enhanced and/or degraded affective states after drinking. These differential reports of the effects of alcohol on mood are consistent with consensus in the literature that while people report enhanced positive mood (i.e., happiness, relaxation, and euphoria) at low doses of alcohol, they also report increased dysphoric mood at higher doses (Davidson & Ritson, 1993; Freed, 1978; Gilman et al., 2008; Russell & Mehrabian, 1975; Sher & Grekin, 2007; Tucker et al., 1982). Taken together, these findings suggest that CWDM drinkers drink, in part, to obtain the enhancement in positive mood that often accompanies alcohol use, while risking experiencing the potential dysphoria that sometimes occurs, particularly at higher doses of alcohol. It is noted that CWDM predicts heavy drinking (Grant et al., 2007b); indeed, 75% of participants in the present study reported binge drinking as their typical drinking pattern. As noted above, alcohol tends to lead to dysphoria at higher doses. Results from the present study support this observation;

indeed, those who described mood worsening from drinking were heavier drinkers on average relative to those who did not describe this effect.

Several CWDM drinkers also described the impact alcohol consumption had on their well-being on the day following a drinking event. Consistent with their other conflicting descriptions of the affective consequences of alcohol consumption noted above, some participants claimed experiencing a maintenance of enhanced mood in the day after drinking on some occasions, with most also stating that, on other occasions, any relief they experienced while drinking was temporary, with negative affect returning the next day. It is noted that the time span between the end of drinking and the start of the next day as identified by participants is unknown, and likely varies across participants and/or the drinking occasions described in the interviews. Indeed, some participants may still have been experiencing acute effects of alcohol intoxication upon awakening after a drinking event if alcohol was consumed at high doses and/or there was little latency between the end of the drinking event and the “start” of the next day. In addition, while participants’ mention of hangovers were not coded under this subtheme, it remains possible that these next-day affective effects were part of hangovers that were not mentioned by the participants. Empirical studies that incorporate experience sampling methods (which measure drinking behaviour and associated moods as they occur in real time; e.g., Swendsen et al., 2000) or short-term longitudinal designs (e.g., Mushquash et al., 2013) could help clarify the timeline of affective responses experienced the day following a drinking event as a function of quantity of alcohol consumed and time since ending drinking.

Overall, the presence of contradictory affective subthemes in participants' interviews highlight the possibility that individuals drinking at high doses and/or who are misusing alcohol may have either developed substance-induced depressive symptoms, or could be exacerbating their existing depression through frequent high dose alcohol intake. It is likely that both self-medication and substance-induced depression intensification processes occur in individuals afflicted with both depressive symptoms and alcohol misuse, which could, in part, explain the high rate of co-occurrence of these two types of disorders (Stewart et al., 2016; Swendsen & Merikangas, 2000). It is also possible that heavy drinkers who have developed a degree of tolerance to alcohol consume alcohol to excess, in part, in hopes of achieving an elusive increase in positive affect or a high that was formerly achievable at lower doses of alcohol (Davidson & Ritson, 1993; Sher & Grekin, 2007).

Taken together, the pattern of findings for the affective theme suggest that the mood-altering effects of alcohol may not fully explain why depression and alcohol use disorders are so commonly comorbid. Given the frequency with which our coping with depression motivated drinkers reported aversive effects of alcohol on their affective state, it seems that mood effects are not likely the only effects sought by drinkers who use alcohol to cope with depression.

Effects of alcohol on *cognitive* symptoms of depression

College students who drink to cope with depression described many cognitive processes and thinking styles that are altered following alcohol consumption. Overall, they claimed noticing less depression-related thinking (i.e., cognitive distortions, rumination) and/or an increased ability to shift to more adaptive thought-content. All

participants reported that alcohol makes them unable to retain multiple negative thoughts in working memory, particularly when distracted by their surroundings (e.g., friends) while drinking, leading to less rumination about past failures and a greater focus on the present moment. Most coping-with-depression-motivated drinkers asserted that drinking improves their concentration and problem-solving abilities. This is an odd assertion given the well-established negative effects of intoxication on cognitive functions (e.g., Peterson, Rothfleisch, Zelazo, & Pihl, 1990). It is possible that this perception is driven by an alcohol-induced reduction in the degree to which their cognitive processes are disrupted by negative and/or ruminative thoughts. Additionally, it was found that those who reported positive effects of alcohol on problem-solving were lighter drinkers on average than those who did not report this particular perceived effect, which is perhaps unsurprising.

A particularly striking and concerning finding in the present study was that some participants who endorsed the Memory subtheme acknowledged intentionally consuming high doses of alcohol to induce memory loss. Having a positive view of blackouts and alcohol-induced cognitive problems more generally, a phenomenon typically experienced as aversive for drinkers (e.g., Buelow & Koeppl, 1995), might constitute one of the characteristics that sets CWDM apart from other drinkers and might contribute to this motive for drinking being identified as particularly risky (Cooper et al., 2016; Grant et al., 2007b). It is noted that past work by Buelow and Harbin (1996) found that heavy drinking students with a history of blackouts from drinking endorsed more positive and more negative alcohol expectancies than heavy drinkers without a history of blackouts. However, the positive and negative alcohol expectancies of heavy drinkers with a history

of blackouts were negatively correlated (unlike the expectancies of other heavy drinkers which were positively correlated). This negative correlation between positive and negative alcohol expectancies in some heavy drinkers could mean that a subset of heavy drinkers experience drinking as more positive than do other drinkers, positive enough to outweigh negative events (like blackouts; Buelow & Harbin, 1996). It is also noted that there is evidence that some students positively evaluate risk-related alcohol expectancies like cognitive impairments (Fromme, Stroot, & Kaplan, 1993) which could also help explain why some CWDM drinkers might seek out blackout effects from alcohol.

Participants in the present study also reported several effects of alcohol on their perceptions or appraisals of their struggles. Indeed, the present study findings indicate that all drinkers who are motivated to consume alcohol to cope with depression reported adopting a more indifferent, accepting, or optimistic view under the influence of alcohol compared to when sober. In contrast, when they are sober, they reported being over-concerned by their circumstances, being judgmental toward their symptoms and their problems, and being pessimistic. These drinkers typically reported that alcohol helps them consider alternative adaptive explanations for events, focus on positive aspects of their personality to boost their self-esteem, and improve their sense of humour (e.g., increased proneness to deem things funny, or act in a silly manner).

Several students also reported an increase in emotional detachment from their circumstances. A few drinkers also claimed that drinking helps them assume a non-judgmental acceptance of their difficulties; those who endorsed experiencing this type of shift in cognitive appraisal from drinking were significantly older on average. The low base rate of endorsement for this type of appraisal may be because acceptance requires a

higher-order level of skill to implement, or because it requires more insight from the participant to recognize it and be able to report on it; indeed, Acceptance and Commitment Therapy (ACT), which emphasizes increasing acceptance of one's current circumstances, describes these interventions as meta-cognitive and requiring learning second-order (or indirect) change strategies (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). While these appear to be positive effects of drinking, the use of alcohol to achieve these positive outcomes can be dangerous as the individual will fail to achieve the skill without alcohol and may become reliant on alcohol to help achieve these types of perspective changes.

Unlike the affective effects of alcohol, these cognitive subthemes highlight several effects of alcohol that might be universally reinforcing for individuals who typically drink to cope with depression. These effects help explain, in part, why these individuals choose to drink, often to high levels, despite the often aversive impact on their mood. Future research could investigate whether alcohol actually shifts thinking processes and content in the manner reported by the coping with depression motivated drinkers in the present study. For example, laboratory-based studies exploring the impact of alcohol on the processing of negative self-evaluation processes thought to maintain depressed affect (Beck et al., 1979; Hull et al., 1983), or investigating the effect of the context of drinking and/or type of distractions present on cognitive processes, would help clarify whether or not alcohol reduces ruminative and negative cognitions in the matter described in the present study.

Some of the work in the literature to date does investigate some of these hypotheses. For instance, work by Steele and Josephs (1988) and Josephs and Steele

(1990) suggests that alcohol, when consumed prior to exposure to a stressor, reduces stress but only when drinking is combined with engaging in a distracting activity. In addition, Stephens and Curtin (1995) found that alcohol disrupts processing of negative self-evaluations among depressed participants. However, this work could be improved by examining the expectancy effects of alcohol (which could help clarify whether the observed effects of alcohol on depression are due to the pharmacological properties of the substance or due to expectancy effects), and by evaluating the impact of alcohol on various affective states (e.g., by examining impact of alcohol both on positive and on depressed mood). The second study in my dissertation will elaborate and improve on the past work of Stephens and Curtin (1995) by addressing these limitations.

The cognitive subthemes derived from the qualitative data in the present study also highlight the clinical implications of this study. Interestingly, coping-with-depression-motivated drinkers reported changes in their maladaptive cognitions and thinking styles while drinking that are similar to outcomes sought in cognitive and behavioural interventions for depression (e.g., cognitive restructuring in cognitive-behavioural therapy (CBT); psychological flexibility, contact with the present moment, and acceptance in acceptance and commitment therapy (ACT); O'Donohue & Fisher, 2012; Hayes et al., 2005). As such, interventions that target both alcohol misuse and concurrent depression might be improved by increasing their emphasis on teaching skills that target maladaptive thinking styles (either through cognitive restructuring or acceptance-based approaches) so that individuals learn to rely on internal coping skills other than alcohol to obtain relief from painful cognitions.

Effects of alcohol on *behavioural* symptoms of depression

Individuals who drink to cope with depression also reported that alcohol impacts on behavioural symptoms of depression in a reinforcing manner, including on interpersonal processes and physiological symptoms. For example, they reported overcoming their tendency to withdraw from others through drinking by increasing their socializing (by spending time with others in areas where alcohol is consumed – e.g. friends' homes, restaurants, and clubs). They also reported experiencing more successful social interactions (via alcohol-induced reductions in social anxiety and increases in confidence, extraversion, honesty, and assertiveness). Finally, they also reported benefitting from seeking others for emotional support (i.e., to discuss their problems and release bottled-up emotions, leading to a sense of relief and, at times, to obtaining new perspective on how to solve one's problems). Much like the cognitive subthemes that emerged from these interviews, the interpersonal subthemes reflect outcomes often targeted in behavioural interventions for depression (e.g., behavioural activation in behavioural therapy [BT]). These findings highlight the importance of emphasizing increased social engagement outside of drinking contexts, as well as on building interpersonal skills for increasing emotional intimacy in relationships, in interventions targeting concurrent depression and alcohol misuse.

The last theme that emerged in the present study pertained to a common physiological symptom of depression, namely, sleep difficulties. Somatic symptoms associated with depression have been conceptualized by Beck (1976) as (covert) behavioural symptoms of depression; as a result, they were classified as a behavioural subtheme in the present study. Several female CWDM drinkers claimed that alcohol

helps them sleep. They reported sometimes seeking this reinforcing effect deliberately by drinking alcohol to self-medicate insomnia. A review of the literature corroborates participants' experience of reduced sleep latency when drinking due to the sedative effects of alcohol (Ancoli-Israel & Roth, 1999; Roehrs & Roth, 2001). Moreover, use of alcohol as a sleep aid is common among undergraduates (with 11.36% of undergraduate drinkers reporting doing so in the past week; Taylor & Bramoweth, 2010). It is noted, however, that alcohol-induced sleep is associated with risks, such as fragmented sleep (Galambos, Dalton, & Maggs, 2009), poor sleep quality because of irregularities in REM (Rapid Eye Movement; Roehrs & Roth, 2001), and greater alcohol-related harms (Kenney, LaBrie, Hummer, & Pham, 2012). Clinicians who are working with clients presenting with comorbid depression and alcohol misuse should assess use of alcohol as a sleep aid and encourage them to implement more adaptive sleep hygiene practices.

Limitations and Future Directions

The array of hypotheses about the mechanisms underlying drinking to cope with depression that were generated from this study is restricted to the limits of participants' capacity for introspective access to their motivations (which could have influenced self-identification as a CWDM drinker on the Modified DMQ-R) and to other internal factors (e.g., their mood, which could have influenced participants' descriptions of the effects of alcohol during the interview). There is a substantial body of research demonstrating that individuals are not always able to accurately identify what influences their behaviours (see Wilson, 2002 and Wilson & Dunn, 2004 for reviews) or internal factors like mood (Wilson, Laser, & Stone, 1982). Future investigations of the potential mechanisms underlying drinking to cope with depression should also take into account the effects of

implicit processes on this behaviour. In addition, the specificity of the themes generated in the present study to drinking to cope with depression could be enhanced in the future by interviewing drinkers low in CWDM and/or by asking CWDM participants to describe drinking events where they were motivated to drink for reasons other than to cope with depression to determine whether the themes generated in the description of these drinking events are similar to or distinct from those generated in the present study. It is also noted that the generalizability of the results are limited by the characteristics of the sample. Future qualitative studies of CWDM drinkers, either using the same coding scheme developed in the present research or developing a new one based on a new thematic analysis from a different researcher, might shed light on whether the same themes emerge among CWDM drinkers who are more diverse in terms of age, or among individuals of the same age who are not undergraduate students, or among other cultures. Furthermore, it would be worthwhile to investigate whether the themes generated by participants in the present study apply to individuals diagnosed with depressive and/or alcohol use disorders. Finally, the conclusions that can be drawn from the ANOVAs and chi square tests examining differences between participants who did and did not endorse each subtheme may be limited by the small sample size and the fact that there were no a priori hypotheses driving these analyses; thus, these quantitative findings require replication in a larger, independent sample.

Nevertheless, the present study derived strength from its participant-centered approach in interviewing individuals with direct experience of drinking to cope with depression to yield rich descriptive data. These data generated several hypotheses to explain the complex phenomenon of drinking to cope with depression, some of which

might be testable in future experimental work. Indeed, future researchers investigating comorbid depression and alcohol use might benefit from using the themes generated by the participants in the present study as a starting point from which to test the complex depression-relieving (e.g., alcohol as a distraction from unhelpful thoughts) and depression-inducing (e.g., dysphoria at high doses) mechanisms identified by participants as underlying their drinking to cope with depression. Similarly, researchers investigating treatment approaches for comorbid depression and alcohol might benefit from using the findings in the present study to design interventions that will teach specific skills (e.g., interpersonal skills, acceptance skills) that accomplish the same goals sought by CWDM drinkers in a less risky manner than through drinking.

Table 2.1

Summary table of themes and associated subthemes for effects of alcohol on symptoms of depression: consistency across participants and theme description

Theme	Total N endorsed (%)	Male N endorsed (%)	Female N endorsed (%)	Description of theme
AFFECTIVE				
Immediate				
Improvement	16 (100.0%)	7 (100.0%)	9 (100.0%)	Participants report mood improvement after drinking. These improvements take the form of increases in positive mood, decreases in dysphoric mood, and numbing of negative affect.
Worsening	10 (62.5%)	4 (57.1%)	6 (66.7%)	Participants report mood worsening (through increases in negative affect, including of depressed mood) after drinking.
Unpredictability	7 (43.8%)	0 (0.0%)	7 (77.8%)	Participants report being unable to predict what their mood will be while drinking. They report experiences of mood improvement and of mood worsening after drinking, with some reporting unpredictable cycling through positive and negative affect while intoxicated.
Delayed				
Temporary	12 (75.0%)	4 (57.1%)	8 (88.9%)	Participants report that the depressive symptom relief they experienced while drinking was temporary. The day after drinking, they found themselves feeling and thinking the same way as, or worse than, before consuming alcohol.

Theme	Total N endorsed (%)	Male N endorsed (%)	Female N endorsed (%)	Description of theme
Maintenance	8 (50.0%)	4 (57.1%)	4 (44.4%)	Participants report that the depressive symptom relief they experienced while drinking was maintained the next day.
COGNITIVE				
Functioning				
Working memory	16 (100.0%)	7 (100.0%)	9 (100.0%)	Participants report that alcohol reduces their working memory capacity for negative thoughts. Distractions occurring while drinking (e.g. loud music in a bar) further limits their focus on negative thoughts. As a result of these effects, participants ruminate less about negative thoughts and past/future events and focus more on the present moment.
Task-oriented	9 (56.3%)	5 (71.4%)	4 (44.4%)	Participants report improved concentration and problem-solving abilities after drinking.
Memory	9 (56.3%)	3 (42.9%)	6 (66.7%)	Participants experience blackouts (intentional or not) or lapses in memory due to alcohol consumption, which inhibit their recall of negative thoughts and worry about past/future events.
Appraisals				
Optimism	16 (100.0%)	7 (100.0%)	9 (100.0%)	Participants report that alcohol allows them to be more flexible in their thinking by helping them identify positive alternate thoughts and focus on positive over negative thoughts. Participants also report a boost in their sense of humour.

Theme	Total N endorsed (%)	Male N endorsed (%)	Female N endorsed (%)	Description of theme
Indifference	8 (50.0%)	3 (42.9%)	5 (55.6%)	Participants report that alcohol consumption helps them adopt an indifferent stance toward their past, future events, society, and the actions of others.
Acceptance	6 (37.5%)	3 (42.9%)	3 (33.3%)	Participants report that alcohol helps them accept their depressive symptoms and the problems in their lives in a non-judgemental way. Participants are able to recognize and accept that some aspects of their life cannot be changed.
BEHAVIOURAL				
Interpersonal				
Socializing	15 (93.8%)	6 (85.7%)	9 (100.0%)	Participants report having a more successful and active social life through alcohol consumption.
Support	8 (50.0%)	2 (28.2%)	6 (66.7%)	Participants report that alcohol intoxication increases the likelihood they will seek support from others by discussing their problems and displaying their suppressed emotions to them.
Physiological				
Sleep	4 (25.0%)	0 (0.0%)	4 (44.4%)	Participants report that alcohol increases subjective drowsiness and tiredness and report improvements in sleep following alcohol consumption.

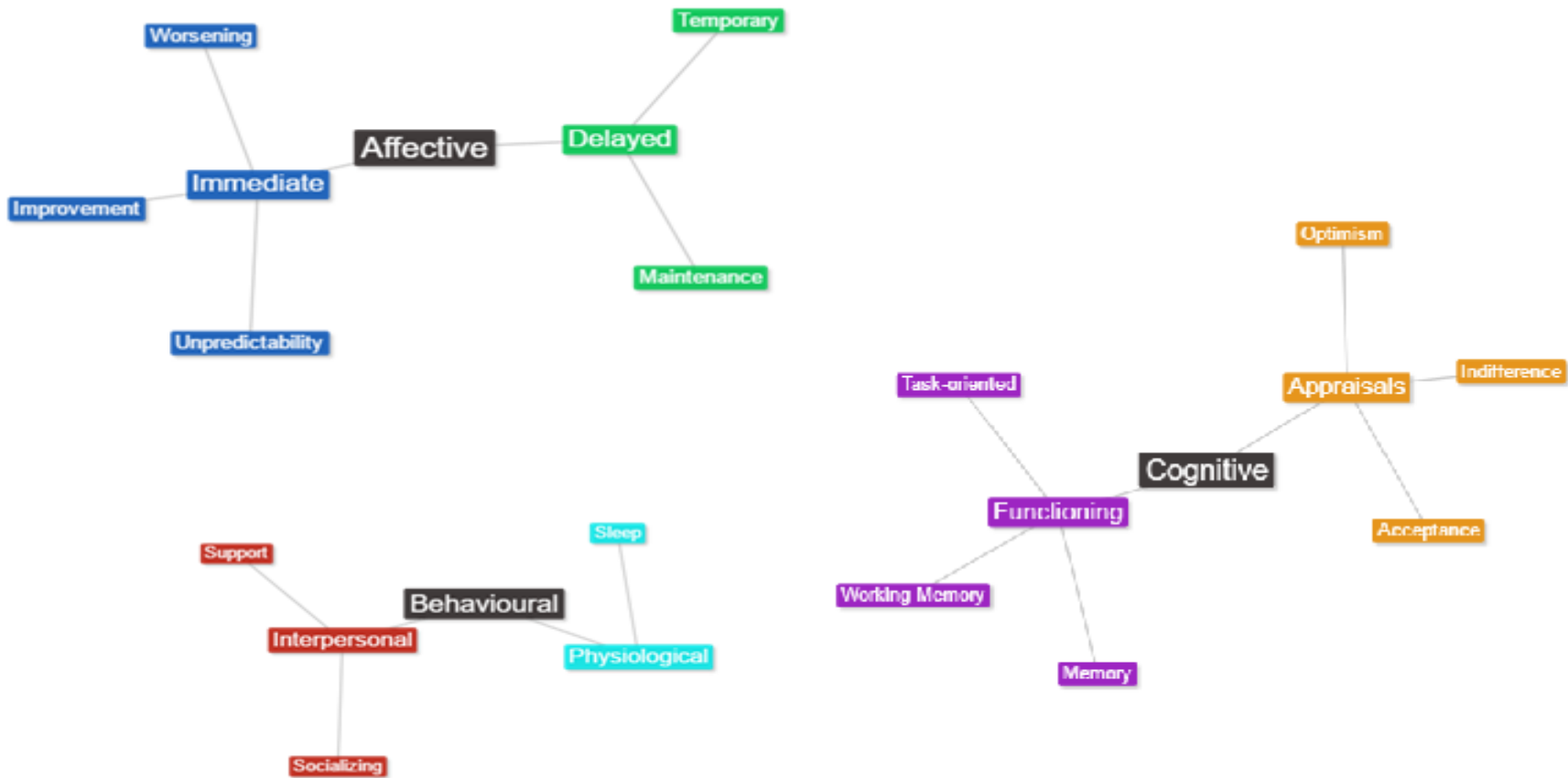


Figure 2.1. Pictorial representation of the themes and subthemes emerging from the present study's thematic analysis.

Chapter 3. Prologue to Study 2

The findings of Study 1 demonstrate that CWDM drinkers report experiencing a variety of effects when they use alcohol. These include impacts on a variety of affective, cognitive, and behavioural symptoms and correlates. While Study 1 was useful for generating a number of hypotheses about the potential mechanisms underlying drinking to cope with depression based on CWDM drinkers' personal experiences, and for highlighting CWDM drinkers' *perceptions* of the outcomes of drinking alcohol, Study 1 fell short of being able to conclude that any of these potential effects actually take place when a CWDM drinker consumes alcohol.

Study 1 highlighted the relevance of alcohol's perceived effects on cognitions associated with depression as potential reinforcing effects of alcohol for individuals who drink to cope with depression. Indeed, all of the effects of alcohol on cognition reported by Study 1 participants were described in positive terms. In contrast, many Study 1 participants described aversive effects of alcohol on their mood, suggesting that alcohol is not exclusively used by CWDM drinkers because of reinforcing effects on mood.

The aim of the second study of my dissertation, Study 2, was to experimentally test some of the effects of alcohol reported by participants in Study 1 and supported by theory and past research. Specifically, Study 2 aimed to investigate in CWDM drinkers versus a comparison group of enhancement motivated (EM) drinkers: (1) the effects of alcohol on positive and depressed mood and (2) the effects of alcohol on recall of self-focused depressed thought content. Study 2 also aimed to compare these effects in CWDM drinkers who received alcohol to these effects in CWDM who received placebo and to those who did not receive alcohol in order to determine whether the observed

effects are due to the pharmacological properties of alcohol and/or to expectancy effects. This study design used three of the four conditions of the balanced-placebo design (as described by Martin & Sayette, 1993) as comparison of the alcohol to placebo condition allows for determination of alcohol's pharmacological effects, and a comparison of the placebo to the no alcohol condition allows for determination of alcohol expectancy effects. Findings stemming from Study 2 have important theoretical implications as well as clinical implications for the prevention and treatment of comorbid depressive disorders and alcohol use disorders as described in the next chapter.

Chapter 4. Study 2: Effects of Alcohol and Expectancy on Mood and on Recall of Self-Relevant Negative Information in Coping-With-Depression-Motivated Drinkers

Abstract

The current study examined alcohol's effects on mood (positive and depressed) and processing of self-relevant depressive information in a sample of 67 university students (43 women and 25 men). Participants were drinkers who reported drinking to regulate their emotions; specifically, participants identified as scoring markedly higher than their peers on coping-with-depression drinking motives (CWDM; $n = 33$) were selected for participation in this study, with participants identified as scoring high on enhancement drinking motives (EM; $n = 34$) used as a comparison group. CWDM and EM participants were randomly assigned to alcohol (targeted BAC of .05; $n = 22$), placebo ($n = 23$), or no alcohol ($n = 22$) conditions. After beverage consumption, participants processed depressed- and non-depressed-content adjectives under self-relevant and semantic-processing instructions and were later asked for their recall of the words. Recall results showed that CWDM participants in the no alcohol condition displayed greater recall of self-relevant (but not semantic) depressed-content adjectives than EM participants in the no alcohol condition. This bias (with respect to recall for negative self-relevant information) was eliminated in CWDM who received alcohol and attenuated in CWDM who received placebo. These effects of beverage condition were not observed in EM participants. CWDM also showed some evidence of reduced recall for negative semantic information in the alcohol condition compared to the no alcohol condition and to the placebo condition. Results suggest that both expectancy and pharmacological effects of alcohol affect processing of negative information in CWDM drinkers. With respect to mood, results showed that all participants experienced increases

in positive mood after alcohol consumption but no change in depressed mood. The theoretical and clinical implications of these findings for improving our understanding of comorbid depression and alcohol use disorders are discussed.

Introduction

Alcohol misuse and depression frequently co-occur. Epidemiological studies in the United States have found evidence of high likelihood of comorbidity between alcohol use disorders and unipolar mood disorders, as defined by the *DSM-IV* (e.g., Grant & Harford, 1995; Grant et al., 2004; Grant et al., 2015; Hasin et al., 2007; Regier et al., 1990; Rush et al., 2008). These studies demonstrated elevated comorbidity rates for alcohol use disorders (including alcohol abuse and alcohol dependence) with mood disorders (including major depressive disorder and dysthymic disorder). The presence of an alcohol use disorder increased the risk of having a comorbid mood disorder by 1.4 to 3.7 times. In turn, the presence of dysthymic disorder or major depressive disorder increased the risk of having a comorbid alcohol use disorder by 1.9 to 4.2 times. Longitudinal epidemiological work has also found that the presence of dysthymic disorder at baseline predicted the later development of alcohol dependence (Swendsen et al., 2010). More recent work using the *DSM-5* (APA, 2013) definitions of alcohol use disorders and depressive disorders have continued to find evidence of comorbidity between the two sets of disorders, with the presence of mood disorders (including major depressive and persistent depressive disorders) increasing the risk of having a comorbid alcohol use disorder by 1.2 to 1.4 times (Grant et al., 2015).

Various theories have been put forward to explain this phenomenon, including several that posit that individuals suffering from these comorbid diagnoses learn to use alcohol for its reinforcing effects (e.g., self-medication hypothesis; Khantzian, 1985). These theories generally posit that individuals who are depressed are motivated to use alcohol to improve their mood; therefore, they assume that (1) these individuals are more

likely to use alcohol when experiencing depressed mood, and that (2) alcohol effectively dampens depressed mood and/or elevates positive mood. Findings from many studies using daily process methodology are generally consistent with the first assumption (people are more likely to drink when distressed; Mohr et al., 2005; Swendsen et al., 2000), though it some studies do not show this association (e.g., Hussong et al., 2005).

However, studies investigating the impact of alcohol on negative and positive affect have yielded varied results about the effectiveness of alcohol at regulating mood states. Indeed, some daily process studies show evidence that drinking episodes are predictive of increases in both positive and negative affect but not predictive of reductions in negative affect (including sadness; e.g., Hussong, Hicks, Levy & Curran, 2001). This could be because alcohol's effects on mood are complex, with many factors influencing this relationship (including the dose of alcohol and whether blood alcohol concentration is rising or descending). Lab-based experiments on the impact of alcohol dose on mood show that while there is evidence that alcohol improves positive mood at low doses (e.g., Tucker et al., 1982), alcohol is associated with more dysphoric mood states at higher doses (see Davidson & Ritson, 1993 and Sher & Grekin, 2007, for a review). In addition, alcohol's effects on mood significantly changes across a period of acute alcohol intoxication, with positive mood states (such as elation) increasing as blood alcohol concentration is rising, and negative affect (such as fatigue and depression) increasing as blood alcohol concentration is descending (Sutker, Tabakoff, Goist, & Randall, 1983).

Despite mixed effects of alcohol on mood, studies of the self-reported motives of drinkers still lend support to the idea that alcohol is consumed by some individuals for its

affect-regulation properties (i.e., coping or enhancement drinking motives; Cooper, 1994). More specifically, studies of drinking motives have found consistent evidence that some individuals endorse being motivated to drink to cope with depressed mood (Grant et al., 2009; see Kuntsche, Knibbe, Gmel, & Engels, 2005 for a review). Furthermore, surveying individuals suffering from major depressive disorder reveals that a sizeable subset (23.2%) of them report engaging in alcohol use to self-medicate (Bolton, Robinson, & Sareen, 2009). It is noted that coping motives for drinking have been frequently associated with higher levels of alcohol use (e.g., Rutledge & Sher, 2001) which is puzzling given the aversive effects on mood that are expected at higher doses of alcohol (see Davidson & Ritson, 1993 and Sher & Grekin, 2007). It is noted that depression is characterized by both increased dysphoric mood and decreased positive mood (Brown, Chorpita, & Barlow, 1998; Watson et al., 1988a; Watson et al., 1988b). It is important to consider that alcohol could have distinct impacts on negative and positive affect. While alcohol is associated with enhanced positive mood at low doses, studies of alcohol administration effect on mood have not, to date, identified an effect of alcohol in reducing dysphoric mood (see Davidson & Ritson, 1993 and Sher & Grekin, 2007 for reviews of alcohol's effects on affective processes). Given the complex effects of alcohol intoxication on mood, it appears likely that other reinforcement mechanisms (separate from the direct effects of alcohol on mood) are operative among individuals who self-report drinking to cope with depression. Study 1 (Chapter 2) suggests that these other mechanisms may involve alcohol's effects on cognitive processes that maintain depression.

A promising line of inquiry of the mechanisms underlying the alcohol-depression comorbidity is founded on a conceptualization of alcohol use as providing an escape from painful self-awareness (e.g., Baumeister et al., 1994). Several researchers have noted that self-focused attention is a feature of many psychological disorders, including mood disorders (Ingram, 1990). Relatedly, Beck's cognitive model of depression (Beck et al., 1979) proposes that depressed mood is caused and/or maintained, in part, by negative cognitions and self-schema that bias that individual's perception of him- or herself. Support for the existence of these negative cognitive processes in depressed individuals has been found in studies that show superior recall for depressed, self-relevant material (over non-depressed and non-self-relevant material), suggesting that depressed individuals are biased to encode and/or retrieve more depression-related content about themselves (Derry & Kuiper, 1981; Kuiper et al., 1983; Rogers et al., 1977). Alcohol could be reinforcing to a depressed individual if it alters these cognitive processes (e.g., self-focused attention and memory bias for negative self-relevant information) that maintain depressed mood.

A set of experimental studies by Hull and colleagues suggest that alcohol may be disrupting self-evaluation processes among individuals high in self-awareness. Indeed, they found that individuals who consumed alcohol were less likely than individuals who consumed placebo to make self-focused statements in general (e.g., less likely to use the pronoun "I" in a subsequent speech; Hull et al., 1983). They also found that alcohol reduced recall of self-relevant information in highly self-aware individuals (Hull & Young, 1983). Other work has sought to isolate the effect of alcohol on negative self-evaluations which, if interrupted by alcohol consumption, could be particularly

reinforcing for depressed individuals. Yankofsky et al., (1986) found that men consuming placebo endorsed more negative self-evaluations after receiving negative feedback about a social interaction than men who consumed alcohol. More recent work by Aramakis et al., (2012) measured reaction times to an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) that asked participants to classify positive and negative attribute words as self-relevant or non-self-relevant. All participants were primed to make self-relevant inferences by giving a speech about their appearance prior to completing the IAT. They found that alcohol selectively slowed participants' reaction times for negative, self-relevant decisions made on the IAT, consistent with impaired negative self-relevant associations among individuals who consumed alcohol. Overall, while there is evidence that alcohol disrupts general self-evaluation processes among individuals who are highly self-aware, there is also evidence to suggest that all individuals not preselected to be high in self-awareness, might experience a specific disruption in negative self-evaluation processes after alcohol consumption.

However, little work to date has been done to investigate alcohol's effects on these cognitive patterns among depressed individuals or individuals who report drinking to cope with depression – groups where these processes are most theoretically relevant. Given the evidence noted above that negative self-focus is a feature of depression, Stephens and Curtin (1995) built on the studies by Hull and colleagues by studying the impact of alcohol on recall of self-relevant negative content among depressed and non-depressed individuals. Depressed and non-depressed participants in that study were either given alcohol or placebo to consume. They were then asked to process adjectives (half of which were negative) under both self-relevant and semantic conditions; for each

adjective, they were either asked whether the word described them, or whether the word had the same meaning as another word. After this task, participants were asked to recall as many of these words as they could. They found that depressed individuals (but not non-depressed individuals) who consumed placebo showed evidence of biased (i.e., elevated) recall of negative self-relevant content and that this bias was eliminated among depressed individuals who consumed alcohol. They also found that this dampening effect on the cognitive bias was correlated with alcohol-induced mood enhancement.

While Stephens and Curtin's (1995) work sheds some light on the potential reinforcement processes that underlie comorbid alcohol use and depressed mood, the absence of an experimental condition in which participants did not consume alcohol makes it difficult to assess the impact of expectancy effects on mood and recall for self-relevant depressed information. A study design with three beverage conditions (alcohol, placebo, and no alcohol; see Martin & Sayette, 1993 for a description of this design) allows for comparing the responses of individuals who expected to have consumed alcohol but did not (placebo), and of individuals who knew that they did not consume alcohol (no alcohol); differences between these two groups can then be attributed to alcohol expectancy effects. While the full four cell balanced placebo design would theoretically be optimal for isolating expectancy from pharmacological effects of alcohol, the so-called "antiplacebo" condition in this design (in which a group of individuals consumes alcohol but is told they did not) has been a largely unsuccessful manipulation in in past research at least when moderate alcohol doses are employed (see Sayette, Breslin, Wilson, & Rosenblum, 1994 for a review). As such, a study with three beverage

conditions is the most practical study design that allows for isolating expectancy from pharmacological effects of alcohol when realistic BACs are being targeted.

While these investigations have been done among depressed individuals, it also remains unclear how alcohol, or the expectancy of drinking alcohol, might influence negative self-evaluation processes in individuals who self-report drinking to cope with depression. Given evidence that motives (including drinking to cope with depression) are more proximal to drinking outcomes than other more distal factors like mood or psychopathology (Cooper, 1994), it is possible that individuals who self-report drinking to cope with depression show the same biased processing of depressed self-relevant content as depressed individuals when sober. Evidence of a reversal of this bias after alcohol consumption and/or after the expectancy of alcohol consumption would help elucidate the specific reinforcing properties of alcohol for individuals who self-report drinking to cope with depression.

In addition, alcohol's pharmacological and expectancy effects on mood, as well as the link between the reversal of the cognitive bias and mood improvement, are also unclear. Stephens and Curtin (1995) reported that depressed participants who consumed alcohol in their study had higher scores on a scale measuring positive mood than did participants who did not consume alcohol. However, they did not investigate the effects of alcohol on the negative mood states of their participants. Separating improvement in positive and depressed mood from alcohol consumption is worthy of further study, as depressive disorders involve both an increase in depressed mood and the absence of positive mood (Brown et al., 1998; Watson et al., 1988a; Watson et al., 1988b).

The goal of the current study was to investigate the effect of alcohol pharmacology and expectancy on negative self-evaluation cognitive processes in individuals who self-report drinking to regulate either negative or positive emotions, namely: a group of individuals reporting high levels of coping-with-depression (but not enhancement) drinking motives (CWDM) and a comparison group of individuals reporting high levels of enhancement (but not CWDM) drinking motives. The results of this study could have direct implications for treatment of individuals who present with both depressed mood and alcohol use disorders, and for all individuals who self-report drinking to cope with depression. For instance, results might shed more light on the cognitive processes (specifically, a bias toward processing negative self-relevant information) underlying comorbid depression and alcohol misuse, which would inform how these two problems might be best targeted in an integrated intervention.

It was hypothesized that 1) CWDM drinkers who received no alcohol would show increased recall of depressed self-relevant information compared with EM drinkers who also received no alcohol; and that 2) CWDM drinkers who received alcohol would show decreased recall of depressed self-relevant information compared with CWDM who did not receive alcohol. As an extension of Stephens and Curtin's (1995) work, the present study also conducted exploratory investigations of expectancy effects on subsequent recall of depressed self-relevant content in both CWDM and EM drinkers. Recall of information processed under semantic conditions was not expected to differ as a function of motive group, depressed content, or alcohol consumption.

I also hypothesized that 3) individuals receiving alcohol would report increases in positive mood following alcoholic beverage administration and absorption; and that 4)

CWDM drinkers' improved positive mood would be negatively linked with reduced recall of depressed self-relevant content after alcohol consumption (as was found among depressed drinkers in Stephens and Curtin's (1995) study).

Finally, the present study also aims to extend Stephens and Curtin's (1995) work by also exploring alcohol's effects on depressed mood and by exploring the effects of expectancy on positive and depressed mood. As the latter investigations were exploratory in nature, no specific effects are hypothesized.

Method

Participants

179 (86 CWDM and 93 high EM) potential participants were eligible to participate in the study based on their drinking frequency (as measured by the Lifestyle Questionnaire; see Materials) and Modified DMQ-R scores obtained at the time of initial screening (see Procedure). Of these, 80 individuals demonstrated an interest in participating. From there, 13 individuals were excluded for not meeting the inclusion criteria (see below) during the telephone screening (1 was pregnant, 4 reported high rates of alcohol-related problems, 4 were taking contraindicated medications, 2 were no longer students, and 2 were under the age of 19 years – the legal drinking age in Nova Scotia, Canada). The final sample thus constituted 67 university students (43 women and 25 men) identified as high in CWDM ($N = 33$) or high in EM ($N = 34$), ranging in age from 19 to 33 years old ($M = 20.91$; $SD = 2.44$). This sample size was deemed necessary to detect a medium effect size, as determined by an a priori power analysis. Participants high in CWDM scored 11.55 on average ($SD = 9.60$) on the Beck Depression Inventory-II (BDI-II; Beck et al., 1996) which is slightly below the cutoff for mild depression. Their scores ranged from 0 to 48, with 22 CWDM participants (66.7% of CWDM participants)

scoring below the level indicative of mild depression (i.e., below a score of 13), 6 (18.2% of CWDM participants) scoring at a level indicative of mild depression (i.e., scores of 14 to 19), 4 (12.1 % of CWDM participants) scoring at a level indicative of moderate depression (i.e., scores of 20 to 28), and 1 (3.0% of CWDM participants) scoring at a level indicative of severe depression (i.e., scores of 29 or above). Participants ranged in year of study from 1st to 4th year of undergraduate studies ($M = 2.36$; $SD = 0.93$). Participants predominantly identified as White or Caucasian (76.1%). At the time of their participation, 37.3% of participants reported being involved in a romantic relationship.

Inclusion Criteria. Only participants reporting having consumed alcohol in the previous 30 days were invited to participate to ensure that participants had sufficient experience consuming alcohol, given this was an alcohol challenge experiment. Participants were initially invited to participate in the study based on their scores on the CWDM and the EM subscales of the Modified DMQ-R (Grant et al., 2007b) and were identified as either high in CWDM (group of interest) or high in EM (comparison group). Participants high in EM were chosen as the comparison group to ensure the two groups would have similarly high rates and quantities of alcohol consumption (Stewart et al., 2002; Grant et al., 2007b). Specifically, eligible CWDM participants had their highest subscale z-score (out of all subscales of the measure) on the CWDM subscale of the Modified DMQ-R and scored at least one standard deviation above the mean of their peers (from a database of surveyed students collected between September 2012 and March 2013; $N = 767$ students who had consumed alcohol in the past month) on the CWDM subscale. In addition, they had a score on the EM subscale less than or equal to the median EM score for all participants meeting the z-score cutoff on the CWDM

motives subscale (in order to account for the correlation between CWDM and EM). EM participants had their highest subscale z-score (out of all subscales of the measure) on the EM subscale of the Modified DMQ-R and scored at least one standard deviation above the mean of their peers on the EM subscale. In addition, they had a score on the CWDM subscale less than or equal to the median CWDM score for all participants meeting the z-score cutoff on the EM subscale. This procedure helped ensure that the two groups were relatively pure in terms of their drinking motives and sufficiently distinct from one another. This procedure for selecting participants who score high on a particular drinking motive has been used in prior studies (e.g., Birch et al., 2004; Grant et al., 2007a). The cutoff score for inclusion for CWDM drinkers on the CWDM subscale was 18 ($Z = 1.03$), with a score on the EM subscale less than or equal to 16 ($Z = .82$). The cutoff score for inclusion for EM drinkers on the EM subscale was 17 ($Z = 1.01$), with a score on the CWDM subscale less than or equal to 11 ($Z = -.34$). CWDM drinkers in this study had scores on the coping-with-depression motives subscale ranging from 18 ($Z = 1.03$) to 38 ($Z = 4.5$) ($M = 24.96$; $SD = 6.64$). EM drinkers in this study had scores on the enhancement motives subscale ranging from 17 ($Z = 1.01$) to 25 ($Z = 2.55$) ($M = 19.3$; $SD = 2.2$).

Eligible participants completed an additional screening phase via telephone to ensure they met the following study inclusion criteria: (a) at least 19 years of age (the legal drinking age in Nova Scotia, Canada); (b) no allergies to cranberry juice (which was served to participants in the experiment); (c) no medical conditions that prohibited drinking alcohol (e.g., liver disease); (d) no current use of medications for which alcohol consumption is contraindicated (e.g., anticonvulsants); (e) no current or past treatment for

alcohol use disorders (since the study could involve alcohol consumption or exposure to alcohol cues); (f) scoring under 16 on the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001); as scores of 16 or higher are indicative of high rates of alcohol-related problems); and (g) female participants could not be pregnant, intending to become pregnant, or nursing at the time of participation (to minimize likelihood of harm to the nursing child or developing fetus).

Materials

Lifestyles Questionnaire (LQ; Appendix A). The LQ is an author-compiled questionnaire which asks about a number of behaviours that participants may have engaged in over the last 30 days. Embedded in the questionnaire is the question “How often did you consume alcohol in the past 30 days?” which was used to ensure that our participants met our inclusion criteria for having consumed alcohol in the past 30 days. The other questions were included to mask the true purpose of the study.

Demographics Questionnaire (DQ; Appendix B). The DQ is an-author compiled questionnaire that assesses participants’ demographic characteristics, including age, year of university, sex, ethnicity, annual salary of family-of-origin, and typical alcohol use patterns (cf. Stewart et al., 1995). This measure was included to describe the sample.

Modified Drinking Motives Questionnaire-Revised (Modified DMQ-R; Grant et al., 2007b). The Modified DMQ-R is a 28-item, self-report questionnaire that yields scores on five subscales representing distinct motives for alcohol consumption (i.e. social, enhancement, conformity, coping-with-anxiety, and coping-with-depression). It was adapted from Cooper’s (1994) Drinking Motives Questionnaire-Revised (DMQ-R)

and separates the original coping motives subscale into separate subscales tapping use of alcohol for anxiety management versus sadness management purposes (Grant et al., 2007b). Each subscale contains three to nine items. Respondents are asked to rate how often they drink for each particular reason (e.g. 'To numb my pain') on a scale of 1 ('Almost Never/Never') to 5 ('Almost Always/Always'). The Modified DMQ-R possesses excellent psychometric properties, including a robust five-factor structure (Grant et al., 2007b) and subscale internal consistencies ranging from .61 to .91 (with the best internal consistency estimates being for the EM and CWDM subscales; Grant et al., 2007b). Internal consistency (Cronbach's alpha) estimates for the EM and CWDM subscales in the present study (administered on the day of the experiment) were also good-to-excellent (.84 for EM and .94 for CWDM). The Modified DMQ-R was used during screening to identify individuals who primarily drink to cope with depression and individuals who primarily drink for enhancement motives. It was also re-administered on the day of the participant's appointment to ensure stability of motives scores from screening to testing. The intraclass correlation coefficients (ICCs) between enhancement and coping-with-depression drinking motives subscale scores at screening and at the time of experiment were both significant ($ps < .001$) and in the good range (.67 for the CWDM and .66 for the EM subscale, respectively; Cicchetti, 1994), comparable to ICCs observed for these DMQ-R scale scores in Grant et al. (2007b).

Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001). The AUDIT was originally developed as a screening measure for alcohol use disorders. It is a 10-item measure assessing drinking frequency, frequency of heavy drinking, and alcohol-related problems. This measure was used to exclude individuals with potential alcohol

use disorders from participation in this study due to ethical concerns about alcohol administration to those with an alcohol use disorder. A score of 16 and above represents a high level of alcohol problems and was the cutoff point used for exclusion from participation. The AUDIT was also used describe the sample and to ensure equivalence of alcohol-related problems across groups.

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item self-report measure of anxiety symptoms. Respondents were asked to rate the extent to which they experienced specific anxiety symptoms (e.g. ‘Feeling of choking’) in the past month on a scale of 0 (‘Not at all’) to 3 (‘Severely – it bothered me a lot’). It is widely used to screen for anxiety symptoms in adults of all ages, has been extensively validated, and has excellent psychometric properties (Beck et al., 1988). The internal consistency estimate for the BAI is .92 (Beck et al., 1988); in our sample, the Cronbach’s alpha for this measure was .88. The BAI was used to describe the sample in terms of degree of anxious symptomatology. A measure of anxiety is pertinent for use in studies of depression because of the high co-morbidity of the two symptom clusters (Gorman, 1996; Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007).

Beck Depression Inventory (BDI-II; Beck et al., 1996). The BDI-II is a 21-item self-report questionnaire assessing symptoms of depression. Respondents were asked to rate the extent to which they have experienced specific depression symptoms (e.g. ‘Past failure’) in the past two weeks on a scale of 0 (e.g. ‘I do not feel like a failure’) to 3 (e.g. ‘I feel I am a total failure as a person’) corresponding to severity of the symptom. Scores of 14 to 19 are indicative of mild depression, scores of 20 to 28 are indicative of moderate depression, and scores of 29 and above are indicative of severe depression

(Beck et al., 1996). The BDI-II is widely used to screen for symptoms of depression in adults of all ages, has been extensively validated, and has excellent psychometric properties (Beck et al., 1996). The internal consistency estimate for the BDI-II is .93 (Beck et al., 1996); in our sample, the Cronbach's alpha for this measure was .90. The BDI-II was used to describe the sample's degree of depressive symptomatology.

State mood (Grant & Stewart, 2007; Grant et al., 2007a; Grant et al., 2009).

Participants were asked at five time points during the experiment (baseline, immediately after beverage consumption, ten minutes after consumption, twenty minutes after consumption, and after completing the word task) to rate their mood at the present moment by indicating the degree to which 13 words described their mood on a 5-point Likert scale ranging from 0 ('not at all') to 4 ('extremely'). The depressed (sad, depressed, and blue) and positive (cheerful, happy, glad, and pleased) subscale scores were used to test whether alcohol consumption led to increases in positive mood, decreases in depressed mood, and whether decreased recall of depressed self-relevant content was inversely correlated with positive mood and positively correlated with depressed mood in the alcohol condition. The other items on the scale measured anxious and angry mood, but were not employed in the current analyses. Cronbach's alpha estimates for the five time points enumerated above ranged from .71-.85 for depressed mood and from .85-.91 for positive mood, indicating acceptable to excellent internal consistency.

Blood Alcohol Concentration Readings (BAC). Participants provided several BAC readings throughout the experiment. The time points that were analyzed in the current study occurred: (1) at baseline, (2) ten minutes after consumption, (3) twenty

minutes after consumption, and (4) after completing the word task. BAC was measured using a FC20 Lifeloc Breathalyzer (Lifeloc Technologies, Inc., Colorado, US), and measurements were in grams of alcohol per 100 ml of blood, expressed as a percentage.

Visual Analogue Scale (VAS) for ratings of Subjective Intoxication (e.g., Himle et al., 1999). This measure was used for participants to rate how intoxicated they felt by making a mark along on a 10 cm line ranging from 0 (“I feel completely sober”) to 10 (“I feel more drunk than I have ever felt before”) at each time their state mood was measured.

Word Processing Task (adapted from Stephens & Curtin, 1995). Adapted from the paper-and-pencil task employed by Stephens and Curtin (1995), this task was designed to enable participants to process and encode depressed and non-depressed content, in the form of adjectives accompanied by one of two processing instructions (see below). Delivering the task via computer instead of using the paper-and-pencil method used by Stephens and Curtin (1995) allowed for each word and accompanying instruction to be processed one at a time, and for the order of presentation of the words to be randomized for each participant (to mitigate the impact of order of presentation on subsequent recall). A list of 60 personally-descriptive adjectives (30 with depressed content and 30 with non-depressed content) used in previous studies and validated for content and relevance (Derry & Kuiper, 1981; Kuiper & MacDonald, 1982; Stephens & Curtin, 1995; see Table 4.1) were used; depressed and non-depressed adjectives were matched on frequency, length, and imagery. The computer program paradigm randomly determined the order in which word and which encoding instruction would be presented; thus, the words paired with each processing condition as well as the order of presentation

were randomly determined for each participant. All participants processed 15 depressed content adjectives and 15 non-depressed content adjectives under each of the two processing conditions. The self-relevant processing condition contained the question “Does this word describe you?” and the semantic processing condition contained the question “Does this word mean the same as ____?”, with the blank containing a synonym of the adjective on one half of the questions and an antonym on the other half of the questions. Participants answered ‘Yes’ or ‘No’ to the questions by pressing identified keys on the keyboard.

Procedure

The study was approved by the Social Sciences and Humanities Research Ethics Board at Dalhousie University. Participants were students from Dalhousie University recruited through flyers, the psychology department subject pool, and advertisements on kijiji.ca. Potential participants completed the screening questionnaires (LQ and Modified DMQ-R) either via e-mail or on the psychology department subject pool website. Individuals high in CWDM or high in EM (comparison group) were contacted via e-mail and invited to complete screening measures via telephone in order to determine eligibility for the study. Participants who were eligible and interested in participating in the study were then scheduled for an appointment to complete the study. They were asked to refrain from eating for four hours, and to remain abstinent from alcohol for 24 hours, prior to their appointment. Participants were blocked on drinking motives before being randomly assigned to alcohol condition in a 2 (motives: CWDM vs. EM) x 3 (alcohol: alcohol vs. placebo vs. no alcohol) x 2 (content: depressed vs. non-depressed content adjectives) x 2 (processing instructions: self-relevant vs. semantic) mixed-model design.

Drinking motives and alcohol condition were between-subjects factors. Content and processing instructions were within-subject factors; all participants processed depressed and non-depressed content adjectives under both self-relevant and semantic-processing instructions.

Participants were greeted by an experimenter blind to their alcohol and motive conditions. This experimenter checked their identification to ensure that they were 19 years of age or older (the legal drinking age in Nova Scotia). Participants provided written informed consent (see Appendix F for consent form), fasting requirements were verified verbally, and a baseline BAC reading was taken to verify abstinence from alcohol. A second experimenter randomly assigned the participant to the alcohol, placebo, or no alcohol beverage condition within each motives group (i.e., blocked randomization). The second experimenter also weighed the participant for use in beverage dosing and left the room in order to prepare the participant's beverages.

The amount of alcohol administered to participants was calculated using the formula developed by Fisher, Simpson, and Kapur (1987) and subsequently modified by MacDonald, Baker, Stewart, and Skinner (2000) to take into account sex and weight. Alcohol was mixed in a 4:1 ratio of cranberry juice to vodka in the alcohol condition. A BAC of .05% was targeted, corresponding to mild intoxication and comparable to the target of many prior alcohol challenge studies (e.g. MacDonald et al., 2000). The amount of vodka was replaced with an equivalent amount of cranberry juice in the placebo and no alcohol conditions (i.e. 5 parts cranberry juice). In addition, the experimenter added a bit of vodka at the top and along the rim of each glass for participants in the placebo condition to enhance the manipulation and impart the odour and taste cues of alcohol (as

seen in prior alcohol studies, e.g. Kushner et al., 1996; MacDonald et al., 2000). The second experimenter also ensured the bottle of vodka was visible in the room for participants assigned to the alcohol and the placebo conditions as an added visual alcohol cue (as in prior alcohol studies, e.g. MacDonald et al., 2000). Beverages were poured in four to five glasses, depending on total volume (as in MacDonald et al., 2000). While the second experimenter prepared these beverages, participants completed a questionnaire battery. The questionnaire battery included the Modified DMQ-R, the BAI, the BDI-II, and the first (baseline) measure of state mood. They also provided a baseline VAS rating of subjective intoxication and a baseline BAC reading. Once participants completed the questionnaires, they were given 20 minutes to consume their beverages, followed by a 20-minute absorption period (as in Battista, MacDonald, & Stewart, 2012). Participants were alone in a room during this period, with the second experimenter checking in on them periodically to ensure that participants were drinking at a steady pace and to collect participants' VAS subjective intoxication and state mood ratings after beverage consumption, 10 minutes following beverage consumption, and 20 minutes following beverage consumption. BAC readings were also obtained 10 and 20 minutes after beverage consumption. Magazines were provided for participants to read during this phase of the experiment.

Participants then completed the information processing word task described above. After this task, participants were given 3 minutes to type in as many of the target depressed and non-depressed content adjectives as they could remember. Participants were not informed ahead of time that their recall would be tested (i.e., this task measured individuals' incidental recall performance). After the recall task, participants completed a

last rating of state mood and subjective intoxication, followed by measurement of their blood alcohol level. They also completed a set of manipulation checks to assess whether participants suspected their recall would be tested after the word task, and whether they believed they had received alcohol, respectively. Once their blood alcohol level dropped below .04 mg%, they were debriefed and dismissed. They were compensated with their choice of bonus points and/or financial honoraria, commensurate with their time commitment from participation.

Results

Descriptive Statistics

A summary of demographic variables, measures of anxiety (BAI; Beck et al., 1988) and depression (BDI-II; Beck et al., 1996) symptoms, alcohol-related problems (AUDIT; Babor et al., 2001), drinking motives⁸ (Modified DMQ-R; Grant et al., 2007b), and frequency and quantity of alcohol consumption can be found in Table 4.2 as a function of assigned beverage condition and drinking motive group. To ensure that participants were comparable across motive groups and beverage conditions on these variables, a series of 2 (motive group) x 3 (alcohol condition) analyses of variance (ANOVAs) were conducted to compare CWDM and EM participants, and participants in the alcohol, placebo, and no alcohol conditions, on these demographics and baseline variables. The alpha for these comparisons was set at $p < .01$ to avoid Type II errors due to multiple tests. As expected based on how participants were selected, CWDM and EM

⁸ The scores on the drinking motives other than CWDM and EM (namely, coping-with-anxiety motives or CWAM, social, and conformity motives) reported here and in Table 4.2 were assessed on the day of testing; on the other hand, the scores on CWDM and EM motives reported here and in Table 4.2 were obtained at the time of screening and were used to identify eligible participants for the study. Scores on CWAM, social, and conformity motives were not retained at the time of screening and as such, are not reported here.

participants significantly differed in their CWDM scores ($F(1, 65) = 196.08, p < .001$) and EM scores ($F(1, 65) = 135.42, p < .001$); however, they did not significantly differ in their scores on any other drinking motives. In addition, CWDM participants had higher BDI-II scores than EM participants, $F(1, 65) = 7.90, p = .007$; the family of origin of CWDM participants also earned significantly lower incomes than the family origin of EM participants, $F(1, 64) = 9.14, p = .004$. No other differences across motive groups and across alcohol conditions were observed, suggesting random assignment was successful in ensuring equivalence across beverage conditions and that EM participants were comparable to CWDM participants in terms of their drinking behaviour. Participants in the present study reported AUDIT scores (e.g., Cook, Chung, Kelly, & Clark, 2005; DeMartini & Carey, 2012) and BDI-II scores (Beck et al., 1996; Carmody, 2005) similar to those found in prior work. These comparisons suggest that the sample was similar to other college student samples with respect with drinking behaviour and levels of depression symptoms.

Correlations among Baseline Variables

The correlations among demographic variables, baseline measures of mood, measures of anxiety (BAI; Beck et al., 1988) and depression (BDI-II; Beck et al., 1996) symptoms, drinking motives (Modified DMQ-R; Grant et al., 2007b), alcohol-related problems (AUDIT; Babor et al., 2001), and frequency and quantity of alcohol consumption collapsed across motives and alcohol conditions can be found in Table 4.3. There was no missing data on any of these variables, nor on any of the variables in this study. AUDIT scores were significantly positively correlated with past week frequency of alcohol consumption, and typical number of drinks consumed in a drinking occasion.

BDI-II scores were significantly positively correlated with BAI scores, CWDM scores at screening, coping-with-anxiety drinking motives on the day of testing, and with baseline depressed mood; in turn, BDI-II scores were significantly negatively correlated with EM scores at screening and with baseline positive mood. BAI scores were significantly positively correlated with coping-with-anxiety drinking motives on the day of testing and with baseline depressed mood (but showed no relationship with positive mood). CWDM scores at screening were significantly positively correlated with coping-with-anxiety and conformity drinking motives on the day of testing, as well as negatively correlated with EM scores at screening (due to the process by which participants were selected). Social drinking motives on the day of testing were significantly positively correlated with typical number of drinks consumed in a drinking occasion. Finally, baseline depressed mood was significantly negatively correlated with baseline positive mood.

Manipulation Checks

When asked, 0% of participants reported that they expected their recall to be tested at the end of the word task, suggesting that the task was successful at measuring incidental recall.

A 2 (motive) x 3 (beverage) ANOVA was conducted to examine whether participants differed in whether they believed they received alcohol across beverage and motive conditions when asked this question at the end of the study. As expected, participants' belief that they received alcohol differed across beverage conditions, $F(2, 61) = 47.51, p < .001$. Post-hoc tests revealed that significantly more participants (100%; $M = 1.00, SE = 0.07$) in the alcohol condition believed they received alcohol than participants in the placebo (56.5%; $M = 0.57, SE = 0.07, p < .001$) and no alcohol (4.6 %;

$M = 0.05$, $SE = 0.07$, $p < .001$) conditions. In turn, more participants in the placebo condition believed they received alcohol than participants in the no alcohol condition ($p < .001$) indicating a successful expectancy manipulation. Participants' beliefs regarding their beverage consumption, when assessed by their answer at the end of the study, did not differ across motive conditions, nor did motive interact with alcohol condition.

In addition, subjective intoxication ratings were compared across alcohol and motive conditions (see Table 4.4). A 2 (motive) x 3 (beverage) x 5 (subjective intoxication ratings over the time of the experiment) mixed model ANOVA was then conducted to further examine the subjective intoxication data. As expected, we found a main effect of beverage condition, $F(2, 61) = 56.20$, $p < .001$; post-hoc tests revealed that the subjective intoxication ratings as a whole for participants in the alcohol condition ($M = 4.31$, $SE = 0.23$; corresponding with moderate intoxication) were significantly higher than for participants in the placebo condition, ($M = 1.88$, $SE = 0.22$ $p < .001$; corresponding with mild intoxication) and significantly higher than for participants in the no alcohol condition ($M = 1.06$, $SE = 0.23$, $p < .001$). In turn, the subjective intoxication ratings for participants in the placebo condition were significantly higher than for participants in the no alcohol condition, again indicating a successful expectancy manipulation ($p < .05$).

As expected, we also found a main effect of time (subjective intoxication ratings over the time of the experiment), $F(4, 244) = 64.86$, $p < .001$, and an unexpected main effect of motive group, $F(2, 61) = 10.21$, $p < .01$. These main effects were qualified by a motive group by time interaction ($F(4, 244) = 5.70$, $p < .001$), a beverage condition by time interaction ($F(8, 244) = 30.68$, $p < .001$), and a motive group by beverage condition

interaction, $F(2, 61) = 4.18, p < .05$, all of which were further qualified by a motive group by beverage condition by time 3-way interaction ($F(8, 244) = 2.29, p < .05$). Simple effects analyses of the 3-way interaction revealed that CWDM participants in the alcohol condition provided significantly higher subjective intoxication ratings than EM participants following alcohol administration across all time points of the experiment except for baseline: i.e., immediately after beverage consumption ($F(1, 20) = 6.63, p < .05$), 10 minutes after beverage consumption ($F(1, 20) = 7.42, p < .05$), 20 minutes after beverage consumption ($F(1,20) = 5.38, p < .05$), and after completion of the word task ($F(1, 20) = 5.59, p < .05$). It was also revealed that CWDM participants in the placebo condition provided significantly higher subjective intoxication ratings than EM participants, but only 20 minutes after beverage consumption, $F(1, 21) = 4.53, p < .05$. There were no significant differences in subjective intoxication ratings between CWDM and EM participants in the no alcohol condition at any time point.

BAC Readings

The mean BAC reached by all participants in the alcohol condition was .055% ($SD = .01$) after beverage absorption and .054% ($SD = .01$) after completing the word task, indicating that the target BAC of .05% was successfully reached. For those in the placebo and no alcohol conditions, the mean BAC was .000% at both time points. BAC readings were compared across alcohol and motive conditions (see Table 4.5) using a 2 (motive) x 3 (beverage) x 4 (BAC readings over the time of the experiment) repeated measures ANOVA. No effects of motive group on BAC readings were observed. As expected, we found a main effect of beverage condition, $F(2, 61) = 534.54, p < .001$, and a main effect of time (BAC readings over the time of the experiment), $F(3, 183) =$

386.91, $p < .001$, which were qualified by a significant beverage by time interaction, $F(6, 183) = 384.26, p < .001$. Post-hoc tests showed that differences between BAC readings were not significant in the no alcohol nor in the placebo beverage condition. For the alcohol beverage condition, time 1 BAC readings were significantly different from all other time points ($p < .001$ for all comparisons) and time 2, 3, and 4 BAC readings did not significantly differ from one another ($p > .05$ for all of comparisons), suggesting BACs were relatively stable during the experiment once alcohol had been consumed and absorbed.

Effect of Alcohol Administration on Mood Ratings

A set of 2 (motive) x 3 (beverage) x 5 (mood ratings across time of experiment) mixed model analysis of variance (ANOVA) was conducted to examine the effects of alcohol consumption on both positive and depressed mood. For positive mood (see Table 4.6), we found a main effect of time, $F(4, 244) = 7.81, p < .001$, qualified by a time by beverage condition interaction, $F(8, 244) = 2.74, p < .01$. Simple effects analyses revealed differences in positive mood across beverage conditions for the baseline assessment only, $F(2, 64) = 3.27, p < .05$; post-hoc tests revealed that participants in the no alcohol condition rated their mood at baseline significantly more positively ($M = 10.86, SD = 3.47$) than participants in the alcohol condition, ($M = 8.18, SD = 3.17, p < .05$). No other significant differences were observed. To account for the differences in positive mood at baseline observed across conditions despite random assignment, a 2 (motives) x 3 (beverage) x 4 (mood ratings over time of experiment) mixed model ANCOVA was conducted, with baseline positive mood ratings entered into the model as a covariate. We found a marginally significant main effect of time, $F(3, 180) = 2.52, p =$

.08, as well as a marginally significant main effect of alcohol condition, $F(2, 60) = 2.66$, $p = .08$. Post-hoc tests revealed that positive mood ratings for participants in the alcohol condition were significantly higher ($M = 9.55$, $SE = 0.53$) than for participants in the no alcohol condition ($M = 7.78$, $SE = 0.53$, $p < .05$); no difference was found between participants in the alcohol and placebo ($M = 8.75$, $SE = 0.51$) conditions, nor between participants in the placebo and no alcohol conditions. In addition, positive mood ratings for all participants (across all motive and beverage conditions) were significantly lower after completing the word task ($M = 7.93$, $SE = 0.35$) than at any other time point after beverage consumption (post-consumption $M = 8.96$, $SE = .32$; 10 minutes after consumption $M = 9.15$, $SE = .32$; and 20 minutes after consumption $M = 8.74$, $SE = .36$, $p < .01$ for all comparisons). No effects of motive group were found for positive mood ratings.

For depressed mood, we found a main effect of time, $F(4, 58) = 9.93$, $p < .001$, as well as a marginal main effect of motive, $F(1, 61) = 3.60$, $p = .06$, where CWDM participants tended to provide higher depressed mood scores overall than EM participants. Post-hoc tests revealed that participants across beverage and motive conditions had significantly higher depressed mood scores at baseline ($M = 1.02$, $SE = 0.25$) than at any other time point in the experiment ($p < .01$ for all time points). In addition, participants had significantly higher depressed mood scores at the end of the experiment (post-word task; $M = 0.44$, $SE = 0.14$) than at 10 ($M = 0.27$, $SE = 0.13$, $p < .05$) and 20 minutes ($M = 0.29$, $SE = 0.13$, $p < .05$) post-beverage consumption. No effect of beverage condition and no interaction effects between time and beverage condition or motive were found for depressed mood ratings.

Test of Schematic Relevance of Word Stimuli

To verify the schematic relevance of the adjectives to the respective groups, a 2 (motive) x 3 (beverage) x 2 (content: depressed or positive content) ANOVA was performed on the answers (yes or no) to the self-relevant word processing questions. We found main effects of motive, $F(1, 61) = 10.61, p < .01$, beverage, $F(2, 61) = 8.72, p < .001$, and content, $F(1, 61) = 111.48, p < .001$. These effects were qualified by a content by motive interaction ($F(1, 61) = 14.15, p < .001$) and a content by beverage interaction ($F(2, 61) = 7.00, p < .01$). Post-hoc tests revealed that EM participants reported that more positive content adjectives described them ($M = 2.85, SD = 1.79$) than did CWDM participants ($M = 1.58, SD = 1.12$), $p < .001$. No differences between CWDM and EM participants were found for the self-relevance of depressed content (CWDM $M = 0.30, SD = 0.73$; EM $M = 0.15, SD = 0.44$). Furthermore, post-hoc tests revealed that participants in the alcohol condition reported that fewer positive content adjectives described them ($M = 1.23, SD = 1.15$) than did participants in the placebo ($M = 2.70, SD = 1.74$) and no alcohol ($M = 2.73, SD = 1.49$) conditions ($p < .01$ for both comparisons), with no differences between participants in the placebo and no alcohol conditions. No differences were found across beverage conditions for depressed content identified as self-relevant.

Recall of Negative Self-Relevant Information

We analysed word recall data in relation to the initial hypotheses using a priori planned comparisons. Specifically, we deconstructed the complete 2 (motives: CWDM vs. EM) x 3 (beverage condition: no alcohol vs. placebo vs. alcohol) x 2 (processing instruction: semantic vs. self-relevant) x 2 (word content: depressed vs. non-depressed)

table of means into a series of directional independent samples *t*-tests (see Birch et al., 2008 and Stewart, Yi, & Stewart, 2014 for other examples of this analytic strategy). Conventional alpha levels were used to analyse the comparisons of primary interest, as recommended by Tabachnick and Fidell (2007). Specifically, these directional independent samples *t*-tests were used to compare the number of words of each type (4 possible types derived by crossing word content – depressed versus non-depressed – and processing instruction – semantic versus self-relevant) correctly recalled by CWDM versus EM participants within each beverage condition. In addition, directional independent samples *t*-tests were used to further compare CWDM participants' recall performance across alcohol conditions⁹. Given the small sample size, marginal effects were noted when a statistically significant difference was hypothesized. Descriptive statistics for number of each type of words correctly recalled by CWDM and EM participants in the no alcohol condition are found in Table 4.7; for the placebo condition, they are found in Table 4.8; and for the alcohol condition, they are found in Table 4.9.

Consistent with hypotheses, CWDM participants showed evidence of a cognitive bias toward increased processing of self-relevant depressed content when sober. CWDM participants in the no alcohol condition recalled more self-relevant depressed words than did their EM counterparts, $t(20) = 1.72, p = .05$. Conversely, EM participants in the no alcohol condition tended to recall more self-relevant non-depressed words than did their CWDM counterparts, $t(20) = -1.63, p = .06$. Also as hypothesized, the depressive bias effect disappeared in the alcohol condition, such that no significant differences between

⁹ To minimize the overall number of comparisons, only these particular comparisons which were of theoretical interest were examined. Thus, the recall performance of EM participants across alcohol conditions was not examined.

motives groups were found in the alcohol condition for recall of self-relevant depressed content, $t(20) = -.84, p > .05$. The only difference between the two groups in the alcohol condition was that EM participants continued to recall more self-relevant non-depressed words than CWDM participants, $t(20) = -1.89, p < .05$. For depressed and non-depressed words processed under semantic conditions, no significant differences between motive groups were found in either the no alcohol ($t(20) = -.26, p > .05$ for depressed words and $t(20) = -.57, p > .05$ for non-depressed words) or the alcohol condition ($t(20) = -.41, p > .05$ for depressed words and $t(20) = -.53, p > .05$ for non-depressed words).

Also consistent with hypotheses, CWDM participants recalled significantly fewer self-relevant depressed words in the alcohol condition than in the no alcohol condition, $t(20) = -2.44, p < .05$. CWDM participants also recalled marginally fewer depressed words encoded semantically in the alcohol condition than in the no alcohol condition, $t(20) = -1.75, p = .05$.

Expectancy effects on subsequent word recall were also investigated. CWDM participants recalled significantly *fewer* (rather than more) self-relevant depressed words in the placebo condition than did EM participants, $t(21) = -2.42, p < .05$. EM participants continued to recall more self-relevant non-depressed words in the placebo condition than did CWDM participants, $t(21) = -2.96, p < .01$. No significant differences between CWDM and EM participants were found with respect to words processed under semantic conditions in the placebo condition ($t(21) = 1.71, p > .05$ for depressed words and $t(21) = -1.32, p > .05$ for non-depressed words).

When comparing only CWDM participants' recall across beverage conditions, CWDM participants in the alcohol condition recalled significantly fewer self-relevantly

encoded depressed words ($t(20) = -2.01, p < .03$) and significantly fewer semantically encoded depressed words ($t(20) = -2.28, p < .02$) than CWDM participants in the placebo condition indicating an effect of alcohol pharmacology on depression-relevant cognitive biases. In addition, CWDM participants in the placebo condition recalled marginally fewer self-relevant depressed words than participants in the no alcohol condition, $t(20) = -1.67, p = .06$, indicating a tendency toward an alcohol expectancy effect on depression-relevant cognitive biases.

Relationship between Recall and Mood

Partial correlations were used to investigate whether positive and depressed mood changes after beverage absorption (i.e., immediately prior to completing the word task) were correlated with the number of correctly recalled self-relevant depressed adjectives in CWDM and EM participants after controlling for baseline positive and depressed mood. These partial correlations were computed separately for participants who consumed an alcoholic and a placebo beverage.

For participants in the alcohol condition, positive mood after beverage absorption was uncorrelated with subsequent recall of self-relevant depressed words for both CWDM ($r = .42, p = .19$) and EM ($r = -.13, p = .71$) participants. Similarly, depressed mood after beverage absorption was uncorrelated with subsequent recall of self-relevant depressed words in CWDM ($r = -.39, p = .27$) and EM participants¹⁰.

For participants in the placebo condition, positive mood after beverage absorption was uncorrelated with subsequent recall of self-relevant depressed words for both CWDM ($r = .12, p = .74$) and EM ($r = -.15, p = .66$) participants. Similarly, depressed

¹⁰ No value was computed for this specific partial correlation due to lack of variability in EM participants' depressed mood ratings immediately prior to completing the word task.

mood after beverage absorption was uncorrelated with subsequent recall of self-relevant depressed words for both CWDM ($r = -.33, p = .36$) and EM ($r = .29, p = .39$) participants.

Discussion

The present study investigated the effect of moderate alcohol intoxication on recall of self-relevant depressed information in individuals who report using alcohol to regulate their depressed mood. The goal was to contribute to the better understanding of the mechanisms that underlie the frequent co-occurrence of alcohol misuse and depressed mood (e.g., Grant & Harford, 1995; Grant et al., 2004; Grant et al., 2015; Hasin et al., 2007; Regier et al., 1990; Rush et al., 2008).

Alcohol's Effects on Cognitive Processes

Our findings supported our prediction that CWDM participants would recall more self-relevant depressed content than EM participants when sober. In addition, it was noted that CWDM participants recalled less self-relevant non-depressed (i.e., positive) content than EM participants in the no alcohol condition. Our findings also supported our prediction that alcohol would reduce recall of self-relevant depressed information among individuals who report engaging in drinking to cope with depression. It was also noted that alcohol did not increase recall for self-relevant positive content in CWDM participants who received alcohol. These findings are consistent with past work by Stephens and Curtin (1995) that showed the same pattern of recall for depressed compared to non-depressed individuals. More recent work by Aramakis et al. (2012) also found that alcohol slowed participants' access to negative self-relevant associations about their appearance; unlike the Stephens and Curtin (1995) study, participants in the

Aramakis et al. (2012) study were not selected based on endorsement (or not) of depression symptoms. While these past studies certainly provided some evidence that alcohol may be negatively reinforcing through its impact on cognitive processes, they did not focus on individuals who specifically report drinking to cope with depression. Focusing on these individuals is important because it hones in on the specific behaviour of interest rather than simply focusing on depressed individuals or drinkers; indeed, not all depressed individuals drink, and not all drinkers drink to cope with depression. It is also important to study drinking motives as they are theorized to be the most proximal predictor of drinking behaviour (Cooper, 1994). The present study further refined the investigation of drinking to cope with depression by selecting a comparison group comprised of drinkers who also report drinking to change their mood, though in a different manner (i.e., drinking to enhance positive mood). CWDM and EM participants differed in the cognitive effects they experienced following alcohol consumption but not in the mood effects they reported, as will be discussed below.

The present study extended the extant research work by examining expectancy effects separately from pharmacological effects of alcohol. Results from the expectancy manipulation revealed that CWDM participants recalled significantly *fewer* self-relevant depressed words in the placebo condition than did EM participants; in addition, CWDM participants who consumed placebo recalled marginally fewer depressed self-relevant adjectives than CWDM participants who received the non-alcoholic control beverage. These findings suggest that the mere expectancy of having received alcohol might be sufficient to lead to some impairment in access to these cognitions among individuals who drink to cope with depression, with the pharmacological properties of alcohol

consumption significantly increasing the magnitude of this dampening effect. Taken together, these findings suggest that alcohol (as well as possibly the expectancy effects associated with drinking as well) may be particularly reinforcing for CWDM drinkers by way of its impact on cognitive processes that commonly occur in conjunction with depressed mood, and shed light on mechanisms that may underlie the development and maintenance of co-occurring alcohol use problems and depression.

Alcohol's Effects on Mood

In addition to effects on cognition, we investigated the effect of mild alcohol intoxication on subjective positive and depressed mood, and found that alcohol consumption enhanced positive mood for all participants over that of participants who did not consume alcohol, regardless of whether they were selected for their endorsement of coping-with-depression or enhancement drinking motives. The positive mood scores of participants who consumed placebo fell in the middle between the positive mood scores of participants in the no alcohol condition (lowest) and those in the alcohol condition (highest) but did not significantly differ from the mood scores of participants who consumed alcohol. The findings related to the impact of alcohol on positive mood suggest that perhaps it is the interaction between the pharmacological and the expectancy effects of alcohol that produces increases in positive mood.

Most of the past work in this area shows that enhancement of positive mood following alcohol consumption is separate from expectancy effects (see Hull & Bond, 1986 for a meta-analysis; Mayfield, 1968; Mayfield & Allen, 1967), with some work showing a specific mood improvement (either increase in positive mood or decrease in depressed mood) for depressed over non-depressed individuals (Berger & Adesso, 1991;

de Wit, Uhlenhuth, Pierri, & Johanson, 1987; Mayfield & Allen, 1967; Stephens & Curtin, 1995). Generally, it has also been theorized that alcohol interacts with its user's personality traits or motivations to produce improvement in mood (Conrod, Pihl, & Vassileva, 1998; Sher, 1985). With this in mind, given that all participants in the present study reported using alcohol primarily to regulate their emotions (either positive or depressed mood), it is perhaps unsurprising that all participants who received alcohol reported improvements in their positive mood. However, it is possible that these effects might be experienced subjectively differently by CWDM versus EM drinkers, in alignment with the drinking motive they most frequently endorse. Specifically, CWDM drinkers could be experiencing the increase in positive mood as negatively reinforcing (providing some alleviation of anhedonia or relief from the absence of positive mood), while EM drinkers might experience the same as positively reinforcing (providing enhancement of positive mood).

The effect of moderate alcohol intoxication on depressed mood was also examined, an improvement on Stephens and Curtin's (1995) work which only investigated the effects of alcohol on positive mood. Though CWDM participants reported marginally higher depressed mood overall than EM participants, we did not observe a decrease of depressed mood among CWDM who consumed alcohol. Expectancy effects also did not produce a reduction in depressed mood for participants. This could be an indication that alcohol use impacts depression mostly through an effect on enhancing positive mood and not through a direct reduction of depressed mood, at least at the moderate dose employed in this experiment. It is noted however that the range of depressed mood scores reported by study participants was relatively restricted and at

floor compared to the range of reported positive mood scores. Future work could further investigate this question by examining the impact of alcohol administration on depressed mood following a depressed mood induction task (e.g., musical mood induction procedure or MMIP; see Västfjäll, 2002). Future work could also investigate whether individuals at different doses of alcohol report a greater range of ratings of depressed mood. Taken together with the effects noted above, the present study results suggest that the effects that are experienced as reinforcing for CWDM drinkers could involve both improvement of positive mood and a reduction in self-focused depressive cognitive processing.

Subjective Intoxication

It is noted that comparison of the subjective intoxication ratings of CWDM versus EM participants revealed another potential mechanism through which alcohol consumption might be reinforcing for CWDM individuals. Specifically, CWDM participants reported significantly higher subjective intoxication ratings than EM participants in both the alcohol and placebo conditions. This effect was not anticipated, and as such, the explanations for this difference are unclear. CWDM could be more sensitive to the intoxicating effects of alcohol than EM participants when the alcohol is administered at a moderately intoxicating level and/or when blood alcohol level is rising. Lower doses of alcohol are generally experienced as pleasurable (Davidson & Ritson, 1993; Sher & Grekin, 2007); thus, CWDM drinkers might also be experiencing relief from aversive mood states in part through a greater sensitivity to the pleasurable aspects of intoxication – aspects that are not captured with the VAS mood scale employed. The present study did not measure participants' experiences of pleasure as a specific aspect of

mood improvement. Future work could benefit from the inclusion of a specific measure of pleasure or of a “high” from alcohol use (e.g., Southwick, Steele, Marlatt, & Lindell, 1981; Volpicelli, Watson, King, Sherman, & O’Brien, 1995) in order to test this speculation and to further clarify alcohol’s complex effects on mood and subjective experience in CWDM drinkers. Future work could also explore this work by comparing CWDM and EM drinkers’ mood and subjective intoxication ratings at varying doses of alcohol.

Conclusions, Limitations, and Future Directions

While several findings from the present study are similar to past work, our results differ from those obtained by Stephens and Curtin (1995) in two important ways. First, all participants in our study showed improvement in positive mood after drinking; in the Stephens and Curtin (1995) study, only depressed participants showed this effect. This difference between the two studies is perhaps unsurprising, given that all participants in the present study were selected because they drink to regulate their affect and may be particularly sensitive to the effects of alcohol on their mood. The second difference between the two studies is that in the present study, mood enhancement was not correlated with recall for self-relevant depressive material (unlike what was observed by Stephens and Curtin, 1995). This might suggest that the effect of alcohol on recall of negative material that was encoded in a self-relevant fashion occurs independently from any effect of alcohol on mood. This finding is particularly interesting when considered in the context of evidence that alcohol has dysphoric effects on mood at the large doses typically consumed by individuals with co-morbid alcohol use problems and depression (see Davidson & Ritson, 1993 and Sher & Grekin, 2007). Indeed, a cognitively-based

reinforcement mechanism that does not rely on mood improvement could help explain how alcohol can remain reinforcing for a depressed person in spite of mixed effects on mood. Overall, present results suggest that there are several reinforcement mechanisms underlying drinking to cope with depression that may operate independently: effects on positive mood, effects on pleasurable intoxication, and effects in reducing aversive cognitive bias. Some of these appear to be unique to CWDM drinkers (namely, the effects of alcohol on pleasurable intoxication and the effects of alcohol in reducing depressed self-awareness) but some common to other internally motivated drinkers (namely, alcohol's effects on positive mood).

While the study design and sample selection in the present study improved upon past work and led to refinement of the conclusions that can be derived about the nature of the effects of alcohol on mood (e.g., by separating the pharmacological effects of alcohol from expectancy effects), it is noted the placebo manipulation was not completely successful in deceiving participants that they had consumed alcohol. While this is not unexpected when realistic doses of alcohol are used, this does limit the firmness of the conclusions noted above regarding the effects of expecting to receive alcohol on subsequent recall of depressed self-relevant information. In addition, while the three-cell design (i.e., with 3 beverage conditions: alcohol, placebo, and no alcohol) is an improvement on the study design in past work by Stephens and Curtin (1995), a balanced placebo design (see Sayette et al., 1994 for a review) with inclusion of a fourth beverage condition (i.e., the antiplacebo condition, in other words, a condition in which participants are told they are not drinking alcohol but are consuming alcohol) would further clarify which effects of alcohol are pharmacological and which are due to

expectancy effects (assuming a successful antiplacebo manipulation). Another limitation of this study is that it was conducted in a sterile laboratory setting which reduces its external validity. Future studies could examine whether the results replicated when participants consume their beverages in a more naturalistic setting (e.g., a room decorated to look like a bar or living room, or in vivo in an actual bar setting). Future work could also investigate the effects of higher doses of alcohol (i.e., those targeting a BAC > 0.06%), as well as the effects of being on the descending limb of the BAC curve, on recall of self-relevant depressed information, both of which could increase our knowledge about the effects of alcohol on the mood and cognitive processes of CWDM drinkers.

A further limitation of the present study is that the lack of a clinically depressed and alcohol misusing sample may limit the generalizability of these findings to clinical samples. However, it is noted that CWDM participants in the present study did show mild elevations on the BDI-II scores compared to their EM counterparts. Indeed, BDI-II scores were positively correlated with CWDM. The study findings are limited by the lack of inclusion of BDI-II scores as a covariate; given that the primary hypothesis tests were performed with one-tailed t-tests that do not permit the inclusion of covariates, no covariates were used in the other statistical tests to maintain consistency across the findings. Future studies should ensure that the results of the present study are replicated when depression is controlled, and should also control for other important third variables (e.g., anxiety symptoms, given the positive correlation between BAI and BDI-II scores in the present study and the known associations between depression and anxiety seen in the literature; e.g., Watson et al., 1988a).

Furthermore, the present study relied on self-report measures of mood. Given research suggesting that people rely on their own theories when reporting on their mood (Wilson et al., 1982), participants' self-report mood ratings in this study could have been influenced by this and/or other implicit processes (see Wilson & Dunn, 2004 for a review of the evidence regarding the inaccessibility of implicit processes, including some mental processes). Using physiological and behavioural measures of mood (e.g., changes in speech parameters, Ozdas, Shiavi, Silverman, Silverman, & Wilkes, 2004; changes in facial expressions, Ekman, Friesen, & Hager, 2002; Rottenberg, Gross, & Gotlib, 2005; and changes in physiological indicators of negative mood states such as measured by heart rate, skin conductance, and blood pressure, Tsai, Pole, Levenson, & Munoz, 2003) would improve the strength of the conclusions in future such studies. Finally, the study's paradigm does not separate alcohol's effects on various cognitive processes likely involved in producing the bias seen in the present study (specifically, attention, encoding, and retrieval). However, the study did show that the pattern of alcohol's effects was different when participants were asked to rate the self-relevance of words than when asked to recall words; indeed, participants who had consumed alcohol rated fewer positive adjectives as self-relevant than did participants who consumed placebo and no alcohol. This suggests that alcohol's effects on perception might differ from its effects on memory. Nevertheless, the present study sheds light on the effects of alcohol on the affective and cognitive processes of CWDM drinkers.

The present study findings emphasize the importance of targeting depression-related cognitions in interventions designed for individuals with comorbid alcohol use disorder and depressive disorders. This could be done by helping the individual recognize

their biased thought processes and consciously access alternate memories and hypotheses about themselves (i.e., as done in cognitive therapies for depression such as those by Beck et al., 1979 and Ellis, 1962). This could also be done by encouraging the individual to engage in pleasant activities, which could have positive effects on mood and eventually, help them have easier access to positive thoughts or memories and to improved thoughts about oneself (i.e., as done in behavioural activation, another treatment for depression; e.g., Lewisohn, Biglan, & Zeiss, 1976). It is noted that pleasant activity scheduling to enhance mood might also be useful for other individuals who drink to regulate mood, including EM. Moreover, given the possible effects of expectancy observed, the findings also emphasize the importance of specifically challenging the positive alcohol expectancies endorsed by CWDM drinkers. Based on prior work involving negative mood induction (e.g., Birch et al., 2004), we would expect that CWDM drinkers show stronger emotional relief alcohol expectancies when depressed. Alcohol expectancy challenges (i.e., inviting individuals to participate in expectancy-inducing experiences, perhaps a mood induction procedure, after they blindly consume either alcohol or placebo and debriefing afterward with a focus on correcting alcohol expectancies; e.g., Darkes & Goldman, 1998; Labbe & Maisto, 2011) might be effective to help individuals correct their expectancies about drinking and its effects on depression symptoms.

Table 4.1

Set of Nondepressed and Depressed Content Adjectives (Derry & Kuiper, 1981)

Nondepressed	Achieving, amiable, assertive, capable, consistent, courteous, curious,
Adjectives	durable, forceful, free, gracious, hasty, helpful, inquiring, jovial, loyal,
(30)	maternal, neat, neighborly, orderly, organized, playful, polite, proper, pushy, rational, rebellious, sociable, sturdy, tidy
Depressed	Bleak, blue, criticized, defeated, destroyed, dismal, downcast,
Adjectives	downhearted, dull, empty, failure, forlorn, glum, guilty, heartsick,
(30)	helpless, hopeless, inadequate, inferior, listless, loser, lost, melancholy, oppressed, solemn, troubled, unlucky, unwanted, weak, weary.

Table 4.2

Demographic characteristics of the sample across experimental conditions

	No alcohol		Placebo		Alcohol	
	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 11)	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 12)	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 11)
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
Age (years)	20.91 (1.58)	20.09 (1.81)	20.55 (1.69)	20.17 (1.53)	22.55 (3.91)	21.27 (2.83)
Year of study	2.45 (0.82)	2.45 (1.13)	2.09 (1.14)	2.50 (0.80)	2.18 (0.87)	2.45 (0.93)
Alcohol frequency per week	1.20 (0.79)	1.17 (0.79)	1.81 (1.32)	1.23 (1.04)	1.47 (1.06)	1.14 (0.58)
Alcohol quantity per occasion	3.95 (1.44)	5.27 (2.24)	5.18 (2.57)	3.79 (1.70)	3.45 (2.35)	6.27 (2.48)
AUDIT	6.81 (2.40)	7.18 (2.56)	7.82 (3.68)	7.83 (3.71)	7.73 (3.20)	8.82 (2.68)
BDI-II*	11.09 (13.33)	6.09 (3.81)	11.18 (7.12)	6.67 (4.42)	12.36 (8.10)	6.27 (4.41)
BAI	12.27 (13.31)	9.00 (3.82)	16.64 (11.06)	10.17 (7.17)	11.45 (6.07)	10.82 (8.53)

	No alcohol		Placebo		Alcohol	
	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 11)	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 12)	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 11)
CWDM (at screening)*	25.91 (6.32)	10.09 (0.94)	23.82 (5.64)	9.67 (0.98)	24.82 (6.95)	9.73 (0.90)
EM (at screening)*	12.45 (2.77)	19.64 (1.50)	12.91 (2.02)	18.81 (2.16)	12.98 (2.60)	19.64 (2.84)
Coping-With-Anxiety Motives	9.36 (2.80)	7.18 (2.82)	9.27 (3.13)	7.00 (3.10)	8.64 (2.20)	8.63 (3.23)
Social Motives	15.45 (3.83)	14.09 (3.94)	17.00 (4.75)	15.75 (3.62)	16.09 (2.81)	16.18 (2.93)
Conformity Motives	8.36 (4.59)	5.55 (1.04)	7.09 (2.81)	7.08 (3.53)	7.09 (2.30)	7.00 (2.57)
Baseline Depressed Mood	0.82 (1.40)	0.73 (1.42)	1.64 (3.35)	0.58 (1.16)	1.45 (2.16)	0.91 (1.81)
Baseline Positive Mood	9.91 (3.99)	11.82 (2.71)	8.64 (4.80)	10.42 (2.35)	8.18 (2.44)	8.18 (3.89)
Sex	36.4% male	0.0% male	54.5% male	16.7% male	63.3% male	50% male

	No alcohol		Placebo		Alcohol	
	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 11)	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 12)	CWDM (<i>N</i> = 11)	EM (<i>N</i> = 11)
Ethnicity	54.4% White	90.9% White	72.7% White	83.3% White	63.6% White	91.7% White
Relationship status	72.7% single	63.6% single	54.4% single	58.3% single	54.5% single	75% single
Salary of family of origin*	63.6% ≤ \$70,000	54.5% ≤ \$70,000	72.7% ≤ \$70,000	54.5% ≤ \$70,000	72.7% ≤ \$70,000	25% ≤ \$70,000

Note. CWDM = coping-with-depression-motivated drinkers; EM = enhancement-motivated drinkers; BDI-II = Beck Depression Inventory-II (Beck et al., 1996); BAI = Beck Anxiety Inventory (Beck et al., 1988); * indicates significant main effect of motive group, $p < .01$

Table 4.3

Correlations among baseline and demographics variables

	Quantity	BDI-II	BAI	AUDIT	CWDM	EM	CWAM	Social	Conformity	Baseline depressed	Baseline positive
Alcohol frequency/wk	.03	.12	.09	.38**	.21	-.12	.19	.17	.05	.10	-.03
Alcohol quantity/occasion		-.01	.24*	.55***	-.17	.17	.09	.28*	.16	-.002	.01
BDI-II			.68***	-.03	.42***	-.26*	.28*	-.02	.06	.47***	-.28*
BAI				.06	.21	-.20	.37**	.18	.17	.31*	-.24
AUDIT					-.06	.06	.07	.24	.23	.05	.05
CWDM (at screening)						-.72***	.25*	.09	.26*	.14	-.12
EM (at screening)							-.07	.03	-.16	-.10	.03
CWAM								.35**	.55***	.26*	-.22

	Quantity	BDI-II	BAI	AUDIT	CWDM	EM	CWAM	Social	Conformity	Baseline depressed	Baseline positive
Social Motives									.47***	.07	-.21
Conformity										.06	.01
Motives											
Baseline depressed mood											-.42***

Note. wk = week; BDI-II = Beck Depression Inventory-II (Beck et al., 1996); BAI = Beck Anxiety Inventory (Beck et al., 1988); AUDIT = Alcohol Use Disorders Identification Test (Babor et al., 2001); CWDM = coping-with-depression motives; EM = enhancement motives; CWAM = coping-with-anxiety motives; * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 4.4

Means and standard deviation estimates of subjective intoxication ratings over time points of the experiment, by motive and beverage conditions

	No alcohol		Placebo		Alcohol	
	CWDM	EM	CWDM	EM	CWDM	EM
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Baseline	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Post-drink	1.03 (0.06)	1.16 (0.54)	2.10 (1.06)	1.55 (0.74)	5.49 (2.14)*	3.44 (1.56)
Post-drink plus 10 minutes	1.02 (0.06)	1.11 (0.36)	2.51 (1.55)	1.70 (0.85)	6.67 (2.20)*	4.37 (1.73)
Post-drink plus 20 minutes	1.06 (0.18)	1.10 (0.33)	2.84 (1.76)*	1.62 (0.88)	6.63 (2.54)*	4.37 (1.99)
Post-word task	1.05 (0.18)	1.05 (0.18)	2.81 (2.04)	1.64 (1.07)	6.19 (2.60)*	3.88 (1.93)

Note. * indicates significant difference between motive categories for each alcohol condition, $p < .05$

Table 4.5

Means and standard deviation estimates of BAC readings over time points of the experiment, by motive and beverage conditions

	No alcohol		Placebo		Alcohol	
	CWDM	EM	CWDM	EM	CWDM	EM
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Baseline	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Post-drink plus 10 minutes	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.058 (0.010)	0.048 (0.015)
Post-drink plus 20 minutes	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.059 (0.008)	0.050 (0.014)
Post-word task	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.058 (0.008)	0.051 (0.012)

Table 4.6

Means and standard deviation estimates of positive mood scores over time points of the experiment, by motive and beverage conditions

	No alcohol		Placebo		Alcohol	
	CWDM	EM	CWDM	EM	CWDM	EM
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Baseline	9.90 (3.99)	11.82 (2.71)	8.64 (4.80)	10.42 (2.35)	8.18 (2.44)	8.18 (3.89)
Post-drink	8.00 (5.14)	10.09 (2.98)	8.64 (4.20)	9.58 (3.50)	9.45 (2.07)	7.91 (3.86)
Post-drink plus 10 minutes	7.55 (5.09)	10.09 (3.30)	9.00 (4.49)	9.58 (3.20)	10.18 (2.75)	8.45 (3.08)
Post-drink plus 20 minutes	7.55 (4.70)	10.18 (3.43)	8.63 (4.67)	8.75 (3.28)	9.09 (3.48)	8.18 (4.02)
Post-word task	7.45 (5.30)	9.73 (2.65)	7.18 (4.75)	8.58 (4.08)	7.64 (3.70)	6.91 (3.59)

Note. * indicates significant difference between motive categories for each alcohol condition, $p < .05$

Table 4.7

Means and standard deviations of words correctly recalled by CWDM and EM participants in the no alcohol condition by processing instruction (self-relevant vs. semantic) and word content (depressed vs. non-depressed)

	CWDM		EM	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-relevant instruction condition				
Depressed content	3.09 [^]	2.12	1.91 [^]	0.83
Non-depressed content	3.09 [^]	1.58	4.36 [^]	2.06
Semantic instruction condition				
Depressed content	1.36	0.92	1.45	0.69
Non-depressed content	1.91	1.70	2.36	2.01

Note. [^]Indicates a marginally significant difference between means across motive conditions ($p < .06$)

Table 4.8

Means and standard deviations of words correctly recalled by CWDM and EM participants in the placebo condition by processing instruction (self-relevant vs. semantic) and word content (depressed vs. non-depressed)

	CWDM		EM	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-relevant instruction condition				
Depressed content	1.91*	1.04	3.17*	1.40
Non-depressed content	3.17**	1.40	4.33**	1.61
Semantic instruction condition				
Depressed content	1.64^	1.03	0.92^	1.00
Non-depressed content	1.73	2.42	2.42	1.44

Note. *Indicates a significant difference between means across motive conditions ($p < .05$); ** $p < .01$; ^Indicates a marginally significant difference between means ($p = .05$)

Table 4.9

Means and standard deviations of words correctly recalled by CWDM and EM participants in the alcohol condition by processing instruction (self-relevant vs. semantic) and word content (depressed vs. non-depressed)

	CWDM		EM	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-relevant instruction condition				
Depressed content	1.27	1.27	1.64	0.67
Non-depressed content	1.18*	1.17	2.27*	1.56
Semantic instruction condition				
Depressed content	0.64	1.03	0.82	1.08
Non-depressed content	1.45	1.29	1.73	1.10

Note. *Indicates a significant difference between means across motive conditions ($p < .05$)

Chapter 5. General Discussion

The primary objective of the two studies comprising my dissertation research was to investigate the varied effects of alcohol consumption in individuals who use it to cope with depression. Drinking to cope with depression motives and more broadly, the mechanisms underlying comorbid alcohol use problems and depression, are relatively poorly understood. Part of the difficulty in understanding drinking to cope with depression is the evidence that while some of alcohol's effects seem to be obviously reinforcing (e.g., the pleasurable experience of intoxication at low doses of alcohol), other effects of alcohol seem to be plainly aversive to an individual suffering from depression (e.g., the dysphoria reported at high doses of alcohol; see Sher & Grekin, 2007; or while BAC is descending after drinking; see Holdstock & de Wit, 1998). In addition, while past work suggests alcohol has vast effects on mood (see Sher & Grekin, 2007), there is no evidence that alcohol effectively reduces depressed mood (see Khantzian, 1997). Puzzlingly, CWDM drinkers tend to drink at high doses (Grant et al., 2007b), suggesting that alcohol may act in reinforcing ways on processes other than mood for depressed drinkers. To increase our understanding of the potential reinforcement mechanisms underlying drinking to cope with depression, the aims of my dissertation research were: first, to identify several hypothesized potential effects of alcohol on depressed mood as perceived by CWDM drinkers via qualitative methods (i.e., semi-structured interviews; Study 1) and second, to experimentally evaluate one of these effects (i.e., disruption of self-focused attention; Study 2) among undergraduate students who report drinking to cope with depression significantly more than their peers. A review and integration of the findings of my two dissertation studies can be found

below, followed by a discussion of the implications, limitations, and future directions of my dissertation research.

Summary of Findings

A brief review and integration of the findings of my two dissertation studies is outlined in the section below.

Study 1: A Qualitative Study of the Perceived Effects of Alcohol on Depression among Undergraduates Who Drink to Cope with Depression

The aim of Study 1 was to identify potential reinforcing properties of alcohol for individuals who use it to cope with depression by asking CWDM drinkers to describe their drinking experiences and what they experience as the effects of alcohol on depressive symptoms. It was expected that this research would provide a rich description of CWDM drinkers' perceptions of the reinforcements that alcohol provides them. It was also expected that the findings would generate hypotheses about the many ways that alcohol might be reinforcing for people who use it to cope with depression; these hypotheses could then be tested in future experimental studies. Through thematic analysis, we found that participants described effects of alcohol on affective, cognitive, and behavioural depressive symptoms. Most of the effects reported by CWDM drinkers were viewed positively. These included their perceptions that alcohol improved their mood in the short-term, an effect that they reported, at times, persists into the day after drinking; that alcohol reduced their working memory capacity for negative thoughts (particularly when they are also distracted); that alcohol improved their concentration and problem-solving abilities; that alcohol led to memory lapses which prevented their recall of negative experiences; that alcohol had a positive impact in how they appraise

situations; that alcohol enhanced their social connections; and that alcohol improved their sleep. However, it was noted that many CWDM drinkers also reported that alcohol also had a negative impact on their depressive symptoms. Specifically, a substantial portion of participants reported that alcohol consumption led to a worsening of mood; that they found the effects of alcohol on their mood to be unpredictable; and that the day after drinking, their depressive symptoms were sometimes worse than before they drank. Overall, these findings generated several avenues for future research on the comorbidity of depressive symptoms and alcohol use problems; these will be discussed later in this chapter.

Study 2: Effects of Alcohol and Expectancy on Mood and on Recall of Self-Relevant Information in Coping-With-Depression-Motivated Drinkers

While Study 1 yielded very rich narrative data on the interplay between alcohol consumption and depressive symptoms, in the words of CWDM drinkers themselves, my first dissertation study relied exclusively on participants' own phenomenological interpretations of alcohol's effects on depressive symptoms. Nevertheless, their descriptions generated several hypothesized reinforcement mechanisms that might underlie drinking to cope with depression. Each of these can be tested empirically using experimental methods. One promising line of enquiry identified in Study 1 was the report by most CWDM drinkers that alcohol disrupts their depressive cognitive processes. To begin to test the hypothesis that alcohol disrupts negative thought processes, the aim of Study 2 was to assess whether alcohol might be reinforcing for individuals who use it to cope with depression by disrupting the processing of negative information that is self-relevant. Self-focused attention (Ingram, 1990) and negatively-biased perceptions of the

self (Beck, 1976) have both been identified as features of depressive disorders. Evidence for increased processing of negative self-relevant information in depressive disorders has been demonstrated in studies that have found greater incidental recall of depressed adjectives among depressed individuals (e.g., Hull et al., 1983; Stephens & Curtin, 1995). Study 2 also aimed to investigate the effects of a moderately intoxicating dose of alcohol on both positive and depressed mood. In Study 2, I built on prior work by Stephens and Curtin (1995) in several important ways: (1) It studied participants who report drinking to cope with depression, which is the specific behaviour of interest (Stephens and Curtin, 1995 selected depressed participants); (2) It investigated the effects of alcohol on both positive and depressed mood (unlike Stephens and Curtin who looked only at changes in positive mood); and (3) It included a no alcohol condition, which enabled me to draw conclusions about both the pharmacological and expectancy-related effects of alcohol on mood and on processing of self-relevant information (unlike Stephens and Curtin who only compared alcohol versus placebo). CWDM participants were compared against enhancement-motivated drinkers, individuals who are also motivated to drink to regulate mood (in their case, to enhance positive mood) and who also drink heavily (Cooper, 1994; see Cooper et al., 2016 for a review).

Consistent with predictions, results revealed that CWDM participants who did not receive alcohol displayed biased processing of self-relevant depressed content in terms of a memory bias favoring this content on an incidental recall task relative to EM drinkers; in contrast, CWDM participants who received alcohol did not show this bias relative to EM drinkers. EM drinkers did not display these effects; instead, EM participants who did not receive alcohol showed greater recall of nondepressed or positive words relative to

CWDM drinkers and this motive group difference did not change among those who received alcohol. Also consistent with predictions, alcohol administration led to increases in positive mood ratings for both CWDM and EM participants relative to no alcohol. Contrary to predictions, the reduced recall of self-relevant depressed information after alcohol consumption was not significantly related to mood improvement in CWDM. This suggests that alcohol's effects on cognitive processes associated with depression might occur independently of alcohol's effects on mood. Alcohol's effects on depressed mood were also explored; results revealed that alcohol administration did not lead to a significant change in participants' depressed mood ratings for either CWDM or EM drinkers, even though CWDM drinkers tended to report more depressed mood overall.

Interestingly, mild expectancy effects on recall of self-relevant depressed content were observed among CWDM participants. When comparing CWDM drinkers across beverage conditions, I found that CWDM participants who consumed placebo (but not CWDM participants who consumed no alcohol) were similar to CWDM participants who consumed alcohol in that they showed no biased processing of self-relevant depressed content. In addition, when comparing CWDM and EM drinkers in the placebo condition and in the alcohol condition, I found that CWDM participants who received alcohol and who received placebo both reported higher levels of subjective intoxication than their EM counterparts, though these effects were less extensive for the placebo condition.

Overall, these findings support the hypothesis that alcohol disrupts cognitive processes associated with depression in CWDM drinkers. They also support that alcohol increases positive mood, at least at the moderately intoxicating dose administered to Study 2 participants. These effects of alcohol on phenomena associated with depression

appear to occur independently in that they were uncorrelated with one another. These findings also highlight that the effects of alcohol on depression may not be entirely due to the pharmacological properties of alcohol; indeed, psychological factors (namely in this study, expectancies about the effects of alcohol) may also play some role in how alcohol affects individuals who drink to cope with depression.

Integration of Study Findings

Taken together, results of both studies in my dissertation highlight the numerous potential effects of alcohol on various symptoms and correlates of depression, particularly affective and cognitive symptoms. Indeed, when asked to describe their drinking experiences in Study 1, CWDM drinkers reported experiencing several reinforcing effects of alcohol on depressive symptoms, including: improved mood, reduced attention to negative internal experiences, reduced recall of aversive memories, and reduced negative appraisals of external and internal experiences. In addition, when CWDM drinkers' processing of depressed self-relevant information (a cognitive process implicated in depressive disorders; e.g., Ingram, 1990) was studied experimentally in Study 2, results showed that alcohol consumption eliminated their bias toward increased processing of this self-relevant depressed content compared to when they are not intoxicated. This effect might be reinforcing for individuals who drink to cope with depression and is consistent with the descriptions of alcohol's effects provided by CWDM drinkers in semi-structured interviews in Study 1.

When CWDM drinkers' moods were studied experimentally in Study 2, the results were also consistent with CWDM participants' narrative descriptions of alcohol's effects in Study 2; at moderately intoxicating doses, alcohol consumption tends to lead to

mood improvement. Study 2 findings also suggest that the reinforcing effects of alcohol on depressive symptoms may not entirely be due to its pharmacological properties; indeed, evidence from Study 2 suggests that expectancy effects are sufficient to produce some elimination of biased processing of self-relevant depressed information. In the same vein, Study 1 highlights other factors outside of the pharmacological properties of alcohol that likely have an impact on depressed mood. Indeed, many CWDM drinkers in Study 1 described relief in their depression from increased socializing at times when they are drinking. Overall, the findings from this dissertation suggest that the reinforcing effects of alcohol for individuals who use it to cope with depression may not be entirely due to the effects of the substance itself.

Findings from this dissertation also highlight the complex and at times, contradictory effects of alcohol on mood. Indeed, a sizable proportion of CWDM drinkers from Study 1 described unpleasant effects of alcohol on their mood along with the reinforcing effects noted above. Study 2 also clarified experimentally that mood improvement after drinking likely occurs through increases in positive mood rather than decreases in negative mood. In light of such findings, it appears important to assess both reinforcing and aversive effects of alcohol on mood, both immediately after drinking and in the day after drinking, as well as effects of alcohol on several types of depressive symptoms (i.e., affective, cognitive, and behavioural) when studying comorbid depression and alcohol use problems. Implications and directions for future research, along with the limitations of this dissertation, are discussed further below.

Implications, Limitations, and Directions for Future Research

As highlighted in the previous chapters of my dissertation, results of the current research have several important theoretical and clinical implications. The following pages first outline a number of these implications; following these, limitations of the current research are outlined. These implications and limitations point to potential directions for future research which will be highlighted throughout.

Theoretical Implications

The findings that have emerged from my dissertation research have a number of important implications for theories about alcohol use and about the mechanisms underlying comorbid depression and alcohol-related problems. Firstly, the present findings lend additional support for self-medication hypothesis (Khantzian, 1985; 1997). Specifically, findings from Study 2 supports one of the core tenets of the self-medication hypothesis (namely, that alcohol is effective in producing an effect on aspects of depression that sufferers might find aversive, like improvement of anhedonia). Indeed, findings from Study 2 suggest that alcohol leads to increases in positive mood in internally motivated drinkers including CWDM drinkers and that part of the reason why CWDM drinkers consume alcohol is to improve positive mood. This might suggest that for depressed individuals who drink, negative and positive reinforcement motives interact to produce drinking behaviour. Recent work has examined this possibility and found some support for the interaction of enhancement and coping motives in moderating the relationships between negative mood and drinking behaviour, but more work is required to clarify the timing of these effects and its applicability to various types of affect-motivated drinking (e.g., depressed versus anxious mood; Armeli et al., 2010).

Study 2 also showed that alcohol leads to the elimination of CWDM drinkers' biased processing of depressed self-relevant information - a cognitive process that has been implicated in depression (Ingram, 1990; Lewinsohn et al., 1985; Nolen-Hoeksema, 1991; Pyszczynski & Greenberg, 1987) and that was active among sober CWDM participants in the present research. As such, Study 2 findings are consistent with conceptualizations of alcohol consumption as providing an escape from painful self-awareness (e.g., Baumeister et al., 1994; Hull, 1981). By interfering with processing of depressed self-relevant information (as evidenced by decreased subsequent incidental recall for these self-relevant depressed words), alcohol might reduce the activation of the negative self-schema of depressed individuals (Hull, 1981), which might be negatively reinforcing for these individuals. According to Beck's theory of depression (Beck, 1976; Beck et al., 1979), reduced activation of one's negative self-schemas would lead to reduction of depressive symptoms. Alcohol might be consumed by some depressed individuals to obtain this effect.

Given the theorized links between reduced activation of negative self-schema and reduced depressive symptoms, it is notable that reduced recall of negative self-relevant information was not linked with mood enhancement in Study 2. This finding also runs contrary to what was found by Stephens and Curtin (1995) who found that reduced recall of negative self-relevant information was linked with increases in positive mood in depressed individuals, and to findings showing that reducing self-awareness or increasing distraction from self-awareness leads to reductions in depressed mood (Fennell et al., 1987; Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema & Morrow, 1993). One potential explanation for this discrepancy between Study 2 findings and past

experimental and theoretical work is that unlike the participants in Stephens and Curtin (1995), not all of the CWDM participants endorsed experiencing symptoms of depression. It is possible that CWDM participants who endorse more depressive symptoms experience greater relief of their symptoms after experiencing a reduction in their negative self-schemas than CWDM participants who endorse fewer depressive symptoms. While I do not have sufficient statistical power to perform this comparison for the present dissertation, it would be important for future work to compare effects for CWDM drinkers according to the degree of depressive symptoms they endorse.

Nevertheless, the present dissertation findings support other prior results on the symptoms and correlates of depression. Specifically, Study 2 supports conceptualizing depression as featuring both high negative and low positive affect (unlike anxiety, which is characterized only by high negative affect; Clark & Watson, 1991; Watson et al., 1988a; Watson et al., 1988b). Indeed, scores on the BDI-II (Beck et al., 1996) were significantly positively correlated with baseline depressed mood and negatively correlated with baseline positive mood; in contrast, while scores on the BAI (Beck et al., 1988) were significantly positively correlated with baseline depressed mood, they were not significantly correlated with baseline positive mood.

While respect to theories about alcohol use, findings from my dissertation research provide support for the usefulness of conceptualizing drinkers according to their drinking motives (e.g., Cooper, 1994; Cooper et al., 2016; Grant et al., 2007b) and the validity of coping-with-depression motives as a construct. To our knowledge, the present dissertation features the first investigation of the self-medication hypothesis for depression involving a direct probe of individuals who endorse drinking to cope with

depression to generate hypotheses about the mechanisms underlying this process. Study 1 of the present dissertation confirmed that CWDM participants identified using their scores on the Modified DMQ-R (Grant et al., 2007b) can recall and describe salient occasions when they drank to cope with depression and can describe what effects they perceive alcohol is having on depressive symptoms. For example, they identified that alcohol leads to improvement in their mood, that alcohol has an impact on cognitive functioning (e.g., reduced memory for negative experiences) that might lead to relief from depressive symptoms, that alcohol has an impact on negative cognitions associated with depression (e.g., increasing optimistic outlook), and that drinking is associated with increased interpersonal interactions which also provide relief from depression.

Interestingly, while the self-medication hypothesis and motivational models of alcohol use were the main theories from which the present research questions were elaborated, findings from my dissertation research also provide some (albeit more limited) support for theoretical models of comorbidity that posit that alcohol use causes depression (e.g., Schuckit, 2006). Specifically, a large portion of CWDM drinkers in Study 1 reported experiencing dysphoric mood as a result of drinking, either shortly after heavy alcohol consumption or the day after drinking. Given that the results from the present dissertation support the presence of both alcohol self-medication and alcohol-induced depression mechanisms underlying depression-alcohol misuse comorbidity, the present research also supports a third theoretical model of comorbidity (see Stewart et al., 2016) wherein alcohol misuse and depression maintain and/or exacerbate one another in a vicious cycle. According to this model, the onset of the comorbid depressive and alcohol use disorders may occur in any of the theorized manners. However, once both disorders

have emerged, the individual engages in a cyclical process of using alcohol to obtain its shorter-term reinforcing effects on depressive symptoms (e.g., improvement in anhedonia, reduced recall of self-relevant depressed information), then experiencing longer-term increases in dysphoric affect as the dose of alcohol increases and/or the BAC decreases following a drinking episode. The latter maintains depressive symptoms that may then be further self-medicated with alcohol, and so on (see Figure 1.2 for a depiction of this hypothesized model, adapted from Stewart et al., 2016). Given the evidence for the relevance of both self-medication and depression-induction effects of alcohol as underlying processes in the depression-alcohol use relationship, it is important that future work in this area consider both types of effects.

For instance, a future examination of an effect of alcohol use on symptoms of depression could make use of structural equation modeling (SEM) to conduct cross-legged analyses testing reciprocal relations between depressive symptoms and heavy drinking over time. To date, this work has been performed on a sample of undergraduate women and did not find support for the maintenance model of comorbidity in a short-term (1 month, 4 waves) longitudinal study (Mushquash et al., 2013), finding only support for a self-medication pathway between depressive symptoms and heavy drinking. This finding is consistent with a number of studies (e.g., Kuo, Gardner, Kendler, & Prescott, 2006; Wang & Patten, 2001a). However, it is noted that some studies have found evidence for an alcohol-induced depression pathway between alcohol use disorder and depression (Wang & Patten 2001b; 2002), including one study (Fergusson, Boden, & Horwood, 2009) that tested reciprocal relationships between the two disorders and like Mushquash et al. (2013) did not find evidence of reciprocity. Future work would benefit

from testing the reciprocal relations between depressive symptoms and alcohol use prospectively and in both the short-term (via daily diary studies) and the long-term. In addition, this research has not yet been conducted specifically with individuals who drink to cope with depression, a group that represents the drinking pattern of interest. In addition to further work that experimentally tests the various mechanisms hypothesized to underlie the depression-alcohol use relationship, longitudinal or daily diary work such as that proposed above would help clarify the complex interplay between these two sets of difficulties.

The present dissertation also supports what is known about alcohol's effects on mood. Past work has long highlighted the paradoxical effects of alcohol on mood, with low doses producing pleasurable effects and high doses producing aversive mood states (see Davidson & Ritson, 1993 and Sher & Grekin, 2007 for a review). Indeed, the affective experiences recalled by CWDM drinkers in the drinking occasions they described in Study 1 are consistent with the past experimental evidence gathered on this subject. Future research investigating mechanisms underlying drinking to cope with depression would benefit from examining aspects of mood that are separate from the valence of the affect. For instance, affect lability or variability (i.e., daily reactivity to positive and negative cues; Eid & Diener, 1999) has been linked with alcohol use and higher coping motives for drinking (Gottfredson & Hussong, 2013) and with the development of alcohol-related problems (Simons, Carey, & Gaher, 2004). Affect lability or variability has been proposed as a risk factor that might help clarify the inconsistencies in the literature regarding the self-medication hypothesis and coping-motivated drinking in individuals experiencing high negative affect (Mohr, Arpin, & McCabe, 2015). Studies

done to date using experience sampling data and longitudinal methods have found that affect lability uniquely predicts alcohol use (Mohr et al., 2015) and alcohol dependence symptoms (Simons, Wills, & Neal, 2014), independently of levels of negative affect. Future research could compare the effects of alcohol on the mood and cognitive processes of depressed (but not emotionally labile) individuals to people high in affect lability to identify the similarities and differences between these individuals and advance our understanding of the emotion regulation effects of alcohol. This work would also have important clinical implications for individuals diagnosed with bipolar disorder and borderline personality disorder since both diagnoses involve affective lability and both are associated with a higher risk of developing alcohol use disorder (Bolton et al., 2009; Hasin et al., 2007; Jahng et al., 2011). Future research could also investigate if/how motivational models of alcohol use (e.g., Cooper, 1994; Grant et al., 2007b) are related to affect lability. For instance, individuals high in affect lability might score highly on measures of coping motives and of enhancement motives; alternately, they may score highly on all drinking motives. To my knowledge, one study to date has investigated drinking motives among patients with bipolar disorder and found that coping motives were related to depressive episodes and enhancement and social motives were related to hypomanic episodes (Meyer, McDonald, Douglas, & Scott, 2012). It remains to be seen how affect lability as a stable dimension is related to drinking motives, and whether in turn these associations may be predictive of unique patterns of use and negative consequences.

In addition to affect lability, future investigations of the effects of alcohol on mood could also be informed by studying the opposite phenomenon, emotional inertia

(i.e., restricted and consistent range of affective states; Fairbairn & Sayette, 2013). It is noted that in his description of the self-medication hypothesis of alcohol use, Khantzian (1997) theorized that alcohol might be used by depressed individuals to soften rigid emotional states of emptiness and numbness, an idea that seems to be, at least based on face validity, related to the construct of emotional inertia. Interestingly, one of the subthemes identified in the descriptions of the effects of alcohol use by CWDM participants in Study 1 was related to individuals feeling more apt to express their aversive inner states to friends and obtaining relief from doing so. To date, few studies have investigated alcohol's effects on emotional inertia. However, one study found that alcohol consumption reduced affective autocorrelation (a behavioural measure of emotional inertia captured through facial expressions coded moment-to-moment; Fairbairn & Sayette, 2013). Taken together, future studies of alcohol's effects on mood would likely benefit from including measures of the changeability of affect and continue to investigate whether alcohol regulates the changeability of affect (rather than simply looking at changes in valence of the affect) and whether this effect is experienced as reinforcing by individuals who drink to cope with depression.

Clinical Implications

Results from my dissertation research also have a number of important clinical implications, particularly with respect to the prevention and treatment of comorbid depression and alcohol use disorder. Prevention efforts may be particularly important to undertake in undergraduate students, a population that engages in high rates of drinking, including binge drinking (Adlaf et al., 2005) and that are at increased risk for developing alcohol use disorders (Knight et al., 2012) and depression (Ibrahim et al., 2013). Given

the evidence from longitudinal work that the associations between depression and alcohol use get stronger as the drinker gets older (Conner, Pinquart, & Gamble, 2009), prevention and early intervention efforts have the potential to have a significant impact on the later well-being of depression-prone alcohol users.

Regarding the prevention of problems with alcohol and depressed mood resulting from drinking to cope with depression, results of my dissertation research point to the importance of targeting alcohol expectancies around the affective *and* cognitive effects of alcohol when designing these types of interventions. Indeed, Study 2 in particular demonstrated that even in a non-clinical sample of CWDM drinkers, expectancies alone might have some effect on participants' processing of self-relevant depressed information. On a related note, results of my dissertation research suggest that assessment of an individual's alcohol expectancies could provide important information to treatment providers about the case formulation of the client presenting for treatment. One type of intervention, the expectancy challenge intervention (Darkes & Goldman, 1998), is an experiential group intervention designed to illustrate the effects of alcohol expectancies on drinking behaviour. Group participants receive either alcohol or placebo drinks but are blind to the contents of their beverage. They are then directed to socialize with the other group members for a period of time; afterward, participants are asked to evaluate whether their peers were drinking alcohol or a placebo. Participants are given corrective, personalized feedback on how their expectancies contribute to the effects they perceive from alcohol use and are sometimes asked to directly challenge their alcohol expectancies (e.g., Corbin, McNair, & Carter, 2001). A meta-analysis of 14 studies investigating the efficacy of the expectancy challenge intervention concluded that this intervention reduced

positive alcohol expectancies as well as binge drinking frequency and quantity of alcohol consumed for up to one month after the intervention (Scott-Sheldon, Terry, Carey, Garey, & Carey, 2012). In addition, while few studies have examined the effects of the intervention at lengthier follow-ups, work done to date showed that positive expectancies remained lowered 6 months after the intervention (Scott-Sheldon et al., 2012). In sum, providing individuals with personalized feedback on their expectancies about alcohol's effects on mood-related cognitive processes and the effects these may be having on their drinking could have lasting effects on these beliefs. The expectancy challenge is a useful intervention for promoting prevention of the development of alcohol use disorders, as it can be delivered to all drinkers, even those who are not currently experiencing harms from their drinking.

In addition to targeting alcohol expectancies in treatment, results of my dissertation suggest that CWDM drinkers might present with unique factors that influence their drinking behaviour. While the specificity of the themes generated by participants in Study 1 to CWDM drinkers only has not yet been established, the results of Study 1 suggest that CWDM drinkers might be using alcohol to self-medicate depression (e.g., to help with sleep) in ways that we would not expect to observe in drinkers who endorse low levels of CWDM. Interventions that are tailored to an individual's primary drinking motive might be useful in providing feedback and tools to change drinking behaviour in a manner that is particularly salient to each individual. A few initial attempts have been made to develop and test interventions targeting drinking motives which have yielded promising results (Blevins & Stephens, 2016; Canale, Vieno,

Santinello, Chieco, & Andriolo, 2015). Larger trials are needed to determine efficacy at longer follow-ups and among clinical samples.

With respect to the treatment of comorbid depression and alcohol use disorder, a meta-analysis of RCTs psychological interventions for comorbid alcohol misuse and mood disorders found evidence of efficacy for cognitive-behavioural therapy (CBT) and motivational interviewing-based interventions for treatment of these concurrent disorders (Baker, Thornton, Hiles, Hides, & Lubman, 2012). This analysis also concluded that longer CBT-based interventions are more beneficial than shorter therapies (Baker et al., 2012). Interestingly, as mentioned in Study 1, in Chapter 2 of this dissertation, many CWDM participants reported effects of alcohol on their thought processes that were comparable to the effects sought by CBT. Specifically, participants described that alcohol helped them adopt a more positive point of view regarding their difficulties, an effect similar to that sought when clinicians help clients challenge negative cognitive distortions and self-schema in cognitive-behavioural therapy for depression (Beck et al., 1979). The same chapter highlights several other perceived effects of alcohol on the thoughts and behaviour of CWDM drinkers that might be achievable via psychological interventions. For instance, some participants described that alcohol helped them accept their difficulties, which might be analogous to mindfulness, acceptance and commitment therapy (ACT; Hayes et al., 2006), and/or dialectical behaviour therapy (DBT; Linehan, 1993) approaches. Many participants described that drinking gives them a reason to socialize with others outside of the home, which might be analogous to behavioural activation (BA) approaches for depression (Lewisohn et al., 1976). These approaches have not been as widely studied as CBT and motivational interviewing for comorbid

mood difficulties and alcohol use disorder. However, there is preliminary evidence suggesting individuals with comorbid mood and alcohol use disorders might benefit from most of these approaches (namely, mindfulness—Witkiewitz, Marlatt, & Walker, 2005; ACT—Thekiso et al., 2015; and DBT—Dimeff & Linehan, 2008). As for BA, it is noted that an RCT evaluating the efficacy of this approach for co-occurring depression and substance use disorder is currently underway (see Ross et al., 2016). Future research is warranted to establish which therapeutic approaches are most efficacious for individuals with comorbid depressive and alcohol use disorders.

Limitations

The current research has some limitations that are important to consider. One of these limitations is that both studies in my dissertation rely on self-report measures, notably the Modified DMQ-R (Grant et al., 2007b) which was used in both studies to select and classify drinkers according to their own perceptions of why they drink. Inherent in this decision is the assumption that people are able to introspectively identify their motives for drinking. Given the considerable body of research demonstrating that individuals are not always able to accurately identify the reasons for their behaviours (see Wilson, 2002 and Wilson & Dunn, 2004 for reviews), it is possible that some participants did not accurately self-identify their drinking motives. A related limitation is that some known implicit influences on drinking behaviours, including conditioned responses to alcohol (see Drummond, 2001 for a review) and implicit cognitive processes (see Wiers & Stacy, 2006 for a review) were not used to select individuals who might drink to cope with depression for participation in these studies. Future research is needed to determine

how CWDM drinkers might be more reliably identified by using incorporating information outside of exclusive reliance on self-report measures.

A further limitation is that CWDM participants were defined and selected slightly differently across the two studies of this dissertation. Specifically, while both studies recruited participants who endorsed CWDM motives more frequently than other motives and significantly more frequently than their peers endorsed CWDM motives, Study 2 also required that CWDM participants had to score significantly lower than their peers on EM motives (this was done to minimize the overlap in the endorsed motives of CWDM participants and the group against which they were compared, i.e., EM participants). Study 1 did not have this additional selection criterion. As a result, it is possible that findings related to CWDM participants in one study may not fully generalize to the CWDM participants in the other study. Few studies have examined the interactive effects of various drinking motives in predicting drinking behaviour and consequences of drinking. However, it is noted that one study by Armeli et al. (2010) suggests that coping motives might interact with positive reinforcement (social and enhancement) motives in predicting the relations between negative affect and drinking behaviour. Specifically, they found that the strongest positive association between depressed mood and number of drinks consumed per day were found among individuals high in coping motives who were also low in social and enhancement motives – a group similar to the CWDM drinkers in the current Study 2. This work highlights the potential for other drinking motives to inform what is known about the mechanisms underlying drinking to cope with depression; i.e., these mechanisms might be different for CWDM who also rate other motives highly than for CWDM who endorse fewer other drinking motives (i.e., those

who are more selectively CWDM drinkers). Future research should consider the potential moderating effects of other drinking motives on the outcomes of interest.

Another limitation of this dissertation research relates to the sample characteristics of participants included in both studies. Both participant samples consisted of primarily Caucasian undergraduate students. While undergraduate students' drinking motives are particularly important to study given the high rates of binge drinking and alcohol-related problems in this group (Adlaf et al., 2005), results of the current research may not generalize to other populations, such as adolescent or adult drinkers, clinical populations (individuals with diagnoses of depressive and/or alcohol use disorders), or drinkers with other comorbid diagnoses to alcohol use disorder than depressive disorders. Young adults have the highest rates of alcohol dependence diagnoses (Grant et al., 2004), and work that tested the moderating effects of age on the associations between depression and alcohol use found that those with alcohol use disorder had a mild decline in depression over time, with this decline being stronger as participants aged (Conner et al., 2009). In contrast, work investigating coping motives in adolescence found these to be less predictive of drinking behaviour than in older age groups (Bradizza, Reifman, & Barnes, 1999). Given the apparent moderating effect of age on the depression-alcohol use and coping motives-alcohol outcomes relationships, it is possible that the present research findings do not capture drinking to cope with depression as well in younger (adolescent) and/or older age groups as in undergraduate students.

Another potential moderator of the depression-alcohol use relationship that was not investigated in the present research is gender. This research question was not explored in the present study due to the difficulty of recruiting sufficient sample sizes of

CWDM drinkers, particularly in Study 2 where the selection criteria were more stringent; the resulting sample size meant we were not adequately powered to examine gender as a potential moderator for the effects of alcohol on mood and/or on processing of negative self-relevant information. Previous work that looked at gender differences in endorsement of drinking motives found no differences between men and women in their endorsement of CWDM and EM (both of the relevant motives in Study 2; Grant et al., 2007b). However, research on the prevalence rates of depression and depressive symptoms among individuals with alcohol-use disorders suggest that women report more depression than men (e.g., Compton, Stinson, & Grant, 2006; King, Bernady, & Hauner, 2003). This gender difference might mean that drinking to cope with depression manifests differently for men and women. Indeed, a daily process study by Hussong (2007) examined the drinking behaviour and related consequences of male and female coping-motivated drinkers on days of elevated sadness. She found that holding greater coping motives was a significant risk factors for drinking in the days following elevated sadness for both men and women. However, she found a gender difference with respect to alcohol-related problems, with only women showing significant positive associations between self-medication drinking and alcohol-related problems. Given these gender differences in coping-motivated drinking, it is important that future research in this area include gender as a separate independent variable when investigating the effects of alcohol on depressive symptoms.

Conclusion

Although coping motives for drinking have been widely studied in the field of addictive behaviours, drinking to cope with depression motives and the mechanisms

underlying comorbid depressive and alcohol use disorders are still poorly understood. This is troubling given prior research findings identifying coping motives for drinking as the riskiest reasons for drinking given their associated adverse consequences (e.g., Cooper et al., 2016), as well as past findings linking drinking to cope with depression with heavy drinking and with drinking-related problems (Grant et al., 2007b). The reinforcing effects of alcohol on depressive symptoms are particularly difficult to identify given the complex effects of alcohol on mood (see Sher & Grekin, 2007). To increase our understanding of the reinforcement mechanisms underlying drinking to cope with depression and to facilitate research in this area, my dissertation research aimed to identify a wide range of potential effects sought by CWDM and to experimentally assess some of these potential effects, namely, the effects of alcohol on the positive and depressed mood of CWDM drinkers and on their processing of self-relevant depressed information.

The main novel contribution of my dissertation research was the identification of numerous avenues for future experimental research on the potential mechanisms underlying the relationship between depression and alcohol use. I accomplished this, in part, via the collection and thematic analysis of the rich and informative drinking narratives of undergraduate students who drink to cope with depression. The most important findings from this dissertation research were that: (1) CWDM drinkers report numerous effects of alcohol that might be reinforcing for individuals with comorbid depressive and alcohol use disorders (including effects of alcohol on affective, cognitive, and behavioural characteristics and correlates of depression). These reports point to numerous hypothetical mechanisms underlying drinking to cope with depression that

could be subject to experimental scrutiny in future research; (2) sober CWDM individuals show evidence of biased (i.e., increased) processing of self-relevant depressed information; and this bias appears to be eliminated following alcohol consumption; (3) the expectancy of receiving alcohol alone leads to increases in pleasurable subjective intoxication, and to a mild attenuation of the aforementioned biased processing of self-relevant depressed information in CWDM drinkers; and (4) some of the effects of alcohol described by CWDM participants were depression-inducing in nature, which has important theoretical implications for the study of drinking to cope with depression and which is consistent with a mutual maintenance model (Stewart et al., 2016). Overall, results of my dissertation research highlight the complexity of the alcohol use-depression relationship and point to the need for future research on the pharmacological and expectancy effects of alcohol on affective, cognitive, and behavioural symptoms and correlates of depressive disorders.

References

- Abrams, D. B., & Niaura, R. S. (1987). Social learning theory. In H. T. Blane & K. E. Leonard (Eds.), *Psychological theories of drinking and alcoholism* (pp. 131-178). New York, NY: Guilford Press.
- Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49–74.
- Adlaf, E. M., Demers, A., & Gliksman, L. (Eds.). (2005). *Canadian Campus Survey 2004*. Toronto, ON: Centre for Addiction and Mental Health.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Ancoli-Israel, S., & Roth, T. (1999). Characteristics of insomnia in the United States: results of the 1991 National Sleep Foundation Survey. I. *Sleep, 22*, S347-S353.
- Aramakis, V. B., Khamba, B. K., MacLeod, C. M., Poulos, C. X., & Zack, M. (2012). Alcohol selectively impairs negative self-relevant associations in young drinkers. *Journal of Psychopharmacology, 26*(2), 221–231.
- Armeli, S., Conner, T. S., Cullum, J., & Tennen, H. (2010). A longitudinal analysis of drinking motives moderating the negative affect-drinking association among college students. *Psychology of Addictive Behaviors, 24*(1), 38–47.
- Arnett, J. J. (2010). *Adolescence and Emerging Adulthood: A Cultural Approach* (4th ed.). Upper Saddle River, NJ: Prentice Hall.

- Babor, T. F., Brown, J., & Del Boca, F. K. (1990). Validity of self-reports in applied research on addictive behaviors: fact or fiction?. *Behavioral Assessment, 12*(1), 5-31.
- Babor, T., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The Alcohol Use Disorders Identification Test: Guidelines for use in primary care*. Geneva, SW: World Health Organization.
- Baddeley, J. L., Pennebaker, J. W., & Beevers, C. G. (2013). Everyday social behavior during a major depressive episode. *Social Psychological and Personality Science, 4*(4), 445–452.
- Baker, A. L., Thornton, L. K., Hiles, S., Hides, L., & Lubman, D. I. (2012). Psychological interventions for alcohol misuse among people with co-occurring depression or anxiety disorders: A systematic review. *Journal of Affective Disorders, 139*(3), 217–229.
- Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Barker, C., Pistrang, N., & Elliott, R. (2002). *Research Methods in Clinical Psychology: An Introduction for Students and Practitioners* (2nd ed.). West Sussex, UK: John Wiley & Sons, Ltd.
- Battista, S. R., MacDonald, D., & Stewart, S. H. (2012). The effects of alcohol on safety behaviors in socially anxious individuals. *Journal of Social and Clinical Psychology, 31*(10), 1074–1094.
- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.

- Beck, A. T. (1976). *Cognitive Therapy and the Emotional Disorders*. New York, NY: International University Press.
- Beck, A. T. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy*, *1*, 5-37.
- Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *American Journal of Psychiatry*, *165*(8), 969–977.
- Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology*, *56*, 893-897.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive Therapy of Depression*. New York, NY: Guilford Press.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck depression inventory-II*. San Antonio, TX: The Psychological Corporation.
- Beach, S. R. H., Jones, D. J., & Franklin, K. J. (2009). Marital, family, and interpersonal therapies for depression in adults. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of depression* (2nd ed.), (pp. 624–641). New York, NY: Guilford Press.
- Berger, B. D., & Adesso, V. J. (1991). Gender differences in using alcohol to cope with depression. *Addictive Behaviors*, *16*(5), 315–327.
- Bibring, E. (1953). The mechanism of depression. In P. Greenacre (Ed.), *Affective disorders* (pp. 14-47). New York: International Universities Press.

- Biddle, B. J., Bank, B. J., & Marlin, M. M. (1980). Social determinants of adolescent drinking, what they think, what they do and what I think and do. *Journal of Studies on Alcohol*, *41*(3), 215–241.
- Birch, C. D., Stewart, S. H., Wall, A.-M., McKee, S. A., Eismor, S. J., & Theakston, J. A. (2004). Mood-Induced Increases in Alcohol Expectancy Strength in Internally Motivated Drinkers. *Psychology of Addictive Behaviors*, *18*(3), 231–238.
- Birch, C. D., Stewart, S. H., Wiers, R. W., Klein, R. M., MacLean, A. D., & Berish, M. J. (2008). The mood-induced activation of implicit alcohol cognition in enhancement and coping motivated drinkers. *Addictive Behaviors*, *33*(4), 565–581.
- Blanco, C., Okuda, M., Wright, C., Hasin, D. S., Grant, B. F., Liu, S.-M., & Olfson, M. (2008). Mental health of college students and their non-college-attending peers. *Archives of General Psychiatry*, *65*(12), 1429-1437.
- Blevins, C. E., & Stephens, R. S. (2016). The impact of motives-related feedback on drinking to cope among college students. *Addictive Behaviors*, *58*, 68–73.
- Bolton, J. M., Robinson, J., & Sareen, J. (2009). Self-medication of mood disorders with alcohol and drugs in the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Affective Disorders*, *115*(3), 367–375.
- Boyatzis, R. E. (1998). *Transforming Qualitative Information: Thematic Analysis and Code Development*. Thousand Oaks, CA: Sage Publications.
- Bradizza, C. M., Reifman, A., & Barnes, G. M. (1999). Social and coping reasons for drinking: predicting alcohol misuse in adolescents. *Journal of Studies on Alcohol*, *60*(4), 491–499.

- Braun, V., & Clarke, V. (1996). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology*, 107(2), 179–192.
- Buelow, G., & Harbin, J. (1996). The influence of blackouts on alcohol use expectancies. *Journal of Alcohol and Drug Education*, 42(1), 25-34.
- Buelow, G., & Koeppel, J. (1995). Psychological consequences of alcohol induced blackout among college students. *Journal of Alcohol and Drug Education*, 40(3), 10-20.
- Camatta, C. D., & Nagoshi, C. T. (1995). Stress, depression, irrational beliefs, and alcohol use and problems in a college student sample. *Alcoholism: Clinical and Experimental Research*, 19(1), 142–146.
- Canadian Institutes of Health Research (2011). Canada's strategy for patient-oriented research: Improving health outcomes through evidence-informed care. Retrieved from: <http://www.cihr-irsc.gc.ca/e/44000.html>
- Canale, N., Vieno, A., Santinello, M., Chieco, F., & Andriolo, S. (2015). The efficacy of computerized alcohol intervention tailored to drinking motives among college students: a quasi-experimental pilot study. *The American Journal of Drug and Alcohol Abuse*, 41(2), 183–187.

- Carmody, D. P. (2005). Psychometric characteristics of the Beck Depression Inventory-II with college students of diverse ethnicity. *International Journal of Psychiatry in Clinical Practice*, 9(1), 22–28.
- Castellanos-Ryan, N., & Conrod, P. J. (2012). Personality and substance misuse: Evidence for a four factor model of vulnerability. In J. Vester, K. Brady, M. Galanter, & P. J. Conrod (Eds.), *Drug Abuse and Addiction in Medical Illness: Causes, Consequences and Treatment* (pp. 47-62). New York, NY: Springer Press.
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, 6(4), 284–290.
- Clark, B. J., Jones, J., Cook, P., Tian, K., & Moss, M. (2013). Facilitators and barriers to initiating change in medical intensive care unit survivors with alcohol use disorders: A qualitative study. *Journal of Critical Care*, 28(5), 849-856.
- Clark, D. A., Beck, A. T., & Stewart, B. (1990). Cognitive specificity and positive-negative affectivity: complementary or contradictory views on anxiety and depression? *Journal of Abnormal Psychology*, 99(2), 148–155.
- Clark, D. A., Steer, R. A., & Beck, A. T. (1994). Common and specific dimensions of self-reported anxiety and depression: implications for the cognitive and tripartite models. *Journal of Abnormal Psychology*, 103(4), 645–654.
- Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, 100(3), 316–336.

- Compton, W. M., Conway, K. P., Stinson, F. S., & Grant, B. F. (2006). Changes in the prevalence of major depression and comorbid substance use disorders in the United States between 1991-1992 and 2001-2002. *The American Journal of Psychiatry*, *163*(17), 2141–7.
- Conner, K. R., Pinquart, M., & Gamble, S. A. (2009). Meta-analysis of depression and substance use among individuals with alcohol use disorders. *Journal of Substance Abuse Treatment*, *37*(2), 127–137.
- Conrod, P. J., Pihl, R. O., & Vassileva, J. (1998). Differential sensitivity to alcohol reinforcement in groups of men at risk for distinct alcoholism subtypes. *Alcoholism: Clinical and Experimental Research*, *22*(3), 585–597.
- Cook, R. L., Chung, T., Kelly, T. M., & Clark, D. B. (2005). Alcohol screening in young persons attending a sexually transmitted disease clinic: Comparison of AUDIT, CRAFFT, and CAGE instruments. *Journal of General Internal Medicine*, *20*(1), 1–6.
- Cooney, N. L., Litt, M. D., & Morse, P. A. (1997). Alcohol cue reactivity, negative-mood reactivity, and relapse in treated alcoholic men. *Journal of Abnormal Psychology*, *106*(2), 243.
- Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment*, *6*(2), 117–128.
- Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P. (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology*, *69*(5), 990–1005.

- Cooper, M. L., Krull, J. L., Agocha, V. B., Flanagan, M. E., Orcutt, H. K., Grabe, S., ... Jackson, M. (2008). Motivational pathways to alcohol use and abuse among Black and White adolescents. *Journal of Abnormal Psychology, 117*(3), 485–501.
- Cooper, M. L., Kuntsche, E., Levitt, A., Barber, L. L., & Wolf, S. (2016). Motivational models of substance use: A review of theory and research on motives for using alcohol, marijuana, and tobacco. In K. J. Sher (Ed.), *The Oxford Handbook of Substance Use Disorders, Volume 1*. (pp. 375-421). New York, NY: Oxford University Press.
- Corbin, W. R., McNair, L. D., & Carter, J. A. (2001). Evaluation of a treatment-appropriate cognitive intervention for challenging alcohol outcome expectancies. *Addictive Behaviors, 26*(4), 475–488.
- Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology, 97*(2), 168–180.
- Coyne, J. C. (1976). Depression and the response of others. *Journal of Abnormal Psychology, 85*, 186-193.
- Creswell, J. W., & Plano Clark, V. L. (2006). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage Publications.
- Darkes, J., & Goldman, M. S. (1998). Expectancy challenge and drinking reduction: process and structure in the alcohol expectancy network. *Experimental and Clinical Psychopharmacology, 6*(1), 64–76.
- Davidson, K. M., & Ritson, E. B. (1993). The relationship between alcohol dependence and depression. *Alcohol and Alcoholism, 28*(2), 147–55.

- Dawson, D. A., Grant, B. F., Stinson, F. S., & Chou, P. S. (2005). Psychopathology associated with drinking and alcohol use disorders in the college and general adult populations. *Drug and Alcohol Dependence*, *77*(2), 139–150.
- de Wit, H., Uhlenhuth, E. H., Pierri, J., & Johanson, C. E. (1987). Individual differences in behavioral and subjective responses to alcohol. *Alcoholism: Clinical and Experimental Research*, *11*(1), 52–59.
- DeMartini, K. S., & Carey, K. B. (2012). Optimizing the use of the AUDIT for alcohol screening in college students. *Psychological Assessment*, *24*(4), 954–963.
- Derry, P. A., & Kuiper, N. A. (1981). Schematic processing and self-reference in clinical depression. *Journal of Abnormal Psychology*, *90*(4), 286–297.
- Dimeff, L. A., & Linehan, M. M. (2008). Dialectical behavior therapy for substance abusers. *Addiction Science & Clinical Practice*, *4*(2), 39–47.
- Dohr, K. B., Rush, A. J., & Bernstein, I. H. (1989). Cognitive biases and depression. *Journal of Abnormal Psychology*, *98*(3), 263–267.
- Doty, P., & de Wit, H. (1995). Effect of setting on the reinforcing and subjective effects of ethanol in social drinkers. *Psychopharmacology*, *118*(1), 19–27.
- Drummond, D. C. (2001). Theories of drugs craving, ancient and modern. *Addiction*, *96*(1), 33–46.
- Ekman, P., Friesen, W. V., & Hager, J. C. (Eds.). (2002). *Facial Action Coding System* [E-book]. Salt Lake City, UT: Research Nexus.
- Ellis, A. (1962). *Reason and Emotion in Psychotherapy*. New York, NY: Stuart.
- Fairbairn, C. E., & Sayette, M. A. (2013). The effect of alcohol on emotional inertia: A test of alcohol myopia. *Journal of Abnormal Psychology*, *122*(3), 770–781.

- Fennell, M. J., Teasdale, J. D., Jones, S., & Damle, A. (1987). Distraction in neurotic and endogenous depression: An investigation of negative thinking in major depressive disorder. *Psychological Medicine, 17*, 441-452.
- Fergusson, D. M., Boden, J. M., & Horwood, L. J. (2009). Tests of Causal Links Between Alcohol Abuse or Dependence and Major Depression. *Archives of General Psychiatry, 66*(3), 260.
- Fisher, H. R., Simpson, R. I., & Kapur, B. M. (1987). Calculation of blood alcohol concentration (BAC) by sex, weight, number of drinks and time. *Canadian Journal of Public Health, 78*(5), 300–304.
- Flett, G. L., Vredenburg, K., & Krames, L. (1997). The continuity of depression in clinical and nonclinical samples. *Psychological Bulletin, 121*(3), 395–416.
- Francis, J. J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P., & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology & Health, 25*(10), 1229–1245.
- Freed, E. X. (2009). Alcohol and mood: An updated review. *International Journal of the Addictions, 13*(2), 173–200.
- Freud, S. (1986). Mourning and melancholia. In J. Coyne (Ed.), *Essential papers on depression* (pp. 48-63). New York: New York University Press. (Original work published 1917)
- Fromme, K., & D'Amico, E. J. (1999). Neurobiological bases of alcohol's psychological effects. In K. E. Leonard & H. T. Blane (Eds.), *Psychological theories of drinking and alcoholism* (pp. 422–455). New York, NY: Guilford Press.

- Fromme, K., Stroot, E. a., & Kaplan, D. (1993). Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. *Psychological Assessment, 5*(1), 19–26.
- Galambos, N. L., Dalton, A. L., & Maggs, J. L. (2009). Losing sleep over it: Daily variation in sleep quantity and quality in Canadian students' first semester of university. *Journal of Research on Adolescence, 19*(4), 741–761.
- Garlow, S. J., Rosenberg, J., Moore, J. D., Haas, A. P., Koestner, B., Hendin, H., & Nemeroff, C. B. (2008). Depression, desperation, and suicidal ideation in college students: Results from the American Foundation for Suicide Prevention College Screening Project at Emory University. *Depression and Anxiety, 25*(6), 482–488.
- Geisner, I. M., Larimer, M. E., & Neighbors, C. (2004). The relationship among alcohol use, related problems, and symptoms of psychological distress: Gender as a moderator in a college sample. *Addictive Behaviors, 29*(5), 843–848.
- Gibbons, F. X., Smith, T. W., Ingram, R. E., Pearce, K., Brehm, S. S., & Schroeder, D. J. (1985). Self-awareness and self-confrontation: effects of self-focused attention on members of a clinical population. *Journal of Personality and Social Psychology, 48*(3), 662–675.
- Gilman, J. M., Ramchandani, V. A., Davis, M. B., Bjork, J. M., & Hommer, D. W. (2008). Why we like to drink: A functional magnetic resonance imaging study of the rewarding and anxiolytic effects of alcohol. *Journal of Neuroscience, 28*(18), 4583–4591.

- Glenn, S. W., & Parsons, O. A. (1991). Prediction of resumption of drinking in posttreatment alcoholics. *The International Journal of the Addictions*, 26(2), 237–254.
- Goodwin, D. W., Crane, J. B., & Guze, S. B. (1969). Alcoholic “blackouts”: A review and clinical study of 100 alcoholics. *American Journal of Psychiatry*, 126, 191–198.
- Gorman, J. M. (1996). Comorbid depression and anxiety spectrum disorders. *Depression and Anxiety*, 4(4), 160–168.
- Gotlib, I., & Joorman, J. (2010). Cognition and depression: current status and future directions. *Review of Clinical Psychology*, 6, 285–312.
- Gottfredson, N. C., & Hussong, A. M. (2013). Drinking to dampen affect variability: Findings From a college student sample. *Journal of Studies on Alcohol and Drugs*, 74, 576–583.
- Graham, K., Massak, A., Demers, A., & Rehm, J. (2007). Does the association between alcohol consumption and depression depend on how they are measured? *Alcoholism: Clinical and Experimental Research*, 31(1), 78–88.
- Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Dufour, M. C., & Pickering, R. P. (2004). The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991-1992 and 2001-2002. *Drug and Alcohol Dependence*, 74(3), 223–234.
- Grant, B. F., Goldstein, R. B., Saha, T. D., Chou, S. P., Jung, J., Zhang, H., ... Hasin, D. S. (2015). Epidemiology of DSM-5 Alcohol Use Disorder. *JAMA Psychiatry*, 72(8), 757-766.

- Grant, B. F., & Harford, T. C. (1995). Comorbidity between DSM-IV alcohol use disorders and major depression: results of a national survey. *Drug and Alcohol Dependence, 39*(3), 197–206.
- Grant, V. V., & Stewart, S. H. (2007). Impact of experimentally induced positive and anxious mood on alcohol expectancy strength in internally motivated drinkers. *Cognitive Behavior Therapy, 36*(2), 102-111.
- Grant, V. V., Stewart, S. H., & Birch, C. D. (2007a). Impact of positive and anxious mood on implicit alcohol-related cognitions in internally motivated undergraduate drinkers. *Addictive Behaviors, 32*(10), 2226–2237.
- Grant, V. V., Stewart, S. H., & Mohr, C. D. (2009). Coping-anxiety and coping-depression motives predict different daily mood-drinking relationships. *Psychology of Addictive Behaviors, 23*(2), 226–237.
- Grant, V. V., Stewart, S. H., O'Connor, R. M., Blackwell, E., & Conrod, P. J. (2007b). Psychometric evaluation of the five-factor Modified Drinking Motives Questionnaire - Revised in undergraduates. *Addictive Behaviors, 32*(11), 2611–2632.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74*(6), 1464–1480.
- Gress-Smith, J. L., Roubinov, D. S., Andreotti, C., Compas, B. E., & Luecken, L. J. (2015). Prevalence, severity and risk factors for depressive symptoms and insomnia in college undergraduates. *Stress and Health, 31*(1), 63–70.

- Haaga, D. a, Dyck, M. J., & Ernst, D. (1991). Empirical status of cognitive theory of depression. *Psychological Bulletin*, *110*(2), 215–236.
- Hasin, D. S., Goodwin, R. D., Stinson, F. S., & Grant, B. F. (2005). Epidemiology of major depressive disorder. *Archives of General Psychiatry*, *62*(10), 1097-1106.
- Hasin, D. S., Stinson, F. S., Ogburn, E., & Grant, B. F. (2007). Prevalence, Correlates, Disability, and Comorbidity of. *Arch Gen Psychiatry*, *64*(7), 830–842.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*(1), 1–25.
- Hicks, T., & Heastie, S. (2008). High school to college transition: a profile of the stressors, physical and psychological health issues that affect the first-year on-campus college student. *Journal of Cultural Diversity*, *15*(3), 143–147.
- Himle, J. A., Abelson, J. L., Haightgou, H., Hill, E. M., Nesse, R. M., & Curtis, G. C. (1999). Effect of alcohol on social phobic anxiety. *American Journal of Psychiatry*, *156*, 1237-1243.
- Holahan, C. J., Moos, R. H., Holahan, C. K., Cronkite, R. C., & Randall, P. K. (2001). Drinking to cope, emotional distress and alcohol use and abuse: A ten-year model. *Journal of Studies on Alcohol*, *62*(2), 190–198.
- Holdstock, L., & de Wit, H. (1998). Individual differences in the biphasic effects of ethanol. *Alcoholism: Clinical and Experimental Research*, *22*(9), 1903–1911.
- Hull, J. G. (1981). A self-awareness model of the causes and effects of alcohol consumption. *Journal of Abnormal Psychology*, *90*(6), 586–600.

- Hull, J. G., & Bond, C. F. (1986). Social and Behavioral Consequences of Alcohol Consumption and Expectancy: A Meta-Analysis. *Psychological Bulletin*, 99(May 2016), 3–7.
- Hull, J. G., Levenson, R. W., Young, R. D., & Sher, K. J. (1983). Self-awareness-reducing effects of alcohol consumption. *Journal of Personality and Social Psychology*, 44(3), 461–473.
- Hull, J. G., & Young, R. D. (1983). Self-consciousness, self-esteem, and success-failure as determinants of alcohol consumption in male social drinkers. *Journal of Personality*, 44(6), 1097–1109.
- Hussong, A. M. (2007). Predictors of drinking immediacy following daily sadness: An application of survival analysis to experience sampling data. *Addictive Behaviors*, 32(5), 1054-1065.
- Hussong, A. M., Galloway, C. A., & Feagans, L. A. (2005). Coping motives as a moderator of daily mood-drinking covariation. *Journal of Studies on Alcohol*, 66(3), 344–353.
- Hussong, A. M., Hicks, R. E., Levy, S. A., & Curran, P. J. (2001). Specifying the relations between affect and heavy alcohol use among young adults. *Journal of Abnormal Psychology*, 110(3), 449–461.
- Hyde, J. S., Mezulis, A. H., & Abramson, L. Y. (2008). The ABCs of depression: Integrating affective, biological, and cognitive models to explain the emergence of the gender difference in depression. *Psychological Review*, 115(2), 291–313.

- Hysenbegasi, A., Hass, S. L., & Rowland, C. R. (2005). The impact of depression on the academic productivity of university students. *The Journal of Mental Health Policy and Economics, 8*, 145-151.
- Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research, 47*(3), 391–400.
- Ingram, R. E. (1990). Self-focused attention in clinical disorders: Review and a conceptual model. *Psychological Bulletin, 107*(2), 156–176.
- Jahng, S., Solhan, M. B., Tomko, R. L., Wood, P. K., Piasecki, T. M., & Trull, T. J. (2011). Affect and alcohol use: An ecological momentary assessment study of outpatients with borderline personality disorder. *Journal of Abnormal Psychology, 120*(3), 572–584.
- Joiner, T. E., Alfano, M. S., & Metalsky, G. I. (1993). Caught in the crossfire: Depression, self-consistency, self-enhancement, and the response of others. *Journal of Social and Clinical Psychology, 12*(2), 113–134.
- Josephs, R. A., & Steele, C. M. (1990). The two faces of alcohol myopia: attentional mediation of psychological stress. *Journal of Abnormal Psychology, 99*(2), 115–126.
- Just, N., & Alloy, L. B. (1997). The response styles theory of depression: tests and an extension of the theory. *Journal of Abnormal Psychology, 106*(2), 221–229.

- Kandel, D., Chen, K., Warner, L. A., Kessler, R. C., & Grant, B. (1997). Prevalence and demographic correlates of symptoms of last year dependence on alcohol, nicotine, marijuana and cocaine in the U.S. population. *Drug and Alcohol Dependence*, *44*(1), 11–29.
- Kandel, D. B., & Logan, J. A. (1984). Patterns of drug use from adolescence to young adulthood: I. Periods of risk for initiation, continued use, and discontinuation. *American Journal of Public Health*, *74*(7), 660–666.
- Kenney, S. R., LaBrie, J. W., Hummer, J. F., & Pham, A. T. (2012). Global sleep quality as a moderator of alcohol consumption and consequences in college students. *Addictive Behaviors*, *37*(4), 507–512.
- Keough, M. T., O'Connor, R. M., Sherry, S. B., & Stewart, S. H. (2015). Context counts: Solitary drinking explains the association between depressive symptoms and alcohol-related problems in undergraduates. *Addictive Behaviors*, *42*, 216–221.
- Kessler, R. C., Nelson, C. B., McGonagle, K. A., Liu, J., Swartz, M., & Blazer, D. G. (1996). Comorbidity of DSM-III—R major depressive disorder in the general population: Results from the US National Comorbidity Survey. *The British Journal of Psychiatry*, *30*, 17-30.
- Khantzian, E. J. (1985). The self medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry*, *142*(11), 1259–1264.
- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*, *4*(5), 231–244.

- King, A. C., Bernardy, N. C., & Hauner, K. (2003). Stressful events, personality, and mood disturbance: Gender differences in alcoholics and problem drinkers. *Addictive Behaviors, 28*(1), 171–187.
- Knight, J. R., Wechsler, H., Kuo, M., Seibring, M., Weitzman, E. R., & Schuckit, M. A. (2002). Alcohol abuse and dependence among U.S. college students. *Journal of Studies on Alcohol, 63*(3), 363-370.
- Koob, G. F., & Le Moal, M. (2005). Plasticity of reward neurocircuitry and the “dark side” of drug addiction. *Nature Neuroscience, 8*(11), 1442–1444.
- Kranzler, H. R., & Anton, R. F. (1994). Implications of recent neuropsychopharmacologic research for understanding the etiology and development of alcoholism. *Journal of Consulting and Clinical Psychology, 62*(6), 1116–1126.
- Kroenke, K., Spitzer, R. L., Williams, J. B. W., Monahan, P. P., & Lowe, B. (2007). Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine, 146*, 317-325.
- Kuiper, N. A., & MacDonald, M. R. (1982). Self and other perception in mild depressives. *Social Cognition, 1*(3), 223-239.
- Kuiper, N. A., MacDonald, M. R., & Derry, P. A. (1983). Parameters of a depressive self-schema. In J. Suls & A. G. Greenwald (Eds.), *Psychological perspectives on the self* (Vol. 2). Hillsdale, NJ: Lawrence Erlbaum.
- Kuntsche, E., Knibbe, R., Gmel, G., & Engels, R. (2005). Why do young people drink? A review of drinking motives. *Clinical Psychology Review, 25*(7), 841–861.

- Kuo, P.-H., Gardner, C. O., Kendler, K. S., & Prescott, C. A. (2006). The temporal relationship of the onsets of alcohol dependence and major depression: using a genetically informative study design. *Psychological Medicine*, *36*(8), 1153.
- Kushner, M. G., Mackenzie, T. B., Fiszdon, J., Valentiner, D. P., Foa, E., Anderson, N., & Wangenstein, D. (1996). The effects of alcohol consumption on laboratory-induced panic and state anxiety. *Arch Gen Psychiatry*, *53*, 264-270.
- Labbe, A. K., & Maisto, S. A. (2011). Alcohol expectancy challenges for college students: A narrative review. *Clinical Psychology Review*, *31*(4), 673–683.
- Lewinsohn, P. M. (1975). The behavioral study and the treatment of depression. In M. Hersen, R. Eisle, & P. Miller (Eds.), *Progress in behavior modification* (Vol. 1). New York: Academic Press.
- Lewinsohn, P. M., Biglan, A., & Zeiss, A. M. (1976). Behavioral treatment of depression. In P. O. Davidson (Ed.), *The behavioral management of anxiety, depression and pain* (pp. 91–146). New York, NY: Brunner/Mazel.
- Lewinsohn, P. M., Hoberman, H. M., & Rosenbaum, M. (1988). A prospective study of risk factors for unipolar depression. *Journal of Abnormal Psychology*, *97*(3), 251–264.
- Lewinsohn, P. M., Hoberman, H., Teri, L., & Hautzinger, M. (1985). An integrative theory of depression. In S. Reiss & R. R. Bootzin (Eds.), *Theoretical issues in behavior therapy*. New York: Academic Press.
- Linehan, M. M. (1993). *Cognitive behavioral therapy of borderline personality disorder*. New York, NY: Guilford Press.

- Litt, M. D., Cooney, N. L., Kadden, R. M., & Gaupp, L. (1990). Reactivity to alcohol cues and induced moods in alcoholics. *Addictive Behaviors, 15*(2), 137–146.
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1993). Self-perpetuating properties of dysphoric rumination. *Journal of Personality and Social Psychology, 65*(2), 339-349.
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality and Social Psychology, 69*(1), 176-190.
- MacDonald, A. B., Baker, J. M., Stewart, S. H., & Skinner, M. (2000). Effects of alcohol on the response to hyperventilation of participants high and low in anxiety sensitivity. *Alcoholism, Clinical and Experimental Research, 24*(11), 1656–65.
- Mackinnon, S. P., Sherry, S. B., & Pratt, M. W. (2013). The relationship between perfectionism, agency, and communion: A longitudinal mixed methods analysis. *Journal of Research in Personality, 47*(4), 263–271.
- MacPhillamy, D. J., & Lewinsohn, P. M. (1974). Depression as a function of levels of desired and obtained pleasure. *Journal of Abnormal Psychology, 83*(6), 651–657.
- Marlatt, G.A., & Miller, W.R. (1984). *Comprehensive Drinker Profile*. Odessa, FL: Psychological Assessment Resources.
- Martens, M. P., Neighbors, C., Lewis, M. A., Lee, C. M., Oster-Aaland, L., & Larimer, M. E. (2008). The roles of negative affect and coping motives in the relationship between alcohol use and alcohol-related problems among college students. *Journal of Studies on Alcohol and Drugs, 69*(3), 412–419.

- Martin, C. S., & Sayette, M. A. (1993). Experimental design in alcohol administration research: limitations and alternatives in the manipulation of dosage-set. *Journal of Studies on Alcohol*, 54, 750–761.
- Mayfield, D. G. (1968). Psychopharmacology of alcohol. I. Affective change with intoxication, drinking behavior and affective state. *Journal of Nervous and Mental Disease*, 146(4), 314-321.
- Mayfield, D. G., & Allen, D. (1967). Alcohol and affect: A psychopharmacological study. *American Journal of Psychiatry*, 123(11), 1346-1351.
- McPherson, G., & Thorne, S. (2006). Exploiting exceptions to enhance interpretive qualitative health research: Insights from a study of cancer communication. *International Journal of Qualitative Methods*, 5(2), 1–11.
- Merikangas, K. R., & Gelernter, C. S. (1990). Comorbidity for alcoholism and depression. *Psychiatric Clinics of North America*, 13(4), 613-632.
- Merikangas, K. R., Stevens, D., & Fenton, B. (1996). Comorbidity of Alcoholism and Anxiety Disorders. *Alcohol Health and Research World*, 20(2), 100–106.
- Meyer, T. D., McDonald, J. L., Douglas, J. L., & Scott, J. (2012). Do patients with bipolar disorder drink alcohol for different reasons when depressed, manic or euthymic? *Journal of Affective Disorders*, 136(3), 926–932.
- Mohr, C. D., Armeli, S., Tennen, H., Temple, M., Todd, M., Clark, J., & Carney, M. A. (2005). Moving beyond the keg party: A daily process study of college student drinking motivations. *Psychology of Addictive Behaviors*, 19(4), 392–403.
- Mohr, C. D., Arpin, S., & McCabe, C. T. (2015). Daily affect variability and context-specific alcohol consumption. *Drug and Alcohol Review*, 34(6), 581–587.

- Morrow, J., & Nolen-Hoeksema, S. (1990). Effects of responses to depression on the remediation of depressive affect. *Journal of Personality and Social Psychology*, 58(3), 519–527.
- Mushquash, C. J., Stewart, S. H., Comeau, M. N., & McGrath, P. J. (2008). The structure of drinking motives in first nations adolescents in Nova Scotia. *American Indian and Alaska Native Mental Health Research*, 15(1), 33–52.
- Mushquash, A. R., Stewart, S. H., Sherry, S. B., Sherry, D. L., Mushquash, C. J., & MacKinnon, A. L. (2013). Depressive symptoms are a vulnerability factor for heavy episodic drinking: A short-term, four-wave longitudinal study of undergraduate women. *Addictive Behaviors*, 38(5), 2180–2186.
- Nagoshi, C. T. (1999). Perceived control of drinking and other predictors of alcohol use and problems in a college student sample. *Addiction Research & Theory*, 7(4), 291–306.
- National Institute on Alcohol Abuse and Alcoholism (2004). NIAAA council approves definition of binge drinking. *NIAAA Newsletter*, 3, 3.
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, 100(4), 569–582.
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition & Emotion*, 7(6), 561–570.
- Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*, 102(1), 20–28.

- Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400–424.
- O'Donohue, W., & Fisher, J. E. (Eds.). (2012). *Core principles of cognitive behavior therapy*. Hoboken, NJ: John Wiley.
- Ozdas, A., Shiavi, R. G., Silverman, S. E., Silverman, M. K., & Wilkes, D. M. (2004). Investigation of vocal jitter and glottal flow spectrum as possible cues for depression and near-term suicidal risk. *IEEE Transactions on Biomedical Engineering, 51*(9), 1530–1540.
- Pariante, C. M., & Lightman, S. L. (2008). The HPA axis in major depression: classical theories and new developments. *Trends in Neurosciences, 31*(9), 464–468.
- Park, C. L., Armeli, S., & Tennen, H. (2004). The daily stress and coping process and alcohol use among college students. *Journal of Studies on Alcohol, 65*(1), 126–135.
- Patrick, M. E., & Schulenberg, J. E. (2011). How trajectories of reasons for alcohol use relate to trajectories of binge drinking: National panel data spanning late adolescence to early adulthood. *Developmental Psychology, 47*(2), 311–317.
- Pedrelli, P., Farabaugh, A. H., Zisook, S., Tucker, D., Rooney, K., Katz, J., ... Fava, M. (2011). Gender, depressive symptoms and patterns of alcohol use among college students. *Psychopathology, 44*(1), 27–33.
- Peterson, J. B., Rothfleisch, J., Zelazo, P. D., & Pihl, R. O. (1990). Acute alcohol intoxication and cognitive functioning. *Journal of Studies on Alcohol and Drugs, 51*(2), 114–122.

- Phoenix, C., & Orr, N. (2017). Analysing exceptions within qualitative data: promoting analytical diversity to advance knowledge of ageing and physical activity. *Qualitative Research in Sport, Exercise and Health*, 9(3), 271-284.
- Pliner, P., & Cappell, H. (1974). Modification of affective consequences of alcohol: A comparison of social and solitary drinking. *Journal of Abnormal Psychology*, 83(4), 418-425.
- Pyszczynski, T., & Greenberg, J. (1987). Self-regulatory perseveration and the depressive self-focusing style: a self-awareness theory of reactive depression. *Psychological Bulletin*, 102(1), 122-138.
- Raimo, E. B., & Schuckit, M. a. (1998). Alcohol dependence and mood disorders. *Addictive Behaviors*, 23(6), 933-46.
- Ramchandani, V. A., Bosron, W. F., & Li, T. K. (2001). Research advances in ethanol metabolism. *Pathologie Biologie*, 49(1), 676-82.
- Ramchandani, V. A., Kwo, P. Y., & Li, T. K. (2001). Effect of food and food composition on alcohol elimination rates in healthy men and women. *Journal of Clinical Pharmacology*, 41(12), 1345-1350.
- Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorder with alcohol and other drug abuse. *Journal of the American Medical Association*, 264(19), 2511-2518.
- Reyno, S. M., Stewart, S. H., Brown, C. G., Horvath, P., & Wiens, J. (2006). Anxiety sensitivity and situation-specific drinking in women with alcohol problems. *Brief Treatment and Crisis Intervention*, 6(3), 268.

- Roehrs, T., & Roth, T. (2001). Sleep, sleepiness, and alcohol use. *Alcohol Research & Health*, 25(2), 101-109.
- Rogers, T. B., Kuiper, N. A., & Kirker, W. S. (1977). Self-reference and the encoding of personal information. *Journal of Personality and Social Psychology*, 35(9), 677–688.
- Ross, J., Teesson, M., Lejuez, C., Mills, K., Kaye, S., Brady, K., ... Masters, S. L. (2016). The efficacy of behavioural activation treatment for co-occurring depression and substance use disorder (the activate study): a randomized controlled trial. *BMC Psychiatry*, 16(1), 221.
- Rottenberg, J., Gross, J. J., & Gotlib, I. H. (2005). Emotion context insensitivity in major depressive disorder. *Journal of Abnormal Psychology*, 114(4), 627–639.
- Rubonis, A. V, Colby, S. M., Monti, P. M., Rohsenow, D. J., Gulliver, S. B., & Sirota, A. D. (1994). Alcohol cue reactivity and mood induction in male and female alcoholics. *Journal of Studies on Alcohol*, 55(4), 487–494.
- Rush, B., Urbanoski, K., Bassani, D., Castel, S., Wild, T. C., Strike, C., ... Somers, J. (2008). Prevalence of co-occurring substance use and other mental disorders in the Canadian population. *Canadian Journal of Psychiatry*, 53(12), 800–809.
- Russell, J. a, Ph, D., & Mehrabian, A. (1975). The mediating role of emotion in alcohol use, *Journal of Studies on Alcohol*, 36(11), 1508–1536.
- Rutledge, P. C., & Sher, K. J. (2001). Heavy drinking from the freshman year into early young adulthood: The roles of stress, tension-reduction drinking motives, gender and personality. *Journal of Studies on Alcohol*, 62(4), 457–466.

- Ryback, R. S. (1971). The continuum and specificity of the effects of alcohol on memory: A review. *Quarterly Journal of Studies on Alcohol*, 32(4), 995-1016.
- Sabourin, B. C., & Stewart, S. H. (2009). Patterns of depression – substance use disorder comorbidity in women seeking addictions treatment. In J. Gallivan & S. Cooper (Eds.), *Pathways, bridges, and havens: Psychosocial determinants of women's health*. (pp. 160-177). Sydney, NS: Cape Breton University Press.
- Sacristán, J. A. (2013). Patient-centered medicine and patient-oriented research: improving health outcomes for individual patients. *BMC Medical Informatics and Decision Making*, 13(1), 6.
- Sayette, M. A., Breslin, F. C., Wilson, G. T., & Rosenblum, G. D. (1994). An evaluation of the balanced placebo design in alcohol administration research. *Addictive Behaviors*, 19(3), 333–342.
- Scher, C. D., Ingram, R. E., & Segal, Z. V. (2005). Cognitive reactivity and vulnerability: Empirical evaluation of construct activation and cognitive diatheses in unipolar depression. *Clinical Psychology Review*, 25(4), 487–510.
- Schuckit, M. A. (2006). Comorbidity between substance use disorders and psychiatric conditions. *Addiction*, 101, 76–88.
- Scott-Sheldon, L. A., J., Terry, D. L., Carey, K. B., Garey, L., & Carey, M. P. (2012). Efficacy of expectancy challenge interventions to reduce college student drinking: A meta-analytic review. *Psychology of Addictive Behavior*, 26(3), 393-405.
- Seligman, M. E. P. (1975). *Helplessness*. San Francisco: Freeman.

- Sher, K. J. (1985). Subjective effects of alcohol: The influence of setting and individual differences in alcohol expectancies. *Journal of Studies on Alcohol*, 46(2), 137–146.
- Sher, K. J. (1987). Stress response dampening. In K. E. Leonard & H. T. Blane (Eds.), *Psychological theories of drinking and alcoholism* (pp. 272–304). New York, NY: Guilford Press.
- Sher, K. J., & Grekin, E. R. (2007). Alcohol and affect regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation*. (pp. 560-580). New York, NY: Guilford Press.
- Sher, K. J., & Wood, M. D. (2005). Subjective effects of alcohol II: Individual differences. In M. Earleywine (Ed.), *Mind-altering drugs: The science of subjective experience* (pp. 135–153). New York, NY: Oxford University Press.
- Sher, K. J., Wood, M. D., Richardson, A. E., & Jackson, K. M. (2005). Subjective effects of alcohol I: Effects of the drink and drinking context. In M. Earleywine (Ed.), *Mind-altering drugs: The science of subjective experience* (pp. 86–134). New York, NY: Oxford University Press.
- Simon, G., VonKorff, M., Piccinelli, M., Fullerton, C., & Ormel, J. (1999). An international study of the relation between somatic symptoms and depression. *The New England Journal of Medicine*, 341(18), 1329–1335.
- Simons, J. S., Carey, K. B., & Gaher, R. M. (2004). Lability and impulsivity synergistically increase risk for alcohol-related problems. *The American Journal of Drug and Alcohol Abuse*, 30(3), 685–694.

- Simons, J. S., Wills, T. A., & Neal, D. J. (2014). The many faces of affect: A multilevel model of drinking frequency/quantity and alcohol dependence symptoms among young adults. *Journal of Abnormal Psychology, 123*(3), 176-694.
- Smith, T. W., & Greenberg, J. (1981). Depression and self-focused attention. *Motivation and Emotion, 5*(4), 323–331.
- Sobell, L. C., & Sobell, M. B. (1990). Self-report issues in alcohol abuse: state of the art and future directions. *Behavioral Assessment, 12*, 77-90.
- Southwick, L., Steele, C., Marlatt, A., & Lindell, M. (1981). Alcohol-related expectancies: defined by phase of intoxication and drinking experience. *Journal of Consulting and Clinical Psychology, 49*(5), 713–721.
- Spangler, D. L., Simons, a D., Monroe, S. M., & Thase, M. E. (1997). Comparison of cognitive models of depression: relationships between cognitive constructs and cognitive diathesis-stress match. *Journal of Abnormal Psychology, 106*(3), 395–403.
- Spasojević, J., & Alloy, L. B. (2001). Rumination as a common mechanism relating depressive risk factors to depression. *Emotion, 1*(1), 25–37.
- Steele, C. M., & Josephs, R. a. (1988). Drinking your troubles away. II: An attention-allocation model of alcohol's effect on psychological stress. *Journal of Abnormal Psychology, 97*(2), 196–205.
- Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist, 45*(8), 921–933.

- Steele, C. M., Southwick, L., & Pagano, R. (1986). Drinking your troubles away: The role of activity in mediating alcohol's reduction of psychological stress. *Journal of Abnormal Psychology, 95*(2), 173–180.
- Stephens, R. S., & Curtin, L. (1995). Alcohol and depression: Effects on mood and biased processing of self-relevant information. *Psychology of Addictive Behaviors, 9*(4), 211–222.
- Stewart, S. H., & Conrod, P. J. (2008). Anxiety disorder and substance use disorder comorbidity: Common themes and future directions. In S. H. Stewart & P. J. Conrod (Eds.), *Anxiety and substance use disorders: the vicious cycle of comorbidity* (pp. 239-257). New York, NY: Springer.
- Stewart, S. H., Grant, V. V., Mackie, C. J., & Conrod, P. J. (2016). Comorbidity of anxiety and depression with substance use disorders. In K. J. Sher (Ed.), *The Oxford Handbook of Substance Use Disorders, Volume 2.* (pp. 149-186). New York, NY: Oxford University Press.
- Stewart, S. H., Peterson, J. B., & Pihl, R. O. (1995). Anxiety sensitivity and self-reported alcohol consumption rates in university women. *Journal of Anxiety Disorders, 9*, 283-292.
- Stewart, M. J., Yi, S., & Stewart, S. H. (2014). Effects of gambling-related cues on the activation of implicit and explicit gambling outcome expectancies in regular gamblers. *Journal of Gambling Studies, 30*(3), 653–668.
- Stewart, S. H., Zvolensky, M. J., & Eifert, G. H. (2002). The relations of anxiety sensitivity, experiential avoidance, and alexithymic coping to young adults' motivations for drinking. *Behavior Modification, 26*(2), 274–296.

- Sutker, P. B., Tabakoff, B., Goist, K. C., & Randall, C. L. (1983). Acute Alcohol Intoxication, Mood States and Alcohol Metabolism in Women and Men. *Pharmacology, Biochemistry & Behavior*, *18*, 34–354.
- Swendsen, J. D., & Merikangas, K. R. (2000). The comorbidity of depression and substance use disorders. *Clinical Psychology Review*, *20*(2), 173–189.
- Swendsen, J. D., Tennen, H., Carney, M. A., Affleck, G., Willard, A., & Hromi, A. (2000). Mood and alcohol consumption: An experience sampling test of the self-medication hypothesis. *Journal of Abnormal Psychology*, *109*(2), 198-204.
- Swendsen, J., Conway, K. P., Degenhardt, L., Glantz, M., Jin, R., Merikangas, K. R., ... Kessler, R. C. (2011). Mental disorders as risk factors for substance use, abuse and dependence: Results from the 10-year follow-up of the National Comorbidity Survey. *Addiction*, *105*(6), 1117–1128.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston, MA: Pearson/Allyn & Bacon.
- Taylor, D. J., & Bramoweth, A. D. (2010). Patterns and Consequences of Inadequate Sleep in College Students: Substance Use and Motor Vehicle Accidents. *Journal of Adolescent Health*, *46*(6), 610–612.
- Thekiso, T. B., Murphy, P., Milnes, J., Lambe, K., Curtin, A., & Farren, C. K. (2015). Acceptance and commitment therapy in the treatment of alcohol use disorder and comorbid affective disorder: A pilot matched control trial. *Behavior Therapy*, *46*(6), 717–728.

- Todd, M., Armeli, S., Tennen, H., Carney, M. A., & Affleck, G. (2003). A daily diary validity test of drinking to cope measures. *Psychology of Addictive Behaviors, 17*(4), 303–311.
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care, 19*, 349-357.
- Tsai, J. L., Pole, N., Levenson, R. W., & Munoz, R. F. (2003). The effects of depression on the emotional responses of Spanish-speaking Latinas. *Cultural Diversity & Ethnic Minority Psychology, 9*(1), 49–63.
- Tucker, J. A., Vuchinich, R. E., & Sobell, M. B. (1982). Alcohol's effects on human emotions: A review of the stimulation/ depression hypothesis. *The International Journal of the Addictions, 17*(1), 155–180.
- Uher, R., Payne, J. L., Pavlova, B., & Perlis, R. H. (2014). Major depressive disorder in DSM-5: Implications for clinical practice and research of changes from DSM-IV. *Depression and Anxiety, 31*(6), 459–471.
- Västfjäll, D. (2002). Emotion induction through music: A review of the musical mood induction procedure. *Musicae Scientiae, 5*, 173–211.
- Volpicelli, J. R., Watson, N. T., King, A. C., Sherman, C. E., & O'Brien, C. P. (1995). Effect of naltrexone on alcohol "high" in alcoholics. *American Journal of Psychiatry, 152*, 613–615.
- Wang, J., & Patten, S. B. (2001). A prospective study of sex-specific effects of major depression on alcohol consumption. *Primary Care Companion to the Journal of Clinical Psychiatry, 3*(3), 148.

- Wang, J., & Patten, S. B. (2001). Alcohol consumption and major depression: Findings from a follow-up study. *Canadian Journal of Psychiatry, 46*(7), 632–638.
- Wang, J., & Patten, S. B. (2002). Prospective study of frequent heavy alcohol use and the risk of major depression in the Canadian general population. *Depression and Anxiety, 15*(1), 42–45.
- Watson, D., Clark, L. A., & Carey, G. (1988a). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology, 97*(3), 346–353.
- Watson, D., Clark, L. A., & Tellegen, A. (1988b). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063–1070.
- Weiss, F., & Koob, G. F. (1991). The neuropharmacology of ethanol self-administration. In R. E. Meyer, G. F. Koob, M. J. Lewis, & S. M. Paul (Eds.), *Neuropharmacology of ethanol* (pp. 125–162). Boston, MA: Birkhauser.
- Weitzman, E. R. (2004). Poor mental health, depression, and associations with alcohol consumption, harm, and abuse in a national sample of young adults in college. *The Journal of Nervous and Mental Disease, 192*(4), 269–277.
- White, A. M., Signer, M. L., Kraus, C. L., & Swartzwelder, H. S. (2004). Experiential Aspects of Alcohol- Induced Blackouts Among College Students. *The American Journal of Drug and Alcohol Abuse, 30*(1), 205–224.
- Wiers, R. W., & Stacy, A. W. (2006). Implicit cognition and addiction. *Current Directions in Psychological Science, 15*(6), 292–296.

- Willner, P., Field, M., Pitts, K., & Reeve, G. (1998). Mood, cue and gender influences on motivation, craving and liking for alcohol in recreational drinkers. *Behavioural Pharmacology*, 9, 631-642.
- Wilson, T. D. (2002). *Strangers to Ourselves: Discovering the Adaptive Unconscious*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Wilson, T. D., Laser, P. S., & Stone, J. I. (1982). Judging the predictors of one's own mood: Accuracy and the use of shared theories. *Journal of Experimental Social Psychology*, 18(6), 537-556.
- Wilson, T. D., & Dunn, E. W. (2004). Self-knowledge: its limits, value, and potential for improvement. *Annual Review of Psychology*, 55, 493-518.
- Witkiewitz, K., Marlatt, G. A., & Walker, D. (2005). Mindfulness-based relapse prevention for alcohol and substance use disorders. *Journal of Cognitive Psychotherapy*, 19(3), 211-228.
- Yankofsky, L., Wilson, G. T., Adler, J. L., Hay, W. M., & Vrana, S. (1986). The effect of alcohol on self-evaluation and perception of negative interpersonal feedback. *Journal of Studies on Alcohol*, 47(1), 26-33.

Appendix A

Lifestyles Questionnaire

Please read each of the following questions and choose the statement that best describes you. Please choose only one answer per question.

1. How often did you consume alcohol in the past 30 days?

- A Once
- B 2 or 3 times
- C 4 or 5 times
- D 6 or more times
- E Not Applicable (Only if you did NOT drink alcohol in the past 30 days)

2. On average, in the past 30 days, how many drinks containing alcohol did you consume on a typical day when you were drinking?

- A Once
- B 2 or 3
- C 4 or 5
- D 6 to 9
- E 10 or more
- F Not Applicable (Only if you did NOT drink alcohol in the past 30 days)



3. How many days did you smoke cigarettes in the past 30 days?

- A One or 2 days
- B 3 to 7 days
- C 8 to 14 days
- D 15 to 30 days
- E Not Applicable (Only if you did NOT smoke cigarettes in the past 30 days)

4. On average, in the past 30 days, how many cigarettes did you smoke on a typical day when you were smoking?

- A Less than 1 (e.g. a couple of 'drags')
- B 1-5
- C 6-10
- D Half of a pack
- E 1 pack or more
- F Not Applicable (Only if you did NOT smoke cigarettes in the past 30 days)

5. How often did you use marijuana/hashish in the past 30 days?

- A Once

- B 2 or 3 times
- C 4 or 5 times
- D 6 or more times
- E Not Applicable (Only if you did NOT use marijuana/hashish in the past 30 days)

6. How often did you exercise in the past 30 days (going to the gym, playing sports, walking the dog, walking to work, power-walking, yoga, gardening, house cleaning, etc.)

- A Not at all
- B Once
- C 2 or 3 times
- D 4 or 5 times
- E More than 6 times
- F Not Applicable (Only if you did NOT exercise in the past 30 days)

7. On average, in the past 30 days, how much time did you spend on a typical day when you were exercising?

- A 15mins to 30mins
- B 30mins to 1hr
- C 1hr to 2hrs
- D 2hrs to 3hrs
- E More than 3hrs
- F Not Applicable (Only if you did NOT exercise in the past 30 days)

8. How often did you gamble (e.g., VLT's, slots, cards for money, bingo, etc.), excluding lottery tickets, in the past 30 days?

- A Once
- B Twice
- C 3 or 5 times
- D More than 6 times
- E Not Applicable (Only if you did NOT gamble in the past 30 days)

9. On average, in the past 30 days, how much money did you gamble on a typical day when you were gambling?

- A \$1 - \$10
- B \$11 - \$50
- C \$51 - \$100
- D \$101 - \$200
- E More than \$200
- F Not Applicable (Only if you did NOT gamble in the past 30 days)

10. How often did you use the internet in the past 30 days?

- A Once
- B 2 or 3 times
- C 4 or 5 times
- D 6 or more times
- E Not Applicable (Only if you did NOT use the internet in the past 30 days)

11. On average, in the past 30 days, how much time did you spend on the internet on a typical day?

- A 15mins to 30mins
- B 31mins to 1hr
- C 61mins to 2hrs
- D 121mins to 3hrs
- E More than 3hrs
- F Not Applicable (Only if you did NOT use the internet in the past 30 days)

12. What is your favorite style of music?

- A Classical/Jazz
- B Country & Western/Folk
- C Rock /Alternative
- D Rap & Hip Hop/Trip Hop
- E Soul/R & B/Reggae

13. How often do you concentrate on listening to music? (i.e. not simply using it as background)

- A Less than once a month
- B Once a month
- C Once a week
- D Once a day
- E Several times a day

14. What function does music play in your life?

- A Relaxes me
- B Gives me energy
- C Helps me to forget about everyday problems
- D Pure entertainment
- E Helps me to study or work more efficiently
- F None of the above

Appendix B

Demographic Questionnaire

Age: _____ (years)

Gender: M / F

To what ethnic group do you consider yourself to belong?

1. White - Caucasian
2. Black - Canadian African
3. Aboriginal
4. Canadian Asian
5. Hispanic
6. Other

What year of your university program are you in?: 1st 2nd 3rd 4th

What is the annual salary of your family of origin?:

1. up to \$10 000
2. \$11 000 to \$20 000
3. \$21 000 to \$30 000
4. \$31 000 to \$40 000
5. \$41 000 to \$50 000
6. \$51 000 to \$60 000
7. \$61 000 to \$70 000
8. more than \$70 000

Alcohol

How often do you normally drink alcohol? (Please type a number beside **one** of the following):

- _____ times per week (maximum = 7)
_____ times per month (if less than once per week)
_____ times per year (if less than once per month)

How much do you typically drink when you drink? (**Note**: one alcoholic beverage = one bottle of beer, one cooler, one small [4-ounce] glass of wine, or one shot / mixed drink containing an ounce of hard liquor)

_____ beverages per occasion

Have you consumed any alcoholic beverages TODAY? (Yes/No) _____

If yes, how long ago was your last drink?
_____ minutes since last drink

Caffeine

How many beverages containing caffeine (e.g., coffee, tea, hot chocolate, or cola) do you normally consume per occasion?

- _____ beverages per day
- _____ beverages per week (if less than once per day)
- _____ beverages per month (if less than once per week)

Have you consumed any beverages containing caffeine TODAY? _____

If yes, how long ago was your last beverage?
_____ minutes since last beverage containing caffeine

Cigarettes

How many cigarettes do you normally smoke per occasion?

- _____ cigarettes per day
- _____ cigarettes per week (if less than once per day)
- _____ cigarettes per month (if less than once per week)

Have you smoked cigarettes TODAY? _____

If yes, how long ago was your last cigarette?
_____ minutes since last cigarette

Exercise

On how many occasions do you normally exercise?

- _____ times per week
- _____ times per month (if less than once per week)
- _____ times per year (if less than once per month)

How much exercise do you normally obtain per occasion?
_____ minutes per occasion

How much have you exercised TODAY? _____ minutes

If you have exercised today how long ago did you finish your exercise?
_____ minutes since last exercise session

Relationship Status

Please indicate which of the following options best corresponds to your sexual relationship status:

_____ Currently not having an ongoing sexual relationship with anyone

_____ Currently engaged in an 'open' sexual relationship with someone (i.e., sex outside the relationship is common)

_____ Currently engaged in a monogamous sexual relationship (i.e., sex outside the relationship is not condoned)

Appendix C

Semi-structured interview

[note: the entire interview, including this explanation will be read orally by interviewers]

This is an interview about your drinking habits, the settings in which you drink, your triggers for drinking alcohol, and your reasons for drinking. We are interested in hearing about your typical or general drinking habits, but also about some specific recent drinking sessions to clarify your moods and reasons for using alcohol. We are particularly interested in hearing about how you think alcohol affects you when you are feeling sad, down, blue, low, or depressed. The interview should not be seen as a "therapy session." This interview is for research purposes only, and its sole purpose is the collection of data concerning people's drinking habits. At the end of the interview we can give you resources on mental health services that you can access at your own discretion. Your responses are fully confidential: However, please keep in mind that we may have to share your information with the proper authorities if you talk about abuse or neglect of a child, an adult in need of protection, plans to commit suicide or planning to harm another person. This interview will be recorded. At the end of the interview you will have the chance to decide whether you want your audio recordings to be used for our research purposes or to be deleted.

I will first ask you about your typical drinking habits. From there, I will ask you to describe in detail some recent drinking sessions where you used alcohol when you were feeling sad, down, low, blue, or depressed. For each of these, describe in detail what happened before you started drinking, what happened while you were drinking, and what happened after, including what you were thinking, feeling, and doing at that time. Please feel free to share as much or as little as you are comfortable with, and to ask me any questions you have as we go along.

Before we begin, do you have any questions?

Note: at this point, the interviewer will start audio recording the interview and inform the participant of this.

To start, I'd like to get an idea of your typical drinking habits.

1. Can you describe your alcohol use, in general?
2. What influences your drinking?
3. When you experience conflict with your loved ones, what do you do?
4. When you experience stress, what do you do?
5. When you experience sad, down, blue, low, or depressed mood, what do you do?

Now I'd like to ask you about some of the reasons for your drinking.

1. What are the main reasons why you drink? In other words, when you are actually drinking, what for you is the most positive or desirable effect of alcohol? What do you like best about alcohol?
2. Are you aware of any inner thoughts or emotional feelings, or things within you as a person, which trigger off your need or desire to take a drink at a particular moment in time?
3. Are you aware of any particular situations or set of events, things which happen to you in the outside world, which would result in your feeling like having one or more drinks?
4. In terms of your life as a whole, what do you see as the most negative effects or consequences of your drinking?
5. Can you describe a situation or set of events which would be least likely to result in your feeling like drinking? In other words, when do you feel least inclined to drink?
6. Suppose that we were to agree that you would not drink at all for the next two weeks. What problems do you think you might have if you did this? Would there be any special feelings or situations that might be more difficult for you to handle?

For the last few questions, I would like to go over some of the topics covered in the drinking motives questionnaire that you filled out earlier today, and previously during screening. Specifically, I will ask you to elaborate on the some of the items that you identified as applicable to you. ***Note: interviewer will prompt for thoughts, feelings, and behaviours before, during, and after the event.***

1. You said on the questionnaire that you drink to forget your worries. In what way does alcohol help you forget your worries? Can you tell me about the last time you drank to forget your worries? (what happened before, during, after)
2. You said on the questionnaire that you drink to cheer yourself up when you are in a bad mood. In what way does alcohol help cheer you up when you're in a bad mood? Can you tell me about the last time you drank to cheer yourself up when you were in a bad mood? (what happened before, during, after)
3. You said on the questionnaire that you drink to numb your pain. In what way does alcohol help numb your pain? Can you tell me about the last time you drank to numb your pain? (what happened before, during, after)
4. You said on the questionnaire that you drink because it helps you when they are feeling depressed. In what way does alcohol help you when you're feeling depressed? Can you tell me about the last time you drank to help when you were feeling depressed? (what happened before, during, after)
5. You said on the questionnaire that you drink because it stops you from dwelling on things. In what way does alcohol stop you from dwelling on things? Can you

tell me about the last time you drank to stop yourself from dwelling on things?
(what happened before, during, after)

6. You said on the questionnaire that you drink to turn off negative thoughts about yourself. Is that true for you? In what way does drinking turn off negative thoughts about yourself? Can you tell me about the last time you drank to turn off negative thoughts about yourself? (what happened before, during, after)
7. You said on the questionnaire that you drink to help you feel more positive about things in your life. In what way does drinking help you feel more positive about things in your life? Can you tell me about the last time you drank to help you feel more positive about things in your life? (what happened before, during, after)
8. You said on the questionnaire that you drink to stop yourself from feeling so hopeless about the future. In what way does drinking stop you from feeling so hopeless about the future? Can you tell me about the last time you drank to stop you from feeling so hopeless about the future? (what happened before, during, after)
9. You said on the questionnaire that you drink to forget painful memories. In what way does alcohol help you forget painful memories? Can you tell me about the last time you drank to forget painful memories? (what happened before, during, after)

Appendix D

Consent Form for Study 1



Dalhousie University
Department of Psychology
1355 Oxford St.
Halifax, Nova Scotia, B3H 4J1

Consent form

Title of the Research Study: A Qualitative Study of Drinking to Cope With Depression

Principal Investigator: Marie-Eve Couture, Ph.D. student, Dalhousie University
Phone: (902) 489-1131 Email: marie-eve.couture@dal.ca

Supervisor: Sherry H. Stewart, Ph.D., Dalhousie University Phone: (902) 494-3793
Email: sstewart@dal.ca

Introduction

We invite you to take part in a research study being conducted by Marie-Eve Couture, a Ph.D. student at Dalhousie University, supervised by Dr. Sherry Stewart, who is a professor at Dalhousie University. Your participation in this study is voluntary and you may withdraw from this study at any time without negative consequences. This study is described below. You should discuss any questions you have about this study with the research assistant.

Purpose of this study

The main purpose of this study is to examine how university students who drink to cope with depression more than their peers describe their alcohol use, their triggers for drinking, the settings they drink in, and the reasons why they drink. We are also interested in how these students describe their mood, their drinking habits, and how they respond to distressing situations.

Study design

This study will take place over the course of one session. It should take approximately 90 minutes to complete. You will be asked to complete paper-and-pencil questionnaires (15 to 20 minutes) and a semi-structured interview (30 minutes to 1 hour). You will be asked about demographics information, your moods, your drinking habits, how you respond to distressing situations, and your reasons for drinking. Twenty university students will participate in this study.

Who can participate in this study?

You must (a) be currently attending some form of post-secondary education (e.g. university, college), (b) have consumed alcohol in the last month, and (c) have scored higher than your peers on a measure of drinking to cope with depression (as identified by the principal investigator). You have already been screened to meet these criteria; we have no other criteria that would exclude you from the study.

Who will be conducting the research?

Marie-Eve Couture, the Principal Investigator, and trained research assistants will be involved in this research and will have access to the data under the supervision of Dr. Sherry Stewart. All research assistants will be trained and supervised by Marie-Eve Couture and Dr. Sherry Stewart.

What you will be asked to do

You will be asked to complete a series of questionnaires about your mood, feelings, and drinking habits. This will take approximately 20 minutes to complete and will be conducted in the lab of Dr. Sherry Stewart on Dalhousie University campus. Following these questionnaires, you will be asked to describe your drinking habits, the settings in which you drink, your triggers for drinking, and your reasons for drinking in a face-to-face interview. This interview will be conducted in a private room with a research assistant. This interview will be audio-recorded. There is no secret audio recording in this study. The research assistant will tell you when he/she is turning the audio recorder on and off. You will be provided with a second consent form at the end of the interview where you can indicate my preferences regarding how that audio-recorded data can be used by the research team (including having the recording deleted, if that is your preference). This interview will take approximately 60 minutes; thus, the total session will take about 90 minutes altogether.

Possible risks and discomforts

There is a possibility that answering some of the questions in this study may distress you. If you start to feel uncomfortable or distressed as a result of any question asked, you may skip that question without penalty. If you are distressed during or after your participation in this study, please feel free to contact Dr. Stewart, by phone at (902) 494-3793 or by email at [sstewart@dal.ca](mailto:ssewart@dal.ca). She will speak with you and help to connect you with appropriate services to help deal with your distress.

Possible benefits

There are no direct benefits anticipated as a result of participating in this study. However, you will have an opportunity to learn about the results of this study at the completion of the project. If you are interested in learning more about the results of this study, please contact Marie-Eve Couture, Principal Investigator, by phone at (902) 489-1131, or by email at marie-eve.couture@dal.ca. She will arrange for you to receive a written summary of the results of the study via email. No individual results will be provided in this summary. All results will be presented in aggregate form only. This summary will describe the results of the study and potential implications of the findings in a non-technical format. This study will also provide indirect benefits by increasing our knowledge of the reasons why people drink to cope with depression.

Compensation/reimbursement

You will be offered \$10 per hour for your participation in this study. If you do not complete all phases of the study, or choose to withdraw from the study, you will be compensated for any phase you did participate in. For example, if you choose to withdraw after participating for one hour, you will receive \$10.

Confidentiality and anonymity

Anonymity: Your individual data will not be identified in any reports or publications. All data will be presented in aggregated form only. In addition, because we are conducting face-to-face interviews during some portions of the study, complete anonymity is not possible. Several steps have also been taken to protect your confidentiality (see below).

Confidentiality: All information obtained is strictly confidential. There are several steps we have taken to ensure your confidentiality. First, you will be provided with an ID number at the beginning of your participation. All data files from this study will contain only this ID number. Thus, your personal contact information (i.e., name or contact information) will not be part of study data files. The list linking ID numbers to your contact information will be kept in a locked lab. Laboratory computers are also password protected, thereby restricting access to study data files. The only individuals who will have access to your data are trained research assistants, the Principal Investigator and her supervisor, Dr. Sherry Stewart.

Should you consent to participate in this interview, you will be provided with an audio records release form at the end of the interview which will give you the opportunity to have your recorded interview deleted before you leave. We may also want to use anonymous quotations from your recorded interview in future research publications (transcribed into text only with identifiers such as names removed; the raw audio will never be listened to by anyone outside of the research team). You will be provided with a second consent form for the use of quotations at the end of this interview. You may still participate and receive full compensation if you decide you do not agree to be quoted anonymously.

Several precautions are also taken to protect the confidentiality of the audio-recorded interview data we collect from you. Research assistants will transcribe audio-recorded data into an electronic text document. These audio files will be marked with ID numbers and not your name, and will in no way be linked to you in terms of identification. The transcriptionists will remove any identifying information in typed transcripts (e.g., names and places) and will sign a strict confidentiality agreement. No data analysis will be conducted using the audio-recorded data until a transcriptionist types it out and removes all identifying information. The audio files and electronic data files will be stored on a computer in a locked office

Consistent with the Dalhousie University Policy on Research Integrity data, paper copies of data and the raw audio files will be securely maintained for 5 years after the publication of the data. Electronic versions of the data will be retained for an indefinite period of time and will be kept in a password protected computer in the locked laboratory

of the principal investigator. Electronic version of the data will not include your name or contact information but will contain the following information about you: age, gender, ethnicity, year of study, total annual family income, and specific information concerning your relationship status.

There will be a second consent form provided at the end of each interview where you can indicate your preferences regarding the use of your audio recordings by the research team. On this form, you can indicate whether or not researchers will be able to use anonymous quotations from your interview in scholarly publications or conference presentations. You can also ask the research assistant to delete the audio-recording of your interview without penalty. You can also decline to be audio-recorded without penalty.

There is an exception to keeping your identifying data confidential. During the interview portion, we may have a duty to disclose information to the proper authorities if you talk about abuse or neglect of a child, an adult in need of protection, plans to commit suicide or planning to harm another person. Specifically, we might share your information if we believe that children or adults are at risk or you plan to hurt yourself or someone else. If we believe this may be the case, we will ask you to speak with Dr. Sherry Stewart, who has a Ph.D. in Clinical Psychology. As part of this assessment, Dr. Sherry Stewart will also inquire about whether any children or adults are at risk. We have a legal responsibility to report any children or adults in need of protection, who may be at risk, to the proper authorities. If Dr. Sherry Stewart believes you are at significant risk, she may share your information with a health professional. If Dr. Sherry Stewart believes children or adults are at significant risk, she may share your information with the proper authorities. We will notify others to try to keep people safe.

Questions

If you have any questions about this study or your participation, or if you would like a copy of the results when the study is completed, you may contact the Principal Investigator, Marie-Eve Couture by phone at 902-489-1131 or by email at marie-eve.couture@dal.ca. A copy of this form will be given to you for your records.

Problems or concerns

If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, you may contact Catherine Connors, Director of Dalhousie University's Office of Human Research Ethics Administration, for assistance at (902) 494-1462 or at Catherine.connors@dal.ca.

Consent form

Title of the Research Study: A Qualitative Study of Drinking to Cope With Depression

Signature page

I have read the explanation of this study. I have been given an opportunity to discuss this study and my questions have been answered to my satisfaction. However, I realize that my participation is voluntary and I am free to withdraw from this study at any time.

___ I consent to take part in this study (*required*).

Name (Please Print)

Signature

Date

Person obtaining consent:

Name (Please Print)

Signature

Date

Appendix E

Codebook for Study 1

We are coding for people's descriptions of the effects of alcohol that might be related to drinking to cope with depression. Please do not code effects of alcohol that are other, unrelated effects (e.g., getting in fights with people, increased tolerance to alcohol, hangover). Please keep track of these in a separate category.

Mood improvement. In coding for this category, the individual must mention their **mood improving after drinking**. These improvements can take many forms: an individual might report an increase in positive mood (e.g. feeling excited, feeling good), a decrease of negative mood (e.g., less depressed, less stressed, less upset), and/or a numbing of negative mood.

- Individuals might be fairly vague about their mood (e.g., I felt good/I felt bad). That is ok and is included here.
- Exclusions: do not include positive descriptions of mood **before** drinking. Also, do not code comments about the mood relief being temporary and the negative mood returning later (see code below).

Mood worsening. In coding for this category, the individual must mention their **mood worsening after drinking**. This worsening includes increases in any unpleasant feeling (e.g., feeling bad, feeling stressed or anxious, etc). Examples of the code are that an individual might report feeling more depressed after drinking than when they started, or that they started in a positive mood and ended in a negative mood.

- Individuals might be fairly vague about their mood, as noted above. That is ok and included here.
- Exclusions: do not include negative descriptions of mood **before** drinking. Do not include descriptions of the unpredictable effects of alcohol on mood (see code below). Also, do not code comments about the mood relief being temporary and the negative mood returning later (see code below).

Unpredictability. In coding for this category, the individual must make some mention that they are not able to predict what their mood will be while drinking. They might say their mood changes quickly while drinking. They might say their moods intensify in an unpredictable way while drinking. They might say their mood can go either way (improved or worsened) after drinking. They might also say their mood bounces back to positive from negative quickly after a setback while drinking.

- Exclusions: do not include descriptions of mood unpredictability noted **before** drinking.

Temporary. In coding for this category, the individual must mention that the relief they experienced, or mood improvement they experienced after drinking was temporary. They might say their depressed (or other vague, negative) mood returned the next day, or that they feel the same the next day as they did before drinking. They might also report

feeling worse the next day than they did before they drank. They might mention the return of other depression-related issues here (e.g., thoughts); that is included here. The code will generally show up when people describe effects they experience the day after drinking.

- Exclusions: do not include negative descriptions of mood either before drinking, or that occur in the drinking occasion (code these using the code above). Do not count mention of a hangover or of other negative consequences here; instead, this is strictly about whether the effects of alcohol on their coping with depression were maintained the next day.

Maintenance. In coding for this category, the individual must report that the relief they experienced, or the mood improvement they experienced after drinking was maintained the next day. They might say they continued to feel good (or any other term denoting a pleasant effect, including numbness from unpleasant experiences) the next day. They might mention the maintenance of other depression-relieving issues here (e.g., ongoing forgetting of negative experiences); that is included here. The code will generally show up when people describe effects they experience the day after drinking.

- Exclusions: do not include positive descriptions of mood either before drinking, or that occur in the drinking occasion (code these using the code above).

Working memory. In coding for this category, the individual must report that the alcohol reduces their working memory capacity for negative thoughts/events (however, note that individuals will probably not refer to their working memory or any other cognitive psychology term). They might talk about how they don't dwell on thoughts while drinking because they can't hold a thought long enough in memory. They might talk of their minds clearing up while drinking. They might say they are easily distracted while drinking which further limits their focus on negative thoughts. They might talk about reduced rumination, reduced negative focus on the self, and more focus on the present moment, all because of or tied to some disruption in their ability to attend to/hold on to negative thoughts. Negative thoughts might include thoughts of the past, the future, unpleasant experiences.

- Exclusions: do not include poor general memory/blackouts because of drinking (code these using the code below). This code instead is capturing in-the-moment memory.

Task-oriented. In coding for this category, the individual must report some improvement in an aspect of their cognitive functioning after drinking. They might report improved concentration or focus after drinking. They might say they are better at problem-solving after drinking (perhaps due to finding they are focused less on unpleasant aspects of themselves, or for other reasons). They might say they are more productive, organized, or creative after drinking.

- While both this code and the working memory code might refer to the effects of drinking on their thoughts, with this code people will talk about interacting with a task in some way (e.g., solving an interpersonal problem, doing homework,

writing). The working memory code looks at capacity for thoughts in general while they are doing other things (e.g., interacting with others).

Memory. In coding for this category, the individual must report some lapses in memory, up to and including blackout (intentional or not), after drinking. This disruption in memory will have a side effect of inhibit their recall of negative events and thoughts; some participants will be explicit about this and pick up on that connection, while others might simply talk about not being able to remember things.

- This is different from the working memory code, in that the impacts of alcohol here are more widespread and not just looking at what they are able to attend to/focus on/hold in working memory while drinking.

Optimism. In coding for this category, the individual must report some sort of improvement in their thoughts or thinking patterns after drinking. They might say they are more optimistic in general while drinking. They might say they become more flexible in their thinking while drinking. They might say they are more likely to believe positive things about themselves, or to be more likely to think of alternative (positive) thoughts while drinking. They might report a boost in their sense of humour while drinking.

- Exclusions: mentions of acceptance of negative experiences are coded below. This code has a more positive connotation.

Indifference. In coding for this category, the individual must report that drinking leads them to look at their past, future events, and other unpleasant things in an indifferent way. They are likely to say they don't care about things (either in general, or the specific thing they were talking about). They might call themselves apathetic.

- Exclusions: this is not the same as acceptance (coded below) or optimism (above), which are both processes that require caring about what is going on to be occurring.

Acceptance. In coding for this category, the individual must report that drinking helps them accept their problems, or their depression, or whatever is going on at the time in a non-judgmental way. They might say that they recognize that some aspects of their lives can't be changed. They might use the word acceptance.

- Exclusions: this is different from the indifference code because individuals still clearly care about what is going on. It is also different from optimism because acceptance doesn't involve a change in seeing things from negative to positive.

Socializing. In coding for this category, the individual must report that drinking leads to benefits in their social life. They might talk about improvements in various aspects of themselves that helps them be more socially successful (e.g., increased confidence, more outgoing, more honest, more assertive). They might also simply say they go out with others more when they drink, or that drinking gives them a reason to socialize with others.

Support. In coding for this category, the individual must report that drinking increases the likelihood that they will get or seek out support from others. They might say they open up to their friends about their problems when they drink which leads to receiving support from them. They might talk about releasing bottled up emotions, again in the presence of friends. They might not make the connection that they get more support when they open up more; simply noting that they have expressed themselves to friends in some way is enough for this to be coded.

Sleep. In coding for this category, the individual must report that their sleep is improved in some way after drinking. They might say that drinking helps them get to sleep faster, feel more tired, sleep for longer or that they wake up feeling more refreshed. They might mention this in general when going through their drinking experiences, or they might say that sometimes they drink for the purpose of getting to sleep. Both are coded here.

Appendix F

Consent Form for Study 2



CONSENT FORM

Title: A study of the effect of alcohol on word processing
Principal Student Investigator: Marie-Eve Couture, Graduate Student,
Department of Psychology, Dalhousie University
Email: marie-eve.couture@dal.ca

Introduction: We invite you to take part in a research study that is being conducted by Marie-Eve Couture, a graduate student at Dalhousie University. Your participation in this study is voluntary and you may withdraw from the study at any time. Your academic standing will not be affected by your decision not to participate. The study is described below.

Purpose of Study: The primary purpose of this study is to examine the effect of alcohol on word processing, as measured by a computer-based task.

Study Design: The study will take place in Dr. Sherry Stewart's lab. It involves the completion of questionnaires, consumption of alcohol, and completion of a computer-based word processing task.

Who can Participate in the Study: A total of 66 participants will take part in this study. You may participate in this study if you are a university student, if you are 19 years old or over, if you are not pregnant/do not intend on becoming pregnant, if English is your first language, if you do not have medical conditions and/or are not taking medications that would make alcohol consumption harmful for you, and if you have consumed alcohol at least once in the past month.

Who Will be Conducting the Research: The study will be run by Marie-Eve Couture (Principal Investigator) under the supervision of Dr. Sherry Stewart, Department of Psychology, Dalhousie University.

What You Will be Asked to Do: During your session, you will be asked to complete a number of questionnaires that will inquire about some of your background information (e.g., age, ethnicity, etc.), current lifestyle practices and behaviours, and your mood. If you are female, you will be encouraged to complete a urine pregnancy test, as alcohol is harmful to developing fetuses. Your privacy will be maintained if you choose to take a pregnancy test: you will complete the test in private, only you and the experimenter will know the results of the test, and the used test will be disposed of discreetly. You will receive beverages to consume; depending on the experimental condition you are assigned to, you may or may not receive alcohol. Your blood alcohol level will be measured using a breathalyzer. You will then be asked to complete a computer-based word processing task, as well as a few short

questionnaires. You will be debriefed and released once your alcohol level drops below legal driving limits. The study will take approximately 2 to 4 hours to complete, depending on your rate of absorption and metabolism of alcohol.

Possible Risks and Discomforts: We consider the risks associated with participation in this study to be minimal. It is possible that you will experience some emotional or psychological discomfort reflecting on or reporting information about personal topics (such as feelings), behaviours such as caffeine consumption, or activities that are illegal, such as underage drinking. You may also experience some distress if you screen positive for pregnancy. If you feel that any of this would be upsetting, you are completely free not to participate or to discontinue participation at any time. Please feel free to contact Dalhousie Psychological Services (494-2081) or Dr. Stewart (494-3793) if you experience distress while completing the study questions or procedures.

You may be asked to consume an amount of alcohol-containing beverages that may reach content of approximately 3 cans of beer in 18-24 minutes. As a result you may experience physical sensations associated with alcohol intoxication (e.g., dizziness, lightheadedness, nausea, vomiting). You will be required to remain in the laboratory following testing for two hours so that your blood alcohol level reaches 0.04%. If, for any reason, you should withdraw your participation in the testing portion of the study after having consumed any beverages containing alcohol, for legal and safety reasons you will still be required to remain in the laboratory until your blood alcohol level reaches 0.04%. Since you will be consuming alcohol-containing beverages during the study, which can have an adverse impact on your judgment and on the speed of your motor responses, you agree not to drive, or operate machinery, for at least 2 hours after leaving the laboratory, following study completion.

Ingesting alcohol while you are pregnant can cause harm to the developing fetus. We are taking precautions to prevent this from occurring by encouraging all female participants of childbearing age to complete a pregnancy test. The information provided with the test states that the test results are > 99.9% accurate. Some research has shown that these tests are not always as accurate as reported, and that they sometimes yield false positive and negative results. Because of this you should confirm the test results with your doctor. A false negative result would mean that ingestion of alcohol during the study could be harmful to the developing fetus.

Possible Benefits: You will have the opportunity to receive indirect educational benefits by participating in this study. For example, participation in this experiment will familiarize you with the type of research and the type of procedures that clinical psychologists (and psychology students) use in their investigations.

Compensation: You will receive 1 credit point an hour (1 bonus mark / hour) towards your grade in your psychology class (the class that awards credit points for research participation) or \$10 per hour (your choice). In total, we anticipate that the

study will take 2 to 4 hours to complete, depending on the experimental condition you are assigned to. Therefore, you will receive 2 to 4 credit points or \$20 to \$40 for your participation.

Confidentiality: Your participation in this study is completely confidential. You will be assigned a unique username, which will be a code consisting of letters and numbers that does not contain any identifying information about you. All data will be identified with this code only (i.e., there will be no personally identifying information on the data). A list linking participant names with their unique usernames will be stored separately from the data, in a locked file cabinet in Dr. Stewart's locked laboratory room. No one's answers will be examined individually. We will only analyze answers after grouping them all together. In keeping with the policy at Dalhousie University, we will keep all data in password protected data file on a secure computer for five years after we have published a report of our findings. Furthermore, after you have been debriefed, we will destroy the linking file (i.e., the file that links participant names to their unique usernames, which is stored separately from study data) AND all of your contact information (i.e., telephone number and e-mail address). We will keep a list of the participant names in case of a study audit, but it will not be possible to link the names to the study data.

Anonymity: It is not possible to remain anonymous in this study since the researchers will need to contact you via e-mail or phone to arrange an introductory and debriefing session.

Results: If you are interested in learning about the study results, then a summary of the study findings will be e-mailed to you once all of the data has been collected and analyzed.

Questions: If you have any questions about this study now or after you participate, please feel free to contact Marie-Eve Couture (Principal Student Investigator) by e-mail at marie-eve.couture@dal.ca.

Problems or Concerns: In the event that you have difficulties with, or wish to voice concern about, any aspect of your participation in this study, you may contact Catherine Connors, Director of Dalhousie University's Office of Human Research Ethics Administration, for assistance (902) 494-1462, Catherine.Connors@dal.ca.

Signature Page - A study of the effect of alcohol on word processing

Psychology Department Subject Pool Policy

If you anticipate receiving educational credit points for assisting in this research, you may choose to do so as either a research subject or as an observer.

If you choose to be a research **Subject**, the researcher will **keep your data** and use it in the research project.

If you choose to be an **Observer**, the researcher will **destroy any data** that you may have provided, after you complete the study.

Please check one box below to indicate whether you choose to be a research participant or an observer.

Research Subject
(Use my data)

Observer
(Destroy my data)

By signing below, I am agreeing that *“I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I hereby consent to take part in this study. However, I realize that my participation is voluntary and that I am free to withdraw from the study at any time”*

Participant’s Signature: _____ Date: _____

Principal Investigator’s Signature: _____ Date: _____

Participation in follow-up studies: The principal investigator (Marie-Eve Couture) may wish to contact you in the future to invite you to participate in a follow-up study. If you would like to be contacted to be invited to participate in a follow-up study, please leave your signature and contact information below.

Name: _____

E-mail address: _____

Phone number: _____

Please specify whether you consent to the experimenter leaving a message:

Yes
Signature: _____

No
Date: _____