

Examining Shame in the Depressive-Risk Pathway to Alcohol Misuse in Emerging Adults:  
Evidence from Experimental and Ecological Studies

by

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## Abstract

Emerging adulthood (ages 18 to 25) is associated with self-discovery and coincides with rates of alcohol misuse and depression that are the highest across the lifespan. The self-medication hypothesis is the prevailing model that helps explain depression-alcohol misuse comorbidities by arguing that individuals crave and drink alcohol to cope with strong negative emotions. However, less is known about the etiological mechanisms and proximal emotions that explain this common comorbidity in emerging adulthood. Burgeoning research demonstrates that depression is associated with alcohol misuse via shame, a potent social emotion. However, this work is limited as much of it has been cross-sectional and has used retrospective self-report methods. Thus, there is a need for in-the-moment and experimental research to better understand the associations between shame and alcohol misuse among emerging adults with depression. The overarching goal of this dissertation was to further understand the role of shame in depression-motivated drinking among Canadian emerging adults by using prospective ecological momentary assessment (Study 1) and experimental methods (Study 2). Results of Study 1 ( $N = 184$ ) found that shame, but not guilt, mediated the association between baseline depression and alcohol problems in “real life” drinking situations. Study 2 ( $N = 80$ ) sought to examine associations between drinking context and shame among emerging adults with depression in a lab setting. The findings add to the story by demonstrating that shame mediated the association between depression and alcohol craving only in a solitary (versus social) context. Using sophisticated research designs and data analytic approaches, this dissertation identified that (a) shame helps explain depressed emerging adults’ propensity for alcohol misuse and (b) solitary contexts exacerbate shame’s influence. Overall, this work clarified the mediating role of shame and the additive influence of solitary context in the depressive-pathway to alcohol misuse among emerging adults. Results shed light on malleable treatment targets for emerging adults that experience mood and alcohol problems.

*Keywords:* depression, alcohol misuse, shame, emerging adult, experimental, ecological momentary assessment

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## **CONTRIBUTIONS OF AUTHORS**

### **Study 1**

In collaboration with my co-supervisors Drs. Matthew Keough and Edward Johnson, I designed the research question, obtained ethics approval at both the University of Manitoba and York University, created the study protocol, trained research staff on the session protocol, conducted data cleaning and statistical analyses, and wrote and submitted the manuscript for publication. Lab personnel completed data collection. I secured funding from the Vanier Canada Graduate Scholarship – Social Sciences and Humanities Research Council and Dr. Keough independently secured funding from the University of Manitoba. Dr. Keough, Dr. Johnson, and Dr. Wardell (co-author) provided extensive feedback on the manuscript. The final manuscript represents a substantial combined effort from all authors.

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In collaboration with my co-supervisors Drs. Matthew Keough and Edward Johnson, I designed the research question, obtained ethics approval at the University of Manitoba, created the study protocol, trained research staff on the session protocol, conducted data cleaning and statistical analyses, and wrote and submitted the manuscript for publication. Lab personnel completed data collection. I secured funding from the Vanier Canada Graduate Scholarship – Social Sciences and Humanities Research Council and Dr. Keough independently secured funding from the University of Manitoba. Both Dr. Keough and Dr. Johnson provided extensive feedback on the manuscript. The final manuscript represents a substantial combined effort from all authors.

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The above publications appear in this doctoral thesis as Chapter 2 and Chapter 4.

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# CHAPTER 1

## GENERAL INTRODUCTION

### Scope of the Problem

Emerging adulthood is a developmental period that spans from 18 to 25 years old (Arnett, 2000; 2005). It is characterized by experimentation (Arnett, 2000; Nelson & Barry, 2005) and transition, with over 70% of emerging adults in North America attending post-secondary education (Arnett, 2016). Rates of alcohol use are highest among emerging adults compared to other age groups (Hingson et al., 2009; Johnston et al., 2015; Muthén & Muthén, 2000). The latest Canadian Campus Survey identified that approximately 32% of emerging adults consume alcohol at levels that are considered problematic (Adlaf et al., 2005) and almost a quarter of Canadian emerging adults meet criteria for an alcohol use disorder (AUD; Qadeer et al., 2018). More recently, the Centre for Addiction and Mental Health Monitor Survey revealed that emerging adults consumed the most alcohol and were more likely than other age groups to report symptoms of AUDs (Ialomiteanu et al., 2016), and epidemiological research identified that emerging adulthood is associated with the highest prevalence of AUDs (Grant et al., 2015). Emerging adults with problematic alcohol consumption experience related problems, including memory loss, feelings of guilt, and physical injuries (Adlaf et al., 2005; Grant et al., 2004). Research has demonstrated a link between alcohol misuse (i.e., drinking at hazardous levels and experiencing alcohol problems) in emerging adulthood and increased risk for developing later addictive behaviours (DeWit et al., 2000; Grant, 1998), highlighting the seriousness of alcohol misuse among emerging adults.

Motivational and social learning models shed light on the diverse reasons for drinking among emerging adults (Cooper, 1994; Grant et al., 2009; Khantzian, 1997; Merrill et al., 2014). For example, Cooper's (1994) motives model argues that young people drink for social, enhancement, coping, and/or conformity reasons. Among emotionally-vulnerable individuals, drinking to cope has been identified as the main pathway to alcohol misuse and experiencing related problems (Grant et al., 2009). This drinking behaviour is logical given that many emerging adults struggle with depression during this stage of development (Ibrahim et al., 2013) and use alcohol as a means to cope with their depressed mood (Khantzian, 1997). Approximately one third of emerging adults struggle with depressive symptoms over the developmental period of emerging adulthood (Ibrahim et al., 2013) and one in four emerging adults experience a depressive episode (Kessler & Walters, 1998; Statistics Canada, 2003). Evidence has demonstrated that individuals

who experience depression often drink to self-medicate and numb themselves from their negative emotions (Khantzian, 1997). Lending support to this contention, rates of comorbidity between depression and alcohol misuse are as high as 60% in the general population (Davis et al., 2008; Swendsen & Marikangas, 2000) and depression-alcohol misuse often initiates in emerging adulthood (Brière et al., 2014). Thus, emerging adulthood is an opportune time to investigate the depression-alcohol misuse comorbidity because behaviour that exists in emerging adulthood can set the stage for longer term addiction and mental health problems (Mental Health Commission of Canada, 2017).

Although a clear link between depression and alcohol misuse exists (Brière et al., 2014), it is unknown what is happening in-the-moment emotionally or contextually that urges emerging adults to drink when they experience depression. Social learning theory, which has since revised and become social cognitive theory (SCT), was a novel theory used to explain how both individual differences (i.e., depression proneness) and context (i.e., drinking alone or with others) matter in understanding problematic drinking behaviour (Bandura, 1977; 1991; 1997). Contemporary SCT integrates social approval, physiological arousal, and self-efficacy as key explanatory facets of human behaviour. According to SCT, individuals with depression experience low levels of self-efficacy for coping with life's difficulties (including regulating painful emotions like shame) and thus turn to alcohol as one of the few solutions, albeit problematic, they have for regulating the painful emotion. In the context of drinking, emerging adults learn over time that drinking can dampen negative emotions and for some, presumably those who have difficulty regulating their negative emotions more constructively, this learned association becomes the primary means to dull negative feelings in the future. While drinking to cope has received support for the experience of depression (Khantzian et al., 1997), there has been a dearth of research on the emotional facets of depression (e.g., shame) that may further elucidate mechanisms in depression-related drinking. Shame—an emotion characterized by feelings of inferiority and worthlessness (Lewis, 1971; Tangney & Dearing, 2002)—is one possible emotional state that may trigger alcohol misuse for emerging adults that experience depression. Shame has been found to be a predisposing factor to depression (Cândeia et al., 2014; Johnson & O'Brien, 2013; Nolen-Hoeksema, 2000; Thompson & Berenbaum, 2006) and is related to alcohol misuse (Bilevicius, Single, Bristow, et al., 2018; Treeby & Bruno, 2012) and solitary drinking (Luoma et al., 2018). While most researchers have simply focused on individual differences and largely ignored social context and associated

emotional experiences of depression (i.e., shame), research and theory suggest that consideration of both individual and contextual factors are necessary to truly understand the complexities of drinking behaviours in emerging adulthood.

Grounded in coping-motivated models (Cooper, 1994), the goal of the current dissertation is to enhance the etiological understanding of depression and alcohol misuse among emerging adults. Specifically, this dissertation examines emotional precursors (e.g., shame) of depression-motivated drinking to explore mechanisms that may drive emerging adults with depression to engage in problematic drinking. To foreshadow, this work builds on extant literature and uses advanced analytic techniques to understand the complex relationship between depression, shame, and alcohol misuse while also considering the role of drinking context. I argue that shame, a potent social emotion, can shed light on why depressed emerging adults misuse alcohol and engage in dangerous drinking behaviours.

## **Theoretical Background**

### ***Emerging Adulthood***

Historically, adulthood was a life phase that began at age 18 since major life decisions, like marriage and childcare, were made by the early twenties. However, there has been a noticeable delay in the establishment of full-fledged adulthood in North America over the last few decades (Arnett, 2000). For example, the average age of marriage in the 1970s was between 21-23 years old whereas in the late 1990s the age of marriage increased to 25-27 years old (U.S. Bureau of the Census, 1997). Similar delays were observed in full-time employment and parenthood due in part to the wider range of possible activities and roles that are available to individuals during this life stage (Arnett, 2000). At the beginning of 21<sup>st</sup> century, Dr. Jeffrey Arnett proposed that a unique developmental period—emerging adulthood—exists between adolescence and adulthood that can account for the observed behavioural delays in what has traditionally been considered adulthood (Arnett, 2000; 2005). Arnett proposes that emerging adulthood grew as a result of a series of major life changes (e.g., Industrial Revolution and the Women’s Movement; Arnett, 2014). For example, the Women’s Movement resulted in greater economic opportunities for women that formerly did not exist which, in turn, delayed the pursuit of marriage (Arnett, 2014). Now, emerging adulthood is widely recognized as a developmentally distinct time period that affords gradual entry into adult responsibilities while also exploring the new-found freedom that follows from adolescence.

Emerging adulthood is a transitional period spanning from 18 to 25 years old where individuals develop greater independence and sense of self (Arnett, 2000; 2005; Nelson & Barry, 2005). According to Arnett's seminal conceptualization, there are distinctive features that differentiate emerging adulthood from adolescence and adulthood, including identity exploration (i.e., identifying personal interests and roles), instability (e.g., in an American sample, rates of moving are highest within early emerging adulthood and stabilize by mid-twenties; U.S. Bureau of the Census, 2011), self-focused time (i.e., spending more time exploring and fulfilling personal obligations), feeling 'in-between' (i.e., in a time of transition not fitting into either the adolescent or adult categories), and possibility (Arnett, 2000; 2005; 2014). During emerging adulthood, individuals begin to experiment with relationships, and many enter post-secondary institutions to further pursue individualistic goals or follow self-focused interests (Arnett, 2016). Although many emerging adults experience rises in overall self-esteem (Galambos et al., 2006) and enjoy freedom as they take on new roles and obligations, many claim this developmental period is plagued with difficulties (Arnett, 2000). Dating back to Erikson's work in the 1950s, it has been suggested that emerging adulthood coincides with a major identity crisis, where multiple identities (i.e., adolescence and adulthood) clash and new pressures (e.g., work, finances) emerge (Erikson, 1950), which has become more pronounced in recent years (Arnett, 2014). For example, emerging adults have been found to hold multiple part-time jobs or switch employment rapidly as opposed to entering into a single long-term career (Sussman & Arnett, 2014). It is possible that the discrepancy between the increased desire for independence but difficulty supporting a lifestyle with such independence and lack of stability adds to the inherent and observable pressures characteristic of emerging adulthood.

According to the Mental Health Commission of Canada (2017), emerging adulthood is a time characterized by the destabilizing influences of volatility, fast-paced changes, and competing life demands. Not surprisingly, emerging adulthood is associated with the onset of mental health problems, including depression and anxiety (Schulenberg & Zarrett, 2006). Rates of mental health concerns have been on the rise in emerging adulthood (Substance Abuse and Mental Health Services Administration [SAMHSA], 2020), with 75% of mental health disorder diagnoses occurring by age 25 (Carver et al., 2015) and at least 50% of emerging adults reporting heavy drinking between the ages of 18 and 25 (five or more drinks in a row over two weeks; Bachman et al., 1997; SAMHSA, 2020; White & Jackson, 2004). Coincidentally, despite the high rates of

mental health and substance use presentations (Carver et al., 2015), emerging adults have reduced access to mental health resources as they often have aged out of youth/adolescent services (Mental Health Commission of Canada, 2017). Prevalence research has also identified that emerging adults access treatment at lower rates than other adults in general (Adams et al., 2014), making emerging adulthood an opportune time to assess factors contributing to mental health concerns.

Arnett's seminal conceptualization of emerging adulthood, including its five defining features, has been applied to substance use both theoretically and experimentally as a way to understand this behaviour (Arnett, 2005; Sussman & Arnett, 2014). For example, instability (e.g., moving, relationships) has been found to promote substance use as a way to cope with unease (Arnett, 2005), which is consistent with self-medicating tendencies (Khantzian, 1997). The self-focused aspect of emerging adulthood has been hypothesized to promote alcohol consumption as an emerging adult can decide to consume alcohol without consideration of others, like caring for children or navigating parental opinions (Sussman & Arnett, 2014). A comprehensive review concluded that environments with greater perceived freedom in adolescence were found to predict substance misuse in emerging adulthood whereas those in cohabiting relationships or married were less predictive of substance use (Stone et al., 2012). Clearly, there are unique facets of emerging adulthood that drive substance misuse.

### ***Etiology of the Depression-Alcohol Misuse Risk Pathway***

Alcohol use follows a developmental trajectory: consumption steadily increases during late adolescence, peaks in emerging adulthood, and declines thereafter (Delucchi et al., 2008; Gates et al., 2016; Hingson et al., 2009; Johnston et al., 2015). Emerging adulthood is associated with the highest rates of binge drinking (defined as men drinking five or more drinks and women drinking four or more drinks within two hours; National Institute on Alcohol Abuse and Alcoholism, 2004) with approximately 40% of emerging adults bingeing more than their younger and older aged counterparts (Arnett, 2000) and 30-40% of Canadian emerging adults drinking above low-risk guidelines (Adlaf et al., 2005). An American nationally representative sample confirmed that rates of both mental health and substance use were higher among emerging adults compared to an adult sample (i.e., ages 26-34; Adams, et al., 2014). A recent assessment among emerging adults found that failure to establish an adult identity was associated with continued alcohol problems into adulthood (Gates et al., 2016) and research has shown that attending university may actually

increase alcohol problems due to increased availability and acceptance of drinking behaviours in university contexts (Simons-Morton et al., 2016; White & Jackson, 2004).

The peak of alcohol misuse that occurs in emerging adulthood coincides with the onset of many emotional problems and mood disorders (Hankin et al., 1998; Kessler & Walters, 1998; Natsuaki et al., 2009), with the onset of depression typically beginning in emerging adulthood (Hankin et al., 1998). Approximately one third of emerging adults report experiences of depressive symptoms (Ibrahim et al., 2013) and almost 20% meet diagnostic criteria for major depressive disorder (Hasin et al., 2018; Mojtabai et al., 2016). Considering prevalence rates, it is not surprising that many emerging adults experience concurrent alcohol and mood problems. Research has established a link between depression and alcohol misuse (Brière et al., 2014; Buckner et al., 2007; Grant et al., 2009; Kuria et al., 2012); research demonstrates that specific symptoms of depression such as loss of pleasure, loss of energy, and sadness predict alcohol misuse (Geisner et al., 2013). Prevalence data that has found that 16% of individuals with clinical depression experience current alcohol problems and 30% have experienced alcohol problems over their lifetime compared to 7% and 16% in the general population, respectively (Sullivan et al., 2005). Co-occurring AUDs and depression are one of the most prevalent comorbidities (Brière et al., 2014; Grant et al., 2004; Teesson et al., 2009), with almost a quarter of emerging adults experiencing a depression-alcohol misuse comorbidity (Brière et al., 2014).

There are disproportionate harms associated with depression-AUD comorbidity. Those with comorbid depression-AUD are known to have more severe alcohol problems and diagnoses (i.e., severe AUD; Boschloo et al., 2011; Brière et al., 2014) compared to a single-disorder diagnosis. An additional mental health difference between multiple versus single diagnoses includes the number of lifetime suicide attempts: compared to both depression and AUD alone, those with comorbid AUD and depression had 2x and 7x higher number of lifetime suicide attempts, respectively (Brière et al., 2014). In terms of psychosocial outcomes, individuals with a depression-AUD comorbidity in emerging adulthood have been found to have poorer global functioning (i.e., ability to function in day-to-day life) and life satisfaction at age 30 compared to those with only depression or AUD (Brière et al., 2014). Given the clear added difficulties associated with depression-AUD comorbidity, it is essential to understand the possible malleable factors related to this comorbidity to be equipped to treat it.

Motivational and social learning theories provide a framework for understanding mechanisms of drinking behaviours, and specifically depression-motivated drinking (Cooper, 1994; Grant et al., 2009). For example, through repeated drinking experiences, SCT posits that depressed emerging adults develop expectancies given the previously experienced analgesic effects of alcohol as a form of self-regulation (Giovazolias & Themeli, 2014). Over time, this temporary reduction of negative mood (through avoidance) can result in craving for alcohol when an emerging adult experiences symptoms of depression to assist in mood regulation/self-medication. The self-medication hypothesis (SMH; Khantzian, 1985; 1997) is a useful and strongly validated model for understanding alcohol behaviours among individuals with depression through negative reinforcement. The SMH conceptualizes substance misuse as a result of self-regulation deficiencies (Khantzian, 1985; 1997). From this view, individuals use substances not because they enjoy the substance but because they are suffering and cannot regulate themselves and thus turn to alcohol to cope with their difficult feelings (Cooper, 1994; Grant et al., 2009). Accordingly, the SMH proposes that individuals use alcohol to cope with depressive symptoms, which negatively reinforces their drinking, sustains their distressing emotions, and often leaves them vulnerable to problems (Beck et al., 2008; Khantzian, 1997). Indeed, work has shown that depressed mood is associated with coping-motivated drinking, and drinking to cope moderates the association between depression and alcohol misuse (Grant et al., 2009). Together, although self-medication and drinking to cope can be associated with short-term benefits in the experience of depressed mood, these effects are transient and contribute to reliance on alcohol and the experience of alcohol-related problems (Khantzian, 1997), and the maintenance of depression through avoidance (Holahan et al., 2001). Coping-related drinking continues to be a contemporary, well-validated model that explains the association between depression and alcohol misuse, particularly among emerging adults (Grant et al., 2009; Grazioli et al., 2018; Skrzynski & Creswell, 2020).

### ***Mediating Role of Shame***

The SMH was first conceptualized to be relevant in the context of depression (Khantzian, 1997), a commonly experienced mood state among emerging adults (Ibrahim et al., 2013). However, since inception, researchers have become more specific about emotional precursors or emotions (i.e., the multifaceted experience that often leads to more chronic mood states, for review see Frijda, 1986; 1993) that lead to high-risk drinking among depressed individuals. Depression is a complex and chronic mood syndrome that involves many painful emotions, including feelings



of worthlessness, sadness, and guilt (American Psychiatric Association [APA], 2013). However, it is unknown whether powerful, discrete emotions may be triggering drinking in the context of depressed mood. As I have noted (Bilevicius, Single, Bristow, et al., 2018), shame has received growing attention, particularly in the context of depression-motivated drinking (Luoma et al., 2019; Treeby & Bruno, 2012). For example, for those who are depressed, feelings of shame are often, but not always a component of their experience (Callow et al., 2021; Cheung et al., 2004; Gilbert, 2000). As a self-conscious emotion (i.e., one that generates an intense level of self-awareness; Gilbert, 2002), feelings of shame have the potential to trigger intense self-criticism and reduced self-esteem (Velotti et al., 2017), making feelings of shame both (a) a risk factor for developing symptoms of depression and a full depressive episode, and (b) a prime target for drinking-related coping. With the severity of the harms that follow from risky alcohol use during emerging adulthood and the research highlighting shame's potential role in depression-motivated drinking, the goal of this dissertation is to elucidate the role of shame in depression-alcohol misuse comorbidities.

**Definition.** Shame—a self-conscious, social emotion—is a strong emotion that may drive risky drinking behaviours among depressed emerging adults (Bilevicius, Single, Bristow, et al., 2018; Gruenewald et al., 2004). Shame is a normative emotion that can arise following conflict or perceived moral failure (Gilbert, 1998; Lewis, 1971; Lewis, 1992; Tangney & Dearing, 2002) and, as many have claimed, is a cardinal feature of depression (Pulcu et al., 2013). Shame is a self-directed emotion that encompasses the entire self rather than a specific attribute or external factor (Lewis, 1971), although experiences of shame can be exacerbated when external criticism occurs (i.e., there is a decline in perceived social merit; Gilbert, 1998; 2000; Kim et al., 2011). While everyone can experience shame (i.e., experiential shame), others have a strong predisposition to experience states of shame (i.e., shame-proneness; Luoma et al., 2017). When an individual experiences shame, they often view a situation as global, stable, and uncontrollable, as opposed to specific, unstable, and controllable (Kim et al., 2011; Tracy & Robins, 2006). This distinction is important as particular attributions, like uncontrollability, are associated with stronger symptoms of depression (Sanjuán & Magallares, 2009). An example of a shameful experience for an emerging adult could involve getting intoxicated at a party and driving home at the end of the night while still under the influence or perhaps failing an exam at university. Both experiences can elicit feelings of inadequacy towards oneself but differ in terms of falling below the standards of society

(e.g., legal drinking and driving rules) and one's own standards (e.g., wanting to fare well in their coursework). Regardless of the triggering event, coinciding rumination and avoidance typically follow, which helps explain the intimate association between shame and depression (Orth et al., 2006).

Shame is often conflated with guilt, another self-conscious emotion (Kim et al., 2011) despite having distinct conceptualizations and behavioural patterns. Guilt is an emotion that arises following a perceived negative event and is focused on a specific element (e.g., on an event or a specific portion of oneself) rather than on the whole self (Tangney & Dearing, 2002; Tangney et al., 2007). For example, an emerging adult may experience guilt after getting intoxicated and driving home, and later reflecting on the experience and saying to oneself, "I *did* a terrible *thing* of driving home drunk." Such a statement highlights the external focus of guilt (i.e., on the drunk driving) rather than viewing the situation as a personal indiscretion (i.e., "I *am* horrible for doing the terrible thing of driving home drunk"). Many researchers have postulated that guilt is a more adaptive emotion given that guilt often motivates reparable action tendencies (e.g., confession), which results in more constructive and adaptive behaviours (Baumeister et al., 1994; Stuewig & Tangney, 2007). Adding support, negative associations between guilt and anti-social behaviours (Tibbetts, 2003) and substance use (Treeby & Bruno, 2012) have been observed empirically. Thus, both seminal and contemporary research conceptualize shame and guilt as distinct emotions that are associated with unique sequelae.

It is perhaps not surprising then that shame, and to a lesser extent guilt, has been found to be a predisposing factor for depression (Johnson & O'Brien, 2013; Orth et al., 2006; Thompson & Berenbaum, 2006). One explanation for this association put forward by Orth and colleagues (2006) uses a combination of sociometer theory (Leary & Baumeister, 2000), self-discrepancy theory (Higgins, 1987), rumination theory (Martin & Tesser, 1996) and response style theory (Nolen-Hoeksema & Morrow, 1991). To illustrate, the experience of shame is associated with a negative evaluation of the self after a perceived negative event. This negative evaluation then lowers one's self-esteem and associated feelings of value and worth, which in turn triggers rumination. Rumination has been found to elicit depression and then falls into a cycle of harmful behaviour, which further perpetuates the feelings of depression (Orth et al., 2006). From this view, guilt would be less likely to result in depression because there is more specificity and less ambiguity that poses a threat to an individual's sense of self. Building on this evidence, shame, but not guilt, has been

found to be associated with social withdrawal (Yelsma et al., 2002) and addictive behaviours (Bilevicius, Single, Bristow, et al., 2018; Treeby & Bruno, 2012). Guilt, on the other hand, has been associated with less persistence in negative feelings as the focus tends to be on more specific behaviours. In other words, the self is not evaluated negatively in isolation, but rather in relation to a specific event or situation (Tangney & Dearing, 2002). Thus, shame, but not guilt, is probably the more central emotion that gives rise to maladaptive coping strategies, like alcohol misuse, among depression-prone emerging adults.

Despite the evidence that supports shame's ties to the experience of depression (Cheung et al., 2004; Orth et al., 2006), there is no explicit recognition of shame in contemporary diagnostic nomenclature of depression. For example, the *Diagnostic and Statistical Manual of Mental Disorders-5* (DSM-5; APA, 2013) is the current and prominent tool for diagnosing mental disorders within the field of clinical psychology. Within the DSM-5, diagnostic criteria for major depressive disorder includes experiencing excessive feelings of guilt or worthlessness, with no explicit mention of shame (APA, 2013). However, convincing meta-analytic evidence suggests that shame is more strongly associated with depression compared to guilt and shame-free guilt is essentially not associated with depressive symptoms (Kim et al., 2011). While the distinction between the two emotions has been recognized, it is problematic that the importance of shame in the experience of depression, and ultimately addictive behaviours, has been underappreciated in clinical diagnostic criteria despite researchers arguing for the inclusion of shame (Bilevicius, Single, Bristow, et al., 2018; Kim et al., 2011).

**But is shame adaptive?** Although substantial literature has highlighted the negative tendencies associated with shame (Yelsma et al., 2002), there are arguments that shame can also be adaptive (Cibich et al., 2016; Gausel & Leach, 2011; Lickel et al., 2014). Universally, shame is associated with self-focused, often negative, attributions and moral failure (Lewis, 1992; Tangney & Dearing, 2002), but in some situations, can be associated with self-improvement (Lickel et al., 2014). For example, in two independent emerging adult samples, recalled experiences of shame predicted a motivation and desire for self-change, as compared to other emotions like guilt and regret (Lickel et al., 2014). This work is fascinating as guilt is commonly viewed as a (relatively) more adaptive social emotion (Tangney et al., 1992). However, the self-focus and internal attribution of shame likely accounts for the desire to change oneself as there is a greater sense of personal responsibility (Lickel et al., 2014). Further, behavioural research has found that

behavioural self-descriptions (e.g., “I did something stupid”) were amendable to lasting change when narratives were constructed with themes of redemption (Adler et al., 2015), even among recovering alcoholics (Dunlop & Tracy, 2013). So, shame, when experienced in the right set of circumstances, may promote a desire to improve oneself. However, when shame is experienced in the context of pre-existing depression, a condition known to be associated with biased negative thinking patterns (APA, 2013), there appears to be negative consequences. Therefore, depressed emerging adults often need to rely on external coping strategies, like drinking, to lessen their maladaptive experiences of shame.

**Shame as a predictor of alcohol misuse.** Coping models of alcohol misuse conceptualize that shame may be a primary emotional experience that contributes to alcohol misuse as a means of escape from the discomfort of shameful thoughts (Grant et al., 2009; Grazioli et al., 2018; Khantzian, 1997). A comprehensive systematic review identified that shame-proneness was a predictor of later substance misuse ( $r = 0.16$ ) that resulted from continued self-medication of negative emotions (Rahim & Patton, 2015), which was echoed in a recent meta-analysis of 18 studies ( $r = 0.16$ ; Luoma et al., 2019). From this view, shame can be understood as an antecedent of alcohol misuse (Randles & Tracy, 2013; Stuewig et al., 2014): an individual consumes alcohol in response to their feelings of shame.

Longitudinal research has found that feelings of shame are predictive of future harmful drinking behaviours (Stuewig et al., 2014). For example, childhood experiences of shame were found to predict earlier alcohol consumption and drug use during emerging adulthood. Even non-verbal displays of shame (e.g., body language) have been found to predict alcohol problems, which authors discussed to be associated with difficulties managing intense negative emotions (Randles & Tracy, 2013). Building on research highlighting shame’s predictive nature of alcohol misuse, I have examined shame longitudinally in a sample of depressed university emerging adults at two timepoints spaced one month apart (Bilevicius, Single, Bristow, et al., 2018). Results revealed that elevated depressive symptoms at baseline were associated with greater alcohol problems at the end of the month, via increased feelings of shame. In other words, shame helped explain why depressed emerging adults experienced alcohol problems that are associated with AUDs. This research is consistent with cross-sectional (Luoma et al., 2019; Treeby & Bruno, 2012) and other longitudinal research (Luoma et al., 2018) that has supported the predictive nature of shame in the context of alcohol problems. As such, the experience of shame likely triggers a desire to numb the painful

feelings associated with shame through the use of alcohol, but the resulting negative reinforcement contributes to the development of alcohol misuse over time.

**Influence of social context on the experience of shame and alcohol misuse.** Normative emerging adult drinking occurs in social contexts (e.g., at parties) and many emerging adults can control their drinking in these contexts (Beck et al., 2008). It is suggested that binge drinking is more likely to occur when in environments like bars or parties and increases when around like-peers where more time is spent socializing as opposed to drinking alone (Weitzman et al., 2003). Thus, while social drinking is associated with problems (Harford et al., 2002), a smaller minority of individuals drink alone, which is developmentally atypical for this age group (Neff, 1997). One quarter of emerging adults report drinking heavily in solitary contexts (Gonzalez et al., 2009; Neff, 1997). Research has begun investigating whether drinking alone, referred to as solitary drinking, is problematic (Christiansen et al., 2002; Creswell et al., 2014; Keough et al., 2016; 2018; Waddell et al., 2021). However, much of the literature done to date has ignored the role of drinking context. Therefore, it is important to examine the role drinking context plays on the experience of drinking to cope behaviours.

It has been found that shame, unlike guilt, promotes avoidance (Laing, 1960; Lewis, 1971), which in the context of depression, may lead to solitary drinking. Shame is a painful emotion and given the intense feelings of inadequacy that are often experienced, some individuals feel worse in the presence of others. Consequently, people tend to withdraw and self-isolate when they experience shame. Shame has been associated with avoidance tendencies, namely creating distance between the self and the shameful event, particularly when the event involves others rather than just the self (Schmader & Lickel, 2006). This avoidance suggests that when an individual experiences shame, they may be less likely to take the necessary steps to repair a situation but rather maladaptively avoid the situation and withdraw (Lewis, 1971; Tangney et al., 2007). As I have outlined, shame (and proneness to shame) is predictive of risky alcohol behaviours (Luoma et al., 2019; Rahim & Patton, 2015; Treeby & Bruno, 2012) as the alcohol numbs, albeit temporarily, emotional pain. Insofar as shame-proneness is a risk factor for both social isolation and alcohol misuse, shame may lead to greater use of alcohol in solitary contexts as both function to regulate feelings of shame. For example, Yelsma and colleagues (2002) found support for withdrawal as a coping mechanism for shame, and research has identified that solitary drinking is associated with significant alcohol misuse (Creswell et al., 2014; Keough et al., 2015; Keough et

al., 2016), including experiencing a greater number of and more severe alcohol-related problems (Gonzalez & Skewes, 2013; Keough et al., 2018). Withdrawal and isolation are both risk factors for the experience of depression (Teo et al., 2013) and solitary drinking, underscoring the detrimental consequences of shame (Beck et al., 2008; Vanhalst et al., 2012). Interestingly, it has been found that the experiential avoidance of shame mediated the association between shame and depressive symptomatology (Carvalho et al., 2015), and it is possible that this avoidance may actually exacerbate the experience of both the shame and depression (Ferreira et al., 2016).

Evidence suggests that when an individual is experiencing depression or shame, they withdraw socially (Segrin, 2000). Such individuals then become isolated and vulnerable to rumination and low energy, which are risk factors that can lead to major depressive episodes (Chou et al., 2011; Raes et al., 2006) and solitary drinking (Beck et al., 2008). This solitary drinking behaviour and lack of social connection can then reinforce social withdrawal, discomfort (Skrzynski & Creswell, 2020), and problematic alcohol behaviours (Johnson et al., 2018) due to the increased time spent outside of social environments (Skrzynski et al., 2018) yet also prevent an individual from having to face their low mood. It is possible that, over time, the solitary context becomes associated with coping-related drinking and can elicit cravings itself due to the known (and experienced) short-term benefits of drinking (Witteman et al., 2015). Ultimately, this behavioural pattern can result in greater emotional difficulty for the individual, the perpetuation of social withdrawal, increased risk of experiencing alcohol misuse, and establishing social context as a trigger for alcohol craving.

To date, only two studies to my knowledge have assessed individual fluctuations in daily shame (i.e., at the individual level) and its association to problematic drinking. The first study revealed that daily ratings of shame predicted drinking at home (i.e., alone) more than any other negative emotion (Mohr et al., 2008). Further, the authors observed that when daily ratings of positive moods were low, there was a significant relationship between feeling ashamed and drinking alone. However, when daily positive mood was high, there was a buffering effect on shame's relation to drinking: there was not a significant relationship between shame and solitary drinking when daily positive mood was high. These results provide preliminary support for the specificity of shame on the experience of alcohol misuse and misuse that occurs in a solitary context. However, this work focused on identifying how levels of shame buffer the effect of positive moods in a non-depressed emerging adult university sample rather than why the buffering

occurred (i.e., mediation). Additionally, this research did not elucidate whether positive moods genuinely mitigated feelings of shame or whether the positive emotions simply provided a distraction from the shame. Mediation analyses between depression and alcohol misuse will clarify the role of shame and solitary context on depression-motivated alcohol misuse.

More recently, Luoma and colleagues (2018) used a non-depressed community sample to examine both between-subject and within-subject differences in shame and how this relates to context-specific alcohol misuse. Using an ecological momentary assessment (EMA) design, the authors found that daily fluctuations in shame predicted solitary drinking, but not social drinking, after controlling for variability in negative affect (excluding shame). The authors also found that an individual's average shame rating moderated the relationship between fluctuations in shame and solitary drinking. For example, if an individual experienced a high daily average of shame, they were less likely to initiate drinking, but would drink higher quantities if they did decide to consume alcohol compared to having a low shame day (i.e., experiencing a rating of shame lower than their average). Rather than conceptualizing results in the context of shame-proneness, the authors discussed their findings in the context of a self-control/self-regulation framework. Self-control is a healthy, yet limited strategy to use when coping with difficult emotions like shame (Baumeister et al., 2007). If an individual experiences a high degree of shame and attempts to regulate their emotions through self-control, they may be less likely to consume alcohol for coping reasons. However, if their capacity to self-control depletes, as it is a finite resource, the individual may become more vulnerable to drink greater quantities of alcohol due to their failed attempt to manage their shame (Luoma et al., 2018). This result coincides with the SMH and SCT: when an individual experiences a surge in negative emotions, like shame, they act in a way to provide immediate relief from the negative emotions (Khantzian, 1997; Luoma et al., 2018).

The study by Luoma and colleagues (2018) is the first to my knowledge that has incorporated daily ratings of shame, drinking context, and alcohol misuse in an EMA framework, and highlights the nuanced relationship between the experience of shame and the decision to consume alcohol hazardously. However, this study utilized a community sample, had a small sample size, and given the analytic strategy may have been underpowered. Further, the authors focused on the associations of shame and drinking context more generally, rather than in a specific mediational framework that examines direct associations between depression and alcohol problems and indirect associations between depression, shame, and alcohol problems. My research

builds on the foundational research done by Luoma et al. (2018) by examining a sample of emerging adults, who are known to be prone to depression, shame, and alcohol misuse. I used a multilevel EMA design, something known to best capture momentary emotional changes (Votaw & Witkiewitz, 2021; Wray et al., 2014) and similar, but distinct, multilevel models to test whether average and daily level associations of shame, not guilt, mediate the relationship between depression and alcohol misuse among a sample of depressed emerging adults. This research will go beyond understanding general associations between shame and alcohol misuse to better understand the relevance of shame in the experience of depression-alcohol comorbidities among emerging adults.

### **Overview of the Current Research**

Emerging adulthood is a unique transitional life period (Arnett, 2000; 2014) that is associated with the peak onset of depression (Ibrahim et al., 2013; Mojtabai et al., 2016) and alcohol misuse (Adlaf et al., 2005). As I have argued, shame is a pertinent factor to both depression and alcohol misuse and no research to date has examined the mediational role of shame in the experience of depression and alcohol misuse among emerging adults. The overarching objective of this dissertation is to clarify the etiological mechanisms of depression-alcohol misuse from a coping-motivated pathway framework. The primary goal of Study 1 was to examine the proximal emotions that predict the consumption of alcohol and experience of problems. To this end, a 12-day EMA design was used to assess whether ratings of shame (both averaged across the entire EMA period and at the daily level) mediated the relationship between baseline depression and alcohol consumed and problems experienced across one month of real-life drinking weekends. Quite extensive cross-sectional and longitudinal research have highlighted the importance that shame (Bilevicius, Single, Bristow, et al., 2018; Luoma et al., 2019; Treeby & Bruno, 2012) plays in depression-motivated drinking; however, no research has actually examined these associations as they unfold in-the-moment in an emerging adult sample, a group known to be at greater risk for alcohol misuse and depression (Adlaf et al., 2005; Brière et al., 2014). Results from Study 1 will make multiple theoretical and clinical contributions. First, the EMA study allows assertions about whether in-the-moment experiences of shame drive momentary decisions to consume alcohol and experience problems which will provide clarity into the theoretical mechanisms underlying the highly damaging alcohol-depression comorbidity. Second, if shame, and not guilt, is in fact a mediator, these results can inform clinical intervention development, and at a minimum,

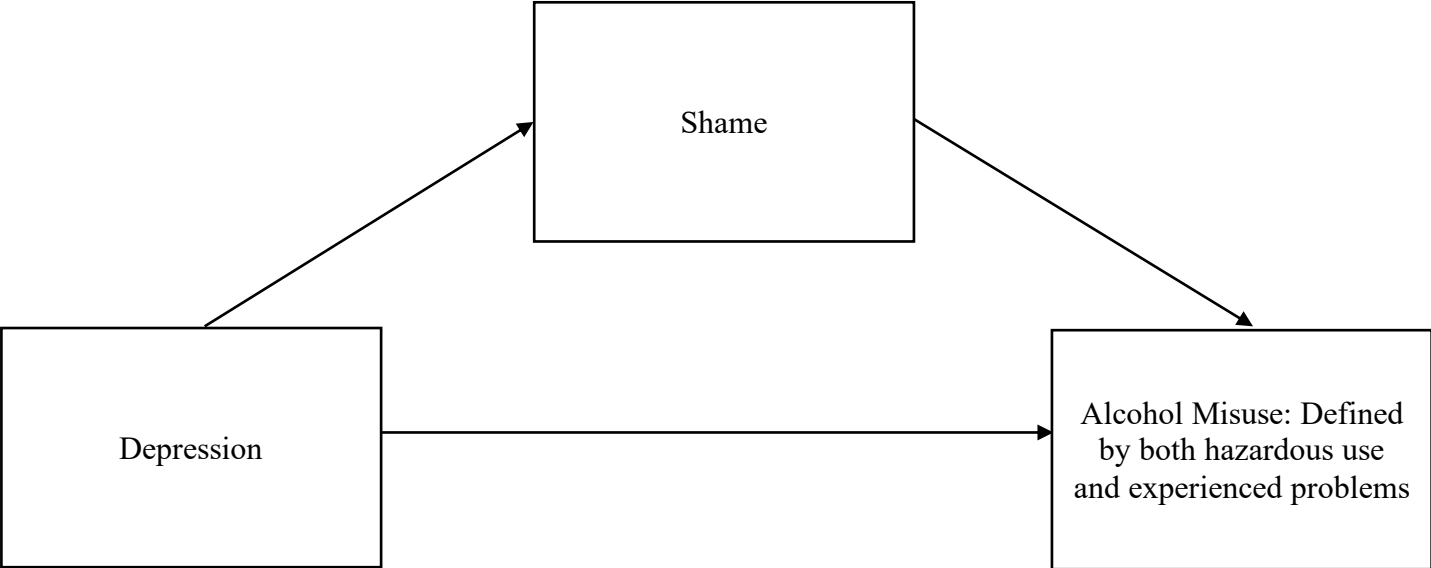


encourage clinicians to add the risks of shame into standard psychoeducational materials for emerging adults.

The primary goal of Study 2 was to expand current literature by experimentally inducing shame to determine whether shame has a context-specific influence on alcohol misuse. I implemented an experimental design whereby emerging adults with depression recalled a shameful event and were exposed to alcohol cues in either a solitary or social condition. This design affords assessment of whether alcohol craving was stronger among solitary or social contexts in the context of pre-existing depression and induced state shame. The results of Study 2 fill gaps in the current literature and build on my program of research by unveiling the impact of shame on solitary drinking, a behaviour shown to be associated with deleterious consequences (Bilevicius, Single, Rapinda, et al., 2018; Keough et al., 2018). Study 2 provides information on the role of potent feelings of shame and contextual factors (i.e., drinking context), which as I have argued, are essential in truly understanding complex etiological factors in depression-motivated drinking. Clinicians can then have more confidence in the need for assessing and targeting shame and drinking context to help protect emerging adults from establishing perilous behavioural patterns, like AUDs, into adulthood.

**Figure 1.1**

*Conceptual Model of Mediation Role of Shame on Depression-Motivated Drinking*



**CHAPTER 2**  
**STUDY 1**

**Shame's Associations with Depression and Problem Drinking: An Ecological Momentary  
Study**

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## Abstract

**Introduction:** Depression and problem drinking are comorbid in emerging adulthood, yet the processes that link them are not well understood. Research has argued that shame has a unique influence on the experience of problematic drinking, but this has rarely been assessed at the state level. Using ecological momentary assessments (EMAs), we assessed whether shame, and not guilt, mediated the association between baseline depression and alcohol use and problems.

**Methods:** One hundred and eighty-four emerging adults ( $M_{age} = 19.27$ ) completed a 12-day EMA study. Multilevel models were used to test hypotheses.

**Results:** In a model with alcohol use as the outcome, there were no significant associations between shame or guilt and alcohol use at the within- or between-subjects level. In a model with alcohol problems as the outcome, guilt was positively associated with alcohol problems but only at the daily level. At the between-subjects level and after controlling for guilt, there was a significant association between depression, shame, and alcohol problems; average levels of shame mediated the association between depression and alcohol problems. In post-hoc reverse directionality models, average alcohol problems mediated the relationship between depression and shame and guilt at the between-person level. No mediation was present for alcohol use.

**Conclusion:** After controlling for guilt, shame is an emotion that helps explain risk for alcohol problems among depressed emerging adults, which has implications for targeted interventions. Reciprocal associations between shame, guilt, and alcohol problems emerged highlighting the need for more fulsome assessments of shame and guilt in future EMA research.

*Keywords:* depression, shame, guilt, problem drinking, alcohol problems, EMA

## **Shame's Associations with Depression and Problem Drinking: An Ecological Momentary Study**

Over 85% of emerging adults (ages 18-25; Arnett, 2000) report consuming alcohol in the past year (Adlaf et al., 2005), many of whom go on to experience negative consequences (Brière et al., 2014; Cohen et al., 2017). Coincidentally, emerging adulthood is also associated with the onset of mood disorders, with over 30% of emerging adults reporting depressive symptomatology (Ibrahim et al., 2013). The association between problem drinking and depression is strong; empirical and clinical research support its comorbidity (Lai et al., 2015). The self-medication hypothesis (SMH; Khantzian, 1985; 1997) argues that individuals drink alcohol to cope with depression which, over time, becomes negatively reinforced if the alcohol is perceived to dampen the depression (Khantzian, 1997). Indeed, coping models confirm that depression-related coping motives are a common reason for drinking among emerging adults (Grant et al., 2009; Kenney et al., 2018; O'Hara et al., 2014) and are the strongest predictor of severe alcohol problems including impaired control and risky behavior (Merrill et al., 2014). It is imperative to understand the underlying mechanisms that drive coping-motivated drinking among depressed emerging adults.

Extant literature has found that shame is an important emotion to consider in the context of comorbid depression and problem drinking (Bilevicius, Single, Bristow, et al., 2018; Luoma et al., 2017; Treeby & Bruno, 2012; Treeby et al., 2020). Shame is an unpleasant, normative emotion that can be experienced following a negative event (Lewis, 1971). According to seminal conceptualizations (Tangney & Dearing, 2002), shame is a negative, self-focused emotion encompassing the entire defective self that is associated with feelings of inferiority and often maladaptive coping behaviors including avoidance and externalization (e.g., blaming others). Shame is frequently conflated with guilt, a similar yet separate emotion. A primary distinction between these emotions is in the attribution; the focus of guilt is on the specific negative behavior or event, whereas the focus of shame is directed inwards, with the entire self being deemed as defective. Indeed, although shame can be functional, it has been argued that shame becomes problematic and can lead to depression when the problems that trigger it are appraised as irreparable (Cibich et al., 2016). This whole-self, irreparable attribution characteristic of shame often drives individuals to socially withdraw in an attempt to conceal the shameful event (Tangney & Dearing, 2002), paralleling the social disconnection that is common in depression (American

Psychiatric Association [APA], 2013). Shame, and not guilt, is often associated with greater social distancing (Pulcu et al., 2013), and given that self-blame and rumination are characteristic of shame (Orth et al., 2006), it is not surprising that shame can be central to the experience of depression for some. Recent research has corroborated the distinction between shame and guilt (Leach, 2017; Tignor & Colvin, 2017; Zhu et al., 2019) and found that shame, and not guilt, is associated with depression (Cheung et al., 2004; Orth et al., 2006; Treeby et al., 2020) and poorer psychological functioning (Webb et al., 2007). However, there is a large focus on guilt in current diagnostic nomenclatures of depression (APA, 2013) which is problematic given the aforementioned research highlighting shame's intimate and unique association with depression.

Some evidence has identified that shame, and not guilt, is predictive of problem drinking both in the context of depression (Bilevicius, Single, Bristow, et al., 2018; Luoma et al., 2019; Treeby & Bruno, 2012) and more generally (Luoma et al., 2017). For example, recent meta-analytic data found a small effect between shame and substance-related problems ( $r = 0.16$ ; Luoma et al., 2019). In a cross-sectional study of emerging adults, a positive association between shame-proneness and drinking to cope with depression was found and a negative association between guilt-proneness and depression-driven drinking was observed (Treeby & Bruno, 2012). This finding was echoed in our recent prospective, longitudinal work that followed emerging adults over the course of one month. In a sample of 210 participants, we found that shame mediated the effect of baseline depression and problem drinking one month later (Bilevicius, Single, Bristow, et al., 2018). Building on this, we recently experimentally induced shame and found that shame triggered depressed emerging adults to crave alcohol but only when they were in a solitary context (Bilevicius et al., 2020). In a more contemporary examination among two independent samples, Treeby and colleagues (2020) found that alcohol use-related shame and guilt were associated with distinct patterns of emotions and behavior; alcohol use-related shame was associated with negative affect and avoidance, but alcohol-related guilt had no association with negative affect and was associated with action-oriented behaviors. Given the clear distinction between shame and guilt (Tangney & Dearing, 2002) and the relevance of shame in both problem drinking and depression (Bilevicius, Single, Bristow, et al., 2018), the aim of the current study was to examine the potential specific influences of shame and guilt in the depression and problem drinking comorbidity.

Although it is clear that shame, depression, and problem drinking are related to one another, there is a need for intensive longitudinal designs (i.e., ecological momentary assessments [EMAs])

to understand how shame (versus other negative emotions) relates to proximal decisions to drink among emerging adults who are depressed. Using a cross-sectional design, Veilleux and colleagues (2014) found that general negative affect predicted drinking to cope among an emerging adult sample, which was further explained through lack of emotional clarity and emotional strategies. Although informative, this study did not examine what specific emotion (i.e., shame) drove the risky drinking behavior and poor emotion regulation. Luoma and colleagues (2018) built on Veilleux's study by collecting EMAs of negative affect, ashamed mood, and drinking context from a community-dwelling sample. Using multilevel models, results suggested that fluctuations in daily ashamed mood predicted solitary drinking, an atypical drinking behavior for emerging adults (Neff, 1997), after controlling for general negative affect (excluding shame). This result is consistent with SMH (Khantzian, 1997) and coping-models of drinking (Cooper, 1994); individuals consumed alcohol to cope with distressing feelings of shame. However, this study utilized a non-emerging adult community-based sample, which may not generalize to the specific population of emerging adults – a population known to experience high rates of depression and alcohol use (Adlaf et al., 2005; Arnett, 2000) as well as their comorbidity (Ibrahim et al., 2013). Emerging adulthood is an opportune time to study depressive pathways and mechanisms and is the population of interest in the current study so we can understand and, ideally, intervene before patterns become more intractable. Additionally, Luoma et al. (2018) did not recruit a depressed sample or conduct mediation analyses. Theoretically, shame is emerging as a cardinal feature of depression (Kim et al., 2011; Orth et al., 2006), so it is likely a relevant factor for drinking among some emerging adults. Thus, it is necessary to examine the potential mediational role of shame to clarify the depression-problem drinking etiological pathway.

The specificity of shame in the context of problem drinking has been identified in cross-sectional (Luoma et al., 2017; Treeby & Bruno, 2012; Treeby et al., 2020), longitudinal (Bilevicius, Single, Bristow, et al., 2018), and burgeoning EMA designs (Luoma et al., 2018); however, there has been limited EMA research assessing the relevance of daily experiences of shame (versus guilt) in problem drinking among emerging adults with depression. This analytic approach is among the only methods that can provide nuanced information to understand the proximal emotions involved in coping-motivated drinking (Votaw & Witkiewitz, 2021). In the current study, we administered EMAs assessing daily mood and alcohol use and problems to emerging adults in the morning and evening for four consecutive weekends. Specifically, we

examined whether depression was associated with increased levels of daily and average shame across the EMA period and whether these increases in shame were associated with increased alcohol use and problems. We hypothesized that baseline depression would be associated with increased ratings of shame, not guilt, over the course of the EMA period, which in turn would be associated with increased alcohol use and problems. As prior research has not contrasted the in-the-moment effects of shame and guilt (Luoma et al., 2017), teasing apart the specific emotional triggers of problem drinking among depressed emerging adults is necessary. This research may allow us to clarify the etiological depression risk-pathway and identify treatment targets for emerging adults who are vulnerable to experiencing further problems, like substance use disorders.

## **Methods**

### **Participants**

Participants came from an online psychology pool at two Canadian universities. Eligible participants were emerging adults (i.e., ages 18 to 25) who scored above sex-specific established cut-offs for hazardous drinking ( $\geq 4$  for men and  $\geq 3$  for women on the Alcohol Use Disorder Identification Test-Consumption [AUDIT-C; Saunders et al., 1993]). We oversampled for the presence of elevated depressive symptomatology (i.e., cut-off of  $\geq 16$  on the CES-D) by preferentially recruiting participants with elevated CES-D scores to increase variability in the predictor. Our sample was 184 participants ( $M_{age} = 19.27$ ; 73.3% female; 60% above the depression cut-off at baseline). Many participants were in their first year of university (67.9%), identified as White (58.8%), and reported English as their first language (82.4%). Over half of participants were single (58.8%) and almost three quarters lived at home (71.7%).

### **Procedures**

This study was approved by the REB at two Canadian universities. The study procedures occurred in three phases. First, potential participants completed an online screener survey to determine eligibility. Eligible participants were invited to the lab to complete phase two which included providing informed consent and completing baseline questionnaires. Participants were then guided through creating unique accounts in the EMA smartphone application MetricWire and practiced answering EMAs that mimicked questions they would receive for the duration of the study. The final phase was the EMA period, which was comprised of EMAs completed over four consecutive weekends (Friday – Sunday), resulting in 12 days of EMA data total (Freisthler et al., 2014; Labhart et al., 2019; Wray et al., 2014). Weekend drinking was chosen as emerging adults



are more likely to consume alcohol on weekends (Lau-Barraco et al., 2016), which increased the likelihood of capturing their drinking episodes. Participants were randomly prompted to complete surveys on their smartphones three times an evening within three equally-spaced intervals between 5:00 pm and 11:00 pm, and once at 11:00 am the next morning. In all three evening prompts, participants were asked to report their mood (i.e., shame/guilt) and alcohol use (based on standard drink size metric). In the morning, participants were asked about their mood and the total number of drinks consumed and problems experienced from the previous night; reports of use and problems in the morning were used as our outcome variables given that morning data are generally more complete for drinking estimates and are more likely to capture drinking that occurred outside of our prompt windows (i.e., can capture the entire drinking episode; Piasecki, 2019).

## **Measures**

### ***Centre for Epidemiologic Studies in Depression Scale (CES-D; Radloff, 1977)***

Participants completed the 20-item CES-D to assess depression at baseline. Participants responded to questions on a 4-point Likert scale (0 = *rarely or none of the time*; 3 = *most or all of the time*). The CES-D is commonly used to identify clinically significant depression and it has good psychometric properties (Chokkanathan & Mohanty, 2013; Malakouti et al., 2015). Internal consistency of the CES-D was good in our sample ( $\alpha = .80$ ).

### ***Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler et al., 2005)***

Participants completed the 24-item B-YAACQ to assess alcohol problems. The B-YAACQ includes a list of problems (e.g., “I have taken foolish risks when I have been drinking; I have passed out from drinking”) that participants dichotomously rate whether they experienced (1 = *yes*, 0 = *no*). The B-YAACQ was administered both at baseline and daily during the EMA period. A total score captured whether emerging adults experienced alcohol problems after a drinking episode.

### ***Ecological Momentary Assessments***

Participants were asked to respond to five negative emotions (sad, shame, guilt, anger, and anxious), although we were most interested in shame and guilt as mediators, on a visual analogue scale ranging from 0-10 (“*Please rate your mood at this moment*”; 0 = *not at all*; 10 = *very much*), which is a common assessment of mood in daily diary and EMA designs (Luoma et al., 2018; Mohr et al., 2008; O’Hara et al., 2014). Participants were then asked to indicate whether they had consumed alcohol since the previous survey (“*Are you drinking?*”). If yes, participants were asked

“*How many have you had to drink since the last prompt;*” participants indicated how many standard drinks they had consumed in that time period. This process occurred three times per evening. Individuals were also asked who they were consuming alcohol with (i.e., social or solitary drinking), but the low frequency of context-specific responses led us to collapse drinking across contexts (3% of drinking episodes were solitary). Participants received one prompt for a survey the next morning to assess mood, alcohol use, and problems. If participants endorsed drinking, they were asked how much was consumed and whether they experienced any problems (as assessed by the B-YAACQ). If participants did not consume alcohol, the survey finished. The EMA cycle resumed at 5:00 pm on the next evening or weekend.

### **Data Analysis**

We used multilevel modeling (MLM) in Mplus v.7 to test unique pathways from baseline depression (predictor) to number of drinks consumed (outcome; consumed the previous evening and assessed the next morning) and alcohol problems (outcome; assessed the morning after drinking) via shame and guilt (mediators; assessed across the evening surveys) across the 12-day EMA period. Given our alcohol outcomes (i.e., number of drinks, number of problems), count models were appropriate. As there was overdispersion in our outcomes, negative binomial models were preferred. Because we observed a high frequency of non-drinking days (60%), we tested the zero-inflated negative binomial model against the regular negative binomial model and found that the zero-inflated model did not fit substantially better. Thus, we report only the non-zero inflated models as they are more parsimonious.

We used two-level models to examine associations between negative emotion variables (shame, guilt) and alcohol use/problem outcomes at both within- (Level 1) and between-subject (Level 2) levels. We calculated person-level means for variables (averaging across all days) to include at the between-subjects levels, as well as person-centred variables at the within-subjects level such that each observation represents a deviation from an individual’s own mean shame and guilt ratings (Preacher et al., 2010). Models were run with fixed slopes and random intercepts. Maximum likelihood robust estimation was used, which corrects for non-normality of data.

A high correlation ( $r = 0.78$ ) was found between shame and guilt, so we chose to model data in two ways to address the overlapping variance and multicollinearity. We ran models with shame and guilt as separate mediators, and then combined them into the same model. This approach allowed us to tease out the effects specific to the small proportion of unique variance.

For each of these models we, first, assessed whether shame or guilt averaged within each weekend day (averaged across the three evening prompts) predicted the number of drinks consumed on the same day over the study period (i.e., 12 days; alcohol use model) and second, whether shame or guilt averaged within each drinking day predicted the total number of alcohol problems (as measured by the B-YAACQ; alcohol problems model). In the alcohol problems models, we chose to include only days where drinking occurred, as participants could not have experienced alcohol problems if they had not consumed any alcohol. Thus, a score of zero (on a drinking day) would reflect the absence of problems rather than non-drinking. We also modelled residual covariances between shame and guilt.

To test for mediation, we used indirect effects between baseline depression and each alcohol outcome mediated through shame or guilt. We adapted the 2-1-1 mediation syntax provided by Preacher et al. (2010) to get estimates of indirect effects. In this type of model, it is only possible to estimate indirect effects at the between-subjects level because the main predictor (baseline depression) is a Level 2 factor (Preacher et al., 2010). Indirect effects were assessed using Monte Carlo confidence intervals (CIs; with 20,000 repetitions; Selig & Preacher, 2008).

Post-hoc reverse multilevel structural equation models (MSEM) were run to understand reciprocal associations between alcohol use and problems and next-day shame and guilt (continuous outcome variables). In these models, we examined pathways between baseline depression (predictor) and shame (outcome; assessed in the morning) and guilt (outcome; assessed in the morning) via alcohol use and problems (mediators; assessed the morning after drinking) across the 12-day EMA period. MSEM uses latent variable modelling to partition the variance into latent within-person (i.e., person-mean centred) and between-person (i.e., grand mean centred) components (Lüdtke et al., 2008).

## Results

### Data Distribution and Descriptive Statistics

Our shame and guilt variables exhibited a normal distribution (shame: skew = 2.45 < 3.0; kurtosis = 4.78 < 10.0; guilt: skew = 2.46 < 3.0; kurtosis = 5.50 < 10.0; Kline, 2009; 2010). We observed 22.8% of missing data across the EMA period. No systematic differences were observed for missingness, including baseline problem drinking, as assessed by the AUDIT, ( $t(181) = -.34, p = .735$ ), depression ( $t(181) = -.04, p = .966$ ), or past-month alcohol use ( $t(179) = -.09, p = .930$ ). Over three quarters of the entire sample consumed alcohol at least once over the 12-day EMA

period. The average number of drinks consumed on drinking occasions was 2.45 (standard deviation [ $SD$ ] = 1.45) and the average number of problems experienced was 2.71 ( $SD$  = 2.97).

### **Alcohol Use Models**

Two models were run with shame and guilt modelled as independent mediators (see Table 1). In both the shame and guilt models, there was no significant association between shame or guilt and alcohol use at the within or between subjects level ( $p < .05$ ).

In the combined model at the within-person level, there were no significant associations between shame or guilt and alcohol consumption (see Table 2). The covariance between shame and guilt at Level 1 was statistically significant, suggesting that if individuals experienced elevated shame, they were also likely to report high guilt as well.

In Level 2 of the model, baseline depression was predictive of shame and guilt, whereby elevated depression was associated with higher levels of the emotions across the EMA period (see Table 2). However, at the between-person level, there was no association between depression and alcohol use or between any emotions and the number of drinks consumed across the EMA period.

### **Alcohol Problems Models**

Again, two models were run with shame and guilt modelled as independent mediators (see Table 3). In the shame model, there was no significant within-person association between shame and alcohol problems. However, in the guilt model, there was a significant association between guilt and alcohol problems at the daily level.

Level 2 revealed a significant, direct association between baseline depression and alcohol problems. In the individual shame and guilt models, only higher average levels of shame were associated with greater levels of alcohol problems aggregated over the EMA study period. Indirect effects suggested the presence of mediation: baseline depression was associated with greater alcohol problems via greater average levels of shame across the EMA period (indirect effect for shame:  $b = 0.009$ ,  $SE = 0.003$ , 95% CI [0.003, 0.014]; see Table 3).

Table 4 represents the combined model with shame and guilt, controlling for the high overlapping variance between these variables. Although no specific within-person effects were observed, Level 2 results suggested that baseline depression predicted alcohol problems across the EMA period. We also observed that shame uniquely mediated the association between depression and alcohol problems, after controlling for the high overlapping variance between shame and guilt (indirect effect for shame:  $b = 0.009$ ,  $SE = 0.003$ , 95% CI [0.004, 0.015]). Incidence rate ratios

identified that shame was associated with an increase in alcohol problems by a factor of 1.198. There was no support for a unique role of guilt in this combined model (indirect effect for guilt:  $b = -0.001$ ,  $SE = 0.004$ , 95% CI [-0.008, 0.007]).

### **Combined Reverse Models**

Post-hoc reverse models testing pathways between depression (baseline), alcohol use and problems (from previous evening and assessed on morning surveys), and shame and guilt (assessed on morning surveys) are presented in Table 5. A combined model with shame and guilt was run twice, once assessing evening alcohol use as a mediator and once assessing evening alcohol problems as a mediator. In Level 1 of the alcohol use model, greater alcohol consumption in a given evening predicted greater levels of next-day shame and guilt. However, no significant associations were observed at Level 2; no mediation was present.

In Level 1 of the alcohol problems model, daily alcohol problems associated with previous evening drinking predicted both next-day shame and guilt. Level 2 results also found that average alcohol problems across the EMA period were associated with higher average levels of shame and guilt, with results identifying that alcohol problems were a mediator of depression and average shame and guilt (indirect effect for shame:  $b = 0.072$ ,  $SE = 0.02$ , 95% CI [0.034, 0.109]; indirect effect for guilt:  $b = 0.060$ ,  $SE = 0.02$ , 95% CI [0.019, 0.101]).

### **Discussion**

The present study adds to the mounting literature that suggests average levels of shame are predictive of alcohol problems and are relevant for understanding problematic drinking among emerging adults with depression (Bilevicius, Single, Bristow, et al., 2018; Luoma et al., 2017, 2019; Treeby et al., 2020). Although guilt was associated with alcohol problems at the daily level, this association was attenuated when controlling for shame. Results also demonstrated that after controlling for the overlap between shame and guilt, a one-point increase in average ratings of shame across weekend drinking days was associated with almost 1.2x more alcohol problems. Further, in both separate and combined models, only shame and not guilt was associated with greater alcohol problems at the between-person level, and only shame mediated the association between depression and alcohol problems. This suggests that shame is a unique emotional experience that plays a role in the link between depression and individual differences in alcohol problems among emerging adult drinkers. However, post-hoc reverse models identified complicated reciprocal effects whereby greater alcohol consumption and problems exacerbated

feelings of both shame and guilt (i.e., no specificity of shame). Specifically, at the daily-level, a one unit increase in number of drinks was associated with 0.123 point increase in shame (equivalent to a change of 0.088 SDs) and a 0.094 point increase in guilt (equivalent to a change of 0.070 SDs). Further, a one unit increase in number of alcohol problems was associated with 0.277 point increase in shame (equivalent to a change of 0.199 SDs) and a 0.300 point increase in guilt (equivalent to a change of 0.222 SDs). Although we cannot know for sure, it is possible that emerging adults in the present study were unable to differentiate between shame and guilt, emotions known to be commonly conflated, and, as noted as a limitation in prior research, single-item assessments may not have picked up on subtle nuances between the emotions (Shaver et al., 1987). Nevertheless, strong self-conscious emotions help explain problematic drinking behaviors among emerging adults.

It is important to acknowledge the lack of within-subject effects of shame. Momentary experiences of shame, as assessed in the current study, may have been insufficient to trigger drinking that leads to alcohol problems, because the fleeting occurrence of shame may not have triggered the appraisal of irreparability (Cibich et al., 2016). However, more frequent feelings of shame on average may suggest the presence of deeper problems. It may be that experiences of shame alone are insufficient to trigger drinking or other problems unless they occur within a context of irreparable personal history (Andrews, 1995) which is supported by recent meta-analytic data that argues problematic shame may be related to sources external to the current substance use behavior (Luoma et al., 2019). However, an alternate explanation is that shame was experienced as a consequence of drinking, although our reverse models do not support the specificity of shame. To date, limited research has investigated shame as a consequence of drinking (Luoma et al., 2019) but it is important to recognize that the experience of problems, particularly in the presence of others, may have triggered feelings of shame and embarrassment (Merrill et al., 2020), leaving the emerging adult with global negative feelings that linger into the next day. Given the lack of within-subject findings and increased feelings of both shame and guilt after experiencing alcohol problems, more thorough examinations of momentary feelings of shame (and how it is distinct from guilt) in depression-alcohol etiological pathways are warranted. For example, using a self-report measure such as the Test of Self-Conscious Affect (Tangney et al., 1989) would build on the present study and provide greater clarity of shame and guilt's nuanced impact on drinking to cope as it derives a measure of guilt-free shame and shame-free guilt.

No within- or between-level effects of shame on alcohol use were observed. There has been inconsistency in the literature surrounding whether depression is associated with increased or decreased alcohol use (Pedrelli et al., 2016). Burgeoning research highlights that it may be less about the amount of alcohol consumed but rather the context that alcohol is consumed in and the experience of problems. For example, our group recently demonstrated in an experimental study that the context of alcohol consumption moderates the association between depression, shame, and alcohol craving (Bilevicius et al., 2020). It has been argued that solitary drinking is a risky alcohol behavior in emerging adulthood (Bilevicius, Single, Rapinda, et al., 2018) given the tendency to self-medicate and experience alcohol problems (Khantzian, 1997). Solitary drinking has been linked to increased alcohol problems, not hazardous consumption, which has predicted an increased likelihood of developing an alcohol use disorder (AUD; Keough et al., 2015; 2018). According to the DSM-5, it is the experience of alcohol problems that more readily makes up the criteria of an AUD (APA, 2013), providing further support to the absence of alcohol use findings in our current work. Given that previous research has highlighted the risks associated with solitary drinking (Creswell et al., 2014; Keough et al., 2015; 2018), it would be interesting to examine whether daily or average levels of shame contribute to increased episodes of solitary drinking or whether the lack of within-subjects findings highlight the absence of association between shame and social drinking that has been observed in literature (Luoma et al., 2018; Mohr et al., 2005; Yelsma et al., 2002). Although research has found evidence of shame contributing to solitary drinking (Bilevicius et al., 2020; Luoma et al., 2018), more work is needed to assess shame as a mediator in depression-motivated solitary drinking in emerging adulthood.

Interestingly, within-person, daily-level fluctuations in guilt emerged as a significant proximal correlate of same-day alcohol problems but only when guilt was modelled alone (i.e., without shame). Guilt is often viewed as an adaptive emotion in the sense that it typically activates more restorative actions than shame (Tangney & Dearing, 2002; Treeby et al., 2020). It is possible that guilt can lead to momentary alcohol problems, but not problems that are experienced long-term. For example, both alcohol-use related guilt and shame have been associated with high levels of alcohol consumption (Treeby et al., 2020); however, compared to shame-proneness, guilt-prone individuals tend to use protective behavioral strategies during alcohol use episodes which help minimize the experience of long-term negative alcohol use related consequences (Treeby et al., 2018). Taken with extant research, our results suggest that although daily variability in guilt can

lead an emerging adult to experience alcohol problems, it is less likely that long-term problems will follow, which has been observed following experiences of state shame (Randles & Tracy, 2013). Consistent with coping models of drinking, it is likely the self-focused nature of shame (as opposed to guilt) that drives the experience alcohol problems.

Although greater average levels of shame are a clear predictor of alcohol problems in our study, post-hoc reverse models revealed that alcohol problems across the EMA period were associated with greater average levels of shame and guilt. This result may seem puzzling at first given aforementioned research highlighting the uniqueness of shame in depression-driven problem drinking (Luoma et al., 2019; Treeby & Bruno, 2012). While seminal conceptualizations posit that shame and guilt are distinct emotions (Lewis, 1971; Tangney & Dearing, 2002), our results suggest that emerging adults are unable to adequately differentiate between shame and guilt after experiencing alcohol problems. It has been found that young people have difficulty differentiating between similar, or within-category emotions (e.g., between sadness emotions such as shame and guilt; Erbas et al., 2019; Shaver et al., 1987) as these same-category emotions often share elements that make them difficult to distinguish, which is worsened when depressive symptoms are present (Willroth et al., 2020). For example, both shame and guilt have been found to be associated with low emotion differentiation in a sample of adults with depression, with poor shame differentiation being the largest predictor of depressive symptoms (Willroth et al., 2020). Similarly, alcohol problems are known to be associated with rumination (Caselli et al., 2008; 2010), which likely further precluded emotion differentiation. In the context of our study, it is also possible the poor morning-after differentiation between shame and guilt is the result of the single-item assessment that was used and did not provide opportunity to distinguish between the nuanced emotions (Shaver et al., 1987). Research has called for more detailed information to be collected in order to clearly separate shame from guilt in research settings (e.g., information regarding type of evaluation, perception of responsibility; Miceli & Castelfranchi, 2018; information about whether a drinking event violates group norms and degree of group identification; Giguère et al., 2014). Thus, future research should implement multi-item assessments of shame and guilt to truly understand the reciprocal associations between depression, alcohol problems, and self-conscious emotions.

Our findings suggest that clinicians should probe for shame and drinking motives when working with emerging adults with depression and problem drinking. Targeting shame may reduce



defensiveness surrounding the shameful event or feelings and ultimately promote more approach tendencies (Schmader & Lickel, 2006). Potential strategies for reducing shame include increasing self-compassion (Gilbert & Procter, 2006) and promoting more acceptance (e.g., defusion) to allow individuals to distance themselves from their negative feelings (Luoma & Platt, 2015). As argued by Treeby et al. (2018), even shifting the experience from shame to guilt through the use of motivational interviewing may reduce the extent of experienced problems. Regardless of the strategy, the evidence is clear that there is a need to directly target shame, particularly when it co-occurs with depression in the context of problem drinking.

There are limitations to this study. First, our data were collected by self-report, which can be sensitive to response bias. However, self-report in alcohol research has been found to be accurate in emerging adult samples (Northcote & Livingston, 2011) and we used a longitudinal design with repeated assessments which is superior to a single time-point assessment. Second, participants were asked about drinking context (i.e., solitary or social drinking) in this study. However, given the low number of solitary drinking episodes, we could only focus our models on overall use. It is still important for future research to more thoroughly assess daily shame and its associations with solitary drinking. Third, although we used an intensive, longitudinal EMA design, we were unable to collect momentary drinking data as it was occurring. This poses some difficulty in temporally separating affect from drinking and limits the ability to provide a full temporal test of mediation. The current study provides a foundation for understanding the relevant emotions for risky drinking, but future event-based EMAs that assess mood as an immediate antecedent to drinking episodes (i.e., a study where participants complete a pre-drinking report prior to consumption) are necessary. Similarly, shame and guilt were assessed via a single VAS item which likely accounts for the poor differentiation of shame and guilt in morning surveys as participants were unable to respond to the nuances of their emotional experiences due to the surge of general negative affect (Shaver et al., 1987). Since there was such high overlap between shame and guilt, it also complicates interpretation of the unique effect of one while controlling for the other. Although the single-item method has empirical support (Mohr et al., 2008; O'Hara et al., 2014), future research should identify the events participants are reporting on to assess context, norm violation, and group identification, and utilize multi-item measures with better discriminant validity to provide a more fulsome understanding of shame's role in depression-motivated drinking. Fourth, we had a primarily White female college sample which means that the findings

do not necessarily generalize to clinically depressed samples and non-White and non-student emerging adults more broadly. Finally, multicollinearity emerged as a limitation; however, our analytic strategy allowed us to assess the remaining unique variance between shame and guilt to reveal a positive and significant effect of shame.

Limitations notwithstanding, our study clarifies that experiences of shame across drinking episodes are associated with alcohol problems among emerging adults with depression, even after controlling for guilt. Although we identified that shame and guilt are outcomes of problem drinking, results underscore the importance of shame in depression-motivated drinking, an emotion largely ignored in contemporary diagnostic nomenclature. Convincing evidence has shed light on the importance of assessing for shame and the need for using more explicit intervention strategies targeting shame to mitigate the harmful effects such as AUDs and relapse that follow from the experience of this potent emotion (Randles & Tracy, 2013).

**Table 2.1**

Unstandardized parameter estimates for the multilevel models predicting number of drinks consumed over the EMA period with shame and guilt separately.

	<i>B</i>	<i>SE</i>	<i>p</i>	<i>Rate Ratio</i>
<b>Shame</b>				
<b>Level 1</b>				
Coefficients: Predicting daily number of drinks				
Shame	0.004	0.04	.905	1.004
<b>Level 2</b>				
Coefficients: Predicting average number of drinks				
Depression (baseline)	-0.004	0.01	.495	0.996
Shame	0.005	0.05	.924	1.005
Coefficients: Predicting average shame				
Depression (baseline)	0.055	0.01	<.001	1.057
<b>Guilt</b>				
<b>Level 1</b>				
Coefficients: Predicting daily number of drinks				
Guilt	0.043	0.03	.208	1.044
<b>Level 2</b>				
Coefficients: Predicting average number of drinks				
Depression (baseline)	-0.005	0.01	.445	0.995
Guilt	0.014	0.07	.835	1.014
Coefficients: Predicting average guilt				
Depression (baseline)	0.051	0.01	<.001	1.052

*Note.* EMA = ecological momentary assessment. This model was run with shame and guilt separately due to the high overlap between shame and guilt. Shame and guilt were assessed on the evening surveys over the course of the study period. Alcohol use was the next morning reports of previous evening drinking. Rate ratios provide measure of effect size.

**Table 2.2**

Unstandardized parameter estimates for the multilevel models predicting number of drinks consumed over the EMA period in a combined model.

	<i>B</i>	<i>SE</i>	<i>p</i>	<i>Rate Ratio</i>
<b>Level 1</b>				
Coefficients: Predicting daily number of drinks				
Shame	-0.041	0.05	.393	0.960
Guilt	0.073	0.04	.071	1.076
Covariances				
Shame with guilt	0.959	0.17	<.001	2.609
<b>Level 2</b>				
Coefficients: Predicting average number of drinks				
Depression (baseline)	-0.007	0.01	.193	0.993
Shame	-0.005	0.03	.871	0.995
Guilt	0.023	0.05	.651	1.023
Coefficients: Predicting average shame				
Depression (baseline)	0.055	0.01	<.001	1.057
Coefficients: Predicting average guilt				
Depression (baseline)	0.051	0.01	<.001	1.052
Covariances				
Shame with guilt	1.191	0.19	<.001	3.290

*Note.* EMA = ecological momentary assessment. Shame and guilt were assessed on the evening surveys over the course of the study period. Alcohol use was the next morning reports of previous evening drinking. Rate ratios provide measure of effect size.

**Table 2.3**

Unstandardized parameter estimates for the multilevel models predicting number of alcohol problems on drinking days over the EMA period with shame and guilt separately.

	<i>B</i>	<i>SE</i>	<i>p</i>	<i>Rate Ratio</i>
<b>Shame</b>				
<b>Level 1</b>				
Coefficients: Predicting alcohol problems				
Shame	0.033	0.03	.228	1.034
<b>Level 2</b>				
Coefficients: Predicting alcohol problems				
Depression (baseline)	0.043	0.01	<.001	1.044
Shame	0.166	0.06	.005	1.181
Coefficients: Predicting average shame				
Depression (baseline)	0.052	0.01	<.001	1.053
<b>Guilt</b>				
<b>Level 1</b>				
Coefficients: Predicting alcohol problems				
Guilt	0.061	0.03	.039	1.063
<b>Level 2</b>				
Coefficients: Predicting alcohol problems				
Depression (baseline)	0.045	0.009	<.001	1.046
Guilt	0.142	0.08	.066	1.153
Coefficients: Predicting average guilt				
Depression (baseline)	0.048	0.01	<.001	1.049

*Note.* EMA = ecological momentary assessment. This model was run with shame and guilt separately due to the high overlap between shame and guilt. Shame and guilt were assessed on the evening surveys over the course of the study period. Alcohol problems from the previous night's drinking were assessed on the morning surveys. Rate ratios provide measure of effect size.

**Table 2.4**

Unstandardized parameter estimates for the multilevel models predicting number of alcohol problems on drinking days over the EMA period in a combined model.

	<i>B</i>	<i>SE</i>	<i>p</i>	<i>Rate Ratio</i>
<b>Level 1</b>				
Coefficients: Predicting alcohol problems				
Shame	-0.012	0.04	.790	0.988
Guilt	0.079	0.04	.058	1.082
Covariances				
Shame with guilt	1.038	0.23	<.001	2.824
<b>Level 2</b>				
Coefficients: Predicting alcohol problems				
Depression (baseline)	0.037	0.01	<.001	1.038
Shame	0.181	0.05	<.001	1.198
Guilt	-0.011	0.08	.882	0.989
Coefficients: Predicting average shame				
Depression (baseline)	0.052	0.01	<.001	1.053
Coefficients: Predicting average guilt				
Depression (baseline)	0.048	0.01	<.001	1.049
Covariances				
Shame with guilt	1.028	0.21	<.001	2.795

*Note.* EMA = ecological momentary assessment. Shame and guilt were assessed on the evening surveys over the course of the study period. Alcohol problems from the previous night's drinking were assessed on the morning surveys. Rate ratios provide measure of effect size.

**Table 2.5**

Unstandardized parameter estimates for the reverse multilevel models predicting shame and guilt over the EMA period in a combined model.

	<i>B</i>	<i>SE</i>	<i>p</i>
<b>Alcohol Use</b>			
<b>Level 1</b>			
Coefficients: Predicting morning shame			
Alcohol use	0.123	0.03	<.001
Coefficients: Predicting morning guilt			
Alcohol use	0.094	0.03	.001
Covariances			
Shame with guilt	1.431	0.22	<.001
<b>Level 2</b>			
Coefficients: Predicting morning shame			
Depression (baseline)	0.062	0.01	<.001
Number of drinks	0.024	0.11	.833
Coefficients: Predicting morning guilt			
Depression (baseline)	0.059	0.01	<.001
Number of drinks	0.063	0.13	.612
Coefficients: Predicting number of drinks			
Depression (baseline)	-0.017	0.01	.211
Covariances			
Shame with guilt	1.093	0.19	<.001
<b>Alcohol Problems</b>			
<b>Level 1</b>			
Coefficients: Predicting morning shame			
Alcohol problems	0.277	0.04	<.001
Coefficients: Predicting morning guilt			
Alcohol problems	0.300	0.06	<.001
Covariances			
Shame with guilt	0.944	0.33	.005
<b>Level 2</b>			
Coefficients: Predicting morning shame			
Depression (baseline)	0.022	0.02	.265
Number of problems	0.442	0.11	<.001
Coefficients: Predicting morning guilt			
Depression (baseline)	0.026	0.02	.266
Number of problems	0.370	0.12	.002
Coefficients: Predicting number of problems			
Depression (baseline)	0.162	0.02	<.001
Covariances			

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Shame with guilt	0.873	0.25	<.001
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*Note.* EMA = ecological momentary assessment. Alcohol use and problems from the previous evening were assessed on morning surveys over the course of the study period. Shame and guilt were also assessed on the morning surveys.



### CHAPTER 3

#### TRANSITION TO STUDY 2

The main purpose of Study 1 was to better understand proximal in-the-moment emotions that drive alcohol use and related problems among emerging adults with depression. Existing literature and theory have identified shame as a high risk emotion in the context of alcohol misuse (Luoma et al., 2019; Treeby & Bruno, 2012) but no longitudinal EMA designs have assessed shame in the context of emerging adults with depression. I hypothesized that daily experiences of shame, but not guilt, would mediate the association between baseline depression and alcohol use and problems across the 12-day EMA period. Partially supporting hypotheses, shame, and not guilt, averaged across the EMA period mediated depression and alcohol problems but not alcohol use. After adding both shame and guilt into a combined model, there was mediation present for only shame on alcohol problems, highlighting the uniqueness of shame on coping-drinking behaviours. Surprisingly, there was no significant mediation of daily levels of shame on depression and alcohol problems. Reverse models added to the story by highlighting a reciprocal relationship between shame, guilt, and alcohol problems.

Study 1 results extend extant research by highlighting it is stable, chronic levels of shame (i.e., shame averaged across the EMA period) that triggers alcohol problems as opposed to in-the-moment, fleeting feelings of shame. These results are important in informing both researchers and clinicians about the emotional facets that, when experienced with depression, increase an emerging adults' vulnerability to experiencing problems. Unfortunately, I was unable to adequately capture solitary drinking episodes in the EMA design which precluded a fulsome understanding of shame and solitary drinking in the context of depression-motivated drinking. Thus, Study 2 helps further the literature and address the major limitations of Study 1 by experimentally manipulating drinking context and assessing the unique influences of shame on alcohol craving in solitary and social contexts. Obtaining such experimental data with both individual and contextual factors will clarify the etiological pathway of depression-alcohol misuse.

Few experimental designs have assessed the role of shame and solitary drinking (Mohr et al., 2008) and there are limitations to the scarce existing research. While the work done to date begins to unveil the relationship between shame and solitary contexts, more work is needed to truly disentangle the role of shame in depression-motivated solitary drinking. The primary goal of Study 2 was to experimentally assess whether cravings for alcohol following a shame induction

differed depending on whether depressed emerging adults were in a solitary or social condition. Results from Study 2 help clarify the complexities of depression-motivated drinking behaviours and inform clinical assessment and intervention specifically targeted at shame and solitary contexts, two experiences that appear to exacerbate mental health concerns among emerging adults.

## **CHAPTER 4**

### **STUDY 2**

#### **Ashamed and Alone – Risk Factors for Alcohol Craving among Depressed Emerging Adults**

Chapter 4 is reprinted and used here with permission as it appears in Alcohol and Alcoholism (Bilevicius, E., Clark, C. C., Johnson, E. A., & Keough, M. T., Ashamed and alone – Risk factors for alcohol craving among depressed emerging adults, Alcohol and Alcoholism, 2020, 55, 5, 540-546. <https://doi.org/10.1093/alcalc/aaa056>), by permission of Oxford University Press. This material is copyrighted, and any further reproduction or distribution requires written permission from Oxford University Press.

## Abstract

**Background:** Comorbid alcohol use and depression has the highest prevalence among emerging adults and is associated with a number of consequences. Self-medication theory posits individuals with depression use alcohol to cope with their negative emotions. Preliminary work has investigated the social context of depression-related drinking and found that solitary drinking is a risky, atypical behaviour in emerging adulthood that is associated with alcohol misuse. However, it is unknown about what is unfolding in the moment that is driving depression-related drinking in solitary contexts. Accordingly, we used an experimental study to examine if shame mediated the association between depression and in-lab alcohol craving.

**Methods:** Emerging adults ( $N = 80$ ) completed a shame induction followed by an alcohol cue-exposure in either a solitary or social condition. We used moderated mediation to test hypotheses.

**Results:** Consistent with hypotheses, conditional indirect effects supported the mediation of depression and alcohol craving through shame among those in the solitary condition, but not in the social condition. There was no support for guilt as a mediator.

**Limitations:** There was a gender imbalance in our sample, and it was limited to university students, which may impact the generalizability of results. We also used unfamiliar dyads to construct our social condition.

**Conclusions:** Our study demonstrates that shame is a specific emotional experience that contributes to solitary drinking among depressed emerging adults. It is important to use these results to inform interventions that directly target solitary contexts and shame.

*Keywords:* depression; solitary context; shame; alcohol craving; experimental design

## **Introduction**

Alcohol use and depression are experiences common to emerging adults (ages 18-25; Arnett, 2005), with rates of comorbidity as high as 10% (Brière et al., 2014). Indeed, the comorbidity between alcohol misuse and depression has a strong empirical basis (Jakovljevic et al., 2013; Lai et al., 2015) and its prevalence is at its highest in emerging adulthood compared to any other age group (Brière et al., 2014), which is then strengthened by a family history of either depression or alcohol use (Castaldelli-Maia et al., 2019). The comorbidity of alcohol misuse and depression and either condition alone is associated with a number of negative sequelae (Brière et al., 2013; Jakovljevic, Jovanovic, & Lesch, 2015). Over time, individuals with comorbid alcohol misuse and depression place a greater burden on the healthcare system and are more likely to die at a younger age (Whiteford et al., 2013).

There has been extensive research into understanding the nature of the comorbidity between alcohol misuse and depression. The self-medication theory (SMT; Khantzian, 1997) hypothesizes that individuals with depression consume alcohol to escape their negative emotions due to the known analgesic effects of alcohol. Accordingly, emerging adults begin to consume alcohol as a means to cope with their depression (Cooper, 1994) or previous difficult life situations (Khosravani et al., 2019). Drinking to cope has been shown to be the most common motive for drinking in emerging adulthood (Grant et al., 2009) and among women that have experienced depression (Brown & Stewart, 2008). Compared to other motives, drinking to cope has been associated with consuming greater amounts of alcohol and experiencing alcohol-related problems indicative of alcohol use disorders (AUDs) including dependence, risky behaviours, and impaired control (Merrill et al., 2014). While there may be short-term mood-enhancing benefits for the individual when they consume alcohol (Khantzian, 1997), the associated long-term effects can be quite damaging. Thus, it is essential to understand the underlying mechanisms of the alcohol misuse-depression comorbidity in emerging adulthood, a time when depression and alcohol use are the highest across the life span (Brière et al., 2014).

Recent studies have shown that emerging adults that are depressed, likely due to their symptoms of low behavioural activation and interpersonal difficulties, engage in solitary drinking (Bilevicius, Single, Rapinda, et al., 2018; Keough et al., 2018), which is atypical for this age group (Neff, 1997). Solitary drinking has been associated with a host of negative outcomes,

such suicidal ideation and increased symptoms of depression, compared to social drinking (Gonzalez and Skewes, 2013). Solitary drinking has been associated with a greater number of alcohol-related problems compared to social drinking (Gonzalez and Skewes, 2013; Creswell et al., 2014), and more recently, with specific alcohol-related problems that overlap with AUDs (American Psychiatric Association [APA], 2013), such as blackout drinking, risky behaviours, and poor self-care (Keough et al., 2018). There is consistent research that has identified solitary drinking as a mediator in the depression-alcohol misuse pathway in emerging adulthood (Keough et al., 2015; Bilevicius, Single, Rapinda, et al., 2018). Thus, solitary drinking appears to be a risky behaviour that can help explain the depression-alcohol misuse relationship in emerging adults.

There have been very limited experimental studies that have examined solitary drinking. Few studies by Kuendig and Kuntsche (2012; 2013) have found that the quantity of alcohol consumption differs between solitary and social contexts and that the patterns of consumption are associated with levels of neuroticism. Although these two experimental studies provide a preliminary understanding of the mechanisms of solitary drinking, there are limitations. First, neither studies used a sample of emerging adults that experience depression. This is problematic as it is important to investigate depression-related drinking behaviours, like solitary drinking, among those that are the most likely to engage in such behaviours (Keough et al., 2018). Relatedly, the authors assessed the relevance of neuroticism and its association to solitary drinking. Although neuroticism is a broad construct that encompasses negative feelings like anxiety and depression, it is distinct from depression (Xia et al., 2011). Thus, we still do not have strong evidence to understand how depression is associated with solitary drinking and associated craving; we need to use experimental designs to manipulate emotions in the moment to understand what is driving depressed emerging adults to consume alcohol in solitary.

Shame is a potent social emotion and is defined as a negative emotion that can arise following difficult experiences (Lewis, 1971). Although commonly conflated in the literature, shame is distinct from guilt—an emotion associated with feelings of remorse for a particular event—as the latter focuses on the particular behaviour that was negative, whereas shame (inappropriately) focuses on the entire person (Lewis, 1971). Compared to guilt, shame is often associated with defensiveness (Lewis, 1971), feelings of depression (Kim et al., 2011; Johnson and O'Brien, 2013), and maladaptive behaviours like alcohol use (Luoma et al., 2017; Treeby

and Bruno, 2012), avoidance, and rumination (Kim et al., 2011; Treeby et al., 2020). From the perspective of SMT, it is possible that when an individual experiences shame, they desire to withdraw and be alone. Subsequently, they may experience ruminative thoughts, which is likely exacerbated when alone and not able to be distracted by external influences (Roelofs et al., 2009), leading them to crave and consume alcohol to cope with their discomfort. Thus, shame appears to be an in the moment emotion that can explain the association between depression and alcohol misuse (Bilevicius, Single, Bristow, et al., 2018).

Being alone appears to be a context where feelings of shame come out (Lewis, 1971) and elicit coping-motivated drinking (Bilevicius, Single, Rapinda, et al., 2018) as an attempt to slow thought processes and reduce feelings of shame. The craving of alcohol may be less salient when in social contexts as an individual is able to distract themselves from painful emotions. However, due to the strong association between depression and craving (de Timary et al., 2013) and the aforementioned avoidant tendencies associated with shame (Schmader and Lickel, 2006) and interpersonal difficulties associated with depression (APA, 2013), an individual may be less likely to engage in any social interactions and have fewer opportunities for distraction. The solitary context then permits the shame-craving cycle to play out, which leads to harmful solitary drinking. In other words, there appears to be an additive impact of being alone and experiencing shame that leads to atypical drinking behaviours in emerging adults. There is a paucity of experimental evidence that assesses this relationship and proposed mechanism underlying solitary drinking, shame, and alcohol craving. Thus, it is important to experimentally manipulate shame, using targeted techniques like a shame induction, to understand the in the moment emotions that effect solitary drinking and associated craving. Our objective was to assess the causal influence of shame on in-lab alcohol craving in solitary and social contexts among depressed emerging adults. Consistent with SMT, we hypothesized that after undergoing a shame induction and being subsequently exposed to alcohol, participants randomized to a solitary condition would crave alcohol more than individuals randomized to a social condition.

## **Methods**

### **Participants**

Our study was approved by the Human Research Ethics Board at the University of Manitoba. Participants were recruited through the online undergraduate psychology database. We recruited individuals between the ages of 18 and 25 who endorsed alcohol misuse (as

determined by scores of  $\geq 4$  for men and  $\geq 3$  for women on the Alcohol Use Disorder Identification Test-Consumption [AUDIT-C; Saunders et al., 1993]). We oversampled those endorsing high levels (scores of 16 or higher) of depression (43.8%) according to the Centre for Epidemiologic Studies in Depression Scale (CES-D; Radloff, 1977) to increase variability in our predictor.

A total of 80 emerging adults completed the study ( $M_{age} = 18.84$ ,  $SD_{age} = 1.38$ ; range 18-25), with 72.5% of participants identifying as female. Within the sample, 73.8% identified as White, 8.8% as Japanese, 3.8% Indigenous, 3.8% Latin American, 3.8% South Asian, 2.5% Black, 2.5% Filipino, and 1.3% Korean. There was almost an even proportion of those reporting being single (55%) and those in an on-going relationship (45%).

### **Procedures**

Interested participants contacted the lab and were emailed a link to an online screener survey to determine eligibility. A total of 769 individuals were screened for the study and 252 were eligible to participate. Eligible participants were invited into the lab to provide informed consent and complete the experiment. Those that expressed interest ( $N = 80$ ) were randomized to one of two experimental conditions using block randomization: solitary or social (same-sex dyads; Larsen et al., 2009; 2010). Participants first completed a series of questionnaires. Then, they completed the shame induction task (Leary et al., 2007) where they were asked recall one of their most shameful experiences and write about it for 15 minutes, which is a mood-induction technique that has been used in previous experimental studies to induce state shame in previous experimental studies (Leary et al., 2007; Johnson and O'Brien, 2013). In the shame induction task, participants were asked to thoroughly describe the shameful experience that occurred, including when it occurred, who was there, what happened just before and just after the event, etc. Participants were then asked to describe what happened and what they did and how they felt as this experience occurred. After the completion of the shame induction, participants completed a visual analogue scale (VAS) to determine their degree of shame.

The cue-exposure occurred in solitary and social conditions 15 minutes after the shame induction. An alcohol cue-exposure is a method commonly used in the literature to evoke or assess cravings for alcohol in emerging adults (Adams et al., 2019; Ramirez et al., 2015; Smith-Hoerter et al., 2004). For participants randomized into the social condition, they were brought together into a single lab room that was set-up as a bar so that the cue-exposure occurred



together and resembled a possible drinking setting. This is a cue-exposure design that is similar to previous research (Kuendig and Kuntsche, 2012; 2013). A research assistant presented a bottle of the preferred beverage and poured the beverage in front of participants. They were then encouraged to use their senses to observe the beverage – all without consuming it – for a total of five minutes. Alcohol was rubbed to the rim of the glasses to enhance the overall cue-exposure (Keough et al., 2016). Individuals in the solitary condition were told to think about the drink to themselves, whereas individuals in the social condition were told to discuss the drink with each other to further strength the distinction between the solitary and social conditions. After the five minutes elapsed, participants rated their level of craving for alcohol, their level of shame using a VAS, and were debriefed. All participants received compensation for their participation.

### **Measures**

**Demographic questionnaire.** A demographic questionnaire was used to obtain basic characteristics of the sample.

**Centre for Epidemiologic Studies in Depression Scale.** The CES-D (Radloff, 1977) is a 20-item depression screening tool. Participants indicated their level of agreement to behaviours/feelings in the last week on a 4-point Likert scale (0 = *rarely or none of the time*; 3 = *most or all of the time*). Scores on the CES-D range from 0 to 60, with scores of >16 indicating at-risk for clinical depression. The CES-D is a well-validated and reliable scale, with reliability scores ranging from  $\alpha = 0.85-0.90$  (Chokkanathan and Mohanty, 2013; Malakouti et al., 2015). In the present study, internal consistency was good ( $\alpha = .89$ ).

**Alcohol craving.** The Alcohol Craving Questionnaire (ACQ; Singleton et al., 1995) is an 18-item questionnaire that assesses the degree to which an individual craves alcohol in the moment. Participants rated their agreement to a number of statements on a 7-point Likert Scale (1 = *strongly disagree*; 7 = *strongly agree*). The ACQ has been shown to have good reliability, with reliability values ranging from  $\alpha = 0.77-0.86$  (Singleton et al., 2000). In the present study, internal consistency was excellent ( $\alpha = .94$ ).

**Visual analogue scale.** A VAS was used to capture current emotions during the study. Participants rated their mood on six emotions (ashamed, guilty, anxious, angry, happy, sad) on a line that ranges from 0-100 before and after the shame induction and following the cue-exposure.

### **Data Analysis**

Data were analyzed using the PROCESS macro in SPSS (Hayes, 2013). We used moderated mediation to assess whether social context moderated the influence of shame (mediator) on the pathway from depression (predictor) to alcohol craving (outcome). We used indirect effects to assess the presence of mediation and used effect sizes and 95% confidence intervals (CI) to evaluate our overall model (Fritz and Mackinnon, 2007). An indirect effect is considered supported if the 95% CI does not include zero.

## Results

### Descriptive Statistics, Zero-Order Correlations, and Manipulation Check

Table 1 presents our descriptive statistics and zero-order correlations. Compared to other published North American studies among emerging adults, we observed comparable average scores of depression (Girz et al., 2013; Single et al., 2019). The shame induction was successful in inducing state shame, revealing higher follow-up shame scores relative to baseline for participants in both the solitary ( $t(41) = -6.76, p < .001$ ) and social conditions ( $t(36) = -6.28, p < .001$ ). As expected, there was a change in negative emotions following the shame induction including shame ( $d = .90$ ), guilt ( $d = .91$ ), anger ( $d = .82$ ), and sadness ( $d = .56$ ).

### Hypothesis Testing

Figure 1 presents the results from our primary moderated mediation model. We found that depression was a positive predictor of self-reported post-task shame. As hypothesized, we also found support that the effect of post-task shame on post-cue alcohol craving depended on social context condition. Specifically, there was a supported indirect effect of depression on alcohol craving through shame, but only when conditioned on the solitary condition ( $b = 0.0170$ , 95% CI [.0036, .0351]) and not the social condition ( $b = -0.0015$ , 95% CI [-.0166, .0157]). Overall, these results suggest that increases in shame may help explain why depressed emerging adults crave alcohol when alone (versus when in the presence of others).

We ran an opposing model with guilt as mediator (see Figure 2). In this model, depression was a positive predictor of self-reported post-task guilt. However, we did not find support for an overall association between post-task guilt and post-cue alcohol craving and this association was not moderated by social context condition (solitary condition [ $b = 0.0076$ , 95% CI {-0.0035, .0213}]; social condition [ $b = -0.0038$ , 95% CI {-0.0155, .0083}]). This suggests that shame (and not guilt) is a central emotional mechanism underlying depression-related solitary drinking.

## Discussion

This is the first experimental study to examine the context-specific influences of shame on the depressive-pathway to alcohol craving. Consistent with literature on shame and alcohol misuse (Treeby and Bruno, 2012; Bilevicius, Single, Bristow, et al., 2018), we found that shame, not guilt, was a unique mediator of alcohol craving. Extending extant literature on the riskiness of solitary drinking (Creswell et al., 2014; Bilevicius, Single, Rapinda, et al., 2018; Keough et al., 2018), we found that the mediation of shame on the depression-alcohol craving relationship was observed in the solitary, but not social condition. These results suggest that there is a context-specific effect of shame that occurs for emerging adults with depression that increases their craving for alcohol and ultimately their propensity to misuse alcohol. Consistent with SMT, these results highlight that solitary drinking appears to exacerbate the association between depression, shame, and alcohol craving.

Our findings support the notion that there are context-specific cueing effects of alcohol for emerging adults experiencing negative affect. It is not surprising then that we found depression-related alcohol craving, given that approximately over 40% of emerging adults have reported engaging in coping-motivated drinking (Park and Levenson, 2002) and depressive states are strongly linked to craving for alcohol (de Timary et al., 2013). It is likely that when an individual experiences intense negative emotions, like the shame that was induced in the present study, they withdraw socially (Segrin, 2000), and in an attempt to cope with the emotions, they turn to alcohol (Khantzian, 1997; Treeby et al., 2020). This solitary drinking then leads an emerging adult to become more susceptible to experiencing severe alcohol-related problems (Keough et al., 2018) and possibly an AUD (Creswell et al., 2014). Thus, a new reinforcement pattern may develop where not only the negative emotions trigger alcohol craving and drinking, but the solitary context alone may drive these risky drinking behaviours. Although the craving and associated drinking will provide temporary relief, its momentary benefits contribute to the continuation of use and the development of more serious problems (Keough et al., 2018).

Not surprisingly, guilt did not mediate the association between depression and alcohol craving. This result is consistent with literature that proposes that there is specificity of shame that drives depressed emerging adults to experience alcohol misuse (Treeby and Bruno, 2012; Bilevicius, Single, Bristow, et al., 2018; Luoma et al., 2018; Treeby et al., 2020). The differential findings between shame and guilt can be interpreted by understanding the fundamental

differences between these two emotions. Specifically, shame is a social emotion that is self-directed towards the entire self and is associated with avoidant tendencies (Lewis, 1971; Treeby et al., 2020). However, guilt is a more adaptive emotion that is specific to the incident that occurred and is associated with more reparative strategies (Tangney et al., 2007). With this fundamental understanding, it is not surprising that shame has been associated with more self-medicating behaviours (Bilevicius, Single, Bristow et al., 2018) as the individual is less able to accept and approach the event that occurred but rather act in ways to ignore it. Indeed, a recent paper identified that shame, but not guilt, was associated with avoidant coping strategies, particularly in the context of negative affect (Treeby et al., 2020). Further, recent research has identified that shame is associated with impaired control and greater negative urgency, which is in turn predictive of the experience of alcohol-related problems. (Patock-Peckham et al., 2018), and shame-related drinking has been associated with specific alcohol-related problems like impaired control (Treeby et al., 2020). Taken with the present research, it appears that shame may increase an emerging adult's propensity to engage in risky drinking behaviours possibly due to an inability to cope with their emotions and, in turn, the desire to ameliorate said negative affect. Research is continuing to support a differential influence of shame and guilt on the experience of negative affect and alcohol misuse (Luoma et al., 2017). The support for the specificity of shame in the current study identifies a group of individuals that may be more prone to engaging in negatively reinforcing pathways of alcohol misuse and experience additional psychiatric symptomatology, which is important clinically.

It is important to acknowledge the nonsignificant findings that were observed in the social condition. Although there is strong evidence that suggests solitary drinking is associated with depression-related drinking (Gonzalez and Skewes, 2013; Creswell et al., 2014; Bilevicius, Single, Rapinda et al., 2018), it is also possible that particular social contexts can intensify negative emotions. It has been argued that when someone feels ashamed, there can be a strain on intimate relationships (Black et al., 2013). Here, our social condition was comprised of unfamiliar dyads, which although is commonly used as a social condition (Larsen et al., 2009), may not generalize to other social contexts. We found that the in-the-moment ratings of shame were significantly lower in the social condition after the in-lab alcohol cue-exposure compared to the solitary condition ( $t(78) = 2.91, p = .005$ ), suggesting that being around an unknown person in our social condition may have helped ease the feelings of shame which, in turn, may have

lessened their association with craving. Another possible explanation for the null findings could be related to interpersonal difficulties symptom that is often experienced in depression (APA, 2013). Depression might be associated with drinking in intimate contexts, like with a close friend or romantic partner, which was not captured by using unfamiliar dyads. However, some social conditions, compared to solitary conditions, have also been associated with increased drinking behaviours (Kuendig and Kuntsche, 2012). There is an apparent gap in the literature that assesses the variations in social contexts and how these different formations may influence the depression-addictive behaviours chain and whether they mirror solitary contexts. It would be interesting for future research to determine whether similar coping behaviours exist when shame is experienced in front of intimate partners.

These results have important clinical implications. Clearly, solitary drinking is a risk factor for experiencing alcohol craving and related problems (Keough et al., 2018), which highlights the importance for screening and assessing for the presence of solitary drinking among emerging adults. If this atypical drinking behaviour is occurring, it would be helpful to use both psychoeducational and motivational interviewing techniques to discuss the risks and benefits of solitary drinking. Given the relevance of shame in the drinking to cope pathway, it would also be helpful to assess for the presence of shame and provide targeted techniques for challenging this emotion, like using a self-compassion intervention (Leary et al., 2007). Here, rather than judging oneself, an individual is encouraged to view the shame-inducing event more objectively and create distance between themselves and the event and offer oneself kindness (Johnson and O'Brien, 2013). By intervening at emerging adulthood, it is possible to reduce the proportion of emerging adults that go on to develop a debilitating AUD.

There are limitations to the current study that must be considered. First, we used convenience sampling and our sample was predominantly White females, which may limit generalizability of our findings. Second, although we had our lab room set-up as a bar, it is possible that the set-up did not closely mimic that of a typical drinking environment which would pose limitations to ecological validity. Third, in our social condition, we used same-sex dyads and confirmed that neither participant knew each other. However, we made this decision due to the evidence that highlights the risks of using mixed-sex dyads in drinking studies (Larsen et al., 2009). Given the variability in possible social drinking contexts, like drinking with strangers (as done in the present study) or with intimate partners, it would be important for future

research to examine the possible differential impacts of social drinking on alcohol craving and consumption depending on the degree of familiarity that exists between participants.

To our knowledge, we are the first to experimentally examine the context-specific cueing effects of alcohol craving following a shame induction. These results support the notion that there are risks of alcohol craving and misuse that are specific to the experience of shame in solitary contexts that are not present in social contexts. This is an important time to better understand the underlying risk factors of alcohol misuse given the high prevalence of misuse among emerging adults (Adlaf et al., 2005; Ialomiteanu et al., 2016) and the necessity for more specific interventions to help this vulnerable population.

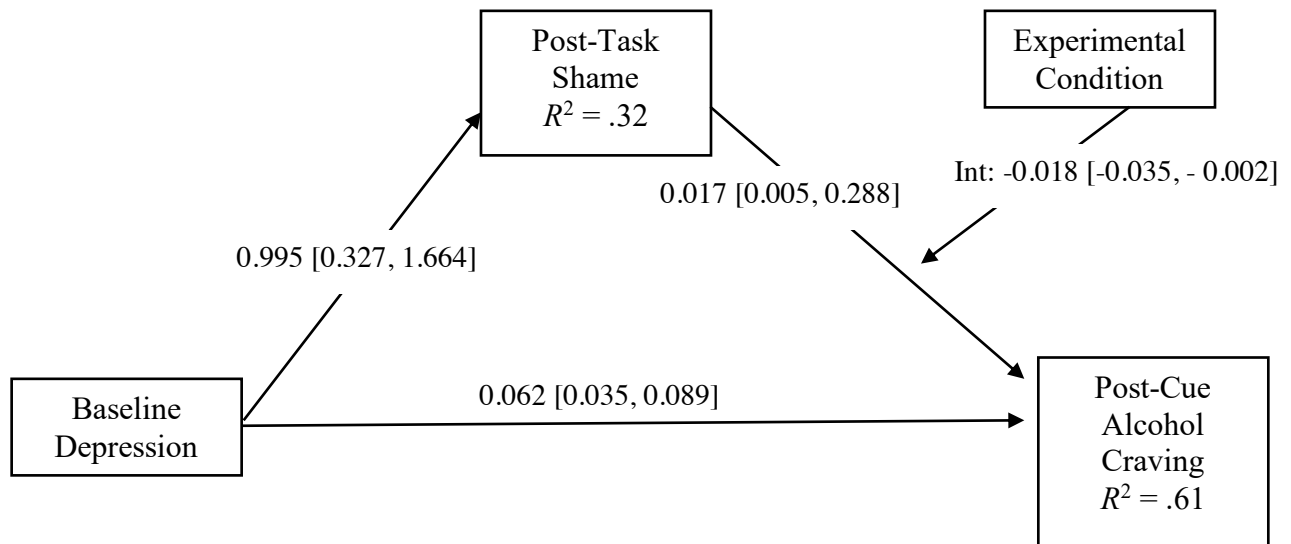
Table 4.1  
*Descriptive statistics and bivariate correlations.*

	1	2	3	4	5	6	7
1. Baseline Depression	-	.34**	.32**	.50**	.32**	.25*	.53**
2. Baseline Shame		-	.70**	.22*	.50**	.44**	.37**
3. Baseline Guilt			-	.17	.32**	.60**	.32**
4. Baseline Alcohol Craving				-	.25*	.04	.83**
5. Post-Shame					-	.68**	.31**
6. Post-Guilt						-	.16
7. Post-Alcohol Craving							-
Overall sample							
<i>M</i>	15.51	13.81	16.46	2.86	39.45	35.39	3.32
<i>SD</i>	8.74	19.92	23.00	1.16	27.33	28.68	1.21
<i>Min - Max</i>	1-52	0-71	0-80	1-6.33	0-90	0-85	1.17-6.24
Social condition							
<i>M</i>	14.71	14.54	17.37	2.72	42.29	40.00	3.13
<i>SD</i>	7.67	20.99	23.09	1.13	27.69	29.88	1.27
Solitary condition							
<i>M</i>	16.24	13.17	15.64	2.98	36.88	31.21	3.50
<i>SD</i>	9.64	19.16	23.17	1.18	27.16	27.23	1.13

*Note.* *M*, means; *SD*, standard deviation. *Min - Max*, minimum – maximum; Post-shame and post-guilt refer to the ratings of emotions after engaging in the shame induction task. Post-alcohol craving refers to craving after the cue-exposure.

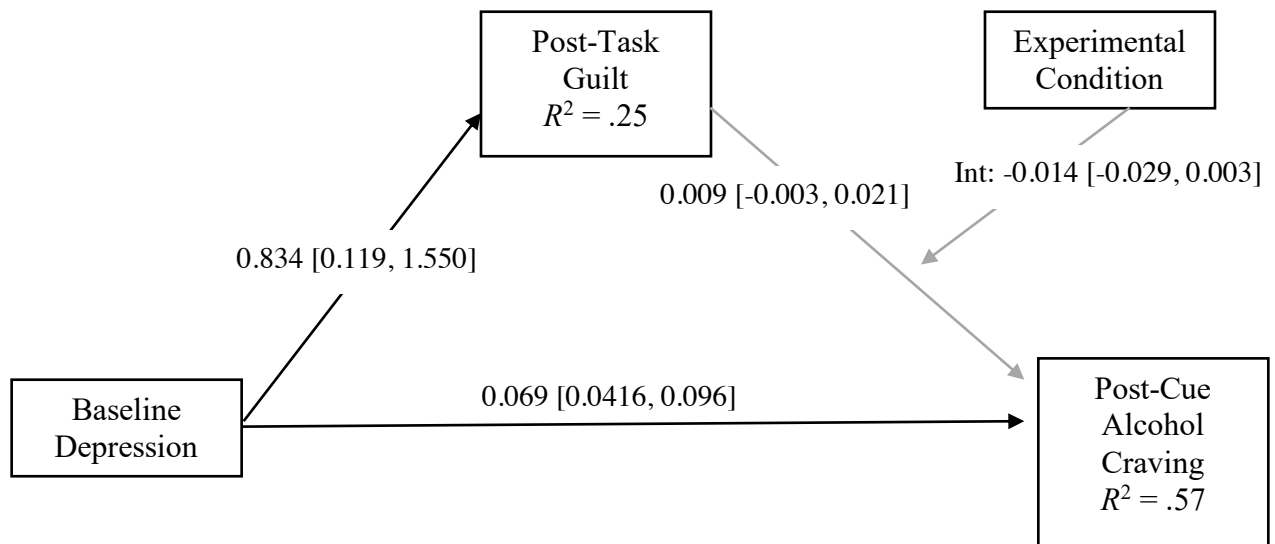
\*  $p < .05$ .

\*\*  $p < .01$ .



*Figure 4.1.* Moderated mediation of depression predicting post-cue alcohol craving mediated by shame. Experimental condition interaction supports the presence of mediation in the solitary condition, but not the social condition. Path coefficients are in the following order: unstandardized coefficient [95% CI]. Paths are significant at  $p < .05$ .





*Figure 4.2.* Moderated mediation of depression predicting post-cue alcohol craving mediated by guilt. Experimental condition interaction does not support the presence of mediation. Path coefficients are in the following order: unstandardized coefficient [95% CI].

## CHAPTER 5

### GENERAL DISCUSSION

#### **Summary of Findings**

The aim of the current dissertation was to clarify the role of shame in depression-motivated drinking among emerging adults. Coping models of drinking have robust empirical support (Grant et al., 2009; Grazioli et al., 2018) and posit that alcohol is used to cope with strong negative emotions due to its known numbing properties (Cooper, 1994; Khantzian et al., 1997) which becomes ingrained through learned expectancies (Bandura, 1977; 1991); less is known about what underlies the depression-alcohol misuse association. Both theory and my body of research have found that shame (Bilevicius, Single, Bristow, et al., 2018) and solitary drinking (Bilevicius, Single, Rapinda, et al., 2018) are relevant etiological considerations for emotionally-vulnerable emerging adults. But more sophisticated approaches were needed to truly understand the complex associations between depression, shame, and high-risk drinking behaviours. Consistent with coping models of drinking (Cooper, 1994; Khantzian et al., 1997), shame is an emotion that helps explain risky drinking behaviours and the experience of problems among emerging adults, both when assessed proximally to drinking and when induced experimentally, and is exacerbated when in solitary conditions. The current findings highlight the necessity of thoroughly assessing for shame in the context of depression in emerging adulthood given the associated negative sequelae.

**Study 1.** The objective of Study 1 was to longitudinally assess shame as a proximal emotional trigger for alcohol use and related problems to clarify the role of shame in depression-motivated alcohol misuse. Clear evidence delineates the role of shame and guilt in the experience of alcohol misuse (Patock-Peckham et al., 2018) and findings suggest that shame and not guilt is associated with greater alcohol problems and hazardous drinking behaviours (Treeby & Bruno, 2012; Treeby et al., 2018). Consistent with aforementioned work and as hypothesized, results of Study 1 suggested that overall levels of shame were a unique mediator of depression and alcohol problems, but not consumption, in a naturalistic environment (i.e., over four consecutive drinking weekends). There was evidence of mediation at the average but not daily level, suggesting that chronic, stable feelings of shame are proximal emotional correlates of alcohol problems rather than fleeting momentary shameful feelings. Supporting hypotheses, there was no mediation observed for the role of guilt on depression and alcohol use or problems when assessing guilt alone and after

adding shame and guilt into a combined model. While still considering the notable limitations to the study (e.g., the assessment of shame, lack of clear temporal precedence, inability to assess drinking context), Study 1 moves the field of emerging adult-alcohol misuse research forward by clearly identifying unique implications of shame. In fact, behavioural research has found that non-verbal displays of shame (chest narrowing and shoulder posture; i.e., non-self-reported shame) among newly recovering alcoholics predicted future relapse tendencies (Randles & Tracy, 2013). Together, these findings highlight the risks associated with on-going experiences of shame and the need for appropriately assessing and treating shame to prevent these future detrimental consequences. The work by Randles and Tray (2013) also draws attention to another more subtle conclusion regarding the assessment of shame; non-self-report measures are possible and predictive of future harmful behaviours. Integrating non-verbal assessments of shame with more empirically-validated measures will allow the field to obtain a more fulsome picture of shame's role in psychopathology given that shame, an intensely painful experience, may be denied or underreported by some, particularly in the context of research (Eterović, 2020).

Study 1 results are also consistent with literature that has highlighted an important distinction between assessing alcohol use and problems (Keough et al., 2016). Research has found that alcohol problems (including loss of control over drinking), not use, are indicative of on-going concerns and future development of an AUD (Olsson et al., 2015). In Study 1, a significant relationship was observed for alcohol problems but not overall consumption, which speaks to the continued need to assess alcohol outcomes separately in research. Clinicians must be vigilant for alcohol problems when assessing emerging adults' experiences as these problems are likely more indicative of future alcohol misuse and emotional concerns.

A more unique, and important result from Study 1 was lack of within-person findings regarding daily experiences of shame on alcohol misuse. It seems plausible that the measurement of shame and the lack of solitary drinking assessments in the current work may account for this result as there was no way of knowing whether the context-specific effect was present which has been demonstrated to impact drinking behaviours, as in Study 2. But this limitation provides an important area of future research: EMA research should assess shame in conjunction with drinking contexts to understand if solitary drinking exacerbates in-the-moment and next-day feelings of shame. Such research would better inform the literature as both individual and contextual factors are needed to have the most fulsome understanding of depression-motivated drinking.

**Study 2.** The overall goal of Study 2 was to experimentally examine the role of both drinking context and shame on depression-alcohol misuse among emerging adults. Consistent with hypotheses and initial findings from Study 1, shame was a significant mediator of depression and alcohol craving. Interestingly, shame was only a significant mediator of craving when it was cued in a solitary condition. That is, solitary context moderated shame's mediational role on alcohol craving, which is important given that alcohol craving is a reliable predictor of future AUDs (Schlauch et al., 2019). Findings from Study 2 highlight a context-specific effect that was necessary to trigger the potency of shame, which aligns with motivational and coping models of alcohol misuse (Cooper, 1994; Khanzian, 1997). The solitary context likely enhanced the felt need to cope with strong negative emotions (Corbin et al., 2020) due to the increased saliency of emotions that is common in solitary contexts (Arpin et al., 2015), the learned alcohol expectancies that have developed, and the inability to observe or learn from others about adaptive coping mechanisms that is possible in social contexts. Study 2 provides stronger evidence that individual (e.g., physiological arousal), self-regulation, and contextual factors are all important in depression-motivated drinking, confirming social cognitive and self-medication theories.

Shame is a commonly experienced emotion that is associated with low self-esteem, psychological distress (Velotti et al., 2017), and increased drinking behaviours (Patock-Peckham et al., 2018). Although previous research has corroborated shame's importance in coping-motivated drinking (Bilevicius, Single, Bristow, et al., 2018), the current work is among the first to elucidate mechanisms that increase the influence of shame. Arpin and colleagues (2015) conducted a daily diary study among a moderate-drinking adult sample to assess the role of loneliness and context-specific drinking. Their multilevel models found that loneliness predicted increased solitary drinking and less time spent in social interactions. Loneliness and depression have a well-established relationship (Cacioppo et al., 2006; Erzen & Çikrikci, 2018; Weeks et al., 1980), and taken with the work that has demonstrated the role of solitary drinking in depression-motivated drinking (Bilevicius, Single, Rapinda, et al., 2018; Keough et al., 2015; 2018), it seems that solitary contexts (which commonly trigger feelings of loneliness) likely have an additive effect on the experience of shame that ultimately increases alcohol craving and misuse.

### **Theoretical Contributions**

The current dissertation contributes to the emerging adult-alcohol misuse literature in many ways. This work is one of the first to assess shame as a mediator of depression and alcohol misuse

among emerging adults. Much of existing work assesses some combination of factors (e.g., shame and alcohol misuse [Bilevicius, Single, Bristow, et al., 2018; Treeby & Bruno, 2012], shame in emerging adulthood [Mohr et al., 2008]), but limited research, particularly non-correlational research, has looked at associations in the context of depression specifically. This is problematic as it has precluded the assessment of shame as a mediator in depression-motivated drinking, an analysis important for understanding etiological mechanisms.

Depression (Ibbrahim et al., 2013) and substance use (Davis et al., 2012) are common experiences for emerging adults and depression-AUD comorbidities are well-established (Brière et al., 2014; Grant et al., 2004). Over the last decade, shame has been identified as an important feature in depression (Johnson & O'Brien, 2013; Kim et al., 2011; Orth et al., 2006), albeit not in contemporary diagnostic criteria, alcohol misuse, and risk of future relapse (Randles & Tracy, 2013). The significant findings from this dissertation contribute to the overall conceptualization of shame in depression-motivated drinking. Shame seems to have an additive impact to the experience of depression that exacerbates when in a solitary context and puts an emerging adult at greater risk for experiencing problems. Etiologically, this work highlights that experiences of shame (both that naturally occur [Study 1] and that are induced [Study 2; e.g., Hogarth et al., 2018]) are potent for emerging adults that are emotionally vulnerable, which provides useful assessment and treatment targets for clinicians and researchers.

Second, the present results advance the distinction between shame and its counterpart guilt in depression-motivated drinking. I have found that shame is associated with unique etiological pathways, which is likely at least in part due to self-stigma and avoidance that is associated with shame (Lewis, 1971) and attributional differences between shame and guilt (Kim et al., 2011). Even though the shame-guilt distinction has received empirical support (Merrill & Monti, 2015), there is a paucity of work that has sufficiently compared the emotions to one another in the context of addiction. In this dissertation, evidence suggested that although a reciprocal association between shame, guilt, and alcohol problems exists, shame, and not guilt, helps explain the experience of alcohol problems in the context of depression. This result is consistent with research conducted by Dearing et al. (2005) in emerging adult and inmate samples that found shame but not guilt was related to substance-related problems. More contemporary research among emerging adults has found that the experience of shame was related to greater alcohol problems through unique facets of impulsivity including negative urgency and impaired control, whereas experiences of guilt had

the opposite effect (Patock-Peckham et al., 2018). One possible explanation is that the lack of self-regulation (e.g., elevated negative urgency) that is often present in shame, paired with the learned behaviour of self-medicating to escape the strong negative emotions (Bandura, 1991; 1997; Khantzian, 1997) may be driving the coping-motivated drinking. Theoretically, this finding is important given the current DSM-5 depression criteria has no mention of shame (APA, 2013), but it is becoming clear that shame is a pertinent emotion that accompanies depression that worsens the experience of alcohol problems (Kim et al., 2011). It is important for both clinical and nonclinical researchers to continue to highlight the importance of shame as, when gone unrecognized, can contribute to dangerous behaviours, both at present (Dearing et al., 2005) and in the future (i.e., developing an AUD; Lemoine et al., 2020).

Although findings from the current dissertation and extant literature highlight the unique role of shame in alcohol misuse (Treeby & Bruno, 2012), post-hoc results from Study 1 found that experiencing alcohol problems mediated the association between baseline depression and both shame and guilt across a month of drinking weekends. Perhaps due to measurement issues, it has been argued that individuals have difficulty separating similar emotions (Erbas et al., 2019), particularly when depressive symptoms are experienced (Willroth et al., 2020). There has been very limited work that has captured in-the-moment feelings of shame and guilt and the work that has been done often utilizes single-item assessments of both emotions (O'Hara et al., 2014). This dissertation is a first step in clarifying the distinction between in-the-moment experiences of shame and guilt in depression-motivated alcohol misuse among emerging adults. The current work highlights that although shame can be a distinctive mediator of depression and alcohol problems and craving, emerging adults may have difficulty identifying shame from guilt when they are experiencing said problems in-the-moment and emotionally overwhelmed. Theoretically, results emphasize the need for more fulsome assessments of shame and guilt as these self-conscious emotions seem to have a pivotal role in risky behaviours and decision-making.

Finally, results from this dissertation suggest that context is necessary to fully understand the role of shame in emerging adult depression-motivated drinking. Context-specific drinking is not a new phenomenon and solitary drinking is considered a developmentally atypical behaviour for emerging adults (Keough et al., 2018; Neff, 1997), yet there has been limited research in this area. As discussed, work by both Luoma and colleagues (2018) and Mohr et al. (2008) have confirmed the role of shame in solitary drinking. Results from Study 2 help advance the field by

revealing the increased potency of shame when cued in a solitary condition. Social withdrawal is a common symptom of depression (APA, 2013) which, in turn, can create an ideal environment to engage in solitary drinking, a behaviour known to be associated with increased odds of an AUD (Keough et al., 2018). By developing a more comprehensive understanding of the risks of solitary drinking and the role shame has in solitary drinking as done in the current dissertation, clinicians can be better equipped for preventative measures in addition to treating the alcohol misuse, which is known to be quite treatment resistant when in the context of depression (Teesson et al., 2000).

### **Clinical Implications**

There are significant clinical implications that follow from this dissertation. Burgeoning literature has highlighted the importance of assessing individual factors in the context of mental health (Musiat et al., 2014) and alcohol misuse treatments (Conrod, 2016; Lammers et al., 2015). For example, Lammers et al. (2015) used individual personality factors on the Substance Use Risk Profile Scale to tailor clinical intervention for alcohol misuse, which has been found to be advantageous in curbing the development of future alcohol problems (Conrod, 2016). Adding support to tailoring interventions is research that has demonstrated that personality traits (Adams et al., 2019) or emotional experiences (e.g., as found in Study 2) are important considerations to fully understand etiological alcohol risk-pathways. Taken with the mediation (i.e., Study 1) and moderated-mediation (i.e., Study 2) results in the current dissertation, there is clear need to thoroughly assess shame among emerging adults that experience depression and alcohol misuse so if shame is present, appropriate (and likely tailored) treatment can follow. Given the lack of mention of shame in the most contemporary DSM criteria for depression and AUDs, greater onus is inherently placed on practitioners to be aware of shame and its potential for deleterious repercussions. An initial step may be to include a brief measure of shame in standard clinic questionnaire batteries for mental health treatment or asking open-ended questions in intake appointments with new clients. Not only do such measures provide greater information for the clinician, but it also allows the client to learn (albeit indirectly) that shameful experiences can be discussed in therapy which may, in turn, reduce avoidant tendencies. At a minimum, discussions of shame and the associated risks could be included in psychoeducation to impart a sense of common humanity and reduced judgment, two essential features of self-compassion that are effective in ameliorating feelings of shame (Johnson & O'Brien, 2013).

Research highlights that shame is an appropriate treatment target (Luoma et al., 2012; Sawyer et al., 2020), and there are particular strategies, like mindfulness-based approaches (Proeve et al., 2018) and Acceptance and Commitment Therapy (ACT; Luoma & Platt, 2015), designed specifically to target self-criticism and shame. For example, Luoma and colleagues (2012) administered an ACT-based group intervention that was tailored to adults that experienced shame and alcohol misuse. Compared to a group receiving treatment-as-usual (TAU), individuals in the shame-focused ACT group were more likely to attend treatment, which mediated reductions in substance use four months later. Although there were improvements observed in the TAU condition, the results were more stable and consistent for those that received therapeutic strategies directly targeted to shame (e.g., tug-of-war with shame-based thoughts). Given that shame is an emotion that is commonly avoided or not often thought to be discussed, the findings from Luoma et al. (2012) support the idea of targeting shame directly to maintain reductions in substance use and related problems. A recent qualitative study highlighted that deep-rooted feelings of shame preceded alcohol behaviours, but recovery was associated with finding a safe place to discuss experiences with shame (Sawyer et al., 2020). It is our responsibility as clinicians to create a warm and safe environment to allow clients to face topics or experiences that are painful to talk about. Emerging adults are known to access treatment at considerably lower rates than both their adolescent and adult counterparts (Mental Health Commission of Canada, 2017) and given shame's avoidant tendencies (Yelsma et al., 2002), it is not hard to imagine that strong feelings of shame may further preclude emerging adults from accessing necessary therapy and services. As this dissertation has demonstrated, when shame is experienced, particularly in solitary contexts, there is increased risk for alcohol problems and craving. By addressing shame directly, especially in the context of emerging adults with depression and substance misuse, we may be able to prevent the development of negatively reinforcing, maladaptive coping behaviours into adulthood and lessen the susceptibility of developing an AUD (Lemoine et al., 2020).

Results from Study 2 advance the substance use research field by demonstrating the moderating effect of solitary context on the experience of shame. This research highlights the need to probe for solitary drinking during initial assessments with emerging adults that experience depression or alcohol misuse. At the present time, there is limited easily shareable information (e.g., infographics) discussing the risks of solitary drinking, and there are no known interventions to address this context-specific drinking behaviour which is concerning given the significant



negative consequences that stem from solitary drinking (Bilevicius, Single, Rapinda, et al., 2018; Keough et al., 2018; Skryznski et al., 2021). Ideally, risks (including risk factors and negative consequences) of solitary drinking can be shared with emerging adults during high school as part of a targeted wellness psychoeducation plan to increase a sense of self-efficacy rather than relying on coping behaviours for dealing with life stresses. According to SCT, directly addressing the low self-efficacy that is common among students transitioning into university (Ham & Hope, 2003) is an important step in mitigating the development of negative alcohol expectancies (Young et al., 2006). Intervening near the beginning of emerging adulthood would be ideal to inform individuals about the risks associated with such drinking behaviours before many individuals begin to experience the life transitions characteristic of emerging adulthood which may serve as a catalyst for either future or further problematic drinking behaviours given that the early to middle years of emerging adulthood (i.e., 19-22) are associated with the highest rates of problem drinking (White & Jackson, 2004).

### **Limitations**

It is important to acknowledge limitations to the current dissertation. The samples in both studies were comprised of emerging adult university students, which is not necessarily representative of the entire emerging adult population. However, almost three quarters of emerging adults attend university, even if they do not complete a degree (Arnett, 2016) and entering university can be seen as a particularly stressful life challenge that is typical for emerging adults (Weitzman, 2004). Further, it has been suggested that rates of alcohol misuse are comparable between college and non-college attenders (42.6 versus 38.1%, respectively; Dawson et al., 2004). It is then reasonable to use university students as a first step in understanding the etiological mechanisms of shame and drinking context in emerging adult depression-motivated drinking.

In Study 1, a brief EMA method was chosen to provide in-the-moment “snap shots” of an emerging adults experience. Although this approach has been used in previous research (Luoma et al., 2018), there are limitations. For example, I was unable to adequately assess for the presence of solitary drinking. Perhaps due to the structure the EMA prompts or a true lack of solitary drinking episodes observed in the current sample, I was unable to assess the proximal (and possible reciprocal) influences of shame in solitary contexts, which have been observed previously (Luoma et al., 2018) and here (i.e., Study 2). The results from Study 1 are still novel and expand existent

knowledge, particularly as my research was conducted in a sample of emerging adults with depression and employed a mediational design which are previous gaps in the literature.

Another limitation that arose from the brief EMA format was the assessment of emotions. It is common to use single-item mood assessments in EMA designs (Wray et al., 2014). However, due to the high correlation between the shame and guilt variables, it became difficult to understand temporal associations and the true specificity of shame. After using advanced statistical modeling, results still suggested that the experience of socially-triggered emotions (i.e., shame) contribute to depression-motivated alcohol misuse.

In Study 2, while drinking context was found to be an important moderator of depression, shame, and alcohol craving, the actual conditions may not have been representative of naturalistic solitary and social contexts. Our drinking contexts were created in line with previous research (Larsen et al., 2009, 2010), but it is also true that the contexts (particularly the social context) may have felt artificial to participants and not emulated a true social situation (e.g., drinking at a bar). The potential lack of ecological validity may limit the social context findings that were presented in this dissertation, which was discussed in detail in the Discussion section of Study 2. However, I was still able to observe interesting effects and found distinct results between the solitary and social conditions, which arguably supports a distinction even if not ecologically valid. Thus, Study 2 was an important initial step for informing theoretical and etiological pathways about the relevance of drinking contexts, and such work should be replicated experimentally and in naturalistic settings.

### **Future Directions**

There are a number of future directions that stem from the current research. As aforementioned, the entirety of emerging adulthood has not been captured here. Although a large majority of emerging adults do attend some form of post-secondary education (Arnett, 2016), research has identified differences between emerging adult student and non-student samples. For example, a student sample of emerging adults were found to be at greater risk for alcohol problems compared to their non-student counterparts (Carter et al., 2010) although there was no discussion on what may be underlying said difference. While much of alcohol-based research in emerging adulthood has relied on university samples, it is essential to obtain a more representative understanding of depression-motivated drinking, and perhaps utilizing a clinical-based sample. Ideally, assessing both shame and solitary context in a clinical sample (i.e., residential treatment

facility) would greatly benefit the current literature to understand more stable and entrenched addictive behaviours versus the patterns that are starting to form in emerging adulthood.

A second important area of future research is extending EMA research into solitary contexts. Although the examination of solitary context was not possible in the current EMA findings, it is necessary to understand proximal emotions that are underlying atypical drinking patterns in emerging adulthood. To date, there is some research that suggests shame is an important consideration for solitary drinking (Luoma et al., 2018; Mohr et al., 2008), with only one study using EMAs (Luoma et al., 2018). Although the current dissertation provides a necessary first step, much more research is needed to develop a clearer temporal understanding between depression, shame, solitary drinking, and alcohol misuse so treatment goals can be addressed in a hierarchical fashion. If treatment begins with the most problematic area (i.e., shame or solitary drinking) there could in turn be indirect improvements in other areas of the individuals life (e.g., improvements in emotion regulation; Finlay-Jones, 2017). Currently, this dissertation demonstrated that both shame and solitary drinking are necessary considerations in the depression-alcohol comorbidity but there is limited clarity on reciprocal associations and hierarchical importance.

Relatedly, a more comprehensive assessment of shame in future EMA research is warranted. Given the novelty of the current work (i.e., assessing momentary experiences of shame in the context of depression), it was appropriate to assess brief, in-the-moment feelings of shame as opposed to completing an entire questionnaire, which is also consistent with a recent review of EMA methodologies in alcohol use research (Wray et al., 2014). The positive results in this dissertation highlight a potential area of future research to provide a more nuanced understanding of shame's effect on depression-motivated drinking. For example, there are sophisticated measures that provide a more in-depth assessment of shame, both with self-report (e.g., Test of Self-Conscious Affect [Tangney et al., 1989, Ruminative Response Scale [Treynor et al., 2003]; Guilt and Shame Proneness Scale [Cohen et al., 2011]), and non-verbal assessments (Randles & Tracy, 2013) due to the concealment that can occur with shame (Eterović, 2020). Now that it is clear that shame is an important emotion in depression-motivated drinking, more time can be spent asking participants to complete various shame-related questionnaires rather than assessing other emotions. Using more nuanced measures of shame would create a deeper understanding of what aspects of shame are driving at-risk alcohol behaviours among emerging adults.

Finally, the current dissertation was focused on shedding light on the role of shame on coping-motivated drinking. Given the significant findings, it is appropriate for clinical research to assess the effectiveness of targeted interventions and whether these interventions are equally effective for individuals that drink in solitary contexts (i.e., is drinking context a significant moderator of treatment efficacy or predictor of treatment engagement) as more research is highlighting the added risks associated with solitary drinking (Gonzalez & Halvorsen, 2021). There is burgeoning research that highlights intensive interventions that target shame are effective for alcohol misuse (Luoma et al., 2012; Luoma & Platt, 2015), but it would be important to know if a more brief, psychoeducational program could produce equivalent benefits which could be provided to emerging adults as they enter a major life transition (e.g., leaving high school or as they begin their university education). Given the high prevalence of substance misuse and depression among emerging adults (Adlaf et al., 2005; Arnett, 2000), it is important to intervene early, before residential treatments are needed.

## **Conclusion**

The current dissertation helps clarify underlying mechanisms of depression-related drinking in emerging adulthood by highlighting the importance of both self-conscious emotional experiences (i.e., shame) and contextual factors (i.e., solitary context). Using coping models of drinking as a theoretical framework and a combination of prospective EMAs and experimental approaches, findings suggest that shame is an emotional precursor to the experience of alcohol problems and craving among emerging adults with depression. Solitary context appears to have an additive effect on the experience of shame that increases the risk of atypical drinking behaviours and the experience of craving and problems. These findings highlight the importance of assessing and treating shame in emerging adulthood to help preclude the formation of irretractable problems, such as relapse and AUDs.

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