# The Impact and Role of Emotion Regulation in Problem Gambling Among Emerging Adults

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## Abstract

Individuals from various socio-economic statuses, cultural backgrounds, and ages engage in gambling-related activities every day. Although many demonstrate a healthy style of engagement, there has been growing health concerns over the significant and detrimental short- and long-term consequences of problematic gambling, which has often been associated with a variety of indicators of maladaptive functioning including issues surrounding the poor regulation of emotions. Although several theories of problem gambling have suggested that gambling may serve as a function to regulate one's affect (e.g., Jacobs, 1986), most studies have investigated symptoms of emotion dysregulation (i.e., anxiety, depression, etc.), rather than exploring problem gambling from a social-psychological theoretical perspective. The present program of research applies the theory of emotion regulation (ER) to the study of problematic gambling across three separate studies with a particular interest in the specific impact of the dimensions of ER. Given the infancy of the research, Study 1 aimed to examine the current literature in the field. As such, a systematic review examining the relationship between ER and both problem gambling and gaming was conducted. A total of 20 published manuscripts were included in the review and data regarding outcome measures, sampling methods, results, and effect sizes of relationships were extracted and critically evaluated. Results indicated 90% of studies found lower ER to be associated with reports of greater video gaming or gambling disorder symptomology, with 13 studies (65%) reporting medium to large effect sizes. Following this study, the rest of the program of research focused solely on gambling behaviors. Study 2 ($N$ = 820 gamblers; $M_{age=}$ 21.14 years, $SD$ = 2.9, 50.9% female) revealed through a linear regression that difficulties with impulse control and improved goal-directed behaviors positively contributed to problem gambling. Further, a mediation analysis demonstrated that the association often seen between problem gambling and depression was

explained by deficits in the acceptance, goals, strategies, and clarity dimensions of ER. Finally, Study 3 ($N$ = 919 gamblers; $M_{age=}$ 21.16 years-old, $SD$ = 2.90, 48.1% female) explored whether deficits in specific dimensions of ER coupled with the motivation to escape negative emotions (i.e., coping motives) increased the likelihood of problem gambling severity. A series of six moderation analyses were conducted and revealed that total models accounted for approximately 37-38% of the variance in problem gambling. Also, coping motives interacted with less difficulties in goal-directed behavior, increased lack of emotional clarity, and increased lack of emotional awareness to create a toxic mixture for problem gambling. These findings provide an in-depth analysis of the relationship between ER and problem gambling, add to our understanding of the underlying mechanisms that explain the affective consequences of problem gambling, and reveal the importance of attending to both psychological and motivational factors when implementing prevention and intervention programs.

## Résumé

Des personnes de statuts socio-économiques, de milieux culturels, et d'âges divers s'adonnent quotidiennement à des activités liées au jeu de hasard. Bien que la majorité démontre un style d'engagement sain, on s'inquiète de plus en plus des conséquences reliées au jeu problématique, qui sont importantes et néfastes, et qui impactent la vie des gens à court et à long terme. Souvent ce comportement a été associé à divers indicateurs de fonctionnement mal adapté, y compris des questions entourant la capacité des gens à gérer leurs émotions. Bien que plusieurs théories sur le jeu problématique aient suggéré que le jeu peut servir à réguler l'état émotionnel d'une personne (p. ex., Jacobs, 1986), la plupart des études ont porté sur les symptômes du dérèglement des émotions (c.-à-d., l'anxiété, la dépression, etc.), plutôt que d'explorer le jeu problématique d'un point de vue des théories adopté par la sociopsychologie. Le programme de recherche présenté apporte la théorie de la régulation des émotions (RÉ) à l'étude des problèmes du jeu dans le cadre de trois études distinctes, spécifiquement sur l'impact des dimensions de la RÉ. Étant donné que la recherche en est qu'à ses débuts, l'étude 1 visait à examiner la littérature existant dans le domaine. Alors, une revue systématique a été effectuée sur la relation entre la régulation des émotions et les jeux de hasard et les jeux vidéo. Au total, 20 revues publiées ont été incluses, et les données concernant les méthodes d'échantillons, les résultats et la taille des effets sur les liens ont été évaluées de façon critique. 90% des études ont indiqué qu'un niveau de RÉ plus faible était lié à des rapports de symptômes plus significatifs de jeu vidéo ou de troubles du jeu. En plus, 13 études (65%) ont conclu que l'impact était entre moyenne et grande (Cohen's $d \geq .50$). Suite à cette étude, le restant du programme de recherche s'est concentré uniquement sur les comportements de jeu. L'étude 2 (N = 820 joueurs ; $M_{âge}$ = 21.14 ans, SD = 2.9, 50.9 % femmes) a démontré, par une régression linéaire, que les difficultés à contrôler les impulsions et

l'amélioration des comportements axés sur des objectifs avaient un effet positif sur le jeu problématique. De plus, une analyse de médiation a démontré que l'association observée entre le jeu problématique et la dépression s'expliquait principalement par des déficits dans les dimensions du RÉ d'acceptation, des comportements axés sur des objectifs, de stratégies de régulations, et de clarté. Enfin, l'étude 3 (N = 919 joueurs ; $M_{âge}$ = 21.16 ans, SD = 2.90, 48.1% femmes) visait à déterminer si les déficits dans ses dimensions spécifiques du RÉ, combiné avec la motivation d'évadé ses émotions négatifs (c.-à-d. les motifs d'adaptation), augmentaient la probabilité du jeu problématique plus sévère. Une série de six analyses de modération a été effectuée et a révélé que le total des modèles représentait environ 37 à 38% de la variance du jeu problématique. De plus, il a été démontré que les motifs d'adaptation interagissaient avec moins de difficultés avec le comportement orienté vers un but, un manque accru de clarté émotionnelle et un manque accru de conscience émotionnelle, ce qui cré un mélange toxique pour le jeu problématique. Ces résultats fournissent une analyse approfondie de la relation entre le RÉ et le jeu problématique, ajoutent à notre compréhension des mécanismes sous-adjacents qui expliquent les conséquences affectives du jeu problématique, et révèlent l'importance de s'occuper des facteurs psychologiques et motivationnels lors de la mise en œuvre de programmes de prévention et d'intervention.

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I was primary author for each of the three studies included in this dissertation. As such, I conceptualized and developed each study, and sought support from the various co-authors when needed. Drs. Jeffrey Derevensky and Tina Montreuil were co-authors across all three studies. As my doctoral co-supervisors, they advised me in the conceptualization and development of research questions as well as the reporting of each study. Dr. Devin J. Mills, a co-author for Study 1 and Study 2, was the second reviewer for article screening in the systematic review and provided extensive feedback specific to data analysis and theoretical framework to the area of gambling. Finally, Dr. Matthew Keough, a co-author on Study 2 and 3, was in charge of data collection in Manitoba, advised me on the statistical approaches for these two studies, and provided feedback and edits. The present dissertation was funded by a doctoral scholarship from the Fonds de recherche du Québec – Société et culture (FRQSC) - Concerted Actions program in collaboration with *Mise sur toi* awarded to Loredana Marchica, and the Gambling Research Program Grant of Manitoba Liquor & Lotteries awarded to Drs. Derevensky, Montreuil, and Keough.

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# Chapter I

## Introduction

Gambling has undergone a surge in popularity over the last decade with increased availability of gambling outlets including casinos, online gambling sites, poker rooms, sports wagering, and new forms of lotteries. Never before has gambling been so widespread and socially accepted. Gambling has become more than a $16 billion dollar industry in Canada, with approximately 76% of Canadians 15 years and older reporting having gambled during the past year (Afifi et al., 2016; Canadian Gaming Association, 2017). This accessibility has the potential to increase risk for problematic gambling behavior, which has consequently become a growing health concern with both short- and long-term consequences for individuals, families and society including, familial discord, financial and legal problems and psychological distress.

While most individuals gamble without experiencing major negative consequences, prevalence study estimates suggest 0.3-2.4% of adults, and 0.2-12.4% of adolescents and young adults meet criteria for a gambling disorder (GD) (Calado et al., 2017; Nowak, 2018). Gambling disorder may be defined by a persistent, recurrent pattern of gambling behaviors that is associated with considerable distress or impairment (Potenza et al., 2019). The higher rates of gambling problems among adolescents and emerging adult populations as compared to adults, mirrors the pattern of substance abuse rates among these age groups. These rates suggest that there are likely specific determinants within adolescence and emerging adults that place these individuals at a greater risk for developing pathological behaviors. Adolescence and emerging adulthood are transitional periods of development marked with several changes experienced concurrently, including increased maturation and brain development (Wood et al., 2018; Casey & Jones, 2010). Given the number of novel changes occurring during these transitional periods, the ability to

regulate one's emotions may be of particular importance. Specifically, excessive gambling has often been associated with impulsivity, depression and other mood disorders (Dowd et al., 2019) and as a result research understanding the association between emotion regulation (ER) and gambling should be further explored. Recognizing the role that specific dimensions of ER play in problem gambling could lead to improved treatment options. Moreover, better understanding of whether ER deficits are involved in the development and maintenance of problematic gambling behaviors, could equally contribute to the implementation of prevention programs even before the manifestation of pathological behaviors emerge.

Although significant advancements have been made in understanding the behavioral and neurological components of gambling disorders in both youth and young adults (see review of risk factors, Blaszczynski & Nower, 2002; Gupta et al., 2013; Shead et al., 2010) there are many clinical needs that remain unanswered. Effective, empirically based treatments for gambling disorder still need to be identified. Specifically, there is insufficient understanding as to why certain individuals do well with treatment, others continuously relapse, and some using natural recovery appear to completely recover on their own. As such, several studies have proposed that gamblers are part of a heterogeneous group with different profiles dependent on specific factors that define them. One of the most widely accepted frameworks to date is Blaszczynski and Nower's (2002) *Pathways Model* which classifies problem gamblers (PGs) into three groups based on their respective developmental pathway; Behaviorally Conditioned, Emotionally Vulnerable, and Biologically Vulnerable. Although, this model does acknowledge ER as a significant factor in gambling problems, most studies validating the framework have investigated this concept superficially through gambling motivations or symptoms of depression and/or anxiety and impulsivity. While research has found that problem gambling is significantly related to mood

disorders, impulsivity, compulsivity and other symptoms of poor ER skills (Dowd et al., 2019), the understanding of problem gambling through a social psychological theoretical framework such as ER is still in its infancy. As such, understanding the contribution of specific dimensions of ER to gambling problems is an important element thought to impact the prevention and intervention of gambling disorders.

Emotion regulation (ER) refers to the process of how, which, and when negative and positive emotions are expressed and experienced (Gross, 1998). According to Gratz and Roemer (2004), ER encompass four dimensions; 1) an *awareness* and *understanding* of emotions, 2) an *acceptance* of experienced emotions, 3) the ability to control *impulsive* behaviors in order to achieve a desired goal when experiencing negative emotions, and 4) the ability to exert *flexibility* in using emotion regulation strategies, which in turn are dependent on situational demands that can modulate emotional responses toward the achievement of desired goals (Gratz & Roemer, 2004). Thus, a failure to meet any of these dimensions may result in pathological behaviors or distress. Research has shown that compared to healthy individuals, those who suffer from multiple psychological disorders tend to encounter increased ER deficits (Aldao et al., 2010; Sheppes et al., 2015; Sloan et al., 2017). Equally, emotional acceptance, a dimension of ER, has been linked to better psychosocial adjustment and treatment outcomes in individuals with psychological disorders (Campbell-Sills et al., 2006; Kotsou et al., 2018).

Emotions are triggered by a variety of stimuli and bring forth a coordinated set of behavioral, experiential, and physiological responses (Gross, 2002). For example, when we become fearful we may decide to run away from a threatening situation. Emotions therefore serve us well, as they direct our responses to the demands of life circumstances. However, emotional responses can also mislead individuals and do more harm than good (Gross, 2002). Specifically,

when individuals feel overwhelmed by their emotions and feel they must take action to control or suppress these emotions. As such, deficits in ER skills can become detrimental to an individual's overall mental health and well-being.

**Program of Research**

This program of research investigates the relationship between ER and problematic gambling behaviors across three studies. Overall, these studies aim to facilitate our understanding of the relationship between ER and behavioral addictions in general, and consequently examine the specific contribution of the different dimensions of ER to problem gambling. Thus, results will allow for the identification of potential protective and risk factors. Study 1 (Chapter III) provides a basis for the program of research by investigating and synthesizing previous research conducted on ER and two behavioral addictions (gambling and gaming). Study 2 (Chapter IV) examines the relationship between each dimension of ER (i.e., awareness, clarity, acceptance, goal-directed behavior, impulse control, and flexibility in strategy use) and problem gambling. While, Study 3's (Chapter V) objective is to assess whether coping motives (i.e., motivation to escape negative emotions) significantly moderates the relationship between deficits in specific dimensions of emotion regulation and problem gambling severity. The final chapter of the dissertation provides an overview of the findings from the three studies as well as implications for theory and directions for future research.

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# Chapter II

## Review of the Literature

With the introduction of a new behavioral addiction category within the Substance-Related and Addictive Disorders section of the Diagnostic Statistical Manual-5th Edition (DSM-5) in 2013, there has been increased discussion surrounding non-substance related addictions (American Psychiatric Association, 2013). Gambling is currently the only non-substance related addiction that has been officially included within this category. However, there are other behavioral addiction disorders that show similarities to both substance use disorders and gambling disorder. Although, still in its infancy, one such behavioral addiction is compulsive video game playing (or internet gaming disorder). In fact, the International Classification of Diseases (ICD) has recently included *Gaming Disorder* in its 11th edition released in 2018 (World Health Organization, 2018). Both gambling disorder (GD) and internet gaming disorder (IGD) can be defined as persistent and repeated maladaptive behaviors associated with excessive participation in these activities. This problematic playing often leads to significant impairment in daily functioning with psychosocial consequences. Estimated prevalence rates for IGD range from 1.7% to 10% among non-clinical samples (Fam, 2018; Griffiths & Kuss, 2012), while for GD estimates include 0.2-12.4% of adolescents and young adults (Calado et al., 2017; Nowak, 2018).

### Behavioral Addictions

The concept of self-medicating with substances is well known and researched. However, there is presently, a change and growing research interest towards individuals who self-medicate using particular behavioral strategies. The use of repetitive actions, causing an individual to escape, numb, appease, release tension, diminish anxiety, or feel euphoric has redefined addiction to go beyond substances, and include behaviors and experiences (Karim & Chaudhri, 2012). The

essential features of behavioral addictions consist of the failure to resist impulses, drives, or the temptation to perform an act that is harmful to oneself or others. It is the repetitive engagement in these behaviors that ultimately interferes with daily functioning, and therefore resembles substance use disorders. Behavioral addictions and substance addictions have many similarities in phenomenology and potential deleterious consequences. Both have increased onset in adolescence and young adulthood, and higher prevalence rates during adolescence and emerging adulthood compared to adulthood (Grant et al., 2010). Both have common patterns of recovery that may range from chronic relapsing patterns up to spontaneous recovery. Further, they are both often preceded by feelings of "tension" before performing the behavior, and "relief or pleasure" during the behavior. Finally, similar to substance abuse, individuals with behavioral addictions often report an urge or "craving" prior to initiating the behavior and a "high" during behavioral engagement which frequently decreases anxiety (at least for a period of time) (Grant et al., 2010).

Currently, only gambling disorder is currently included under the behavioral addictions section of the DSM-5. Gambling is operationally defined as placing something of value at risk with the aim of possibly gaining something of equal or greater value. This behavior can be viewed along a continuum ranging from non-gambling to social or occasional gambling and at-risk gambling to problem/disordered gambling (Derevensky, 2007). While disordered gambling is now the terminology used in the DSM-5, the term problem gambling will be employed throughout this program of research given that no clinical interviews were conducted to confirm participants self-reported problems.

Additional behavioral addictions such as video gaming are currently being researched and proposed for inclusion in the DSM-5 based on their similarities with substance use disorders as well. Video games are defined as interactive games played on electronic devices and are used

internationally by millions of individuals. According to the Entertainment Software Association (2019), 65% of Americans play video games regularly (3 hours or more per week), and the average age of video game players is 33 years old. In the DSM-5, Internet Gaming Disorder was included as a proposed behavioral addiction requiring further study (American Psychiatric Association, 2013; Potenza, 2014). Furthermore, the proposal states that problematic use of non-internet-based forms of video game playing warrant consideration within this category as well. After extensive international reviews of research, the World Health Organization (WHO) recently included gaming disorder as a behavioral addiction within the new ICD-11, and defined gaming disorder as a pattern of persistent or recurrent gaming behaviors ("digital gaming" or "video gaming"), which may be both online and/or offline (WHO, 2018). Advances in technology have also meant that gamers are able to immerse themselves into an increasingly realistic virtual world, often providing an escape or alternative to the restrictions of everyday life. For many, this escape becomes a compelling experience that engulfs their daily activities and responsibilities (Porter et al., 2010). The proposed Internet Gaming Disorder (IGD) criteria were chosen and worded in parallel with substance use and gambling disorder (GD), which includes nine criteria for diagnosis, wherein exhibiting four or more symptoms over a 12-month period is sufficient to meet diagnosis criteria. Further, endorsing a greater number of diagnostic criteria suggests more difficulties with the given behavior (American Psychiatric Association, 2013; Petry et al. 2014). Table 1 describes the nine criteria for diagnosing GD and IGD and illustrates the similarities between these two behavioral addictions, specifically for eight of the nine diagnostic criteria.

Table 1.
*DSM-5 Diagnostic Criteria for Gambling Disorder and Internet Gaming Disorder*

| DSM-5 Criteria | | |
|---|---|---|
| Gambling Disorder | Internet Gaming Disorder | Definition/Comparison |
| 1) Preoccupation | 1) Preoccupation | Persistent thoughts about past gaming/gambling activity or anticipating/planning the next game/gamble |
| 2) Tolerance | 2) Tolerance | The need to spend increasing amounts of time (or money) in the activity |
| 3) Inability to cut down or quit | 3) Unsuccessful attempts to stop or reduce behavior | Difficulty cutting down on the activity on one's own accord |
| 4) Withdrawal when gambling is taken away/reduced | 4) Withdrawal when gaming is taken away/reduced | Symptoms typically described as irritability, anxiety or sadness |
| 5) After losing money gambling, often returning another day to get even (i.e., "chasing" one's losses) | 5) Excessive gaming despite problems | Continuing to gamble/ game even when experiencing psychosocial or financial problems |
| 6) Deception | 6) Deception | Has deceived family members, therapists, or others regarding the amount of participation (or money lost) in the activity |
| 7) Gambing when feeling distressed | 7) Escape or relief from a negative mood | For example, relief from feelings of helplessness, guilt, anxiety |
| 8) Jeopardizing/losing significant relationships, job, educational or career opportunities | 8) Jeopardizing/losing relationships, jobs, or educational and career opportunities | Impacts all areas of one's life |
| 9) Relying on other to provide money to relieve a desperate financial situation resulting from gambling | 9) Loss of interest in other hobbies or activities | - Relying on others for relief from financial problems<br>- Losing interest in other areas of one's life |

**Problem Gambling**

The following program of research focuses and explores more specifically the prototypical behavioral addiction, gambling. The rationale for the move of gambling disorder in the DSM-5 from the impulse control disorders classification to the substance-related and addictive disorders classification is due to the growing biological and psychological literature on problem gambling

(PG) and its commonalities with substance use disorders. The consequences of excessive engagement in these activities (Reilly & Smith, 2013), levels of cravings (Romanczuk-Seiferth et al., 2014), and heritability in PG, parallel other substance-related addictions (Lobo & Kennedy, 2006). Additionally, there are also recent brain imaging and neurochemical studies that have begun to show similar brain areas associated with problem gambling and drug addiction, including similar activations of the reward system (Potenza, 2001; Potenza et al., 2011; Potenza, 2013).

**Developmental factors associated with problem gambling.** The median age of marriage in industrialized societies has risen to the late 20s and early 30s, and the early to mid-20s has now become a time for the pursuit of postsecondary education or training and numerous job or career changes as well as self-exploration. As such, the theory of emerging adulthood was first proposed by Arnett (2000) as a framework for identifying this transitional period between adolescence and adulthood that currently exists. Emerging adulthood is said to have five features that make it a distinct developmental period; (1) identity explorations, (2) instability, (3) self-focused behaviors, (4) feeling in-between, and (5) optimism towards future possibilities (Arnett, 2007). Identity exploration consists of the discovery and assessment that young people engage in while making decisions about who they are and what they want out of work, school, and love. Instability encompasses the marked changes in the young person's life such as repeated changes in residence and life circumstances as they go to college live with friends, or romantic partners. Often these frequent moves begin to diminish as families and careers are established in the 30s. Additionally, freed of the parent- and society-directed routine of school, young people begin deciding for themselves what they want to do, where they want to go, and who they want to be with. This is an age of self-focused behaviors that become more limited as they enter constraints of marriage, children, and a career. Although these emerging adults are now taking responsibility for

themselves, they often report not completely feeling like an adult, but rather are in a feeling of in-between. Finally, emerging adulthood is often characterized by a period where optimism of creating a better life for oneself reigns and possibilities towards the future are endless (Arnett 2004). However, these features that make up emerging adulthood also lend themselves towards engaging in more risky behaviors without being bound by parental rules or thoughts of long-term consequences.

There has been a growth in popularity of gambling among adolescents and emerging adults, specifically with the emergence of internet gambling, major increases in land-based casinos, sports wagering, and e-sports wagering. Online gambling creates increased opportunities for emerging adults to partake in gambling activities as difficulties with accessibility and availability become minimized. Moreover, the distinction between gambling and video gaming has become progressively blurred with many gambling sites offering "free play for practice" games simulating actual gambling activities. As with adults, problem gambling among young adults has significant deleterious consequences including severe psychological, financial, familial, and social challenges (Edgerton et al., 2015). However, problem gambling prevalence studies among adolescents and emerging adults have consistently shown to be at least 3 times higher than adult prevalence rates (Calado et al., 2018). A systematic review aiming to identify early risk factors that were longitudinally associated with the development of problem gambling found individual, relational, and community risk factors associated with development of problem gambling. Risk factors included, substance use frequency, antisocial behaviors, depression, sensation seeking, impulsivity, undercontrolled temperament, peer antisocial behaviors, and poor academic performance (Dowling et al., 2017).

Emotional factors may contribute to the engagement of gambling among individuals who develop problem gambling behaviors. For instance, gambling is commonly used as a means to escape negative affect, and problem gambling often co-occurs with mood disorders and high levels of impulsivity and compulsivity (Balodis et al., 2012; Cunningham-Williams & Cottler, 2001; Dowling et al., 2015; Gupta et al., 2013; Potenza, 2014). Symptoms among adolescents and emerging adults also include lower academic performance, isolation, and other high-risk behaviors (Emshoff & Perkins, 2008). In addition, early exposure to gambling is a substantial predictor and risk factor highly associated with problem gambling disorders in adulthood (Edgerton et al., 2015). Given the increased prevalence of gambling problems during adolescence and emerging adulthood it is important to consider the impact of developmental periods in predicting problematic gambling behaviors. Adolescence and emerging adulthood are important developmental phases resulting from the swift and substantial changes that occur biologically, cognitively, socially, and emotionally (Wood et al., 2018). For example, neurodevelopment during this time period may increase vulnerability to such problematic behaviors. Evidence on adolescent neurodevelopment has suggested that the mesolimbic dopamine system during this age period functions more sensitively as compared to adults (Chambers & Potenza, 2003). Thus, adolescents and emerging adults are more dependent and susceptible to rewards (Zimmermann & Iwanski, 2014), including those provided by the intermittent reinforcement schedules of gambling activities. Further, delayed maturation in the prefrontal cortex (serving inhibition and cognitive control), coupled with early development of striatal regions (sensitive to novelty and rewards) places adolescents and emerging adults at increased risk for impulsive behaviors (Casey & Jones, 2010). Additionally, middle adolescence is marked by an abundance of highly emotional conflicts and increased neuroticisms, while agreeableness and conscientiousness tend to decrease (Soto et al., 2011). Beyond

adolescence, emerging adulthood is considered a developmental period characterized by extended emotional insecurity, as well as, neuroticism. In contrast to emerging adulthood, middle to late adulthood is depicted by increased emotional stability, control, and conscientiousness (Soto et al., 2011). Thus, the ability to regulate one's emotions and make choices using higher level executive functioning appears to be lower in adolescence and likely does not fully develop until later adulthood.

**Models of Problem Gambling**

Theories of problem gambling have aimed to explain the aetiology of this disorder through lenses that examine the biological, personality, developmental, cognitive, or learning factors that distinguish problem gamblers from social/recreational gamblers. Applying biological and psychological approaches, Jacobs (1986) aimed to create a general theory of addiction wherein he described two predisposing risk factors. The first, a unipolar physiological resting state, depicts an individual that is chronically and excessively either hypo or hypersensitive to emotional and physiological states. The second set of factors are psychological in nature that arise from social and developmental experiences. It is suggested within this theory that addiction occurs as a function to lessen the experience of anticipated pain and regulate one's affect or avoid negative mood states (Jacobs, 1986).

Learning theories of problem gambling have focused on the subjective excitement or arousal that the activity often generates and how operant and classical conditioning models explain repeated engagement. Research has shown that gambling produces a state of arousal (Anderson & Brown, 1984), dissociation (Jacobs, 1986), and increased heart rate (Anderson & Brown, 1984). Further, wins, delivered through a variable ratio schedule of reinforcement (wins are experienced intermittently, and the rate of reinforcement cannot be easily determined), are resistant to

extinction effects and often produce feelings similar to drug-induced "highs." These theories suggest that repeated pairings classically condition the arousal sensation to the gambling environment, and then second order conditioning allows gambling cues (e.g., anticipation of gambling, exposure to gambling situations) to elicit urges for gambling resulting in a habitual pattern of gambling behaviors (Anderson & Brown, 1984). However, these learning theories have failed to explain why some individuals fail to become addicted to the behavior.

Cognitive theories emphasize irrational cognitive schemas which result from early and repeated wins. These cognitive distortions include illusions of control, biased evaluations, erroneous perceptions, superstitious thinking, attributional biases, selective memory, and a faulty understanding of probability (Joukhador et al., 2003). Finally, Sharpe and Tarrier (1993) introduced a theoretical model that combined behavioral learning theories with cognitive theories. The cognitive-behavioral model suggests that arousal, operating as a positive reinforcer, becomes associated with thoughts and situations, which then combines with autonomic arousal states to act as cues or triggers for gambling. Once a trigger is encountered it leads to heightened arousal states which then become accompanied by gambling-related cognitions that increase the likelihood of engagement (e.g., "I know I can win," "Luck is with me today") (Sharpe & Tarrier, 1993).

A fundamental assumption within each of these theoretical frameworks is that problem gamblers consist of basically a homogeneous group. However, other theories have suggested that gamblers may be conceptualized into subtypes based on predisposing features (e.g., personality traits, early adverse childhood experiences) and affect-related reasons for gambling (gambling as a means to increase arousal or escape negative affect) (Blaszczynski & Nower, 2002; Stewart et al., 2008). Moran (1970), was one of the first to propose that PGs are most likely part of a heterogeneous group whose common feature is excessive gambling. Since then, many studies have

supported the idea that there exists different profiles of PGs, each with a specific set of environmental, cognitive, social characteristics, and motivations that define them (for a review, see Milosevic & Ledgerwood, 2010). Several empirical studies have consistently identified PGs within a three-group model, with Blaszcsynski and Nower's (2002) *Pathways Model* representing the most widely accepted and comprehensive theoretical framework to date. The *Pathways Model* aims to integrate biological, developmental, cognitive, personality, learning theory and environmental factors into a single framework. This model proposes that there are three primary subtypes of problem gamblers; Behaviorally Conditioned (BC), Emotionally Vulnerable (EV), and Biologically Vulnerable (BV) (Moon et al., 2016). Each of the three pathways have specific vulnerability factors, aetiological processes, and demographic characteristics. However, there also have three elements relevant to all gamblers regardless of subtype including, ecological determinants (i.e., public policy issues that promote accessibility), classical and operant conditioning, and the development of cognitive schemas (Blaszczynski, 2000).

*Pathway I: Behaviorally Conditioned (BC).*

Behaviorally Conditioned gamblers are discernible by the absence of specific preceding psychopathologies. Rather, their gambling behaviors are influenced by classical and operant conditioning, distorted cognitions surrounding personal skills and probability of winning, and a development of habitual gambling patterns. This group of gamblers often begin gambling as a socialization activity or for entertainment. Further, instead of being an underlying mechanism, mood disorders, cognitive distortions, and impulsive behaviors are consequences of excessive and problematic gambling (Allami & Vitaro, 2015; Blaszczynski, 2000; Gupta et al., 2013).

*Pathway II: Emotionally Vulnerable (EV)*

Individuals in the emotionally vulnerable pathway share similar ecological determinants, conditioning processes, and cognitive distortions as those in Pathway I. However, they also possess symptoms of anxiety and/or depression (i.e., underlying emotion dysregulation), and challenging family backgrounds (Allami & Vitaro, 2015; Blaszczynski, 2000; Gupta et al., 2013). Therefore, individuals within this pathway are said to use gambling as a coping mechanism for emotion regulation and to meet specific psychological needs.

*Pathway III: Biologically Vulnerable (BV)*

Individuals in the third pathway possess psychosocial vulnerabilities similar to gamblers in Pathway II, but are distinguished by biological vulnerabilities and features including, impulsivity, antisocial personality traits, and behaviors, and difficulties with attention (i.e., ADHD is a common co-morbidity among pathway III gamblers) (Allami & Vitaro, 2015; Blaszczynski, 2000; Gupta et al., 2013).

The *Pathways Model* has significant implications for the prevention and treatment of gambling disorders as it assumes each pathway develops through distinct causes, and as such should be addressed in unique ways. Although emotion regulation is a substantial component to the *Pathways Model*, no studies, to the best of the authors knowledge, examined the role of emotion regulation through a social-psychological theoretical perspective. Rather, in trying to validate the model, the symptoms of emotion dysregulation (depression, anxiety, etc.), and motivations for gambling have been explored.

Previous research has also identified several motivational factors that are predictive of greater engagement in gambling-related activities including social and enhancement motives as well as the use of gambling as a coping strategy (Juodis & Stewart, 2016). Stewart and Zack's (2008) model of gambling motivations, based on research suggesting that the motives for excessive

gambling are similar to motives for alcohol consumption, is a widely used framework for investigating gambling motivations. These motivations include gambling to escape/avoid negative affect (coping motives), gambling to increase positive affect (enhancement motives), and gambling for social rewards (social motives) (Stewart & Zack, 2008). Enhancement motives have been identified as a significant predictor of gambling behaviors and both enhancement and coping motives have been significantly related to problem gambling. Specifically, individuals with higher coping motives have been shown to have more severe gambling problems than those with enhancement and social motives. Further, individuals with higher enhancement motives participated in more gambling activities and experienced more gambling problems than individuals with social motives (Lambe et al., 2015; Stewart & Zack, 2008). These findings suggest an importance on both coping and enhancement motives in understanding problematic forms of gambling.

Regardless of which theoretical framework of problem gambling one endorses all frameworks suggest that the probability of gambling once an urge develops is mediated by the individuals own coping mechanisms. These skills include the ability to manage internal cues (e.g., to manage autonomic arousal and ability to challenge irrational cognitions), to delay decision making and use problem-solving skills, to delay reinforcement (Sharpe & Tarrier, 1993). Further, within each of these models, the importance of emotions and the regulation of emotions as a coping skill can also be observed. Given the symptomology, the extensive comorbidity with mood disorders, and the motivation to excessively engage in gambling to escape negative affect, emotion dysregulation factors may play a significant contribution in the development and maintenance of behavioral addictions. However, research has often focused on the symptomology rather than

underlying mechanisms motivating problematic engagement. Thus, there exists an essential gap in the literature between ER and behavioral addictions.

**Emotion Regulation**

Emotions may be conceptualized as mental states that unconsciously arise and are often accompanied by distinct physiological changes (Shu et al. 2018). Emotions often have significant impact on how individuals think, behave, and feel. Gross and Thompson (2007) suggested that emotional states have a direct impact on an individual's goals, given that people behave in ways to initiate changes in emotional reactions. Emotions may be experienced as both positive and negative, may be short-lived or more prolonged, and can occur at various intensities (Jeon, 2017). Emotion regulation (ER), may be understood as an input-output process (which can be both unconscious and conscious) where there is an evaluation of emotions, both from internal and external cues (Gross, 2008). It is also considered a transdiagnostic construct given that those who suffer from several psychological disorders tend to encounter increased deficits in ER (Aldao et al., 2010; Sheppes et al., 2015).

Some models of ER emphasize the control of emotional experiences or expressions, specifically to reduce the experience of negative emotions. However, there are other models that emphasize a functional nature of all emotions that does not necessarily involve diminishing or controlling negative emotions (Thompson, 1994). These approaches suggest that the goal of ER is not necessarily to eliminate or control negative emotions, but rather to influence the response tendencies in order to produce adaptive responses to the environment. This approach would imply that difficulties in ER are produced by an inability to experience and differentiate a full range of emotions as well as the inability to modulate stronger negative emotions (Gratz & Roemer, 2004; Gross & Munoz, 1995). Theories that emphasize the functionality of emotions are consistent with

research that have shown the aversive effects of attempting to control emotional experiences and expressions (Bowen et al., 2007). Additionally, Hayes and colleagues (1996) suggested that the efforts made to avoid unwanted thoughts and feelings underlie many psychological disorders. Therefore, research suggests that the effort to control, rather than accept emotional responses may actually be undermining the goal of ER (Gratz & Roemer, 2004). As such, the following program of research follows the model of ER brought forth by Gratz and Roemer (2004) that encompasses clinically relevant difficulties in ER based on the above integrative and comprehensive conceptualization of ER. According to this model ER is said to encompass six dimensions; (1) an *awareness,* and (2) an *understanding* of emotions, (3) an *acceptance* of experienced emotions, (4) the ability to engage in *goal-directed* behavior when experiencing negative emotions, (5) the ability to control *impulsive* behaviors when experiencing negative emotions, and (6) the ability to exert *flexibility* in using different emotion regulation strategies (Gratz & Roemer, 2004). Awareness and understanding of emotions reflect the extent to which individuals are clear about which emotions they are experiencing or the extent to which they can attend to emotional responses. Acceptance of emotional experiences reflects the degree and tendency that an individual must respond negatively to negative emotions and/or denies any form of distress. The ability to control impulsive behaviors reflects the struggle or control an individual has over their behaviors when upset, while flexibility with emotion regulation strategies reflects the access an individual has to various strategies when upset or the ability to engage in goal-directed behavior when experiencing negative emotions (Gratz & Roemer, 2004). Difficulties in any of these dimensions may result in disordered behaviors or distress. For instance, research has shown that compared to healthy individuals, those who suffer from multiple psychological disorders (e.g., anxiety, depression) tend to encounter increased difficulties with emotion regulation in general (Aldao et

al., 2010; Sheppes et al., 2015; Sloan et al., 2017). Equally, emotional acceptance has been linked to better adjustment and treatment outcomes in individuals with psychological disorders (Campbell-Sills, et al., 2006; Kotsou et al., 2018). Finally, difficulties with emotion regulation have been shown to be a significant risk factor (even above attachment) to substance abuse (Estevez et al., 2017).

**Application of Emotion Regulation to Problem Gambling**

Most of the research on ER has focused on childhood or adulthood, with little attention paid to adolescence and emerging adulthood. Previous research has shown that individuals with gambling problems often report gambling in an attempt to regulate and escape unwanted emotions (Wood & Griffiths, 2007). Further, Riley (2014) found that experiential avoidance was predictive of higher levels of problem gambling among 103 male and female Australian problem gamblers seeking treatment, thus suggesting a lack of acceptance for negative emotions and a focus on strategies that allow avoidance and escape of negative states. Additionally, problem gamblers have regularly exhibited impairments in ER strategies that involve looking at long-term over short-term benefits and costs. For example, the Iowa Gambling Task assesses decision-making behavior through the process of learning via monetary rewards and punishment. Problem gamblers have consistently performed worse than controls on this task due to a perseverance in choosing immediate higher magnitude rewards in spite of larger long-term punishments (Power et al., 2012; van Holst et al., 2010). The under-representation of potential ER strategies may be understood as a "myopia for the future," wherein problem gamblers are unable to see various regulatory strategies that would lead to more beneficial long-term decisions. This consequently suggests a lack of flexibility and an inability to control impulsive behaviors that are often costly to the individual. Given the symptomatology of PG and the increased prevalence rates among emerging adulthood

it can be hypothesized that ER plays an important role in the development of PG. However, the current research on ER in emerging adulthood, specifically, within the PG field is scarce; demonstrating a significant need to better understand the relationships between these psychological factors.

The current three research studies make up the following program of research. Collectively, these studies examine the impact and role of ER on behavioral addictions and more specifically problematic gambling behaviors. A key implication of the proposed dissertation includes an understanding of the underlying mechanisms in problematic gambling. Thus, providing research that would potentially significantly impact prevention and intervention practices. Proactive efforts towards prevention are often deemed an effective solution to addressing behavioral addictions and should be considered a priority. However, there are only a limited number of prevention programs aimed at gambling that currently exist and few have been empirically validated. Additionally, the majority of these programs are not based on the role of protective and risk factors (Derevensky, 2012; Dowling et al., 2017). Prevention approaches provide services to the general population or individuals who are identified as being at risk for a specific disorder. By understanding the role ER has on gambling problems, individuals who show high dysregulation could be screened as potentially at risk for a PG. As such, services would be made available in the hopes of decreasing these risk factors and reducing the likelihood of a future disorder. Finally, the connection between ER and gambling problems would also allow for the advancement of available empirically based treatment options. By focusing on enhancing ER skills among problem gamblers, treatments can be focused on the underlying mechanism rather than symptomology (i.e., gambling addiction, mood disorders) thereby increasing overall mental health and well-being.

Given that research examining behavioral addictions using a social psychological framework of emotion regulation is still in its infancy, the objective of Study 1 was to examine the current literature in the field. As such a systematic review examining the relationship between emotion regulation and both problem gambling and gaming was conducted. Following Study 1, Studies 2 and 3 make novel contributions to the literature by focusing on the relationship between problem gambling (PG) and ER. Specifically, Study 2 aimed to examine the relationship between each specific dimension of emotion regulation (i.e., awareness, clarity, acceptance, goal-directed behavior, impulse control, and flexibility in strategy use) and PG. Further, the study aimed to assess the indirect effects of problem gambling onto depressive and anxious symptomology through the dimensions of ER. Finally, Study 3 explored whether deficits in specific dimensions of ER coupled with the motivation to escape negative emotions (i.e., coping motives) increased the likelihood of PG severity. It must be noted, that although each study should be considered independent from the other two studies, due to the shared focus in content there is some unavoidable redundancy in the review of literature across the three studies.

# Chapter III

## Study One

### The Role of Emotion Regulation in Video Gaming and Gambling Disorder: A Systematic Review

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# The Role of Emotion Regulation in Video Gaming and Gambling Disorder: A Systematic Review

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## ABSTRACT

Behavioral addictions are now recognized as a psychiatric condition. With this recognition came increased research interest, specifically within the video gaming and gambling fields, into the etiology and symptomology of these behavioral addictions. Emotion regulation (ER) has significant implications for mental health, with research highlighting the link between ER and the development of psychopathology. However, the relationship between ER and behavioral addictions remains relatively unknown.

**Objectives:** This review investigated the recent literature on this relationship.

**Methods:** Out of an initial sample of 2471 studies, 20 were eligible for inclusion. Data regarding outcome measures, sampling methods, results, and effect sizes of relationships were extracted and critically evaluated.

**Results:** Results indicated 90% of studies found lower ER to be associated with reports of greater video gaming or gambling disorder symptomology, with 13 studies (65%) reporting medium to large effect sizes.

**Conclusion:** The findings provide an in-depth analysis of the relationship between ER and behavioral addictions and highlights the key role ER plays in these addictive behaviors. This review provides novel insights into the potential prevention and intervention practices for behavioral addictions as well as recommendations for future directions.

**Keywords:** Emotion Regulation, Gambling, Video Gaming

Les dépendances comportementales sont maintenant reconnues comme une situation psychiatrique. Cette reconnaissance a entraîné un intérêt accru pour la recherche, en particulier dans les domaines du jeu vidéo et du jeu, dans l'étiologie et la symptomologie de ces dépendances comportementales. La régulation des émotions (RE) a des implications importantes au niveau de la santé mentale, les recherches soulignant le lien entre la RE et le développement de la psychopathologie. Cependant, la relation entre la RE et les dépendances comportementales reste relativement inconnue.

**Objectifs:** Cette étude a examiné la littérature récente concernant cette relation.

**Méthodes:** Sur un échantillon initial de 2 471 études, 20 étaient éligibles pour l'inclusion. Les données concernant les mesures de résultats, les méthodes d'échantillonnage, les résultats et l'ampleur de l'effet des relations ont été extraites et évaluées de manière critique.

**Résultats:** Les résultats ont indiqué que 90% des études démontrent que la baisse de la RE était associée à des rapports faisant état d'une plus grande symptomatologie du jeu vidéo, 13 études (65%) rapportant des effets de taille moyenne à grande.

**Conclusions:** Les résultats fournissent une analyse approfondie de la relation entre la RE et les dépendances comportementales et mettent en évidence le rôle clé que la RE joue dans ces dépendances comportementales. Cette étude fournit de nouvelles informations sur les pratiques potentielles de prévention et d'intervention pour les dépendances comportementales ainsi que des recommandations pour des orientations futures.

**Mots clés:** Jeu, Jeux vidéo, Régulation des émotions

## INTRODUCTION

With the introduction of a new behavioral addictions category within the Substance-Related and Addictive Disorders section of Diagnostic Statistical Manual—5th edition (DSM-5), there has been increased discussion surrounding non-substance-related addictions.[1] Gambling disorder (GD) is currently the only non-substance-related disorder included within this category. However, there are other behavioral disorders that show similarities to both substance use disorders and GD. Although, research is still in its infancy, one such behavioral addiction is compulsive video gaming or

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Internet gaming disorder (IGD). While, IGD was proposed as a condition meriting further study in the DSM-5,[1] the World Health Organization recently recognized IGD (termed Gaming Disorder) in its 11th edition of the International Classification of Diseases (ICD-11) released in 2018.[2]

Gambling, *placing something of value at risk with the aim of possibly gaining something of greater value*, can be viewed along a continuum ranging from non-gambling to social or occasional gambling and at-risk gambling to problem/disordered gambling.[3] A US study reported that 58% of individuals gambled in the past year, with males gambling more often than females.[4] GD, *persistent and recurrent problematic gambling behavior leading to significant impairment or distress*,[1] has estimated prevalence rates of 0.3% to 2.4% among adults, and 0.2% to 12.4% among adolescents and young adults.[5,6]

Video or digital games[1] include interactive games played on electronic devices used internationally by millions of individuals. According to the Entertainment Software Association,[7] 42% of Americans play video games regularly (3 hours or more per week), and contrary to common stereotypes,[8] the average age of video game players is 35 years old. The ICD-11 defines gaming disorder as a *pattern of persistent or recurrent gaming behavior ("digital gaming" or "video-gaming"), which may be both online and/or offline.*[2] Estimated prevalence rates for video gaming disorder range from 1.7% to 10% among community samples including adolescents and adults.[9] Advances in technology allow gamers to immerse themselves into an increasingly realistic virtual world, often providing an escape to the restrictions of everyday life. For many this form of psychological escape becomes a compelling experience that engulfs their daily activities and responsibilities.[10]

The evidence demonstrating the parallels between gambling and video gaming, both esthetically and structurally, continues to grow. For example, both activities operate on behavioral principles of variable reinforcement schedules to reward and prolong play. Outcomes for both GD and IGD include financial and social challenges, lower academic or vocational performance, isolation, involvement in other risky behaviors (e.g., risky sexual behaviors, substance use), increased comorbidity with mood disorders, and mental health issues.[11,12] In addition, excessive engagement in these activities is often motivated by a desire to escape negative emotions and is closely related to diminished self-control, low self-esteem, loneliness, depression, and state and trait anxiety.[9,13–15]

Although advances have been made in better understanding the behavioral components of GDs and IGDs, research is needed on the mechanisms that may play an important role in the development and maintenance of behavioral addictions. Such research is critical to the production of effective, empirically based prevention and intervention programs for GD and IGD. To date, current research has often focused on the symptomology (e.g., depression/anxiety) rather than addressing underlying mechanisms that may motivate problematic engagement. Given the symptomology of these disorders, the extensive comorbidity with mood disorders, and the motivation to excessively engage in these behaviors to escape experienced negative emotions and affect, deficits in emotion regulation (ER) may represent a critical mechanism by which GD and IGD develop. As such, there exists an essential gap in our current understanding of the relationship between ER and these 2 behavioral addictions.

## Emotion Regulation

ER refers to the process by which, how, and when negative and positive emotions are expressed and experienced.[16] Research has suggested that ER may be considered a transdiagnostic construct, given that those who suffer from psychological disorders tend to encounter increased ER deficits.[17,18] According to Gratz and Roemer,[19] difficulties in ER are produced by an inability to experience and differentiate a full range of emotions as well as the inability to modulate stronger negative emotions. Consequently, it is important for individuals to be able to monitor and evaluate their emotional experiences, in addition to managing the expression of these emotions through ER strategies. As such, Gratz and Roemer's[19] theoretical construct suggests that ER encompasses 4 general principles: (1) an *awareness* and *understanding* of one's emotions, (2) an *acceptance* for experiencing one's emotions, (3) the ability to *control impulsive* behaviors, and (4) the ability to be *flexible* with ER strategies dependent on the context. Research has revealed that a failure to meet any of these principles may result in negative mental health outcomes and distress.[18,20] The ability to regulate emotions is often brought forth by using various ER strategies. Examples of adaptive ER strategies include problem solving, accepting/tolerating emotions, and adjusting/reappraisal, while maladaptive ER strategies are typically thought to include suppression, rumination, and avoiding/concealing emotions. Reappraisal and adjusting strategies involve cognitively reformulating the meaning of the situation in order to modify emotions, while suppression consists of inhibiting behaviors associated with emotional responding.[18] Consistent with this approach to ER, research suggests that a lack of emotional acceptance is maladaptive and associated with greater difficulties in ER.[19] In fact, there is continued evidence showing that efforts to avoid or control internal experience (i.e., unwanted emotions) underlies many psychological disorders.[19]

[1] (Although, the World Health Organization distinguishes video-gaming and digital-games as separate forms of gaming, for the purpose of this paper the term video games includes both types of gaming activity, given the ICD-11 definition of *gaming disorder*.).

Previous research has revealed that individuals with gambling problems often report gambling in an attempt to regulate and escape unwanted emotions.[21] Further, Riley[22] found that experiential avoidance was predictive of higher levels of problem gambling among problem gamblers seeking treatment, thus suggesting a lack of acceptance for negative emotions and a focus on strategies that allow avoidance and escape of negative affective states. In addition, problem gamblers have regularly shown impairments in ER strategies that involve looking at long-term over short-term benefits and costs. For example, the Iowa Gambling Task assesses decision-making behavior through the process of learning via monetary rewards and punishment. Problem gamblers have consistently performed worse than controls on this task due to a perseverance in choosing immediate higher magnitude rewards in spite of larger long-term punishments.[23,24] These under-representations of possible ER strategies may be understood as a "myopia for the future," where problem gamblers are unable to see various regulatory strategies that would lead to more beneficial long-term decisions. This consequently suggests a lack of flexibility and an inability to control impulsive behaviors that are often costly to the individual.

Given that individuals presenting with gambling and video gaming problems often report engagement in the behavior as an attempt to regulate and/or escape unwanted emotions,[21,25] it would seem that they utilize these activities as maladaptive ER strategies. However, the relationship between these 2 variables remains relatively unexplored. By understanding the role ER plays on excessive gambling and video gaming engagement, individuals who display poor or maladaptive ER skills could possibly be screened and provided programs to reduce the risk of behavioral addictions. Finally, a validation of the probable connection between deficits in ER and behavioral addictions would contribute to advancements in terms of available treatment options. As such, the primary objective of the following review is to investigate the relationship between ER and problem gambling and video gaming, and to identify gaps and limitations in the literature.

## METHODS

The methodology for this review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses protocol in the design, performance, and reporting of results.[26]

### Eligibility criteria

Given that a previous systematic review examining research between 1990 and 2009 was conducted on emotional intelligence and gambling[27] the current review included all quantitative studies that were published between January 2010 and March 2019, thereby examining the most recent literature in the area. In addition, articles included had to be in English, published in peer-reviewed journals, and studies examining the relationship between ER (i.e., following Gratz and Roemer's theoretical model) or Emotion Regulation Strategies (i.e., Reappraisal/Suppression) and either problem gambling and/or video gaming to be included in the review. Measures used in the studies that were included had been previously validated in research as having strong psychometric properties. Further, no animal or intervention studies were included.

### Search strategy

Studies were identified both by searching electronic databases and conducting a backwards search of relevant articles. Articles were obtained from searching databases which included, PsycINFO, Medline, PubMed, and Web of Science.

The electronic search was executed for 2 groups of keyword combinations. For ER, the following keywords were used: *Emotion OR Regulation, Emotion Dysregulation, Regulation of Emotions, Self-Regulation, Emotional Control, Emotional Management, Emotional Response,* and *Emotional Reactivity.* For video gaming and gambling addictions the following keywords were used: *Gambl*, Gambling Disorder, Gambling Addiction, Pathological Gambling, Gaming, Gaming Disorder, Internet Gaming Disorder, Pathological Gaming,* and *Video Gaming Addiction.*

### Data collection

Data extraction from each publication was carried out by the first author and revised by the second author for potential inconsistencies, and included information pertaining to (1) author and publication year, (2) country of study origin, (3) type of behavioral addiction, (4) sampling method, (5) sample characteristics (age, sample size), (6) outcome measures assessing behavioral addictions and ER (measures, constructs assessed), (7) statistical analyses applied, and (8) study results (Table 1). The extracted data was reviewed by the second author.

## RESULTS

### Study selection

All obtained records were screened for eligibility in 3 phases: (1) initial title and abstract screening, (2) full text screening, and (3) a data extraction phase (refer to Fig. 1 for study identification flow diagram).[2] A total of 20 articles meeting all criteria were included in the review.

[2] (Both the first and second author reviewed the articles with 91% agreement rate. Ten articles were flagged for discussion due to minor disagreements in the reviewer's evaluations. The reviewers met to discuss these disagreements until a unanimous decision was made.).

**Table 1: Studies included in systematic review.**

| | Study | Country | Type of behavioral addiction | Sampling method | Sample characteristics (% female) | Addiction and ER outcome measures | Statistical analysis | Results |
|---|---|---|---|---|---|---|---|---|
| 1. | Amendola et al (2019) | Italy | Gaming | Convenience General | N = 280 (49%); $M_{age}$ = 13.31 years (SD = 2.33, range = 11–18) | CSAS, DERS | ANOVA; multiple linear regression | DERS strategies subscale was best predictor of IGD; strategies, non-acceptance, and being male accounted for 29% of variance in IGD |
| 2. | Barrault et al (2017) | France | Gambling | Convenience General | N = 416 (2%); $M_{age}$ = 31.4 years (SD = 8.5, range = 18–55) | CPGI, ERQ | ANOVA; Chi-square; multiple linear regression; correlation | Anxiety and depression: linked to PG with higher scores in PG group for depression and anxiety; ERQ: no difference in ER strategies between poker players within each group |
| 3. | Barrault et al (2019) | France | Gambling | Convenience General | N = 287 male; $M_{age}$ = 34.1 years (SD = 10.2) | SOGS, ERQ | Chi-square; the Student *t* test; Spearman correlation; univariate logistic regression | PG not associated with ER; gambling type was a significant moderator between suppression and PG; strategic gamblers used suppression more often than mixed gamblers |
| 4. | Blasi et al (2019) | Italy | Gaming | Convenience WoW players | N = 390 (25.9%); $M_{age}$ = 28.28 (SD = 8.24, range = 18–67) | DERS-18, IAT-WoW | Pearson correlation, SEM analysis | DERS total and subscales were significantly and negatively related to IGD; ER predicted both motives to escape and IGD; motive to escape partially mediated relationship between ER and IGD |
| 5. | Ciccarelli et al (2016) | Italy | Gambling | Convenience General | N = 108 male; $M_{age}$ = 36.80 years (SD = 11.52, range = 21–63) | Modified Posner task, SOGS, DERS | Zero-order correlations; ANOVAs; single sample *t* test | All DERS subscales correlated with gambling severity; compared to NPG, PGs reported higher levels of craving, emotion dysregulation, and negative mood states |
| 6. | Elmas et al (2017) | Turkey | Gambling | Convenience General | N = 246 males; $M_{age}$ = 33.3 years (SD = 11.64, range = 18–64) | TAS-20, DERS, SOGS | *t* Test; hierarchical regression; multiple regression | Difficulties with ER and alexithymia are positive significant predictors of PG; emotion dysregulation had a mediator role between alexithymia and PG |
| 7. | Estevez et al (2017) | Spain | Gaming and gambling | Convenience General | N = 430 (51.6%); $M_{age}$ = 15.6 years (SD = 1.33, range = 13–21 years) | DERS; SOGS-RA; video game-related experience questionnaire | Blockwise regression analysis; the Student *t* test | ER significantly predicted all outcome variables (especially lack of control subscale); ER had a significant negative correlation with VG and GD |
| 8. | Jauregui et al (2016) | Spain | Gambling | Convenience Clinical and control | N = 167 male PGs; $M_{age}$ = 39.29 years (SD = 11.84); N = 107 male non-gamblers; $M_{age}$ = 33.43 years (SD = 11.93) | SOGS, DERS | Stepwise multiple linear regression; SPSS Macro INDIRECT | PGs exhibited greater difficulties with ER; ER difficulties correlated with predicted PG; ER difficulties mediated the relationship between anxiety and pathological gambling controlling the effect of age, both when controlling and not controlling for effect of other substance abuses |
| 9. | Liau et al (2015a) | Singapore | Gaming | Convenience General | Study 1: N = 2714 (28%), $M_{age}$ = 10.93 years (SD = 2.04); Study 2: N = 301 (18.2%), $M_{age}$ = 12.88 years (SD = 0.80) | Video game habits, PSI-2, DSM-4 gambling items (adapted for gaming) | SPSS Macro INDIRECT | Self-regulation was a mediator between impulsivity and pathological video gaming |
| 10. | Liau et al (2015b) | Singapore | Gaming | Convenience General (2 years longitudinal) | N = 2998 (27.3%); grades 3–8 | PSI-2, DSM-4 gambling (adapted for video gaming) | Linear and logistic regression; SEM | Increases in levels of ER and family environment warmth were related to decreases in PVGU |
| 11. | Liu et al (2017) | China | Gaming | Convenience General (18-month longitudinal design) | N = 420 (47.6%), $M_{age}$ = 9.74 years (SD = 0.45) | SCDC, pathological video game use questionnaire (adapted), ERQ | Chi-square Path analysis, CFI, TLI, RMSEA | Controlling for age, sex, and sensation seeking, social communication was related to decreased ER, which in turn was related to lower school connectedness which was related to increases in IGA |
| 12. | Navas et al (2017) | Spain | Gambling | Convenience Clinical and control | N = 41 male GDs; $M_{age}$ = 35.22 years (SD = 11.16); N = 45 male HCs, $M_{age}$ = 33.22 years (SD = 7.18) | SOGS, UPPS-P, ERQ | Bayesian *t* tests; bivariate correlations | GDs relative to HCs showed higher levels of emotional suppression; negative urgency correlated positively with emotional suppression |
| 13. | Navas et al (2016) | Spain | Gambling | Convenience Clinical and match control | N = 41 GDs, $M_{age}$ = 35.22 years (SD = 11.16); N = 45 HCs, male $M_{age}$ = 33.22 years (SD = 8.18) | CERQ, GRCS, SOGS | ANOVAs; MANOVAs; linear stepwise/logistic regression; mediation path analysis | GDs were observed to use self-blame and catastrophizing, but also positive refocusing more often than controls; GDs putatively adaptive CERG strategies shared a significant portion of variance with GD severity and gambling-related cognition beliefs |

(*continued*)

Table 1
(continued).

| | Study | Country | Type of behavioral addiction | Sampling method | Sample characteristics (% female) | Addiction and ER outcome measures | Statistical analysis | Results |
|---|---|---|---|---|---|---|---|---|
| 14. | Orlowski et al (2018) | Germany | Gambling | Convenience Vocational schools | N = 4928 (37.2%), $M_{age}$ = 19.9 years (SD = 3.72, range = 15–52) | Stinchfield self-report questionnaire based on DSM-5 criteria of GD; ASQ | Linear regression; multinomial logistic regression | Significant association between "Adjusting" and "Tolerating" ER strategies and GD but not for "Concealing"; lower "Tolerating" and "Adjusting" scores increased likelihood of GD classification |
| 15. | Pace et al (2015) | Italy | Gambling | Convenience General | N = 251 (43.4%) $M_{age}$ = 33.02 years (SD = 13.09, range = 21–77) | SOGS, ATQ-SF, ERQ | ANOVAs; discriminant function analysis | Compared to low-risk gamblers PGs had lower levels of internal LoC and cognitive reappraisal and higher levels of chance LoC |
| 16. | Poole et al (2017) | Canada | Gambling | Convenience General (Mturk) | N = 414 (37%); $M_{age}$ = 35.5 years (SD = 11.1, range = 18–71 years) | DERS; PGSI | Binary logistic regressions; mediation analysis | 25.7% classified as GD; increase in ACEs significantly predicted PG; increase in ACEs significantly predicted lower ER; lower ER significantly predicted GD, controlling for ACE; significant indirect effect of ACEs on GD via emotion dysregulation |
| 17. | Rogier and Velotti (2018) | Italy | Gambling | Purposive and snowball sampling Clinical and control | N = 178 total $M_{age}$ = 47.24 years (SD = 11.64); control group: N = 105 (23.8%); clinical group: N = 74 (15.1%) | DERS; SOGS | ANOVAs; independent sample *t* test; MANCOVAs, hierarchical multiple regression; mediation analysis | GD had higher DERS total scores and higher scores on all DERS subscales compared to control group; GD severity was significantly correlated with all DERS subscales, except goals; emotion dysregulation significantly mediated relationship between grandiose narcissism and GD severity with direct effect becoming non-significant |
| 18. | Tang et al (2019) | United States | Gambling | Convenience General (Mturk) Full-time employees | N = 1233 (55%); $M_{age}$ = 37.28 years (SD = 9.16, range = 25+ years) | PGSI, DERS-18 | Multiple regression analysis; SPSS PROCESS v3 | PG related to lower ER; ER was best predictor of PG, followed by gender; ER significant mediator between work stress and gambling; ER was significant mediator between burnout and PG; serial mediation supported in that work stress was related to PG through influence of burnout and ER, with ER being most proximal psychological factor |
| 19. | Williams et al (2012) | Australia | Gambling | Convenience PG group, CC and HC | N = 56 PGs (25%), $M_{age}$ = 37.73 years (SD = 11.36); N = 51 CCs (66.6%), $M_{age}$ = 30.98 years (SD = 12.50); N = 49 HCs (77.5%), $M_{age}$ = 28.97 years (SD = 8.55) | DERS, ERQ, SOGS, SCIP | Zero-order correlations; partial correlations; MANCOVA; univariate tests | PGs and CCs reported significantly less use of reappraisal as ER strategy and reported a greater lack of emotional clarity and more impulsivity than HCs; PGs reported a greater lack of emotional awareness compared to HCs and reported differences in access to effective ER strategies compared to both CCs and HCs |
| 20. | Yen et al (2018) | Taiwan | Gaming | Convenience IGD group and matched HC | N = 174 (20%; 87/87); $M_{age}$ CC = 23.29 years (SD = 2.34), $M_{age}$ HC = 23.38 (SD = 2.40) | DSM-5 criteria for IGD; MINI psychiatric interview; ERQ | Logistic and linear regressions | IGD group had significantly lower scores of reappraisal; IGD group had higher scores on suppression; reappraisal was a significant negative predictor of IGD; suppression was a significant positive predictor of IGD; higher suppression and lower reappraisal significantly predicted comorbid mood disorders in IGD group |

ACEs = Adverse Childhood Experiences, ANOVA = Analysis of Variance, ASQ = Affective Style Questionnaire, ATQ-SF = Adult temperament questionnaire-short form, CC = clinical control, CERG = Cognitive emotion regulation questionnaire, CERQ = Cognitive Emotion Regulation Questionnaire, CFI = comparative fit index, CPGI = Canadian Problem Gambling Index, CSAS = Video Game Dependency Scale, DERS = Difficulty in Emotion Regulation Scale, DSM = Diagnostic Statistical Manual, ER = emotion regulation, ERQ = Emotion Regulation Questionnaire, GD = gambling disorder, GRCS = Gambling related cognition scale, HC = Healthy Control, IAT-WoW = Internet Addiction Test- World of Warcraft, IGA = Internet gaming addiction, IGD = Internet gaming disorder, LoC = Locus of Control, MANCOVA = multivariate analysis of covariance, MANOVA = multivariate analysis of variance, MINI = Mini-International Neuropsychiatric interview, NPG = non-problem gamblers, PG = Problem Gambling, PGSI = Problem gambling severity index, PSI-2 = Personal Strengths Inventory, PVGU = problematic video game use, RA = revised adolescent, RMSEA = Root Mean Square Error of Approximation, SCDC = Social and Communication Disorders Checklist, SCIP = Structure Clinical Interview for Pathological Gambling, SEM = Structural Equation Modeling, SOGS = South Oaks Gambling Screen, TLI = Tucker-Lewis Index, UPPS-P = UPPS-P Impulsive Behavior Scale, VG = Video gaming.

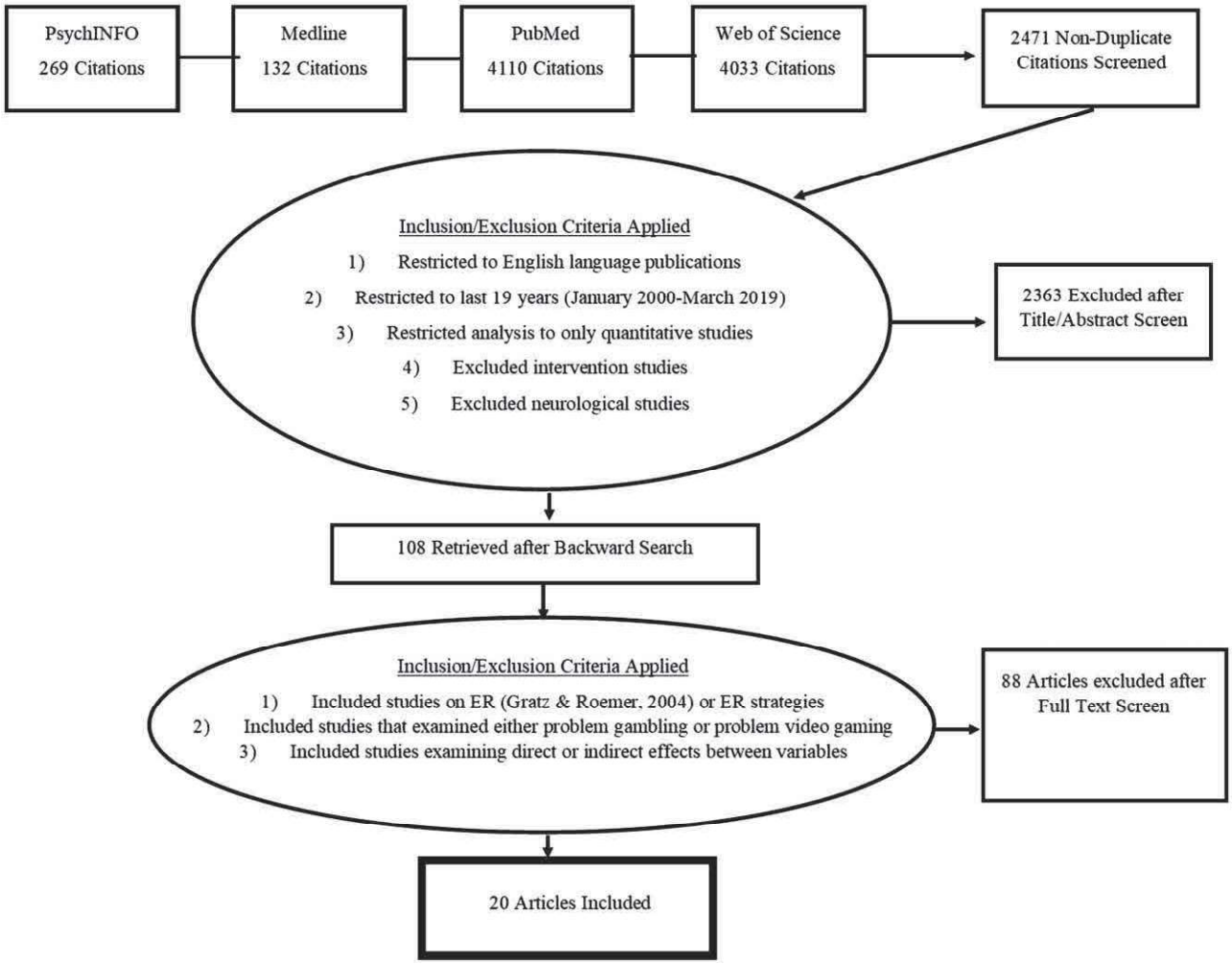


**Fig. 1.**

Study identification flow diagram.

## Study characteristics

The characteristics of selected studies are presented in Table 1. Most of the studies selected (95%) took place during the past 5 years (2014–2019), more than half (65%) were carried out in Europe, and most of the studies (k = 13) examined the relationship between problem gambling behaviors and ER.

## Assessment of methodology

### *Sample characteristics and sampling method*

All studies applied convenience sampling methods. In total, data from 12,899 participants (not including duplicate samples) were analyzed across all 20 studies. Most studies (k = 18) used a cross-sectional design, while 2 incorporated longitudinal data (ranging from 18 months to 2 years).

In 15 studies (75%), the participants were adults (18+ years). Among adult participants, 2 studies examined problem video gaming, while the other 13 focused on gambling. Studies with child/adolescent participants all examined video gaming, with 1 study investigating both video gaming and gambling. As such, developmental differences regarding the relation between ER and GD or IGD could not be assessed at this time. Few of the studies included (25%) had samples with comparable numbers of males and females. For instance, 45% were based on samples that included less than 40% of female participants and 6 studies had samples comprised solely of males. All studies used self-report measures.

### *Behavioral addiction measures*

All the included studies (k = 20) used some form of self-report assessment for problematic levels of the behavioral addiction (gambling/video gaming) (e.g., Canadian Problem Gambling Index, South Oaks Gambling Screen, Pathological Video Game Use Questionnaire). Three studies employed a different measure for behavioral addiction in conjunction with self-report questionnaires, 2 employed a diagnostic clinical interview for gambling behaviors,[28,29] while Ciccarelli et al[30] employed a modified version of the "Posner Task" as a behavioral

measure for gambling problems. The *Posner Task* has been previously used to assess GDs by examining whether participants have an attentional bias for "gambling-related" images over "neutral" images.

### *Emotion regulation measures*

All (k = 20) studies incorporated a self-report measure of ER. Twelve studies measured ER through a questionnaire that encompassed all the principles of ER (e.g., Difficulty in Emotion Regulation Scale), or through an ER subscale of a larger measure (e.g., Personal Strengths Inventory). Other studies measured strategies of ER. Seven studies measured levels of suppression, reappraisal, adjusting, tolerating, and concealing [Emotion Regulation Questionnaire, Affective Style Questionnaire, or cognitive ER strategies (Cognitive Emotion Regulation Questionnaire)].

## Synthesis of results

The measures of effect sizes varied across studies, with several studies not reporting effect sizes. When effect sizes were not available, where possible, they were estimated using statistical test results (correlations, *t* test, *F* test, means, and SDs) and an effect size calculator.[31] When the information provided in the publication did not allow for this calculation, respective authors were contacted as an attempt to acquire the necessary information. Effect sizes were converted into a Cohen's *d* standardized effect size using effect size converting formulas.[32,33] Cohen[33] suggests the following standard for interpreting the magnitude of an effect size for *d*, whereby 0.20 is small, 0.50 is medium, and 0.80 or greater is large.

### *Emotion regulation and problem gambling*

Of the 14 published articles examining the relationship between ER and problem gambling, 2 failed to find significant results. Barrault et al[34] found no significant difference in ER strategies (i.e., reappraisal and suppression) among problem gamblers in a group of poker players. In addition, Barrault et al[35] reported once again that ER strategies were not associated with GD, but that gambling type was a significant moderator between using suppression as an ER strategy and GD (i.e., the effect of suppression was higher among strategic gamblers compared to mixed gamblers).

Four studies (29%) reported large effect sizes. Specifically, Elmas et al,[36] Jauregui et al,[37] and Williams et al[28] found that higher emotion dysregulation scores were associated with increased levels of problem gambling (Cohen's $d$ = 0.90–1.02). Navas et al[38] reported a large effect size between maladaptive ER strategies (i.e., catastrophizing and self-blame) and problem gambling (Cohen's $d$ = 0.91 and 1.37).

Six studies (43%) reported medium effect sizes; 4 studies reported that higher emotion dysregulation was associated with increased problem gambling (Cohen's $d$ = 0.50–0.70).[30,39–42] Two studies reported that reappraisal was significantly lower among problem gamblers as compared to low-risk gamblers (Cohen's $d$ = 0.71),[43] and that suppression was significantly higher among problem gamblers compared to healthy controls (Cohen's $d$ = 0.50).[39]

Finally, 2 studies (14%) found small effect sizes between these variables. One study found a significant association between problem gambling and higher levels of emotion dysregulation (Cohen's $d$ = 0.30),[44] while Orlowski et al[45] reported a negative association between problem gambling and adjusting (Cohen's $d$ = −0.12) and a positive association between problem gambling and concealing (Cohen's $d$ = 0.14).

### *Emotion regulation and problem video gaming*

Of the 7 studies that examined the relationship between ER and problem video gaming, 2 studies (29%) reported large effect sizes indicating that higher emotion dysregulation led to increased IGD[46,47] and 1 study reported a medium effect size (Cohen's $d$ = 0.60).[44]

Four studies (57%) found small effect sizes reporting that increased ER was related to decreased levels of problem video gaming (Cohen's $d$ = 0.20, 0.29, and 0.30).[48–50] Finally, Yen et al[29] reported that participants in the IGD group had significantly higher levels of suppression scores (Cohen's $d$ = 0.35) and lower levels of reappraisal scores (Cohen's $d$ = 0.41) compared to healthy controls.

Liau et al,[48] in a longitudinal study, reported increases in ER acted as a protective factor for problem video gaming, while impulsivity acted as a risk factor. Liu et al,[50] further reported that social communication predicted problem video gaming directly, as well as indirectly by serial mediation through ER and school connectedness.

# DISCUSSION

This review examined the relationship between ER and problem gambling and video gaming. Overall, the information presented in this review provides support for the relationship between ER deficits and behavioral addictions among both child/adolescent and adult samples. Eighteen studies (90%) reported a statistically significant relationship between ER and behavioral addictions, whereby less adaptive ER was associated with a rise in behavioral addiction symptoms. More specifically, 6 studies reported large effect sizes (Cohen's $d \geq 0.80$); while another 7 reported medium effect sizes (Cohen's

$d \geq 0.50$). Thereby demonstrating a consistent pattern in the direction of this relationship. As such, difficulties with ER may be considered a risk factor in the development of behavioral addictions.

In addition, these results continue to support the notion of ER as a transdiagnostic construct.[51] Research with non-clinical samples have generally reported significant relationships between ER and symptoms across various psychopathologies including, depression, anxiety, eating difficulties, bipolar disorder, and other substance use disorders.[17,51–53,55] The current review extends these findings by examining the relationship between ER and behavioral addictions (gambling and video gaming), thereby lending further support to the mounting evidence that suggests difficulties with ER are likely part of the underlying mechanisms of multiple forms of psychopathology. Further, these results suggest that ER should be considered as a crucial and specific target in psychological treatment and prevention measures of behavioral addictions. For instance, programs that focus on teaching how to label emotions and recognize how emotions are manifested in the body (i.e., emotional awareness) will allow individuals to better *understand* and become *aware* of their emotional experiences. While, programs such as, mindfulness-based treatments that target awareness, acceptance, and non-judgment toward experienced emotions, will allow individuals to overcome periods of high emotional intensity without reacting *impulsively* which are characteristics of individuals engaging in excessive gambling and gaming behaviors.

It is possible that conclusions drawn from study results were compromised by several factors including sample characteristics, measurement issues, and various methodological approaches. First, in 75% of studies, participants were over the age of 18, while only 5 studies (all within the gaming field) involved either children or adolescents. This implies a specific need to differentially examine how ER effects behavioral addictions in children, adolescents, and adults, especially given the high levels of stressors frequently observed in adolescence. Specifically, adolescents are often less successful in regulating their emotions,[5] they manifest higher levels of impulsivity, and are more susceptible to addictive behaviors.[52] For instance, research has consistently shown that adolescents are 2 to 4 times more likely to experience gambling problems compared to adults.[5,53–57] In addition, the transitionary points within lifespan development could also be explored as another means of understanding the unique stressors that occur at different development periods (e.g., changing schools, graduating from college, starting a family). The studies included also had an over-representation of male participants, with 30% of studies having samples comprised solely of males. This is likely due to the over-representation of males with gambling and gaming disorders.[9,58] However, studies have shown higher prevalence rates for mood disorders and ER difficulties among females.[59] It is thus possible that effect sizes observed in these studies would have been stronger among samples with higher female representation. Unfortunately, it is impossible to test this hypothesis given that no study had a sufficiently large sample of females. This suggests a need for more definitive research investigating the relationship between ER deficits and behavioral addictions among females. In addition, all studies utilized self-report measures, which may potentially lead to biased estimates of self-assessed behavior, misunderstanding of questions, or social-desirability biases. Social-desirability biases in gambling research is a significant risk to research in the behavioral addictions field as participants may feel uncomfortable reporting on risky or addictive behaviors, especially given the lower social acceptability of excessive engagement.

Finally, only 2 studies (10%) examined the relationship between ER and problem video gaming longitudinally, while no studies to date have investigated the relationship between ER and problem gambling over time. To effectively understand the predictive relationship of ER deficits on developing behavioral addictions, further longitudinal research needs to be conducted.

There are a number of limitations in this review that should be noted. First, the studies included were limited to English publications, excluding published research in other languages. Given that most of the selected studies were conducted in Europe, future research should include other language publications to obtain a more comprehensive review. Second, all types of gambling and video gaming activities were included and combined in this review. It is possible that results may differ depending on the type of gambling or video gaming activity. However, given the limited research in behavioral addictions examining the effect of ER, for the current review it was necessary to combine type of activity. Previous research in the gambling field, has shown that problem gamblers were more likely to be associated with particular forms of gambling activities (i.e., electronic gaming machines, casino games, bingo, and poker), as well as, more likely to participate in more forms of gambling than non-gamblers.[60] Third, we include several diverse measures of ER (e.g., Emotion Regulation Questionnaire and Difficulty in Emotion Regulation Scale) and problem gambling and video gaming within this review. It is also possible that these instruments may measure slightly different constructs. A significant challenge for research in ER and behavioral addictions is the use of standardized instruments and methodologies. For one, video gaming addiction continues to have inconsistencies in conceptualization, and approaches to screening and diagnosis (even post DSM-5 and ICD-11). These inconsistencies have

limited stable and reliable prevalence rates, as well as comparison of results among studies.[61] In addition, although ER is now viewed as an important construct throughout many areas of psychology (i.e., biological, social, development, clinical, etc.), many academics use the term ER in diverse ways, also creating inconsistencies in conceptualization and definitions.[62] Finally, given the high level of comorbidity between behavioral addictions and other psychopathologies (e.g., mood disorders) the relationship found between ER and behavioral addictions could be accounted for by these comorbid disorders that have been previously associated with ER. Nevertheless, significant theoretical and practical implications are expected from such work. However, the limited number of peer-reviewed articles examining ER suggests more extensive research is necessary in order to address the longitudinal appropriateness of using this theoretical construct in predicting behavioral addictions. Future studies should also focus on the role of ER among adolescents and young adults in predicting behavioral addictions, especially if prevention efforts intend to be implemented. Moreover, in order to understand the predictive nature of ER, additional longitudinal studies need to be conducted within the field.

While current research in this domain is still in its infancy, the results of this review provide preliminary evidence suggesting that deficits with ER are significantly associated with behavioral addictions. As a result, individuals suffering from behavioral addictions might benefit from intervention programs that target the development/enhancement of ER skills. In addition, those with ER deficits could be potentially identified as at-risk and take part in prevention programs. Prevention and intervention research has begun to move away from single-disorder programs toward initiatives that target multiple disorders (i.e., focusing on all behavioral addictions, rather than only problem gambling or video gaming). Therefore, programs that adopt increasing protective factors such as ER, rather than focusing merely on symptomology, are likely to be the most effective toward improved mental health outcomes and overall well being.

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## Bridging Studies

With the introduction of the new behavioral addictions' category within the DSM-5 (APA, 2013) there has been increased and renewed interest in the understanding and etiology of various behavioral addictions. Research has suggested that emotion regulation (ER) may be considered a transdiagnostic construct, given that those who suffer from psychological disorders tend to encounter increased ER deficits (Aldao et al., 2010; Sheppes et al., 2015). However, the relationship between ER and behavioral addictions is relatively unknown. In order to understand the current state of the literature within this growing field, Study 1 aimed to synthesize and analyze research conducted within the last nine years. Results indicated that although research is still in its infancy (e.g., only 20 studies were identified, studies only examined general emotion regulation, etc.) preliminary evidence suggests that deficits in ER are associated with an increased likelihood of a behavioral addiction (i.e., either video gaming problem or gambling problem). Although 90% of studies found a positive association between deficits in ER and problem video gaming and gambling, most studies examined ER in general, rather than investigating the unique contribution of each dimension of ER. In order to make a clinical impact clinicians working with these individuals need to understand what areas of ER are most associated with problem behaviors, thereby allowing for targeted and time-efficient interventions to occur. As such, Study 2 aimed examine the unique contribution of each specific dimension of ER onto the most studied behavioral addiction (i.e., problem gambling (PG)). Additionally, individuals with PG often have co-morbid mood disorders including depression (Sanscartier et al., 2019). Further, suicidal ideation in PG has been estimated to range from 17% to 48% and rates of suicide attempts have ranged from 9.7% to 31% (Lee et al., 2011; Manning et al., 2015; Ronzitti et al., 2017; Rossini-Dib et al., 2015; Thon et al., 2014). As such, the second goal of Study 2 was to assess the indirect effects of PG onto

depression through each dimension of ER. Understanding the mediating role of ER between PG and depression has the potential to improve a clinician's ability to work with problem gamblers on specific deficits in ER that may increase their likelihood of developing depression.

# Chapter IV

## Study Two

Emotion Regulation in Emerging Adult Gamblers and its Mediating Role with Depressive Symptomology

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Research paper

# Emotion regulation in emerging adult gamblers and its mediating role with depressive symptomology

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ABSTRACT

*Background:* It is presently estimated that as much as 10% of emerging adults are at risk for a gambling disorder. The consequences stemming from problematic gambling engagement include increased substance use, mental health disorders, suicidality, financial strain and legal issues. The present study explores whether deficits in emotion regulation explain the association between problem gambling severity and depression.

*Methods:* A sample of 820 emerging adult gamblers ($M_{age}$ = 21.14 years-old, *SD* = 2.90, 50.9% female) completed an online survey including an assessment of problematic engagement in gambling over the past year, levels of anxious/depressive symptomology, and difficulties in emotion regulation. In total, 15.6% and 8.2% of this sample were at moderate or high risk for gambling disorder.

*Results:* Results from a linear regression model revealed that difficulties with impulse control positively contributed to problem gambling scores and engagement in goal-directed behavior positively contributed to problem gambling scores, even after accounting for symptoms of depression. Moreover, results from a mediation model revealed that the association between problem gambling and depression was explained by participants' deficits in non-acceptance, goals, strategies, and clarity.

*Limitations:* Limitations include the use of self-report and cross-sectional data making it difficult to infer causality.

*Conclusions:* These findings add to our understanding of the mechanisms that appear to explain for the first time the affective consequences of problem gambling. Enhancing specific dimensions of emotion regulation will allow for tailored interventions among gamblers with depression, ultimately achieving better mental health outcomes.

## 1. Introduction

Emerging adulthood is a distinct period of development between ages 18–27 years; characterized by significant changes and exploration of possible life directions. Individuals within this age group can be distinguished from adolescence and adulthood by their newly-acquired independence. Having left the dependency of childhood and adolescence behind, while not yet acquiring the responsibilities normative to adulthood, allows emerging adults the opportunity for increased exploration of various life choices (Arnett, 2000). However, as of a result of this freedom, emerging adulthood has also been shown to be a peak developmental period for engaging in multiple risky behaviors, including binge drinking, illegal drug use, cigarette use, risky sexual behaviors, and gambling (Arnett, 2007; St.Pierre et al., 2014); of which often leads to negative consequences.

Of particular interest, gambling has undergone a surge in popularity over the last decade with increased accessibility of gambling venues (e.g., casinos, new forms of lotteries, and the emergence and fast-paced growth of online gambling sites). Additionally, with new regulations currently being passed in the United States and the constant debate in Canada over the legalization of sports wagering, gambling has never been so widespread, easily accessible, and socially accepted. Gambling, defined as *placing something of value at risk with the aim of possibly gaining something of greater value*, can be viewed along a continuum ranging from non-gambling to social/occasional/recreational gambling to at-risk gambling (i.e., not meeting the clinical criteria of gambling disorder but expecting some gambling related problems) to problem/disordered gambling (Derevensky, 2007). Gambling disorder is currently

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the only behavioral addiction included in the Substance-Related and Addictive Disorders section under the Non-Substance-Related Disorders subsection of the Diagnostic Statistical Manual-5th edition (DSM-5). Within this category, it is defined as a persistent, recurrent, and maladaptive engagement in gambling activities that leads to significant distress in one's daily life including, legal, financial, physical, and psychosocial consequences in a 12-month period (APA, 2013).

Among emerging adults increased accessibility of gambling may prove to be a significant risk factor for later mental health outcomes (Welte et al., 2017). For instance, within adolescence and emerging adulthood rates of problem gambling are considerably higher than among older adults (Volberg et al., 2010). A recent systematic review reported that worldwide prevalence rates for problem gambling within this age group ranges from 0.2–12.3% (Calado et al., 2017; Nowak, 2018), while rates in older adults have been estimated at 0.3–2.4% (Tse et al., 2012). The consensus among clinicians and researchers is that disordered gambling among emerging adults is not only common but has both short- and long-term deleterious consequences for the individuals, their families, and the community, including severe psychological, mental health, familial, financial, and social challenges (Derevensky, 2007; Edgerton et al., 2015). Furthermore, symptoms of gambling disorder among emerging adults may also include lower academic performance, isolation, higher substance use, and other high-risk behaviors (Emshoff and Perkins, 2008). Finally, early exposure to gambling has been consistently associated with increased levels of comorbid disorders, including substance abuse, antisocial personality disorder, attention deficit/hyperactivity disorder, social anxiety, mood disorders and suicide ideation (Black et al., 2015; Hartmann and Blaszczynski, 2018).

Difficulties with impulse control and mood disorders have also been associated with general difficulties in regulating emotions and have been suggested to serve as functions for coping with negative emotions (Chapman et al., 2008; Cole et al., 1994; Fox et al., 2008; Weiss et al., 2012). As such, given the association of problem gambling with impulsivity, mood disorders and the relationship between impulsivity and mood disorders with difficulties in emotion regulation, it is possible that engagement in gambling serves as a maladaptive emotion regulation strategy.

Emotion regulation refers to the process of how, which, and when negative and positive emotions are expressed and experienced (Gross, 1998). According to Gratz and Roemer (2004), emotion regulation encompass six dimensions; (1) an *awareness,* and (2) *understanding* of emotions, (3) an *acceptance* of experienced emotions, (4) the ability to engage in *goal-directed* behavior, (5) the ability to control *impulsive* behaviors when experiencing negative emotions, and (6) the ability to exert *flexibility* in using emotion regulation strategies (Gratz and Roemer, 2004). A failure to meet any of these dimensions may result in pathological behaviors or distress. Research has shown that emotion regulation deficits are predictive of increased risk for mental health disorders (Aldao et al., 2010; Sheppes et al., 2015). Additionally, compared to healthy individuals, those who suffer from psychological disorders tend to encounter increased emotion regulation deficits (Aldao et al., 2010; Sheppes et al., 2015). Equally important, emotional acceptance, a process of emotion regulation, has been linked to better psychosocial adjustment and treatment outcomes in individuals with psychological disorders (Campbell-Sills et al., 2006).

Research has consistently demonstrated that individuals with gambling problems often report gambling as a coping mechanism for unwanted emotions (Riley, 2014; Wood and Griffiths, 2007). Further, problem gamblers often have difficulties with impulsivity, and an under-representation of available emotion regulation strategies, which inhibits their ability to choose long-term over short-term benefits and goals (Power et al., 2012; van Holst et al., 2010). Although, impulsivity has shown strong evidence as an intermediate determinant of problem gambling, very few studies have examined the relationship of emotion regulation as a whole and gambling problems. To date, only nine studies have investigated this relationship. Results indicate, that higher levels of emotion dysregulation are associated with increased levels of problem gambling. However, of these nine studies all were conducted in Europe or Australia (Ciccarelli et al., 2016; Elmas et al., 2017; Jauregui et al., 2016; Navas et al., 2017; Pace et al., 2015; Rogier and Velotti, 2018; Williams et al., 2012a), except for one that was conducted in North America (Poole et al., 2018). Further, even fewer studies have investigated the contribution of each dimension of emotion regulation (i.e., non-acceptance, goals, impulse, awareness, strategies, and clarity) to problem gambling. Understanding the relationship between emotion regulation facets and gambling problems would allow for advancements in the currently limited available treatment options. Focusing on enhancing emotion regulation skills among problem gamblers, would suggest addressing underlying mechanisms of psychopathology rather than merely symptoms. Moreover, a better understanding of whether emotion regulation deficits are involved in the development and maintenance of problematic gambling behaviors could contribute to the implementation of prevention programs even before the manifestation of pathological behaviors.

The first objective of this study seeks to assess the unique contribution of each of the six dimensions of emotion regulation to problem gambling. It is hypothesized that all dimensions of emotion regulation will be predictive of problem gambling. However, given that research has suggested gambling to be a maladaptive emotion regulation strategy used to escape negative emotions, it is hypothesized that, non-acceptance and a lack of flexibility in using emotion regulation strategies will be among the strongest predictors of problem gambling. Additionally, given that research has consistently demonstrated an association between impulsivity and gambling problems, it is hypothesized that the inability to control one's impulses when faced with negative emotions will also be one of the strongest predictors of problem gambling. The second objective is to assess the indirect effects of problem gambling onto depressive and anxious symptomology through the dimensions of emotion regulation (non-acceptance, goals, impulse, awareness, strategies, and clarity), while controlling for sex, age, and gambling frequency. Few studies have examined the mediating mechanisms between problem gambling and mood disorders, with most investigating mediators such as impulsivity, cognitive beliefs, and coping strategies (Clarke, 2006; Herrero-ferna and Jauregui, 2015; Jauregui et al., 2017; Takamatsu et al., 2016; Tang et al., 2010). To our knowledge this is the first study that aims to examine the mediating role of each unique dimension of emotion regulation on the relationship between problem gambling and anxious/depressive symptomology and as such is exploratory in nature. However, taking into account the high comorbidity between problem gambling and mood disorders (Cunningham-Williams and Cottler, 2001; Gupta et al., 2013), it is broadly hypothesized that emotion regulation will play a significant mediating role between gambling and anxious/depressive symptomology. According to Blaszcsynsky and Nower's (2002) *Pathways Model*, individuals within the *Behaviorally Conditioned* (BC) pathway develop mood disorders due to their excessive and problematic gambling engagement. Given that BCs are the most common pathway within community samples (Blaszcsynsky and Nower, 2002), it is assumed that within our sample problem gambling will lead to symptoms of mood disorders. Further, problem gambling has shown to significantly predict greater levels of mood disorders (Jauregui et al., 2017), and research among emerging adults demonstrates that coping strategies mediate the relationship between gambling disorder and depression (Matheson et al., 2009). Finally, longitudinal studies have shown that coping mediates the relationship between negative life events and the onset of emotional disorders (Asselmann et al., 2015); thus suggesting that the negative life events associated with problematic gambling will lead to depression/anxious symptomology which will subsequently be mediated by the dimensions of emotion regulation.

## 2. Method

### 2.1. Participants

Of a total of 2657 completed questionnaires with participants who consented to take part in the study, 33 participants were excluded for failing to respond appropriately to any of the three attention items within the survey, 51 were excluded for completing the survey twice (based on IP and provided e-mail addresses) or completing the survey in less than 5 min, and 248 were excluded for not meeting age requirements (18–27 years old). Additionally, given that the purpose of the current study was to examine the relationship between emotion regulation and gambling, non-gamblers were removed from the sample. As such, 1406 participants were excluded for indicating that they had not gambled once in the past 12 months. Finally of the remaining 919 participants, 99 were excluded for inconsistent responding (i.e., reporting having gambled during the past 12 months, but not reporting gambling on any gambling activities) or for completing less than 50% of the study.

A total of 820 gamblers ages 18–27 years ($M_{age}$ = 21.14 years-old, $SD$ = 2.90) were included in the final analyses. The overall sample was evenly distributed by sex (50.9% female), and participants predominantly described themselves as White/Caucasian (66%) (see Table 1 for demographic characteristics of the sample). More than half of the sample gambles less than monthly during the previous 12 months and the most common gambling activity (played weekly) was lotteries/scratch tickets, games of skill (e.g., pool, darts), and playing the stock market. According to the CPGI, 15.6% of emerging adults within this sample of gamblers met criteria for moderate risk of problem gambling and 8.2% met the criteria for problem gambling (see Tables 2 and 3).

**Table 1**
Demographic characteristics of sample.

| Characteristic | Percentage (%) |
|---|---|
| Sex, $n$ = 818 | |
| Male | 49 |
| Female | 50.9 |
| Intersex | 0.1 |
| Ethnicity, $n$ = 820 | |
| White/Caucasian | 66 |
| Hispanic/Latino | 4.9 |
| Asian/Pacific Islander | 21.7 |
| Black/African American | 5.0 |
| Native American Indian | 2.9 |
| Other | 0.5 |
| Education, $n$ = 814 | |
| Currently pursuing CEGEP degree | 7.7 |
| Currently pursuing certificate at institution of higher education | 3.2 |
| Currently pursuing an Undergraduate degree | 63.6 |
| Currently pursuing a Graduate degree | 11.4 |
| Not registered at any institution of higher education | 14.1 |
| Country/Province $n$ = 820 | |
| Ontario | 1.8 |
| Quebec | 19.4 |
| Nova Scotia | 0.6 |
| Manitoba | 48.0 |
| British Columbia | 0.6 |
| Prince Edward Island | 0.1 |
| Saskatchewan | 0.3 |
| Alberta | 0.3 |
| Newfoundland | 0.6 |
| USA | 25.8 |
| Other | 2.5 |
| PHQ classification $n$ = 820 | |
| Normal range | 31.8 |
| Minimal severity | 33.2 |
| Mild severity | 17.9 |
| Moderate severity | 11.4 |
| Severe | 5.7 |
| GAD classification $n$ = 820 | |
| No risk | 38.5 |
| Mild risk | 45.6 |
| Moderate risk | 12.9 |
| Severe risk | 3.0 |

*Note.* Percentages for ethnicity do not sum up to 100% as participants were allowed to choose multiple ethnicities; for countries/province "other" includes Europe and Asia.

### 2.2. Measures

#### 2.2.1. Demographic items

Participants responded to five demographic items, including their sex (male, female, intersex), age, ethnicity, level of current education, and the country/province in which they reside.

#### 2.2.2. Difficulties in emotion regulation scale

(DERS; Gratz and Roemer, 2004), is a 36-item six-scale self-report measure designed to assess clinically relevant domains of emotional competence, thought to be a critical dimension of emotion regulation. Within this scale emotional competence is divided into six factors that correspond with Gratz and Roemer's (2004) six dimensions of emotion regulation. These factors include: 1) lack of emotional clarity *(clarity)*, 2) lack of emotional awareness *(awareness)*, 3) non-acceptance of emotion responses *(non-acceptance)*, 4) impulse control difficulties *(impulse),* 5) limited access to emotion regulation strategies *(strategies),* and 6) difficulties engaging in goal directed behavior when emotionally aroused *(goals)*. Participants indicate on a 5-point Likert scale how often each item applies to themselves, with responses ranging from 1 (*almost never*) to 5 (*almost always*). Higher scores on the DERS reflect greater emotion regulation difficulties. Psychometric properties of the DERS have been previously established with adult and adolescent populations; showing good construct validity, internal consistency and test-retest reliability (Gratz and Roemer, 2004; Weinberg and Klonsky, 2009). In the following sample the DERS demonstrated a high internal consistency for total score (Cronbach's $\alpha$ = 0.94), non-acceptance subscale (Cronbach's $\alpha$ = 0.91), goals subscale (Cronbach's $\alpha$ = 0.88), impulse subscale (Cronbach's $\alpha$ = 0.87), awareness subscale (Cronbach's $\alpha$ = 0.82), strategies subscale (Cronbach's $\alpha$ = 0.91), and clarity subscale (Cronbach's $\alpha$= 0.81).

#### 2.2.3. Canadian problem gambling index

(CPGI; Ferris and Wynne, 2001), is a 9-item scale used to assess problem gambling behaviors including, spending more than one can afford on gambling, experiencing feelings of guilt or stress for gambling, and chasing losses. Items are scored using a 4-point Likert scale 0 (*never*) to 3 (*almost always*), and are summed to provide an index score that can be separated into four categories (0 = non-problem, 1–2 = low-risk, 3–7 = moderate-risk, and 8–27 = problem gambler) (Ferris and Wynne, 2001). Studies have shown the CPGI to be a reliable measure with high internal consistency reliability (Cronbach's $\alpha$ = 0.86) (Brooker et al., 2009). The CPGI also includes items that measure gambling participation and frequency. Respondents were asked if they participated in any gambling activity in the past year. If they respond affirmatively, they were asked how frequently they participated in a set of 15 gambling activities (e.g., fantasy sports, lotteries, poker) in the past year. Gambling participation was rated on a 5-point Likert scale from 0 *(never)* to 4 *(daily)*. In the current sample the CPGI problem gambling total score demonstrated a high internal consistency (Cronbach's $\alpha$ = 0.88).

#### 2.2.4. Patient health questionnaire

*(PHQ-9;* Kroenke et al., 2001*);* consists of 9 items representing the depression module of the full PHQ. Each item is rated on a 4-point Likert scale 0 (*not at all*) to 3 (*nearly every day*). Scores on the PHQ-9 range from 0–27, with higher scores indicating more depression symptoms. The internal reliability of the PHQ-9 is excellent with a

**Table 2**
Proportion of gamblers yearly participation and CPGI classification.

| Sample Distribution | Percentage (%) Male ($n$ = 402) | Female ($n$ = 416) | Overall ($n$ = 820) |
|---|---|---|---|
| Past 12-Month Gambling Participation | | | |
| Less than once per month | 64.9 | 72.1 | 68.5 |
| At least once per month | 22.1 | 18.5 | 20.2 |
| At least once per week | 10.4 | 8.4 | 9.5 |
| Daily | 2.5 | 1.0 | 1.8 |
| CPGI Categories | | | |
| Non-problem gambler/Social gambler | 41.0 | 55.5 | 48.4 |
| Low-risk problem gambler | 30.3 | 25.5 | 27.8 |
| Moderate risk problem gambler | 18.7 | 12.7 | 15.6 |
| Problem gambler | 10.0 | 6.3 | 8.2 |

*Note.* $N_s$ for male and female participants do not sum up to 820 as two participants reported *Intersex* and two participants did not report any sex.

**Table 3**
Proportion of gamblers participation in various gambling activities (%).

| Gambling activity | Never | < 1/ month | At least 1/month | At least 1/week | Daily |
|---|---|---|---|---|---|
| Lottery tickets (e.g., Super 7, Maxi Lotto) | 53.5 | 31.5 | 9.4 | 4.8 | 0.7 |
| Instant scratch tickets | 48.4 | 34.9 | 12.0 | 3.9 | 0.7 |
| Raffle or fundraising tickets | 55.8 | 37.6 | 4.9 | 1.3 | 0.2 |
| Horse races | 90.8 | 6.8 | 1.0 | 0.9 | 0.1 |
| Play bingo for money | 84.3 | 10.7 | 4.1 | 0.5 | 0.2 |
| Gambled at a casino (including charity casinos) | 45.1 | 43.2 | 8.4 | 2.8 | 0.5 |
| Slot machines or VLTs | 50.1 | 39.1 | 7.4 | 2.7 | 0.6 |
| Poker in a casino | 83.3 | 11.3 | 3.7 | 1.1 | 0.5 |
| Sports with a bookie | 89.4 | 5.7 | 2.6 | 1.7 | 0.5 |
| Fantasy sports pools | 77.6 | 12.0 | 6.1 | 2.6 | 1.7 |
| Daily fantasy sports | 85.1 | 7.2 | 3.4 | 2.2 | 1.8 |
| Cards or board games with family or friends | 41.7 | 31.5 | 19.2 | 5.9 | 1.6 |
| Games of skills (pool, darts, etc.) | 59.5 | 23.5 | 11.8 | 4.2 | 0.7 |
| Arcade or video games | 49.2 | 21.4 | 13.8 | 7.8 | 7.6 |
| Gambled on the Internet | 79.1 | 12.1 | 4.9 | 2.8 | 1.1 |
| Online poker | 85.0 | 8.0 | 3.0 | 3.0 | 0.9 |
| Sports lottery (e.g., mise au jeu) | 90.6 | 5.5 | 2.7 | 1.0 | 0.2 |
| Personally invest in stocks, options, or commodities markets | 73.0 | 10.8 | 7.8 | 4.9 | 3.4 |

Cronbach's $\alpha$ = 0.89 and a test-retest reliability of 0.84. In the current sample the PHQ total score demonstrated a high internal consistency (Cronbach's $\alpha$ = 0.89).

#### 2.2.5. Generalized anxiety disorder −7 adapted

*(GAD-7;* Spitzer et al., 2006*);* is a 7-item anxiety scale with items being scored on a 3-point Likert scale 0 (*not at all*) to 2 (*more than half the days*). Higher scores indicate elevated levels of anxiety. Internal consistency of the GAD-7 is excellent with a Cronbach α = 0.92 and a test-retest reliability of 0.83. Convergent validity as compared to two other anxiety scales, the Beck Anxiety Inventory ($r$ = 0.72) and the anxiety subscale of the Symptom Checklist-90 ($r$ = 0.74) has also shown to be good. In the current sample the GAD total score demonstrated a high internal consistency (Cronbach's $\alpha$ = 0.90).

### 2.3. Procedure

Ethics obtained from the Universities and CEGEPs (publicly funded pre-university colleges in Quebec) where recruitment and data collection took place (Manitoba and Quebec)[1]. Participants were recruited using three methods. Method 1 included campus flyers in Quebec and online discussion boards (e.g., *Reddit, Craigslist, Facebook*) directed to the general Canadian population. Method 2 included recruitment through the university participant pool, wherein students received course credits for participation. Finally, method 3 included North American participants recruited from Amazon's *Mturk*. *Mturk* is a crowdsourcing Internet marketplace enabling individuals to advertise and coordinate participants for research projects. In a study by Kim and Hodgins (2017), the reliability and validity of data collected for addictive disorders (i.e. alcohol, gambling and cannabis use) from *Mturk* indicated that overall, 80–85% of participants provided valid responses. The results suggested that the self-report data obtained from alcohol and gambling populations through *Mturk* were of high quality.

In all, 32.1% of the data was collected through recruitment method 1; 49.4% through method 2; and 18.5% through method 3. There were no meaningful differences between recruitment methods suggesting that the sample could be collapsed. All questionnaires were completed online with the first page containing information about the study. Obtaining informed consent was required prior to being given access to the survey. All participants wishing to take part in a draw, were entered in order to win one of 40, $20.00 Amazon gift cards.

### 2.4. Statistical analysis

Participants with and without missing data were compared using Little's (1988) missing completely at random (MCAR) test. A $\chi^2/df$ ratio value of 2 or less suggests that missing values can be estimated reliably. The following sample revealed a $\chi^2/df$ ratio of 1.08. As a result, missing values were estimated using the expectation-maximization algorithm. A bivariate correlational analysis was conducted using SPSS v25 (2017) in order to evaluate the relationships between difficulties in emotion regulation, problem gambling, age, sex, gambling frequency, anxious and depressive symptomology. Second, in line with the first objective, a two-step hierarchical linear regression was conducted to examine the relationship between emotion regulation and problem gambling with a bootstrapping procedure of 5000 resamples. Finally, a mediational analysis was conducted using the PROCESS v3.3 bootstrapping procedure in SPSS v25 (2017) with 5000 resamples (Hayes, 2013) in order to examine the mediational role emotion regulation plays in the relationship between problem gambling and depression.

[1] This research was reviewed and cleared by the McGill University (#145-0917), University of Manitoba (#P2018:087 (HS22035)), Dawson College (#181005), John Abbott College (#JACREB201807), Vanier College (#VC03.08), and Marionopolis College (#145-019).

**Table 4**
Bivariate correlations between variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Sex | 1 | | | | | | | | | | . | | | |
| 2. Age | −0.03 | 1 | | | | | | | | | | | 21.14 | 2.90 |
| 3. Gambling Frequency | −0.09* | .18** | 1 | | | | | | | | | | 1.44 | 0.73 |
| 4. CPGI | −0.11** | .14** | .44** | 1 | | | | | | | | | 2.07 | 3.64 |
| 5. DERS total score | .22** | −0.09** | −0.04 | .16** | 1 | | | | | | | | 89.38 | 24.52 |
| 6. Non-Acceptance | .21** | −0.07 | −0.05 | .10** | .81** | 1 | | | | | | | 14.21 | 6.12 |
| 7. Goals | .21** | −0.12** | −0.07* | .02 | .73** | .54** | 1 | | | | | | 14.92 | 5.08 |
| 8. Impulse | .20** | −0.04 | .01 | .19** | .82** | .61** | .58** | 1 | | | | | 12.60 | 5.25 |
| 9. Awareness | −0.08* | −0.05 | .04 | .12** | .36** | .10** | −0.001 | .10** | 1 | | | | 16.72 | 4.90 |
| 10. Strategies | .24** | −0.03 | −0.04 | .14** | .90** | .70** | .66** | .76** | .13** | 1 | | | 18.76 | 7.60 |
| 11. Clarity | .15** | −0.09* | −0.04 | .14** | .73** | .50** | .38** | .47** | .45** | .54** | 1 | | 12.16 | 4.04 |
| 12. GAD | .28** | −0.08* | −0.03 | .05 | .63** | .52** | .50** | .48** | .12** | .61** | .47** | 1 | 5.14 | 3.90 |
| 13. PHQ | .19** | −0.02 | .02 | .13** | .64** | .51** | .46** | .50** | .17** | .62** | .50** | .72** | 8.41 | 6.20 |

Note.
* $p \leq 0.05$.
** $p \leq 0.01$. *CPGI = Problem gambling, GAD = Anxiety, PHQ = Depression.*

## 3. Results

### 3.1. Relationship between emotion regulation and problem gambling

The bivariate correlations, means and standard deviations are reported in Table 4. Given that anxiety was not significantly correlated with problem gambling or gambling frequency it was removed as a variable in the subsequent analyses.

The first objective aimed to test for the effects of emotion regulation on problem gambling, while controlling for the effects of sex, age, gambling frequency, and depression. As such, all variables were entered into a two-step hierarchical multiple regression with problem gambling as the dependent variable. In Step 1, sex, age, gambling frequency, and depression were entered, followed by the emotion regulation subscales (non-acceptance, goals, impulse, awareness, strategies, and clarity) in Step 2. A test of the first model with only the control variables as predictors was significant, F (4, 813) = 56.42, $p < .01$, and accounted for 22% of the variance in problem gambling. Introducing the emotion regulation subscales explained an additional 4% of the variance in problem gambling and this change in $R^2$ was also significant, $\Delta F(6, 807) = 6.43$, $p < .01$. In the first model all the control variables significantly contributed to problem gambling. Specifically, males and older participants were more likely to have higher problem gambling scores and individuals who gambled more often were also more likely to have higher problem gambling scores. Finally, higher levels of depressive symptomology were also associated with a higher likelihood of gambling problems. In the second model, with the addition of the dimensions of emotion regulation, depression was no longer found to be a significant predictor of problem gambling, whereas the DERS goals and impulse subscales were significant predictors. Specifically, as an individual's difficulties with impulse control increased so did their problem gambling scores, while as their difficulties engaging in goal directed behaviors decreased their problem gambling scores increased (see Table 5).

**Table 5**
Hierarchical multiple regression with problem gambling as the dependent variable.

| Model | Variables | *B* | *SE B* | β | *t* | *p* | $R^2$ |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | 0.217 |
| | Sex | −0.73 | 0.23 | −0.10 | −3.18 | 0.002** | |
| | Age | 0.08 | 0.04 | 0.07 | 2.11 | 0.035* | |
| | Gambling Frequency | 2.02 | 0.16 | 0.41 | 12.94 | 0.000** | |
| | Depression | 0.09 | 0.02 | 0.15 | 4.73 | 0.000** | |
| 2 | | | | | | | 0.253 |
| | Sex | −0.82 | 0.23 | −0.11 | −3.57 | 0.000** | |
| | Age | 0.09 | 0.04 | 0.07 | 2.29 | 0.022* | |
| | Gambling Frequency | 1.99 | 0.15 | 0.41 | 12.99 | 0.000** | |
| | Depression | 0.02 | 0.02 | 0.04 | 0.95 | 0.345 | |
| | Non-Acceptance | 0.004 | 0.03 | 0.01 | 0.14 | 0.892 | |
| | Goals | −0.07 | 0.03 | −0.09 | −2.19 | 0.029* | |
| | Impulse | 0.12 | 0.03 | 0.18 | 3.65 | 0.000** | |
| | Awareness | 0.03 | 0.03 | 0.04 | 1.04 | 0.297 | |
| | Strategies | 0.02 | 0.03 | 0.03 | 0.57 | 0.569 | |
| | Clarity | 0.07 | 0.04 | 0.08 | 1.75 | 0.080 | |

Note.
* $p \leq 0.05$ *and.*
** $p \leq 0.01$.

### 3.2. The mediating role of emotion regulation

For the second objective, data were entered into Model 4 of the PROCESS bootstrapping macro for SPSS v25 (2017) with 5000 resamples to assess the indirect effects of problem gambling onto depressive symptomology through emotion regulation (non-acceptance, goals, impulsivity, awareness, strategies, and clarity). Sex, age, and gambling frequency were included as covariates. An indirect effect was considered significant if its 95% bootstrap confidence interval did not include zero.

Results from the total effect of problem gambling on depression (i.e., without the mediators) was significant (*path c:* β = 0.31, t (813) = 4.73, with a 95%CI [0.18, 0.45], $p < .001$). With the inclusion of the mediators, results revealed significant associations between problem gambling and non-acceptance (path $a_1$: β = 0.30, t (813) = 4.62, 95%CI [0.17, 0.42], $p < .001$), goals (path $a_2$: β = 0.13, t (813) = 2.38, 95%CI [0.02, 0.23], $p < .05$), impulse (path $a_3$: β = 0.36, t (813) = 6.69, 95%CI [0.26, 0.47], $p < .001$), awareness (path $a_4$: β = 0.17, t (813) = 3.30, 95%CI [0.07, 0.28], $p < .001$), strategies (path $a_5$: β = 0.44, t (813) = 5.68, 95%CI [0.29, 0.60], $p < .001$), and clarity (path $a_6$: β = 0.24, t (813) = 5.66, 95%CI [0.16, 0.32], $p < .001$). Additionally, there were significant associations between non-acceptance (path $b_1$: β = 0.09, t (807) = 2.38, 95%CI [0.02, 0.17], $p < .05$), goals (path $b_2$: β = 0.09, t (807) = 2.04, 95%CI [0.01, 0.18], $p < .05$), strategies (path $b_5$: β = 0.32, t (807) = 7.81, 95%CI [0.24, 0.40], $p < .001$), and clarity (path $b_6$: β = 0.29, t (807) = 5.16, 95%CI [0.18, 0.40], $p < .001$) with depression. While, the associations between difficulties with impulse control (path $b_3$: β = 0.01, t (807) = 0.16, 95%CI [−0.09, 0.11], $p = .87$) and awareness (path $b_4$: β = 0.03, t (807) = 0.86, 95%CI [−0.04, 0.11], $p = .39$) with depression were not significant. Lastly, the direct effect of problem gambling on depression after controlling for emotion regulation was reduced to non-significance (*path c':* β = 0.05, t (807) = 0.95, 95%CI [−0.05, 0.14], $p = .34$), indicating a full mediation effect.

The indirect effect of problem gambling on depression through all

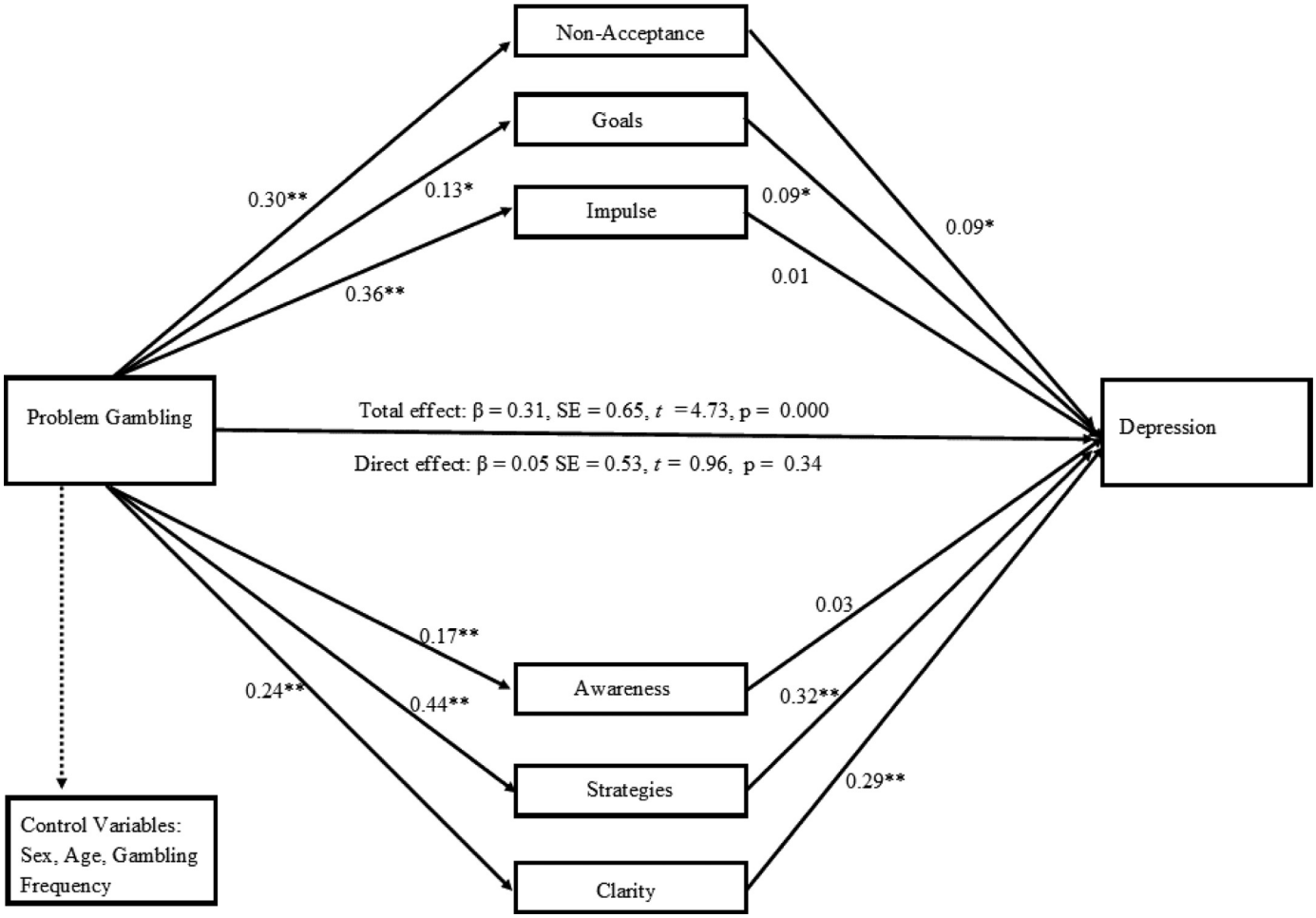


**Fig. 1.** Mediational effect of problem gambling on depression through emotion regulation controlling for sex, age, and gambling frequency
Note. *$p \leq 0.05$ and ** $p \leq 0.01$.

dimensions of emotion regulation was significant (β = 0.26, 95%CI [0.18, 0.33]), accounting for 83.9% of the total effect of problem gambling on depression. Specifically, the indirect effect of problem gambling on depression through non-acceptance was significant and estimated to account for 8.9% of the total effect (95%CI [0.004, 0.06]), through goals was significant and estimated to account for 3.8% of the total effect (95%CI [0.0001, 0.03]), through strategies was significant and estimated to account for 45.4% of the total effect (95%CI [0.09, 0.20]), and through clarity was significant and estimated to account for 22.4% of the total effect (95%CI [0.04, 0.11]). Contrasts of the indirect effects revealed that the indirect effect of problem gambling through strategies was significantly greater than that of non-acceptance and goals, but not significantly greater than the indirect effect of clarity. The indirect effects of problem gambling on depression via the impulse control (accounting for approximately 1% of total effect), and awareness (accounting for 1.9% of total effect) were not significant (Fig. 1).

## 4. Discussion

Gambling has experienced a surge in popularity over the last decade with increased acceptability and accessibility. The current study found rates of moderate and problem gambling among this sample of emerging adult gamblers to be estimated at 15.6% and 8.2% respectfully. Although, this is consistent with rates reported in Europe by Calado et al. (2017), it may seem high given that the study was conducted in North America. However, it is important to note that these are prevalence rates of problem gambling among individuals who have reported gambling in the last year, and not necessarily a general sample, which may potentially explain the inflated rates. Further, a recent meta-analysis by Nowak (2018) investigating prevalence rates among emerging adults and college students found that U.S/Canadian universities had similar rates of reported problem gambling than international schools (6.0% vs. 6.5%) and country of origin also did not significantly differ between U.S/Canadian students and international students (9.44% vs. 12.8%). Emerging adulthood remains a critical developmental period for the participation in risky behaviors, including excessive gambling participation, leading to later harmful mental health outcomes. It was hypothesized that non-acceptance, impulsivity and lack of flexibility in using emotion regulation strategies would be the strongest predictors of problem gambling. Further, given the high levels of comorbidity between problem gambling and mood disorders, this study investigated the indirect effects of problem gambling onto depressive symptomology through the dimensions of emotion regulation. It was hypothesized that emotion regulation would play a significant mediating role between problem gambling and depressive symptomology.

The results revealed that the full linear model including sex, age, gambling frequency, depression, and each dimension of emotion regulation accounted for 25% of the variance in problem gambling, with the dimensions of emotion regulation accounting for approximately 4%. Consistent with previous research, males were more likely than females to have higher problem gambling scores (Scholes-Balog et al., 2014; Williams et al., 2012), and increased gambling frequency increased the likelihood of self-reported gambling problems (Welte et al.,

2004).

With the addition of the emotion regulation dimensions, depression was no longer a significant predictor while, goals and impulsivity became significant predictors of problem gambling. As such, our hypothesis was partially supported in that impulsivity was found to be a predictor of problem gambling, however non-acceptance and lack of flexibility in using emotion regulation strategies were not. Specifically, individuals who perceived exhibiting impulse control difficulties when upset or highly emotional, were more likely to report higher rates of problem gambling. There is a significant amount of evidence in other addictive behaviors (e.g., overeating, smoking, and alcohol) that have also shown self-regulation difficulties and that impulse control tends to deteriorate during periods of emotional distress (Racine and Horvath, 2018; Smith and Cyders, 2016; Tice et al., 2001). Additionally, previous research in gambling has shown that components of impulsivity described as positive and negative urgency (i.e., the tendency to experience strong impulsive reactions under negative or positive affect) were stronger predictors of problem gambling compared to a lack of premeditation and a lack of perseverance which are cognitive dimensions of impulsivity (Blain et al., 2015; Del Prete et al., 2017; Marmurek et al., 2015; Steward et al., 2017; Torres et al., 2013). Thus, it is possible that individuals who are under significant emotional distress may be expending their regulatory resources leaving them vulnerable to impulsive actions and unable to regulate their behavior in ways that would be more productive and beneficial in the long term (Tice et al., 2001). Among problem gamblers this would result in an increase in gambling participation to problematic levels. Results also indicated that individuals who had higher problem gambling scores were more likely to report being able to engage in goal directed behavior when upset (i.e., distracting oneself when upset, focusing on other things, thinking about something else). Previous research has shown that problem gamblers often gamble as a means of coping with negative emotions (Riley, 2014; Wood and Griffiths, 2007). It is possible that when gambling as a means to escape or cope with unwanted emotions, individuals are essentially partaking in goal-directed behaviors and making directed efforts to experience positive feelings. Thus, when relevant to an individual's current motivations and goals, taking actions to find gambling avenues may require significant amount of planning and the mobilization of executive control. Executive control allows the individual to focus their attention on the most salient goal and to find the best means they know to achieve this goal while disregarding alternative goals and potential consequences (Kopetz et al., 2018).

The second objective aimed to assess the indirect effects of problem gambling onto depressive symptomology through the dimensions of emotion regulation, while controlling for sex, age and gambling frequency. This is the first study to our knowledge that addresses the dimensions of emotion regulation as a potential mediator between problem gambling and depression. Previous studies have reported that depression has been linked to a decrease in flexibility when using adaptive emotion regulation strategies, less acceptance of one's emotions, less emotional awareness and clarity and a decrease in impulse control (Schäfer et al., 2017; Visted et al., 2018). Results from the current study confirm our hypothesis and revealed a full mediation effect, wherein *non-acceptance of emotions* significantly mediated the relationship between problem gambling and depression and accounted for 9% of the total effect, *goal-directed behaviors when upset* accounted for 4% of the total effect, *lack of flexibility in using emotion regulation strategies* accounted for 45% of the total effect, and *lack of emotional clarity* accounted for 22% of the total effect. These results suggest that among problem gamblers there are unique dimensions of emotion regulation that increase the probability of depressive symptomology. Therefore, among problem gamblers with depression, focusing interventions on increasing knowledge and understanding of emotions and feelings, increasing acceptance of emotional responses, and teaching more adaptive emotion regulation strategies, that do not include using gambling as a coping mechanism (i.e., thereby lowering goal-directed behavior when upset), may be beneficial in fostering positive mental health outcomes.

## 5. Limitations and future directions

This research allows for a greater understanding of the relationship between problem gambling and emotion regulation. However, there are several limitations that should be addressed. First, the present study used self-report data, opening itself to a certain level of potential biases, especially given the sensitive nature of certain questions in the survey. Although, a series of checks and filters were employed to confirm validity and sincerity of the responses, it is impossible to validate each respondent's true engagement. Second, the data collected has an over-representation of undergraduate students. Although, undergraduates represent a significant portion of emerging adults, this over-representation makes it difficult to generalize the findings to a general population. Third, the data was taken at one time-point making it cross-sectional in nature. As such, it is impossible to create a causal/directional relationship between difficulties in emotion regulation and problem gambling, or problem gambling and depression. Future research should conduct a cross-lagged analysis in order to better understand the direction of this relationship. Further, given limitations placed for questionnaire length, pathological behaviors (i.e., problem gambling, depression, and anxiety) were only assessed using one scale (i.e., CPGI, PHQ-9, GAD-7) each. As such, we cannot confirm the validity of the prevalence rates achieved through these scales and diagnosis is limited. Although, each measure has been previously well validated in the literature, future research would benefit from including additional scales or clinical interviews to validate scores. Finally, the full regression model between emotion regulation and problem gambling accounted for 25% of the variance in problem gambling with emotion regulation only accounting for 4% of this variance. Although this may seem low, it is comparable and stronger than previous research indicating emotion regulation accounting for an extra 2% of the variance in problem gambling (Elmas et al., 2017). Additionally, this 4% did represent a statistically significant amount of variance and offers a substantial piece in understanding the complex set of risk factors involved in problem gambling. Future studies would benefit from examining this relationship both longitudinally and using behavioral paradigms.

## 6. Conclusions

Given the limited research examining the association between the dimensions of emotion regulation and problem gambling, this study provides an initial step towards understanding this relationship. Despite the limitations, the results suggest that difficulties with impulse control when highly emotional and goal-directed behaviors occurring during emotional distress are the strongest emotion regulation predictors of problem gambling. Further, examining the mediational role of the dimensions of emotion regulation between problem gambling and depression allows for an increased understanding of the unique factors of emotion regulation, including non-acceptance of emotions, goal-directed behaviors during emotional distress, lack of flexibility in using emotion regulation strategies, and lack of emotional clarity, that should be addressed for within problem gamblers who also suffer from depressive symptomology.

By focusing on enhancing the specific dimensions of emotion regulation discussed in this study among problem gamblers, treatment efforts should focus on the underlying mechanisms rather than the symptoms of gambling addiction. As such, interventions should become more tailored to the needs of specific gamblers, ultimately achieving better mental health outcomes.

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## CRediT authorship contribution statement

**Loredana A. Marchica:** Conceptualization, Writing - original draft, Formal analysis, Methodology, Project administration. **Devin J. Mills:** Formal analysis, Writing - original draft. **Matthew T. Keough:** Data curation, Writing - review & editing. **Tina C. Montreuil:** Project administration, Writing - review & editing. **Jeffrey L. Derevensky:** Project administration, Writing - review & editing.

## Declaration of Competing Interest

All authors declare they have are no conflicts of interest.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2019.07.078.

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## Bridging Studies

The results from the previous two studies highlighted the role ER plays in problem gambling. Specifically, and in line with previous research, results from Study 2 indicated that difficulties with impulse control when experiencing negative emotions positively contributed to PG (Blain et al., 2015; Del Prete et al., 2017; Marmurek et al., 2015; Steward et al., 2017; Torres et al., 2013). Surprisingly, results from Study 2 also indicated that engaging in goal-directed behaviors when upset also significantly positively contributed to PG. Based on the items within this dimension of ER (i.e., distract themselves when upset, focus on other things, and think about something else), it was hypothesized that problem gamblers are better able to engage in goal-directed behaviors when they use gambling as a means of coping with their negative emotions. Thus, the combination of ER deficits with specific motivations for gambling would have a significant impact on levels of PG. Previous research on gambling motivations had already shown that enhancement motives (gambling to increase positive affect) and coping motives (gambling to decrease/avoid negative affect) for gambling were associated with increased gambling participation and gambling problems (Lambe et al., 2015; Stewart & Zack, 2008). However, no study had investigated the moderating effect of ER dimensions on this relationship. As such, the goal of Study 3 was to test this hypothesis and explore whether deficits in ER dimensions coupled with a coping motivation to gamble increased the likelihood of PG. ER deficits may place individuals at-risk for PG but only if their motivation to gamble is to regulate their emotions (i.e., gambling as an ER strategy). Thus, considering motivational factors along with ER is clinically significant in the prevention of PG.

# Chapter V

## Study Three

Emotion Regulation Interacts with Gambling Motives to

Predict Problem Gambling Among Emerging Adults

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# Emotion regulation interacts with gambling motives to predict problem gambling among emerging adults

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## HIGHLIGHTS

- 15.2% and 8.1% of gamblers (18–27 years old) reported moderated and problem gambling levels.
- Difficulties with impulse, emotional awareness and clarity were significant predictors of PG.
- Among motives enhancement and coping motives uniquely predicted PG.
- Coping interacted with goal-directed behavior, awareness and clarity in predicting PG.

## ARTICLE INFO

*Keywords:*
Emotion regulation
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## ABSTRACT

*Background:* It is presently estimated that as much as 10% of emerging adults are at risk for a gambling disorder. The consequences stemming from problematic gambling engagement include increased substance use, mental health disorders, suicidality, financial strain and legal issues. The present study explores whether deficits in specific dimensions of emotion regulation coupled with the motivation to escape negative emotions (i.e., coping motives) increases the likelihood of problem gambling severity, while controlling for variables such as gambling frequency, age, and sex.

*Methods:* A sample of 919 emerging adult gamblers ($M_{age}$ = 21.16 years-old, *SD* = 2.90, 48.1% female) completed an online survey including an assessment of problematic engagement in gambling over the past year, gambling motivations, and difficulties in emotion regulation. In total, 15.2% and 8.1% of this sample were at moderate or high risk for gambling disorder.

*Results:* A series of six moderation analyses revealed that the total models accounted for approximately 37–38% of the variance in problem gambling and that coping motives interacted with less difficulties engaging in goal-directed behavior, increased lack of emotional clarity, and increased lack of emotional awareness to create a toxic mixture for problem gambling.

*Conclusions:* These findings reveal the importance of considering both psychological factors such as emotion regulation and motivational factors in understanding who is at greatest risk for gambling problems

## 1. Introduction

It is well acknowledged that young people represent a population at significant risk for the development of gambling problems with rates often exceeding the adult population (Calado, Alexandre, & Griffiths, 2017). Findings from a national U.S study found that rates of past year gambling peaked between 22 and 30 years old with 89% of young adults reporting having gambled in the past year and rates of problem gambling exceeding alcohol dependence after the age of 21 (Welte, Barnes, Tidwell, & Hoffman, 2011). Further, Welte and colleagues (2011) also found linear increases in rates of problem gambling from adolescence into young adulthood, with 1.3% of 14- to 15-year-olds and 3.9% of 22- to 30-year-olds meeting criteria for problem gambling. These peaks in gambling problems coincide with the developmental period of emerging adulthood, often associated with increased participation in a variety of risky behaviors including binge drinking, illegal drug use, cigarette use, risky sexual behaviors, and gambling (Arnett, 2007; St-Pierre, Temcheff, Gupta, Derevensky, & Paskus, 2014).

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Despite evidence of increased rates of problem gambling during emerging adulthood, the psychological factors associated with problem gambling have yet to be well understood. Theories of problem gambling have suggested that gambling may serve as a function to regulate one's affect or avoid negative mood states (Jacobs, 1986). Psychological factors like emotion regulation skills are often considered inherent traits that can change an individual's mood states along dimensions such as valence, arousal, approach and avoidance (Thompson, 1994). As such, having strong ER skills would allow an individual to experience more positive global mood states. Additionally, ER may be considered a set of psychological skills that can be enhanced through training (Gross & Munoz, 1995). Thus, understanding the relationship between ER processes and gambling behaviors is a first step in determining the clinical implications of such interactions. While the research is still in its infancy, preliminary results suggest that emotion regulation does play a significant role in the development of problem gambling (Navas et al., 2017; Williams, Grisham, Erskine, & Cassedy, 2012).

Emotion regulation (ER), a transdiagnostic construct, is said to encompass six dimensions; (1) an *awareness,* and (2) *understanding or clarity* of emotions, (3) an *acceptance* of experienced emotions, (4) the ability to engage in *goal-directed* behavior when experiencing negative emotions, (5) the ability to control *impulsive* behaviors when experiencing negative emotions, and (6) the ability to exert *flexibility* in using different ER strategies (Gratz & Roemer, 2004). Difficulties in any of these dimensions may result in pathological behaviors or distress, with research consistently confirming that ER deficits are predictive of increased risk for mental health disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Sheppes, Suri, & Gross, 2015; Montreuil & Kimhy, 2015). Further, the expectancy-value model of ER suggests that the motivation to experience an emotion (i.e., choose to use ER skills) is reliant on the expectation that the emotion will lead to a desired outcome (Tamir, Bigman, Rhodes, Salerno, & Schreier, 2015). However, the current literature within the ER and gambling field has failed to acknowledge the likely effect of motivation and how motivators for gambling may potentially play a moderating role in this relationship.

### 1.1. Motivational models of gambling

Previous research has identified several motivational factors that are predictive of greater engagement in gambling-related activities (Juodis & Stewart, 2016). Stewart and Zack (2008) gambling motivations questionnaire, is one of the most widely used frameworks for investigating gambling motivations. These motivations include gambling to escape/avoid negative affect (coping motives), gambling to increase positive affect (enhancement motives), and gambling for social rewards (social motives) (Stewart & Zack, 2008). Enhancement motives have been identified as a significant predictor of gambling behaviors and both enhancement and coping motives were significantly related to problem gambling (Lambe, Mackinnon, & Stewart, 2015; Stewart & Zack, 2008). These findings reveal the importance of both coping and enhancement motives in understanding problematic forms of gambling. Therefore, in addition to difficulties with ER, both enhancement and coping motives seem to play a significant role in predicting problem gambling. However, it is suggested that although ER, coping, and enhancement motives may independently predict problem gambling (Lambe et al., 2015; Stewart & Zack, 2008; Marchica, Mills, Derevensky, & Montreuil, 2019), the combination of these motives (exceptionally coping motives), with specific ER dimensions may be particularly harmful. For instance, a person who gambles because they have difficulties with emotional awareness, but gambles for social motives, will only play for social interactions, thus limiting engagement in gambling activities. However, individuals who have ER difficulties and are also gambling for coping motives, will possibly use gambling as an ER strategy, and are more likely to gamble when alone and for longer periods of time. The literature has not yet considered underlying psychological factors such as ER skills, and it is unknown to what extent these motives are associated with ER skills and how they may impact problem gambling.

### 1.2. The current study

Both enhancement (i.e., gambling to increase positive affect) and coping motives (i.e., gambling to escape/cope with negative affect) for gambling are heavily related to regulating emotions and research has consistently shown both motives to be related to problem gambling. As such, the goal of this study is to assess the moderating effect of enhancement and coping motives for gambling on the association between each dimension of ER and problem gambling, while controlling for social motives. Previous research on the relationship between the dimensions of ER and problem gambling (Marchica, Mills, Keough, Montreuil, & Derevensky, 2019) indicated that fewer difficulties engaging in goal-directed behaviors when experiencing negative affect was related to increased problem gambling severity. It was suggested that individuals with coping motivations were essentially partaking in goal-directed behaviors by making directed efforts to escape unwanted emotions through gambling. The current study aims to investigate this assumption, and it is hypothesized that the relationship between goal-directed behaviors and problem gambling will be moderated by coping motives. The hypotheses surrounding the remaining dimensions of ER are exploratory in nature.

## 2. Methods

### 2.1. Participants

Of a total of 2657 completed questionnaires with participants who consented to take part in the study, 332 were excluded for failing any of three attention items, completing the survey twice (based on IP and provided e-mail addresses) or in less than 5 min, inconsistent responding (e.g., reporting having gambled during the past 12 months but not reporting gambling on any gambling activities), and not meeting age requirements (18–27 years old).

Additionally, given that gambling motives are not applicable among non-gamblers (i.e., abstainers), only individuals who endorsed having gambled at least once in the year prior to survey completion were included in the analysis. As such, an additional 1406 participants were excluded for having not gambled in the past 12 months. A total of 919 gamblers ($M_{age}$ = 21.16 years-old, $SD$ = 2.90) were included in the final analyses. Table 1 illustrates sociodemographic characteristics of the sample. Within this sample of emerging adult gamblers, 15.2% met the criteria for moderate risk and 8.1% met the criteria for problem gambling according to the Canadian Problem Gambling Index (CPGI; Ferris & Wynne, 2001) (see Table 2).

### 2.2. Measures

#### 2.2.1. Demographic items

Participants responded to five demographic items; their biological sex (male, female, intersex), age, ethnicity, level of current education, and country/province of residence.

#### 2.2.2. Difficulties in emotion regulation scale

(DERS; Gratz & Roemer, 2004), is a 36-item six-scale self-report measure designed to assess six factors that correspond with Gratz and Roemer (2004) six dimensions of emotion regulation: (1) clarity (Cronbach's $\alpha$ = 0.81), (2) awareness (Cronbach's $\alpha$ = 0.82), (3) non-acceptance (Cronbach's $\alpha$ = 0.91), (4) impulse (Cronbach's $\alpha$ = 0.87), (5) strategies (Cronbach's $\alpha$ = 0.91), and (6) goals (Cronbach's $\alpha$ = 0.88). Participants respond on a 5-point Likert scale with responses ranging from 1 (*almost never*) to 5 (*almost always*). Lack of emotional awareness and clarity reflect the extent to which individuals are clear

**Table 1**
Sociodemographic characteristics of sample.

| Characteristic | Percentage |
|---|---|
| Sex, $n$ = 917 | |
| Male | 51.7% |
| Female | 48.1% |
| Intersex | 0.2% |
| Ethnicity, $n$ = 919 | |
| White/Caucasian | 66.5% |
| Hispanic/Latino | 4.9% |
| Asian/Pacific Islander | 21.8% |
| Black/African American | 5.0% |
| Native American Indian | 2.7% |
| Other | 0.5% |
| Education, $n$ = 919 | |
| Currently pursuing CEGEP degree | 8.4% |
| Currently pursuing certificate at institution of higher education | 3.1% |
| Currently pursuing an Undergraduate degree | 62.2% |
| Currently pursuing a Graduate degree | 11.5% |
| Not registered at any institution of higher education | 14.8% |
| Country/Province n = 919 | |
| Ontario | 1.7% |
| Quebec | 21.9% |
| Nova Scotia | 0.6% |
| Manitoba | 43.3% |
| British Columbia | 0.8% |
| Prince Edward Island | 0.1% |
| Saskatchewan | 0.2% |
| Alberta | 0.5% |
| Newfoundland | 0.6% |
| USA | 26.6% |
| Other | 3.8% |

*Note.* Percentages for ethnicity do not sum up to 100% as participants could choose multiple ethnicities; for countries/province "other" includes Europe and Asia.

about which emotions they are experiencing or the extent to which they can attend to emotional responses. Non-acceptance of emotional responses reflects the degree that an individual responds negatively to negative emotions and/or denies any form of distress. Impulse control difficulties reflects the struggle or control an individual has over their behaviors when upset, limited access to ER strategies reflects the ability an individual has to retrieve and use various ER strategies when upset, and difficulty engaging in goal-directed behaviors reflects the ability an individual has to concentrate and focus on goal-directed behaviors when experiencing negative emotions (Gratz & Roemer, 2004).

#### 2.2.3. Canadian problem gambling Index

(CPGI; Ferris & Wynne, 2001), is a 9-item scale used to assess prevalence of past-year problem gambling. Items are scored using a 4-point Likert scale 0 (*never*) to 3 (*almost always*). The CPGI also includes items that measure gambling participation and frequency. Gambling participation was rated on a 5-point Likert scale from 0 *(never)* to 4 *(daily)*. In the following sample the CPGI total score demonstrated a high internal consistency (Cronbach's $\alpha = 0.88$).

#### 2.2.4. Gambling motivations Questionnaire-9 items

(GMQ; Stewart & Zack, 2008) is a 9-item scale divided into three subscales: *Social, Coping* and *Enhancement* motives for gambling. Items are scored on a 4-point Likert scale from 1 *(almost never/never)* to 4 *(almost always)*. A Confirmatory Factor Analysis (CFA) with the 9-item GMQ showed that the three-factor model was an excellent fit for the data and reports have shown stronger absolute fit indices than the original 15-item questionnaire (Lambe et al., 2015). In the following sample the GMQ demonstrated high internal consistency for coping motives (Cronbach's $\alpha = 0.80$), enhancement motives (Cronbach's $\alpha = 0.80$), and acceptable internal consistency for social motives (Cronbach's $\alpha = 0.76$).

### 2.3. Procedure

Ethical approval was obtained from the Universities and CEGEPs (i.e., publicly funded pre-university college in Quebec) where recruitment and data collection took place (Manitoba and Quebec). Participants from a general North American population sample were recruited using three methods (campus flyers/discussion boards, university participant pools, and Amazon's *Mturk)* as part of a larger study investigating the relationship between ER and gambling (see Marchica et al., 2019 for further details on study procedure).

### 2.4. Statistical analysis

Participants with and without missing data were compared using Little (1988) missing completely at random (MCAR) test. A $\chi^2/df$ ratio value of two or less suggests that missing values can be estimated reliably. The following sample revealed a $\chi^2/df$ ratio of 1.18. As a result, missing values were estimated using the expectation–maximization algorithm. A bivariate correlational analysis was conducted using SPSS v25 (2017) in order to evaluate the relationships between all variables. Second, a series of six moderation analyses were conducted using the PROCESS v3.3 bootstrapping procedure in SPSS v25 (2017) with 5,000 resamples (Hayes, 2013) to examine the interaction between the dimensions of ER (non-accept, goals, impulse, aware, strategies, clarity) and gambling motives on problem gambling.

## 3. Results

Bivariate correlations are presented in Table 3.

### 3.1. Moderation analyses

The main objective of this study sought to assess the moderating effect of enhancement and coping motivations for gambling on the association between each dimension of ER and problem gambling severity. Previous research has shown that sex and gambling frequency are highly associated with problem gambling (Scholes-Balog, Hemphill, Dowling, & Toumbourou, 2014; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2004), as such we tested these variables in our model. Given that there was a significant interaction in the present sample these

**Table 2**
Distribution of sample according to the Canadian Problem Gambling Index categories.

| | Percent | | |
|---|---|---|---|
| CPGI Categories | Male ($n$ = 474) | Female ($n$ = 441) | Overall ($n$ = 919) |
| Non-problem gambler/Social gambler | 39.8% | 54.7% | 46.8% |
| Low-risk problem gambler | 32.8% | 26.7% | 29.9% |
| Moderate risk problem gambler | 17.8% | 12.5% | 15.2% |
| Problem gambler | 9.6% | 6.1% | 8.1% |

*Note.* $N_s$ for male and female participants do not sum to 919 as two participants reported *Intersex* and two participants did not report their biological sex. It is important to note that the percentages exclude non-gamblers.

**Table 3**
Bivariate correlations between variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Sex | 1 | | | | | | | | . | | | | | | |
| 2. Age | −0.02 | 1 | | | | | | | | | | | | 21.16 | 2.90 |
| 3. Gambling Frequency | −0.10** | 0.13** | 1 | | | | | | | | | | | 1.46 | 0.76 |
| 4. CPGI | −0.11** | 0.12** | 0.41** | 1 | | | | | | | | | | 2.10 | 3.60 |
| 5. DERS total | 0.21** | −0.08* | −0.04 | 0.15** | 1 | | | | | | | | | 89.33 | 23.19 |
| 6. Non-Accept | 0.19** | −0.06 | −0.05 | 0.09** | 0.81** | 1 | | | | | | | | 14.20 | 5.80 |
| 7. Goals | 0.21** | −0.11** | −0.07* | 0.02 | 0.73** | 0.51** | 1 | | | | | | | 14.92 | 4.80 |
| 8. Impulse | 0.20** | −0.04 | 0.00 | 0.18** | 0.82** | 0.61** | 0.59** | 1 | | | | | | 12.60 | 4.97 |
| 9. Awareness | −0.07* | −0.05 | 0.03 | 0.12** | 0.36** | 0.10** | 0.00 | 0.10** | 1 | | | | | 16.72 | 4.65 |
| 10. Strategies | 0.23** | −0.03 | −0.04 | 0.13** | 0.90** | 0.70** | 0.66** | 0.76** | 0.13** | 1 | | | | 18.75 | 7.19 |
| 11. Clarity | 0.14** | −0.09* | −0.04 | 0.13** | 0.73** | 0.50** | 0.38** | 0.47** | 0.45** | 0.54** | 1 | | | 12.15 | 3.82 |
| 12. GMQ-Enhancement | −0.14** | −0.08* | 0.29** | 0.43** | 0.08* | 0.09** | 0.04 | 0.10** | 0.01 | 0.07* | 0.04 | 1 | | 1.98 | 1.96 |
| 13. GMQ-Social | −0.08* | −0.01 | 0.12** | 0.20** | 0.04 | 0.04 | 0.05 | 0.06 | 0.01 | 0.01 | 0.03 | 0.41** | 1 | 1.91 | 1.89 |
| 14. GMQ- Coping | −0.05 | 0.11** | 0.27** | 0.51** | 0.20** | 0.16** | 0.08* | 0.27** | 0.02 | 0.19** | 0.11** | 0.54** | 0.41** | 0.70 | 1.41 |

Note. *p ≤ 0.05; **p ≤ 0.01 (2-tailed). CPGI = Problem gambling, GMQ = Gambling Motivations Questionnaire.

variables, along with age, were included as covariates. Additionally, social motives for gambling and the ER dimensions not included in each moderation as the independent variables were also included as covariates. Data was fit to the Model 2 Template of the PROCESS bootstrapping for SPSS v25 (2017) with 5,000 resamples (Preacher & Hayes, 2004). This particular model automatically creates two mean-centered interaction terms, *DERS dimension* × *Enhancement Motives* and *DERS dimension* × *Coping Motives* and assesses their unique contribution in a linear regression predicting problem gambling severity.

In the first moderation analysis, *non-acceptance* was entered as the independent variable and problem gambling as the dependent variable. The overall model significantly accounted for 37% of the variance in problem gambling ($F(14, 902) = 38.44$, $p < .001$). Males and individuals who gambled more frequently were more likely to have higher problem gambling scores. Additionally, difficulty with emotional awareness and stronger endorsement of using coping motives for gambling contributed to problem gambling severity. Neither interactions (i.e., *Non-Accept* × *Enhancement* and *Non-Accept* × *Coping*) were significant predictors in this model (see Table 4).

In the second moderation analysis, *difficulty engaging in goal-directed behavior* was entered as the independent variable and problem gambling as the dependent variable. The overall model significantly accounted for 38% of the variance in problem gambling ($F(14, 902) = 39.11$, $p < .001$). Males and individuals who gambled more frequently were more likely to have higher problem gambling scores. Additionally, difficulty with emotional clarity and stronger endorsement of using coping motives contributed to problem gambling severity (see Table 4). Only the *Goals* × *Coping* interaction was significant, with an $R^2$ change of 0.01. The interaction was probed by testing the conditional effects of difficulty engaging in goal-directed behaviors at three levels of coping motivation, one standard deviation (*SD*) below the mean (or lowest unit possible within measure) (low = 0), at the mean ($M = 0.70$), and one *SD* above the mean (high = 2.10). Difficulties engaging in goal-directed behavior was significantly related to problem gambling when coping motivation was one *SD* above the mean gambling ($B = -0.12$, $SE = 0.04$, $t(9\,0\,2) = 3.22$, $p = .001$, 95CI [−0.19, −0.05]), approached significance when coping motivation was at the mean ($B = -0.05$, $SE = 0.03$, $t(9\,0\,2) = -1.92$, $p = .06$, 95CI [−0.10, 0.001]), but was not significant when coping motivation was one *SD* below the mean ($p = .52$) (see Fig. 1).

In the third moderation analysis, *impulse control difficulties* was entered as the independent variable and problem gambling as the dependent variable. The overall model significantly accounted for 37% of the variance in problem gambling ($F(14, 902) = 38.51$, $p < .001$). Males and individuals who gambled more frequently were more likely to have higher problem gambling scores. Additionally, higher levels of impulse control difficulties, stronger endorsement of enhancement and coping motives for gambling contributed to problem gambling severity. Neither interactions (i.e., *Impulse* × *Enhancement* and *Impulse* × *Coping*) were significant predictors in this model (see Table 4).

In the fourth moderation analysis, *lack of emotional awareness* was entered as the independent variable and problem gambling as the dependent variable. The overall model significantly accounted for approximately 38% of the variance in problem gambling. Males and individuals who gambled more frequently were more likely to have higher problem gambling scores. Additionally, reporting stronger endorsement of enhancement motives for gambling contributed to problem gambling severity (see Table 4). Only the *Awareness* × *Coping* interaction was significant, with an $R^2$ change of 0.01. The interaction was probed by testing the conditional effects of lack of emotional awareness at three levels of coping motivation, one *SD* below the mean, at the mean, and one *SD* above the mean. Lack of emotional awareness was significantly related to problem gambling when coping motivation was one *SD* above the mean ($B = 0.13$, $SE = 0.03$, $t(9\,0\,2) = 3.97$, $p < .001$, 95CI [0.07, 0.20]), approached significance when coping motivation was at the mean ($B = 0.04$, $SE = 0.02$, $t(9\,0\,2) = 1.88$, $p = .06$, 95CI [−0.002, 0.08]), but was not significant when coping motivation was one *SD* below the mean ($p = .95$) (see Fig. 2).

In the fifth moderation analysis, *limited access to ER strategies* was entered as the independent variable and problem gambling as the dependent variable. The overall model significantly accounted for approximately 37% of the variance in problem gambling ($F(14, 902) = 38.17$, $p < .001$). Males and individuals who gambled more frequently were more likely to have higher problem gambling scores. Additionally, stronger endorsement of enhancement and coping motives for gambling contributed to problem gambling severity. Neither interactions (i.e., *Strategies* × *Enhancement* and *Strategies* × *Coping*) were significant predictors in this model (see Table 4).

In the sixth moderation analysis, *lack of emotional clarity* was entered as the independent variable and problem gambling as the dependent variable. The overall model significantly accounted for 38% of the variance in problem gambling ($F(14, 902) = 39.89$, $p < .001$). Males, individuals who gambled frequently, and difficulties with emotional awareness was associated with higher problem gambling scores (see Table 4). Only the *Clarity* × *Coping* interaction was significant, with an $R^2$ change of 0.01. The interaction was probed by testing the conditional effects of lack of emotional clarity at three levels of coping motivation, one *SD* below the mean, at the mean, and one *SD* above the mean. Lack of emotional clarity was significantly related to problem gambling when coping motivation one *SD* above the mean ($B = 0.15$, $SE = 0.05$, $t(9\,0\,2) = 3.35$, $p < .001$, 95CI [0.06, 0.24]), approached significance at the mean ($B = 0.06$, $SE = 0.03$, $t(9\,0\,2) = 1.79$, $p = .07$, 95CI [−0.01, 0.13]), and was not significant when coping motivation was one *SD* below the mean ($p = .68$) (see Fig. 3).

**Table 4**
Regression results of moderation analyses.

| Moderation | Variables | B | SE B | t | $R^2$ |
|---|---|---|---|---|---|
| 1 *Non-Acceptance as IV* | | | | | 0.37 |
| | Non-Acceptance | −0.03 | 0.03 | −0.87 | |
| | Goals | −0.04 | 0.03 | −1.60 | |
| | Impulse | 0.05 | 0.03 | 1.50 | |
| | Awareness | 0.05 | 0.02 | 1.97* | |
| | Strategies | 0.02 | 0.02 | 0.79 | |
| | Clarity | 0.06 | 0.03 | 1.66 | |
| | Enhancement | 0.28 | 0.15 | 1.87 | |
| | Coping | 0.53 | 0.22 | 2.41* | |
| | Social | −0.06 | 0.06 | −1.06 | |
| | Age | 0.03 | 0.03 | 0.95 | |
| | Sex | −0.43 | 0.20 | −2.18* | |
| | Gambling Frequency | 1.21 | 0.13 | 9.16** | |
| | Enhance × Non-Accept | 0.002 | 0.01 | 0.16 | |
| | Coping × Non-Accept | 0.02 | 0.01 | 1.31 | |
| **2** *Difficulty engaging in Goal-directed behavior as IV* | | | | | 0.38 |
| | Non-Acceptance | −0.01 | 0.02 | −0.45 | |
| | Goals | −0.04 | 0.03 | −1.30 | |
| | Impulse | 0.05 | 0.03 | 1.75 | |
| | Awareness | 0.04 | 0.02 | 1.67 | |
| | Strategies | 0.02 | 0.02 | 0.87 | |
| | Clarity | 0.06 | 0.03 | 1.92* | |
| | Enhancement | 0.14 | 0.18 | 0.77 | |
| | Coping | 1.56 | 0.27 | 5.84** | |
| | Social | −0.07 | 0.06 | −1.28 | |
| | Age | 0.03 | 0.03 | 0.85 | |
| | Sex | −0.47 | 0.19 | −2.43* | |
| | Gambling Frequency | 1.19 | 0.13 | 9.04** | |
| | Enhance × Goals | 0.01 | 0.01 | 1.06 | |
| | Coping × Goals | −0.05 | 0.02 | −2.90* | |
| **3** *Difficulties with Impulse control as IV* | | | | | 0.37 |
| | Non-Acceptance | −0.01 | 0.02 | −0.47 | |
| | Goals | −0.04 | 0.03 | −1.64 | |
| | Impulse | 0.08 | 0.04 | 2.31* | |
| | Awareness | 0.04 | 0.02 | 1.65 | |
| | Strategies | 0.0 | 0.02 | 0.71 | |
| | Clarity | 0.06 | 0.03 | 1.86 | |
| | Enhancement | 0.54 | 0.15 | 3.62** | |
| | Coping | 0.81 | 0.23 | 3.60** | |
| | Social | −0.07 | 0.05 | −1.31 | |
| | Age | 0.02 | 0.03 | 0.72 | |
| | Sex | −0.44 | 0.19 | −2.24* | |
| | Gambling Frequency | 1.18 | 0.13 | 8.91** | |
| | Enhance × Impulse | −0.02 | 0.01 | −1.67 | |
| | Coping × Impulse | 0.01 | 0.01 | 0.35 | |
| **4** *Lack of Emotional Awareness as IV* | | | | | 0.38 |
| | Non-Acceptance | −0.01 | 0.02 | −0.47 | |
| | Goals | −0.04 | 0.03 | −1.62 | |
| | Impulse | 0.05 | 0.03 | 1.52 | |
| | Awareness | 0.01 | 0.03 | 0.29 | |
| | Strategies | 0.02 | 0.02 | 0.88 | |
| | Clarity | 0.06 | 0.03 | 1.78 | |
| | Enhancement | 0.40 | 0.20 | 1.98* | |
| | Coping | −0.26 | 0.30 | −0.87 | |
| | Social | −0.06 | 0.06 | −1.00 | |
| | Age | 0.03 | 0.03 | 0.81 | |
| | Sex | −0.43 | 0.19 | −2.20* | |
| | Gambling Frequency | 1.22 | 0.13 | 9.33** | |
| | Enhance × Awareness | −0.01 | 0.01 | −0.44 | |
| | Coping × Awareness | 0.05 | 0.02 | 3.76** | |
| **5** *Limited access to ER strategies as IV* | | | | | 0.37 |
| | Non-Acceptance | −0.01 | 0.02 | −0.43 | |
| | Goals | −0.05 | 0.03 | −1.68 | |
| | Impulse | 0.05 | 0.03 | 1.47 | |
| | Awareness | 0.04 | 0.02 | 1.78 | |
| | Strategies | 0.03 | 0.03 | 0.96 | |
| | Clarity | 0.06 | 0.03 | 1.79 | |
| | Enhancement | 0.42 | 0.16 | 2.66** | |
| | Coping | 0.67 | 0.23 | 2.88** | |
| | Social | −0.07 | 0.06 | −1.25 | |
| | Age | 0.03 | 0.03 | 0.84 | |
| | Sex | −0.43 | 0.20 | −2.22* | |
| | Gambling Frequency | 1.20 | 0.13 | 9.05** | |
| | Enhance × Strategies | −0.01 | 0.01 | −0.78 | |
| | Coping × Strategies | 0.01 | 0.01 | 0.74 | |
| **6** *Lack of emotional clarity as IV* | | | | | 0.38 |
| | Non-Acceptance | −0.02 | 0.02 | −0.75 | |
| | Goals | −0.04 | 0.03 | −1.65 | |
| | Impulse | 0.03 | 0.03 | 1.11 | |
| | Awareness | 0.05 | 0.02 | 2.01* | |
| | Strategies | 0.03 | 0.02 | 1.16 | |
| | Clarity | 0.004 | 0.04 | 0.10 | |
| | Enhancement | 0.23 | 0.18 | 1.24 | |
| | Coping | −0.03 | 0.28 | −0.10 | |
| | Social | −0.05 | 0.06 | −0.95 | |
| | Age | 0.03 | 0.03 | 0.83 | |
| | Sex | −0.42 | 0.19 | −2.16* | |
| | Gambling Frequency | 1.21 | 0.13 | 9.19** | |
| | Enhance × Clarity | 0.01 | 0.01 | 0.39 | |
| | Coping × Clarity | 0.06 | 0.02 | 3.05** | |

*Note.* Problem Gambling was entered as the DV in all moderation analyses.
*p ≤ 0.05 and ** p ≤ 0.001.

## 4. Discussion

Emerging adulthood is considered a high-risk developmental period characterized by five psychosocial features: identity exploration, instability, self-focus, feelings of in-between, and exploration of possibilities; all of which may potentially play a unique role in the increased engagement in various risky behaviors (Arnett, 2005). In fact, previous research among emerging adults has revealed elevated levels of engagement in risky behaviors including substance and alcohol use, risky sexual behaviors, and excessive gambling engagement (Arnett, 2007; St-Pierre et al., 2014). Specifically, problem gambling prevalence rates among emerging adults have been consistently higher compared to adult samples with rates ranging from 0.2%−12.3% (Calado et al., 2017; Nowak, 2018). In the current study, this sample of gamblers was no exception, with rates for moderate risk and disordered gambling categories at 15.2% and 8.1% respectively. Although it is important to note that the sample consistent only of gamblers thereby potentially inflating observed prevalence rates.

Problem gambling has been reported to be highly associated with gambling motivations of enhancement (to increase positive emotions) and coping (to decrease/escape negative emotions) (Stewart & Zack, 2008). Given the strong relationship between these motives and intent to regulate affect, this study sought to understand the moderating effect of enhancement and coping motives on the relationship between each dimension of ER and problem gambling. It was hypothesized that the relationship between difficulty engaging in goal-directed behaviors and problem gambling would be moderated by coping motives. Hypotheses surrounding the remaining dimensions of ER were exploratory in nature.

In the current study, we found that aside from control variables, difficulties with impulse control when upset, difficulties with emotional awareness and emotional clarity, enhancement motives for gambling and coping motives for gambling were uniquely associated with problem gambling behavior. Each of the six regression models were significantly associated with problem gambling, accounting for approximately 37–38% of the variance. The moderation analyses demonstrated that enhancement motives did not significantly interact with any ER dimension. Given that the DERS assesses ER competency, specifically difficulties in engaging in ER skills during high *negative* emotional experiences, it is not surprising that a motivation defined by gambling to increase *positive* emotions would not be significant. In line with our hypothesis, coping motives was found to have significantly interacted with difficulties engaging in goal-directed behavior. Additionally, coping motives significantly interacted with lack of emotional clarity and lack of emotional awareness. Specifically, these interactions

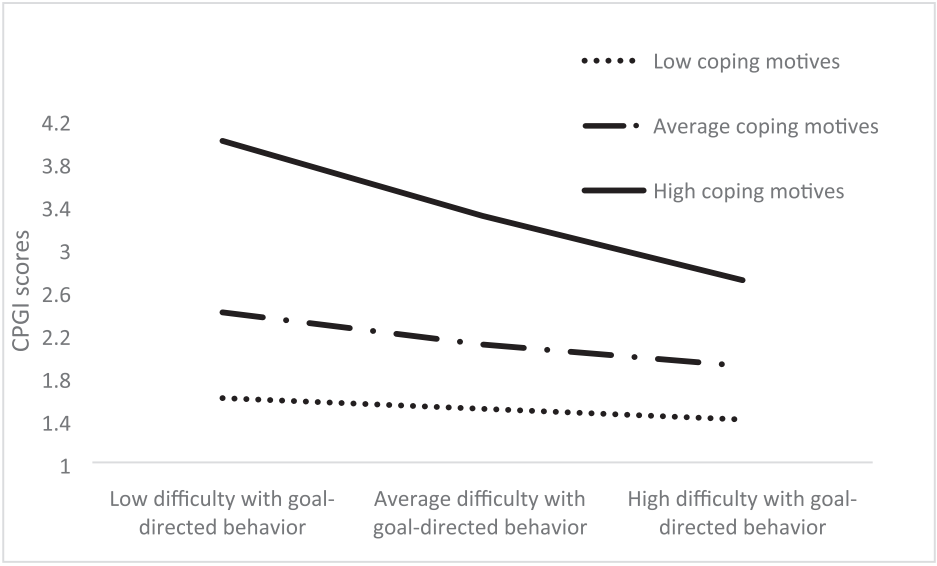


**Fig. 1.** Moderating effect of coping motives on the relationship between difficulties with goal-directed behaviors when upset and problem gambling.

suggest that co-occurring poor emotional awareness and poor emotional clarity combined with a high motivation to relieve/escape dysphoric mood states (i.e., coping motives) are significant risk factors for problem gambling. While, stronger goal-directed behavior (i.e., less difficulties engaging in goal-directed behaviors when upset) combined with a high motivation to relieve negative mood states is a particularly troublesome mixture for problem gambling. This direction although surprising, is in line with previous research reporting that less difficulties engaging in goal-directed behaviors was significantly related to problem gambling severity (Marchica et al., 2019). It is hypothesized that when gambling to cope with negative emotions, individuals are making a conscious or unconscious effort to distract themselves through gambling and are thus essentially involved in goal-directed behaviors. Executive control allows the individual to focus their attention on the most salient goal, to find the easiest avenue to achieve this goal while potentially disregarding alternative goals, values, and long-term consequences (Kopetz, Woerner, & Briskin, 2018). As such, the current study provides evidence for this suggested hypothesis in that individuals with high coping motivations are essentially partaking in goal-directed behaviors by making directed efforts to escape or distract themselves from unwanted negative emotions through gambling.

### *4.1. Limitations and future directions*

The findings of this study consider precursor psychological factors to problem gambling, such as ER skills and how they interact with motives for gambling. However, the results should be understood under the context of the study's limitations. This study utilized self-report data, which allows for a certain level of potential biases to occur. Given the sensitive nature of survey questions (i.e., problematic gambling participation), it is always possible that participants were not sincere or fully engaged when completing the survey. However, a series of checks and filters were employed to help confirm the validity and sincerity of responses. Nevertheless, the data is cross-sectional, which makes it impossible to convey a causal/directional relationship between the variables of interest. Future research should examine this relationship longitudinally in order to better understand the directionality between ER and problem gambling. Second, there are several other potential psychosocial factors that may potentially affect the relationship between gambling motives, ER, and problem gambling. As such, future studies should examine additional factors including mood, social status, and a comparison between developmental levels. Finally, although the interaction between coping motives and the three dimensions of ER

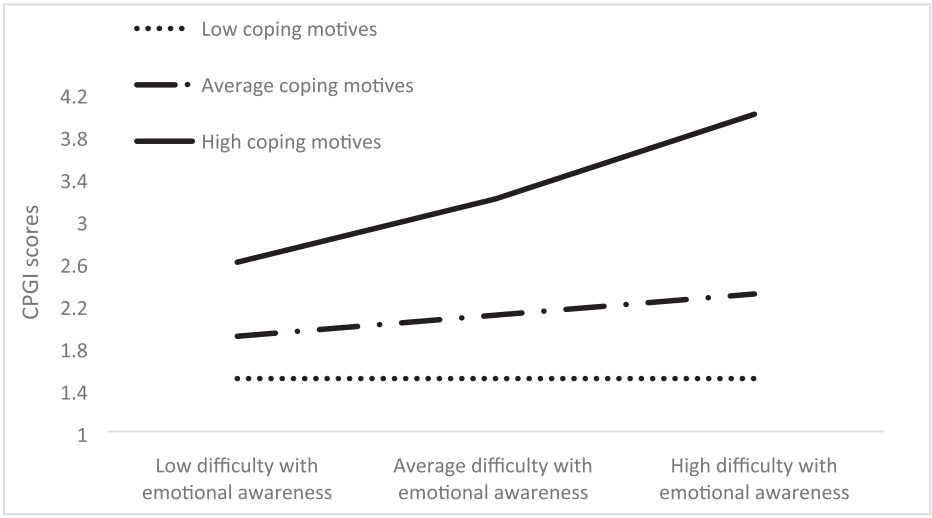


**Fig. 2.** Moderating effect of coping motives on the relationship between lack of emotional awareness and problem gambling.

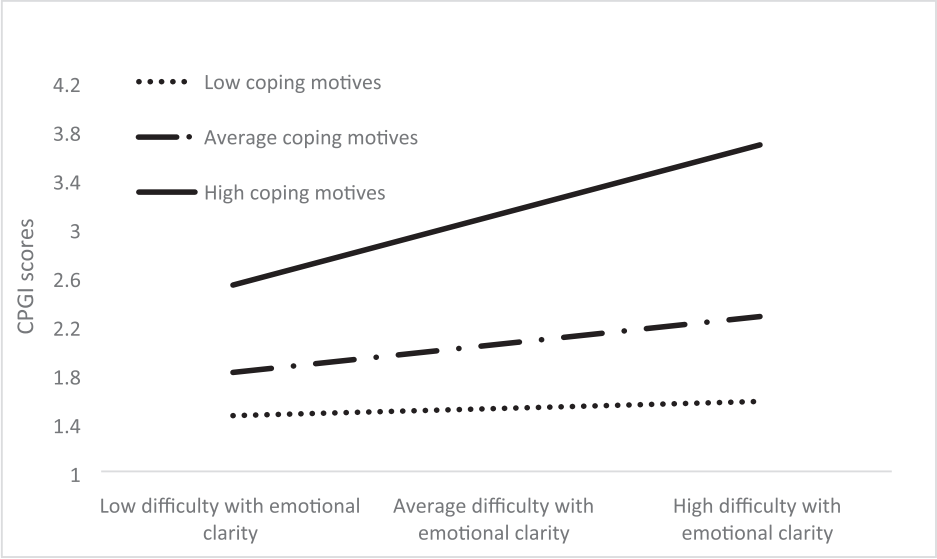


**Fig. 3.** Moderating effect of coping motives on the relationship between lack of emotional clarity and problem gambling.

(goals, clarity, and awareness) were statistically significant the change in $R^2$ of each only accounted for 1% of the variance in problem gambling. While from a clinical perspective this may seem marginal, from a theoretical perspective the results do provide insight into the interplay between coping motives and ER; thereby suggesting additional research be conducted to further understand these interactions in greater detail. Future studies would also benefit from investigating this relationship using experimental paradigms in order to see the effect of ER skills on problem gambling when specific mood states are induced in participants.

## 5. Conclusions

No study to date has examined the moderating effect of gambling motivations on the relationship between ER and problem gambling. Previous research has shown that difficulties with ER (i.e., low levels of general emotional competence) is related to higher levels of problem gambling with medium to large effect sizes (Ciccarelli, Nigro, Griffiths, Cosenza, & D'Olimpio, 2016; Elmas, Cesur, & Oral, 2017; Jauregui, Estévez, & Urbiola, 2016; Navas et al., 2017; Poole, Kim, Dobson, & Hodgins, 2018; Rogier & Velotti, 2018; Williams et al., 2012). Additionally, research in the area of gambling motivation has shown that enhancement and coping motives for gambling are consistently associated with elevated levels of gambling participation and problem gambling (Mcgrath et al., 2010; Stewart & Zack, 2008; Stewart, Zack, Collins, & Klein, 2008). Specifically, recent research examining the relationship between four motivational factors of gambling (social, financial, fun/thrilled-related, and affective) demonstrated that affective motives (i.e., gambling to regulate affect) was the only direct predictor of gambling symptoms (Barrada et al., 2019). Finally, a recent study by Jauregui and Estevez (2019) not only found that difficulties with ER significantly correlated with gambling severity among adolescents, but that difficulties with ER also mediated the relationship between gambling motives and gambling severity. These studies along with the current findings reveal the importance of considering psychological factors such as ER as well as motivational factors (i.e. enhancement/coping motives) in understanding the underlying mechanisms for why, how, and for whom this activity can become problematic.

Despite the limitations of the current study, the results suggest that researchers and clinicians working with emerging adults should be aware of the potential combinations of difficulties with ER and gambling motivations that are especially risky for young adults. Without discounting other factors potentially at play such as, interpersonal and social processes (Hofmann, 2014), the results suggest that ER difficulties are specifically troublesome when combined with a motivation to cope with negative emotions. As such, depending on the combination, different intervening measures should ensue. For instance, emerging adults who have difficulties with emotional awareness and emotional clarity and who are motivated to gamble to escape negative emotions should be taught how to label and recognize emotions, along with non-judgemental acceptance (often seen in mindfulness-based programs) so that they can overcome periods of negative emotionality without needing to *escape* or *avoid* their experienced emotions. Additionally, problem gamblers who are better at engaging in goal-directed behaviors, especially when they are motivated to escape negative emotions, tend to use gambling as their ER strategy and thus should be taught alternative and more adaptive methods to regulate their mood, for instance, through activities that increase positive mood (e.g., exercise, drawing, etc.).

More importantly, given that ER is a fluid construct that is continuously evolving throughout development, it can be taught and enhanced within individuals (Gross & Munoz, 1995). As such, the potential for using ER as a preventative measure for problem gambling is great. Global direct and indirect economic costs of mental disorders have been estimated at US$2.5 trillion and are expected to double by 2030 (Trautmann et al., 2016), demonstrating a substantial impact on health services. However, few adults and even fewer adolescents actually seek treatment for mental health disorders. Therefore, proactive prevention efforts and outreach programs may be a cost-effective solution to address these problems. ER is a transdiagnostic construct that has been linked to several other psychological disorders (Aldao et al., 2010), with this study also linking it to problem gambling. Thus, by promoting the implementation of prevention programs that increase the development of ER skills as early as possible (e.g., elementary school and high school) we would be reducing the risk for mental disorders and the economic burden currently impacting our health services.

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## 7. Contributors

*Loredana A. Marchica:* was responsible for study design, wrote the initial manuscript, and collected the data for the Quebec sample.

*Matthew T. Keough*: was responsible for data collection in Manitoba and provided consultation on statistical analysis and manuscript edits.

*Tina C. Montreuil:* helped supervise the project and provided manuscript edits.

*Jeffrey L. Derevensky:* supervised the project and provided final manuscript edits.

*All authors discussed the results and contributed to the final manuscript.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.addbeh.2020.106378.

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# Chapter VI

# General Discussion

## Summary of Findings and Original Contributions

Over the past two decades there has been increased research into non-substance behavioral addictions (Demetrovics & Griffiths, 2012; Grant et al., 2010; Griffiths, 2017; Griffiths et al., 2014). Excessively engaging in these behaviors has been known to produce short-term rewards or "highs" similar to substance use. These rewards often lead to diminished control over the behavior despite adverse consequences (Jorgenson et al., 2016). The essential features of behavioral addictions consist of the failure to resist impulses, drives, or the temptation to perform acts that are potentially harmful to oneself or others. It is the repetitive engagement in these behaviors that ultimately interferes with daily functioning, and therefore resembles substance use disorders (Karim & Chaudhri, 2012). Problem gambling is the prototypical behavioral addiction, while gaming disorder has only recently been included in ICD-11 as a behavioral addiction, along with gambling (WHO, 2018). Both of these behavioral addictions can be broadly defined as persistent and recurrent patterns of behaviors in the given activity that if engaged in excessively are associated with significant distress (Fam, 2018; Griffiths & Kuss, 2012; Potenza et al. 2019). Estimated prevalence rates for gaming disorder have ranged from 1.7% to 10% (Fam, 2018; Griffiths & Kuss, 2012), while estimates for PG among emerging adults and adolescents have ranged from 0.2-12.4% (Calado et al., 2017; Nowak, 2018). Similar to previous research, prevalence rates within the present program of research were between 15.6% and 8.1% for moderate and problem gambling.

Given that gambling is the only behavioral addiction currently officially recognized as a diagnosis in the DSM-5 (APA, 2013), the present program of research focused on PG. Further, the

term problem gambling was used, rather than gambling disorder, throughout the program of research, to indicate a range of severity versus a classification of gambling disorder; especially, given that no clinical interviews were conducted confirming participant's self-reported problems. Research has shown that PGs exhibit greater levels of mood disorders including anxiety and depression, as well as difficulties with impulsivity, compulsivity, and attention, and antisocial personality traits (Allami & Vitaro, 2015; Balodis et al., 2012; Cunningham-Williams & Cottler, 2001; Dowd et al., 2019; Gupta et al., 2013; Potenza, 2014). However, the root cause underlying problem gambling has yet to be fully investigated. Research illustrates that individuals with difficulties in ER engage in addictive behaviors and substance use to avoid or regulate negative emotions (Aldao et al., 2010; Estevez et al., 2017; Ricketts & Macaskill, 2003), or to extend positive emotions (Williams & Grisham, 2012). Thus, the present program of research applied the theory of ER (Gratz & Roemer, 2004) to the area of PG among emerging adults as a means of potentially identifying factors underlying the development of PG.

Emotions have a considerable impact on the way individuals think, behave, feel (Shu et al. 2018), as well as, on individual goals and motivations for engagement in various behaviors (Gross & Thompson, 2007). ER refers to the process of how, which, and when negative and positive emotions are expressed and experienced (Gross, 1998). Difficulties with ER is described as experiencing difficulty in accepting experienced emotions, controlling impulses towards negative feelings, engaging in goal-directed behaviors, and retrieving efficient ER strategies (Gratz & Roemer, 2004). Research has shown that compared to healthy individuals those who suffer from multiple psychological disorders (e.g. mood disorders, impulse-control disorders, eating disorders, substance addiction, and bipolar disorder) exhibit increased ER deficits (Aldao et al., 2010; McLaughlin et al., 2011; Sheppes et al., 2015; Sloan et al., 2017). Gratz and Roemer (2004)

proposed an integrative model of ER that encompasses clinically relevant difficulties in ER and emphasizes a functional nature to all emotions with the goal of influencing response tendencies in order to produce adaptive responses to the environment. This theory is consistent with research showing the aversive effects of trying to control or avoid unwanted emotional experiences (Bowen et al., 2007; Hayes et al., 1996) and the benefit of emotional acceptance (Campbell-Sills et al., 2006; Kotsou et al., 2018).

Theoretical frameworks aiming to understand the aetiology of PG have long acknowledged the importance of emotions in PG. However, many models assume that PGs consist of a homogeneous population and thus one treatment modality can be applied to all PGs. However, this is often not the case. As such, Blaszczynski (2000) deemed PGs as a heterogeneous population and proposed a model that integrated biological, personality, developmental, cognitive and learning theories, considered environmental factors, and unearthed subgroups of gamblers sharing similar commonalities. Blaszczynski and Nower's (2002) *Pathways Model* is one of the most widely accepted frameworks of PG to date and has been validated in the literature among adolescents, adults, clinical samples, and longitudinally (Allami et al., 2017; Blaszczynski & Nower, 2002; Gupta et al., 2013; Valleur et al., 2016). Although acknowledging emotions and ER as a substantial factor in gambling problems, most studies have validated the framework by examining motivations for gambling or symptoms related to gambling (e.g., depression, anxiety, impulsivity). Further, research that has examined emotion regulation and problem gambling have only assessed for general emotion dysregulation rather than assessing the unique contribution of each dimension to the disorder. Understanding the contribution of each specific dimension of ER to PG is an important component in creating unique prevention and intervention treatment programs for working with such a heterogeneous population.

The objective of Study 1 was to examine the relationship between ER and two of the most widely studied behavioral addictions, problem gambling and video gaming. Results from the systematic review indicated that difficulties or deficits in ER were related to higher endorsement of behavioral addictions. This concurs with findings from an earlier systematic review on emotional intelligence and addictive substance use behaviors which indicated that lower levels of emotional intelligence was associated with increased smoking, alcohol, and illicit drug use (Kun & Demetrovics, 2010). Specifically, Study 1 found that out of 20 studies examining either gambling or gaming and ER, 90% reported statistically significant relationships between ER deficits and behavioral addictions. Further, 13 of these studies reported a medium to large effect sizes in their results (Cohen's $d \geq .50$). These results extend research on the relationship between ER and various psychopathologies (e.g., anxiety, depression, bipolar disorder, eating difficulties) (Aldao et al., 2010; McLaughlin et al., 2011; Sheppes et al., 2015; Sloan et al., 2017) by illustrating a consistent relationship between ER and behavioral addictions. Thus, lending support the notion that ER may be considered a transdiagnostic construct (Aldao, 2013). However, the literature reviewed in Study 1 demonstrated several areas of needed exploration in the field. For instance, studies included an overrepresentation of male participants, however, previous research has shown higher prevalence rates of mood disorders and ER difficulties among females (Gardener et al., 2013). Thus, suggesting that future research should aim for an equal distribution of sex. Further, no studies examined the effect of specific dimensions of ER on PG. If gamblers are to be considered a heterogeneous population, it can be assumed that they also differ on their ability levels within each dimension of ER. In particular, the creation and implementation of evidence-based intervention and prevention practices would be best facilitated by understanding which specific dimension of ER should be the focus.

Rising from the gaps in the literature observed in Study 1, Study 2 sought to explore the relationship between each dimension of ER (i.e., awareness, clarity, acceptance, goal-directed behavior, impulse control, and flexibility in strategy use) and PG. The results revealed that goal-directed behaviors and impulsivity were significant predictors of PG. Specifically, gamblers who reported having difficulties with impulse control when experiencing negative emotions were more likely to be PGs and gamblers with higher PG scores were more likely to engage in goal-directed behaviors. Research has consistently demonstrated a relationship between impulsivity and PG. In particular, positive and negative urgency, components of impulsivity defined as the tendency to experience strong impulsive reactions under negative or positive affect, have been shown to be stronger determinants of PG compared to lack of perseverance (a cognitively loaded dimension of impulsivity) (Blain et al., 2015; Del Prete et al., 2017). Further, PGs have often been associated with distinct coping motivations for gambling (i.e., gambling to avoid or escape negative emotions). Engagement in gambling for these individuals may be considered a goal-directed behavior that is used with the aim of avoiding negative emotions rather than merely making money. According to the *Pathways Model* (Blaszczynski & Nower, 2002) individuals in the Behavioral Conditioned pathway represent the most common pathway among community samples and develop mood disorders due to their excessive gambling. As such, the second objective of Study 2 aimed to assess the indirect effects of problem gambling onto depressive and anxious symptomology through the dimensions of ER. Results indicated a full mediation effect wherein lack of flexibility in using emotion regulation strategies mediated the relationship between PG and depressive symptomology and accounted for 45% of the total effect, lack of emotional clarity accounted for 22% of the total effect, non-acceptance accounted for 9% of the total effect, and

using goal-directed behaviors when upset accounted for 4% of the total effect. Thus, among PGs there are unique dimensions of ER deficits that increase the likelihood of developing depression.

Surprisingly, Study 2 demonstrated that PGs were more likely to report engaging in goal-directed behaviors when responding to negative emotions. It was hypothesized that this response was motivated by a need to avoid or escape negative emotions (i.e., coping motives). As such, Study 3 aimed to test this hypothesis by examining whether coping motives for gambling coupled with the dimensions of ER would produce a particularly dangerous combination in the predicting PG severity. Results were in line with the hypothesis and demonstrated that stronger goal-directed behaviors (i.e., less difficulties with goal-directed behavior when upset) combined with a high motivation to avoid negative emotions was a problematic mixture for PG. Additionally, the study went further and found that high coping motives also significantly interacted with a lack of emotional clarity and a lack of emotional awareness to increase risk of PG. Recent research has begun to implement and consider emotional causes for gambling. For instance, research by Barrada and colleagues (2019) demonstrated that among four motivational factors for gambling (social, financial, fun/thrill-related, and affective), solely affective motives directly predicted gambling symptoms. Further, Jauregui and Estevez (2019) recently reported that among adolescents, ER significantly predicted PG and difficulties with ER mediated the relationship between gambling motives and PG.

The present program of research provides novel insight into the relationship between the specific dimensions of ER and PG. Not only does this body of work illustrate the overall and current state of research within the field, it provides an initial step towards understanding the underlying mechanisms of PG and considers psychological factors such as ER skills and their interaction with gambling motives. However, the study results should be understood within the

context of the study limitations. Of note, both study 2 and 3 were cross-sectional and as such inferences of causality or directionality between the variables cannot be assumed. However,, the results from this research do provide evidence for the relationship between deficits in specific dimensions of ER and PG and provided further evidence for the conceptualization of ER as a transdiagnostic construct beneficial to universal prevention programs. Specifically, results demonstrate that it is difficulties with impulse control when upset and engagement in goal-directed behaviors that appear to be the strongest predictors of PG. Additionally, there are potential combinations of difficulties with ER and gambling motivations that are especially risky for young adults in the development of PG. These specific ER and motivation risk factors lend themselves to selective and targeted prevention practices and consider the gamblers unique profile in clinical practice.

**Key Implications for Practice**

The findings from the present program of research have several key implications to the development of future prevention programs for PG. Prevention approaches consist of services offered to the general population or to people who are identified as being at risk for a specific disorder. These individuals receive services with the hope that the likelihood of a future disorder will be reduced. Currently, theory, research, and practice have come to support an approach to prevention that aspires to not only prevent disorders, but promote positive health among populations (Wahlbeck, 2015). Gordon (1983) first proposed a mental health focused prevention approach. According to this model, three different modes of prevention can be used, separately or simultaneously, to target distinct groups. First, universal prevention comprises of programs that can be offered to an entire population (e.g., all students in a school), based on the likelihood that the prevention will be beneficial to all, and will outweigh any costs or risks of negative

consequences (Gullota, 2005; Schulte, 2016). Given the results of the current research, at this level, programs that focus on increasing an individual's resiliency by expanding on their strengths, resources, and other protective factors like strong ER skills should be implemented. Second, selective prevention refers to programs that are targeted to a specific subpopulation identified as being at-risk for the disorder (e.g., emerging adults) (Gullota, 2005; Schulte, 2016). At this level, programs targeting individuals who already demonstrate deficits in ER should be implemented. Last, indicated prevention is comprised of programs targeting specific individuals, who have been identified as having a high risk for a disorder based on individual assessment, but have not yet experienced significant negative symptoms (Gullota, 2005; Schulte, 2016). Following the results from the current research program suggests that at this level, ER programs should target individuals who report excessive engagement in gambling activities and meet some criteria for the disorder but do not yet meet diagnostic levels of four or more criteria. However, at all three levels, the implementation of measures should ideally occur prior to the onset of the disorder. It assumes a population health perspective rather than an individual perspective and promotes general mental health and well-being.

The findings from the present program of research also have several key implications to the development of future direct intervention programs. Study 2 demonstrated that by focusing on enhancing specific dimensions of ER treatment efforts would be targeting the specific underlying mechanisms rather than symptoms of PG. For instances among PGs with symptoms of depression rather than broadly aiming to decrease the surplus of symptoms involved with PG and depression this research suggests that interventions should focus on increasing knowledge, understanding, and acceptance of emotions, and teaching flexible use of a variety of ER strategies so that these individuals may use other more positive coping strategies beyond gambling. Study 3 furthers our

knowledge in the creation of intervention programs by also examining gambling motivations. This study indicates that depending on the combination of ER deficit with specific motivational style and individual endorses, different intervention measures should ensue. For instance, emerging adults who report having deficits in emotional awareness and clarity and who are motivated to gamble to escape should be taught how to label or identify and recognize emotions, along with non-judgmental acceptance of their emotions in order to overcome stressful moments without the urge to avoid their experienced negative emotions. However, when individuals report a strength in ER goal-directed behaviors and a motivational style that endorses gambling to avoid negative emotions they more likely to use gambling as their ER strategy. Previous research has demonstrated that gamblers often report negative mood states after gambling (Matthews et al., 2009), therefore suggesting that gambling is not a successful ER strategy. As such, these individuals should be taught more adaptive ER strategies including techniques of validation, cognitive defusion (understanding in the moment that an emotion is just an emotion that interprets an experience and is not necessarily true or long lasting), or grounding techniques and meditative practice in order to return to the present moment (Blackledge & Hayes, 2001).

Both studies demonstrate the importance of proper comprehensive assessment of needs before interventions measures are implemented. A complete biopsychosocial assessment can be critical when implementing integrated treatment plans. A biopsychosocial assessment consists of assessing biological, psychological, and social factors that can contribute to an individual's difficulties. It is a model that assumes problems do not exist in a vacuum, but rather each aspect of an individual's life influences the other in various ways (Avery & Barnhill, 2017). As such, it is important to not only identify needs and deficits related to the disorder, but also identify

strengths and supports that the individual possesses that could benefit treatment (Avery & Barnhill, 2017).

**Directions for Future Research**

The heightened prevalence of excessive gambling among emerging adults is of special concern because, aside from the financial, social, familial, educational, and psychological strain problem gambling produces, it is often comorbid with mood disorders (e.g., depression and anxiety; Derevensky & Gupta, 2004). Further, research has shown that individuals with mood disorders, and consequently ER deficits, often engage in solitary gambling which, in turn, predicts more time spent on gambling and excessive gambling behaviors (Bristow et al., 2018). Further, increased solitary engagement makes the challenges faced by these individuals especially difficult to discern. As such, future research should compare the differences in ER skills among gamblers who engage in online gambling as compared to other gambling activities as a means of discerning whether engaging in online gambling is a risk factor in itself.

Although ER is often understood as emotional control, the results from the current program of research point to a functional nature of emotions—a nature that does not necessarily involve diminishing or controlling affect. Moreover, the results highlight the importance of understanding and being aware of both positive and negative emotions, particularly when engaging in risky behaviours (like gambling). Future research should examine the protective role that ER skills serve in the relation between daily affective states and engagement in excessive gambling. Further, according to the elaborated intrusion theory of desire (Kavanagh et al., 2005), craving (or desire) is the result of emotion-laden cognitive elaborations that includes both the behavior (e.g., gambling) and its anticipated consequences (e.g., relief from negative emotions) to intrude on

attentional forces. Thus, elaborated intrusion theory of desire establishes a significant need to understand the role of ER in craving as well.

Recently, a Self-Determination Theory (SDT) model of healthy emotion regulation, grounded in an organismic view of wellness, has been proposed (Ryan et al., 2008). Within this model, emotions are considered informational inputs to help in self-guided actions rather than being obstacles that must be controlled (Roth et al., 2019). In line with SDT's motivational taxonomy, there are three parallel forms of emotion regulation: (1) integrative emotion regulation (which supports autonomy), (2) controlled emotion regulation (which directs, reinterprets, or minimizes emotional inputs), and (3) emotion dysregulation (an amotivated approach wherein emotions are poorly managed) (Roth et al, 2019). Integrative emotion regulation (IER) has been associated with healthy regulation and higher quality of life (Benita et al., 2020) and is an intrapersonal style that involves multiple mechanisms. Firstly, individuals who report stronger IER have a non-judgemental, open attention to emotional experiences. Second, the individual has an open curiosity in order to actively explore the emotion and understand its meaning towards other areas of their lives (e.g., their goals and values). As such, the flexibility in whether to inhibit or express emotions (i.e., use different emotion regulation strategies) becomes an *outcome* of the process rather than the *goal* (Roth et al., 2019). Individuals who endorse stronger controlled emotion regulation often respond to emotions by attempting to manage the feelings or the emotional expression. Unlike IER, there is little inner exploration that occurs; therefore, strategy use becomes the *goal* rather than the *outcome* (Roth et al., 2019). As such, controlled emotion regulation can impair one's ability to deal effectively with negative emotions and has been linked to lower mental health and daily functioning (Benita et al., 2020). Finally, emotion dysregulation occurs when individuals feel overwhelmed and are completely unable to manage their emotions

(Roth et al., 2019). Emotion dysregulation has been associated with greater psychological distress and self-harming behaviors (Emery et al.,2016). In line with the results from this program of research, the aforementioned theoretical model highlights the quality of ER rather than merely focusing on strategy use. Nonetheless, much of this work remains largely disconnected from the established emotion regulation models of Gross (1998) and Gratz and Roemer (2004). Therefore, future research should examine how these new interpretations of ER are similar and different from past models, and whether they enhance our understanding of ER in the presence of risky behaviors.

Finally, the SDT theory of motivation suggests that autonomous forms of motivation offer more sustained behavioral changes (Ryan & Deci, 2000). As such, future research should investigate the role of these motivational models within ER and behavioral addictions. When individuals are both autonomous in motivation and emotion regulation (i.e., IER) they are more likely to experience self-directed behavioral changes in their gambling engagement. In line with SDT, when exploring daily fluctuations in affect, those who exhibit stronger integrative emotion regulation should report less overall negative affect, less excessive gambling behaviors, and less intrusive cravings for gambling. Further, those who exhibit stronger autonomous motivation should be more likely to use the daily affect recordings to visualize and acknowledge potentially risky gambling patterns and to be intrinsically motivated for self-directed behavioral changes.

By understanding the motivational styles of gamblers and the quality of their emotion regulation skills, clinicians would be better equipped to create individualized programs based on each gambler's traits and needs. Future research in this area would thus assess the protective quality of ER and would allow for the understanding of how context, real-time felt emotions, and motivations impact gambling behaviours and cravings. Using SDT's integrative emotion regulation framework, the importance of actively working with emotions in productive and healthy

ways would be highlighted, with the end goal being a reduction in the risk for mental health problems and increased quality of life. Finally, future research should aim for repeated longitudinal measures of motivational changes, ER skills, and gambling behaviour in order to understand the developmental trajectory of these disorders.

**Conclusions**

Problem gambling, as it has been termed throughout this program of research, is a continued pattern of gambling engagement that interferes with an individual's ability to function optimally in daily life. Problem gambling has been associated with a variety of negative outcomes including financial, social, legal, familial, and mental health problems. Although, mood disorders (e.g., anxiety, depression) are significant co-morbid disorders associated with PG (either leading to PG or resulting from PG), little was known about the association between ER and PG. The present program of research applied a social-psychological theoretical ER framework proposed by Gratz and Roemer (2004) to the study of PG. Building on previous studies examining ER and other mental health disorders, including substance use (Aldao et al., 2010; McLaughlin et al., 2011; Sheppes et al., 2015; Sloan et al., 2017), the present series of studies examined the association of specific ER dimensions to PG. Results demonstrated initial support for the perspective that deficits in ER are related to PG and specifically, that difficulties with impulsivity, non-acceptance, emotional clarity, and flexibility in strategy use are all critical ER dimensions to consider when working with PGs. These results highlight the importance of comprehensive biopsychosocial clinical assessments in approaching problematic gambling among emerging adults.

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# Appendix A: Ethical Approval

McGill

**Research Ethics Board Office**
James Administration Bldg.
845 Sherbrooke Street West. Rm 325
Montreal, QC H3A 0G4

Tel: (514) 398-6831

Website: www.mcgill.ca/research/researchers/compliance/human/

**Research Ethics Board II**
**Certificate of Ethical Acceptability of Research Involving Humans**

**REB File #:** 145-0917

**Project Title**: The role of emotion regulation in problem gambling

**Principal Investigator:** Loredana Marchica

**Status:** Ph.D. Student

**Department:** Educational & Counselling Psychology

**Supervisors:** Prof. Tina Montreuil and Jeffrey Derevensky

**Co-Investigator/Other Researcher:** Matthew Keough, University of Manitoba

**Approval Period:** **October 13, 2017 to October 12, 2018**

The REB-II reviewed and approved this project by delegated review in accordance with the requirements of the McGill University Policy on the Ethical Conduct of Research Involving Human Participants and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans.

Deanna Collin
Ethics Review Administrator, REB I & II

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* Approval is granted only for the research and purposes described.
* Modifications to the approved research must be reviewed and approved by the REB before they can be implemented.
* A Request for Renewal form must be submitted before the above expiry date. Research cannot be conducted without a current ethics approval. Submit 2-3 weeks ahead of the expiry date.
* When a project has been completed or terminated, a Study Closure form must be submitted.
* Unanticipated issues that may increase the risk level to participants or that may have other ethical implications must be promptly reported to the REB. Serious adverse events experienced by a participant in conjunction with the research must be reported to the REB without delay.
* The REB must be promptly notified of any new information that may affect the welfare or consent of participants.
* The REB must be notified of any suspension or cancellation imposed by a funding agency or regulatory body that is related to this study.
* The REB must be notified of any findings that may have ethical implications or may affect the decision of the REB.

**Appendix B: Consent Form**

# THE IMPACT OF EMOTION REGULATION

CONSENT TO PARTICIPATE IN RESEARCH

Thank you for your interest in participating in this study. The purpose of this project is to investigate the relationship between emotion regulation and gambling behaviors among students. This project is being conducted by the International Center for Youth Gambling and High-Risk Behaviors Research Lab at McGill University. As a part of her PhD dissertation, this study is led by Loredana Marchica, M.A, under the supervision of Drs. Derevensky and Montreuil of the Department of Education and Counselling Psychology. Below you will find additional information regarding this study. If you have any further questions, you can contact the research lab phone at (514) 398-6830 or email ergamblingstudy@outlook.com. This email address is confidential and has been established for the sole purpose of this study. You are also free to contact the Center by phone at (514) 398-1391 or by email at ygi.educ@mcgill.ca.

**Participant Responsibility:** As a participant of this study, you will be asked to complete a questionnaire. The questionnaire will take approximately 15-20 minutes to complete.

**Participant Incentive:** Once you have completed the questionnaire you are eligible to enter a raffle for one of forty gift cards to Amazon worth $20. **Participation in the raffle is voluntary and your odds of winning a gift card are approximately 1 in 50**.

**Confidentiality:** Your participation in this study will be kept confidential. Questionnaires will not have any identifying information. Further, all questionnaire and consent form hard copies will be kept in a locked drawer of the Center's research office, only accessible to the principal investigator and her advisor Dr. Derevensky. Further, all computer files will be kept in a password protected file stored within a secure computer accessible only to the principal investigator and her advisor.

**Potential Risks:** While there are no anticipated risks involved in participating in this research project, some participants might be sensitive to, or uncomfortable with some of the questions. You do not have to answer any questions you do not want to and are free to withdraw from the study at any time, without penalty or prejudice.

**Study Objective:** Your participation in this study will increase our understanding of how students' emotion regulation skills affect their gambling behaviors. This will allow us to better understand the possible benefits of emotion regulation. Further, understanding this relationship will help in the creation of better suited prevention and intervention programs for students.

**Conditions of participation:**

- You have carefully read that you are free to withdraw consent and discontinue your participation at any time without negative consequences.

- You understand that your participation in this study is:
  CONFIDENTIAL (i.e., the research will not disclose your identity)

- You understand that the data from this study may be published

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

CLICK NEXT TO CONTINUE TO STUDY

If you have any questions or concerns about your rights or welfare as a participant in this research study, please contact the McGill Research Ethics Officer at (514) 398-6831 and/or at the following email address, lynda.mcneil@mcgill.ca.

Thank you very much.

Loredana Marchica, M.A.
PhD Student
International Center for Youth Gambling
and High-Risk Behaviors
McGill University

Childhood Anxiety & Regulation of Emotions
(C.A.R.E.) Research Group
McGill University
Montreal, Qc

# Appendix C: Questionnaire Items

Relationship between Emotion Regulation and Gambling Behaviors

**Demographics**

1. Sex (select one):
◯ Male ◯ Female ◯ Intersex

2. Age: _____

3. Please indicate ethnicity (e.g., Caucasian, Hispanic)

_____

4. Are you currently enrolled (i.e., registered to take courses) at an institutions of higher education?

◯ I am currently in CEGEP

◯ I am currently pursuing an Undergraduate degree

◯ I am currently pursuing a Graduate degree

◯ I am not currently registered at any institution of higher education

**Gambling**
**SECTION 1- Gambling Involvement**

People bet money and gamble on many different things including buying lottery tickets, playing bingo, or card games with their friends. I am going to list some activities that you might have bet money on.

| 5. In the past 12 months, how often did you bet or spend money on the following activities | Daily | At least once/ week | At least once/ month | Less than once/month | Never |
|---|---|---|---|---|---|
| a. Lottery tickets (e.g., POGO, Super 7, Maxi Lotto) | ◯ | ◯ | ◯ | ◯ | ◯ |
| b. Instant scratch lottery tickets | ◯ | ◯ | ◯ | ◯ | ◯ |
| c. Raffle or fundraising tickets | ◯ | ◯ | ◯ | ◯ | ◯ |
| d. Horse races | ◯ | ◯ | ◯ | ◯ | ◯ |
| e. Play Bingo for money | ◯ | ◯ | ◯ | ◯ | ◯ |
| f. gambled at a casino (including charity casinos) | ◯ | ◯ | ◯ | ◯ | ◯ |
| g. Slot machines or VLTs | ◯ | ◯ | ◯ | ◯ | ◯ |
| h. Poker in a casino | ◯ | ◯ | ◯ | ◯ | ◯ |
| i. Sports with a bookie | ◯ | ◯ | ◯ | ◯ | ◯ |
| j. Fantasy sports pools | ◯ | ◯ | ◯ | ◯ | ◯ |
| k. Daily fantasy sports | ◯ | ◯ | ◯ | ◯ | ◯ |

| | | | | | |
|---|---|---|---|---|---|
| l. Cards or board games with family or friends | ○ | ○ | ○ | ○ | ○ |
| m. Games of skill such as pool, darts etc. | ○ | ○ | ○ | ○ | ○ |
| n. Arcade or video game | ○ | ○ | ○ | ○ | ○ |
| o. Gamble on the Internet | ○ | ○ | ○ | ○ | ○ |
| p. Online poker | ○ | ○ | ○ | ○ | ○ |
| q. Play a sports lottery (e.g. mise au jeu) | ○ | ○ | ○ | ○ | ○ |
| r. Personally invest in stocks, options or commodities markets | ○ | ○ | ○ | ○ | ○ |

**SECTION 2- Problem Gambling Assessment**

| Some of the following questions may not apply to you, but please try to be as accurate as possible<br><br>6. Thinking about the LAST 12 MONTHS; | Never | Sometimes | Most of the time | Almost Always | Dont know |
|---|---|---|---|---|---|
| a. bet more than you could afford? | ○ | ○ | ○ | ○ | ○ |
| b. have you needed to gamble with larger amounts of money to get the same feeling of excitement? | ○ | ○ | ○ | ○ | ○ |
| c. when you gambled, did you go back another day to try and win back the money you lost? | ○ | ○ | ○ | ○ | ○ |
| d. have you borrowed money or sold anything to get money to gamble? | ○ | ○ | ○ | ○ | ○ |
| e. have you felt that you might have a problem with gambling? | ○ | ○ | ○ | ○ | ○ |
| f. has gambling caused you any health problems, including stress or anxiety? | ○ | ○ | ○ | ○ | ○ |
| g. have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? | ○ | ○ | ○ | ○ | ○ |
| h. has your gambling caused any financial problems for you or your household? | ○ | ○ | ○ | ○ | ○ |
| i. have you felt guilty about the way you gamble or what happens when you gamble? | ○ | ○ | ○ | ○ | ○ |
| j. have you lied to family members or others to hide your gambling? | ○ | ○ | ○ | ○ | ○ |
| k. have you bet more money than you wanted to on gambling? | ○ | ○ | ○ | ○ | ○ |
| l. have you wanted to stop betting money or gambling, but didn't think you could? | ○ | ○ | ○ | ○ | ○ |

**SECTION 3- Correlates**

Next, we explore some of your beliefs about gambling, as well as any early experiences you have had with gambling or betting money

| | Strongly Agree | Agree | Disagree | Strongly Disagree | Dont know |
|---|---|---|---|---|---|
| 7. After losing many times in a row, are you more likely to win | ○ | ○ | ○ | ○ | ○ |
| 8. You could win more if you used a certain system or strategy | ○ | ○ | ○ | ○ | ○ |

| | Yes | No | Dont know |
|---|---|---|---|
| 9. Do you remember a big win when you first started gambling? | ○ | ○ | ○ |
| 10. Do you remember a big loss when you first started gambling? | ○ | ○ | ○ |
| 11. Has anyone in your family EVER had a gambling problem? | ○ | ○ | ○ |
| 12. Has anyone in your family EVER had an alcohol or drug problem? | ○ | ○ | ○ |

| 13. IN THE LAST 12 MONTHS; | Yes | No | Dont Know |
|---|---|---|---|
| a. have you ever used alcohol or drugs while gambling? | ○ | ○ | ○ |
| b. have you gambled while drunk or high? | ○ | ○ | ○ |
| c. have you felt you might have an alcohol or drug problem? | ○ | ○ | ○ |
| d. if something painful happened in your life, did you have the urge to gamble? | ○ | ○ | ○ |
| e. if something painful happened in your life, did you have the urge to drink? | ○ | ○ | ○ |
| f. if something painful happened in your life, did you have the urge to use drugs or medication? | ○ | ○ | ○ |
| g. have you been under a doctor's care because of physical or emotional problems brought on by stress? | ○ | ○ | ○ |
| h. have you felt seriously depressed? | ○ | ○ | ○ |
| i. have you seriously thought about or attempted suicide as a result of your gambling? | ○ | ○ | ○ |

**SECTION 4 – Gambling Motivations**

| Below is a list of reasons why some people gamble. Please indicate how often you gamble for each of the following reasons, by circling whichever number applies: | Almost never/never | Sometimes | Often | Almost always |
|---|---|---|---|---|
| 14. Because you like the feeling | ○ | ○ | ○ | ○ |
| 15. Because it's what most of your friends do when you get together | ○ | ○ | ○ | ○ |
| 16. To forget your worries | ○ | ○ | ○ | ○ |
| 17. To be sociable | ○ | ○ | ○ | ○ |
| 18. Because you feel more self-confident or sure of yourself | ○ | ○ | ○ | ○ |
| 19. To get a "high" feeling | ○ | ○ | ○ | ○ |
| 20. Because it helps when you are feeling nervous or depressed | ○ | ○ | ○ | ○ |
| 21. Because it makes a social gathering more enjoyable | ○ | ○ | ○ | ○ |
| 22. Because it makes you feel good | ○ | ○ | ○ | ○ |

**Emotion Regulation**
**SECTION 1- Difficulties in Emotion Regulation**

| Please indicate how often the following statements apply to you | Almost Never | Sometimes | About half the Time | Most of the Time | Almost Always |
|---|---|---|---|---|---|
| 23. I am clear about my feelings | ○ | ○ | ○ | ○ | ○ |
| 24. I pay attention to how I feel | ○ | ○ | ○ | ○ | ○ |
| 25. I experience my emotions as overwhelming and out of control | ○ | ○ | ○ | ○ | ○ |
| 26. I have no idea how I am feeling | ○ | ○ | ○ | ○ | ○ |
| 27. I have difficulty making sense out of my feelings | ○ | ○ | ○ | ○ | ○ |
| 28. I am attentive to my feelings | ○ | ○ | ○ | ○ | ○ |
| 29. I know exactly how I am feeling | ○ | ○ | ○ | ○ | ○ |
| 30. I care about what I am feeling | ○ | ○ | ○ | ○ | ○ |
| 31. I am confused about how I feel | ○ | ○ | ○ | ○ | ○ |
| 32. When I'm upset, I acknowledge my emotions | ○ | ○ | ○ | ○ | ○ |
| 33. When I'm upset, I become angry with myself for feeling that way | ○ | ○ | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| 34. When I'm upset, I become embarrassed for feeling that way | ○ | ○ | ○ | ○ | ○ |
| 35. When I'm upset, I have difficulty getting work done | ○ | ○ | ○ | ○ | ○ |
| 36. When I'm upset, I become out of control | ○ | ○ | ○ | ○ | ○ |
| 37. When I'm upset, I believe I will remain that way for a long time | ○ | ○ | ○ | ○ | ○ |
| 38. When I'm upset, I believe that I'll end up feeling very depressed | ○ | ○ | ○ | ○ | ○ |
| 39. When I'm upset, I believe that my feelings are valid and important | ○ | ○ | ○ | ○ | ○ |
| 40. When I'm upset, I have difficulty focusing on other things | ○ | ○ | ○ | ○ | ○ |
| 41. When I'm upset, I feel out of control | ○ | ○ | ○ | ○ | ○ |
| 42. When I'm upset, I can still get things done | ○ | ○ | ○ | ○ | ○ |
| 43. When I'm upset, I feel ashamed with myself for feeling that way | ○ | ○ | ○ | ○ | ○ |
| 44. When I'm upset, I know that I can find a way to eventually feel better | ○ | ○ | ○ | ○ | ○ |
| 45. When I'm upset, I feel like I am weak | ○ | ○ | ○ | ○ | ○ |
| 46. When I'm upset, I feel like I can remain in control of my behaviors | ○ | ○ | ○ | ○ | ○ |
| 47. When I'm upset, I feel guilty for feeling that way | ○ | ○ | ○ | ○ | ○ |
| 48. When I'm upset, I have difficulty concentrating | ○ | ○ | ○ | ○ | ○ |
| 49. When I'm upset, I have difficulty controlling my behaviors | ○ | ○ | ○ | ○ | ○ |
| 50. When I'm upset, I believe that there is nothing I can do to make myself feel better | ○ | ○ | ○ | ○ | ○ |
| 51. When I'm upset, I become irritated with myself for feeling that way | ○ | ○ | ○ | ○ | ○ |
| 52. When I'm upset, I start to feel very bad about myself | ○ | ○ | ○ | ○ | ○ |
| 53. When I'm upset, I believe that wallowing in it is all I can do | ○ | ○ | ○ | ○ | ○ |
| 54. When I'm upset, I lose control over my behaviors | ○ | ○ | ○ | ○ | ○ |
| 55. When I'm upset, I have difficulty thinking about anything else | ○ | ○ | ○ | ○ | ○ |
| 56. When I'm upset, I take time to figure out what I'm really feeling | ○ | ○ | ○ | ○ | ○ |
| 57. When I'm upset, it takes me a long time to feel better | ○ | ○ | ○ | ○ | ○ |
| 58. When I'm upset, my emotions feel overwhelming | ○ | ○ | ○ | ○ | ○ |

| Below is a collection of statements about your everyday experience. Using the scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to your experience rather than what you think your experience should be. Please treat each item separately from every other item. | Always | Very Frequently | Somewhat Frequently | Somewhat Infrequently | Very Infrequently | Almost Never |
|---|---|---|---|---|---|---|
| 59. I could be experiencing some emotion and not be conscious of it until sometime later | ○ | ○ | ○ | ○ | ○ | ○ |
| 60. I break or spill things because of carelessness, not paying attention, or thinking of something else | ○ | ○ | ○ | ○ | ○ | ○ |
| 61. I find it difficult to stay focused on what's happening in the present | ○ | ○ | ○ | ○ | ○ | ○ |
| 62. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way | ○ | ○ | ○ | ○ | ○ | ○ |
| 63. I tend not to notice feelings of physical tension or discomfort until they really grab my attention | ○ | ○ | ○ | ○ | ○ | ○ |
| 64. I forget a person's name almost as soon as I've been told it for the first time | ○ | ○ | ○ | ○ | ○ | ○ |
| 65. It seems I am "running on automatic," without much awareness of what I'm doing | ○ | ○ | ○ | ○ | ○ | ○ |
| 66. I rush through activities without being really attentive to them | ○ | ○ | ○ | ○ | ○ | ○ |
| 67. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there | ○ | ○ | ○ | ○ | ○ | ○ |
| 68. I do jobs or tasks automatically, without being aware of what I'm doing | ○ | ○ | ○ | ○ | ○ | ○ |
| 69. I find myself listening to someone with one ear, doing something else at the same time | ○ | ○ | ○ | ○ | ○ | ○ |
| 70. I drive places on 'automatic pilot' and then wonder why I went there | ○ | ○ | ○ | ○ | ○ | ○ |
| 71. I find myself preoccupied with the future or the past | ○ | ○ | ○ | ○ | ○ | ○ |
| 72. I find myself doing things without paying attention | ○ | ○ | ○ | ○ | ○ | ○ |
| 73. I snack without being aware that I'm eating | ○ | ○ | ○ | ○ | ○ | ○ |

**SECTION 2- Emotion Regulation Strategies**

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

**1----------2----------3----------4----------5----------6----------7**
**strongly agree neutral strongly disagree**

74. ____ When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.
75. ____ I keep my emotions to myself.
76. ____ When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about.*
77. ____ When I am feeling *positive* emotions, I am careful not to express them.
78. ____ When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
79. ____ I control my emotions by *not expressing them*.
80. ____ When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.
81. ____ I control my emotions by *changing the way I think* about the situation I'm in.
82. ____ When I am feeling *negative* emotions, I make sure not to express them.
83. ____ When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation.

**SECTION 3– Anxiety and Depression Scales**

| 84. Over the last 2 weeks, how often have you been bothered by any of the following problems? | Not at all | Several days | More than half the days | Nearly everyday |
|---|---|---|---|---|
| a. Little interest or pleasure in doing things | ○ | ○ | ○ | ○ |
| b. Feeling down, depressed, or hopeless | ○ | ○ | ○ | ○ |
| c. Trouble falling/staying asleep, sleeping too much | ○ | ○ | ○ | ○ |
| d. Feeling tired or having little energy | ○ | ○ | ○ | ○ |
| e. Poor appetite or overeating | ○ | ○ | ○ | ○ |
| f. Feeling bad about yourself, or that you are a failure, or have let yourself or your family down | ○ | ○ | ○ | ○ |
| g. Trouble concentrating on things, such as reading the newspaper or watching TV | ○ | ○ | ○ | ○ |
| h. Moving or speaking so slowly that other people could have noticed. Or the opposite; being so fidgety or restless that you have been moving around more than usual. | ○ | ○ | ○ | ○ |
| i. Thoughts that you would be better off dead or of hurting yourself in some way | ○ | ○ | ○ | ○ |

85. If you checked off any problem on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

◯ Not difficult at all ◯ Somewhat difficult

◯ Very difficult ◯ Extremely difficulty

| 86. Over the last 2 weeks, how often have you been bothered by the following problems? | Not at all | Several Days | More than half the days |
|---|---|---|---|
| a. Feeling nervous, anxious, or on edge | ◯ | ◯ | ◯ |
| b. Not being able to stop or control worrying | ◯ | ◯ | ◯ |
| c. Worrying too much about different things | ◯ | ◯ | ◯ |
| d. Trouble relaxing | ◯ | ◯ | ◯ |
| e. Being so restless that it is hard to sit still | ◯ | ◯ | ◯ |
| f. Becoming easily annoyed or irritable | ◯ | ◯ | ◯ |
| g. Feeling afraid as if something awful might happen | ◯ | ◯ | ◯ |

**SECTION 4– Impulsive and Sensation Seeking Scales**

| 87. For each item, indicate which response best applies to you | Describes me very well | Describes me somewhat | Does not describe me very well | Does not describe me at all |
|---|---|---|---|---|
| a. I would like to travel to places that are strange and far away | ◯ | ◯ | ◯ | ◯ |
| b. I would have enjoyed being one of the first explorers of an unknown land | ◯ | ◯ | ◯ | ◯ |
| c. It would be interesting to see a car accident happen | ◯ | ◯ | ◯ | ◯ |
| d. I like the feeling of standing next to the edge of a high place and looking down | ◯ | ◯ | ◯ | ◯ |
| e. I can see how it must be exciting to be in a battle during a war | ◯ | ◯ | ◯ | ◯ |

| 88. For each item, indicate which response best applies to you | Rarely/Never | Occasionally | Often | Almost Always/Always |
|---|---|---|---|---|
| a. I plan tasks carefully | ○ | ○ | ○ | ○ |
| b. I do things without thinking. | ○ | ○ | ○ | ○ |
| c. I am self controlled | ○ | ○ | ○ | ○ |
| d. I concentrate easily | ○ | ○ | ○ | ○ |
| e. I am a careful thinker | ○ | ○ | ○ | ○ |

**SECTION 5– Cultural Identity Scale**

| 89. For each item, indicate which response best applies to you | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| a. I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs | ○ | ○ | ○ | ○ | ○ |
| b. I have a strong sense of belonging to my own ethnic group | ○ | ○ | ○ | ○ | ○ |
| c. I understand pretty well what my ethnic group membership means to me | ○ | ○ | ○ | ○ | ○ |
| d. I have often done things that will help me understand my ethnic background better | ○ | ○ | ○ | ○ | ○ |
| e. I have often talked to other people in order to learn more about my ethnic group | ○ | ○ | ○ | ○ | ○ |
| f. I fell a strong attachment towards my own ethnic group | ○ | ○ | ○ | ○ | ○ |

*Thank you for your time and participation!*

**Appendix D: Resources**

# Resources

If you would like information about your gambling habits or those of a friend or you would like to locate resources that would be helpful to emerging adults experiencing gambling problems (or their loved ones), contact the **Gambling: help and referral** hotline.

**1-800-SOS-JEUX (461-0140)** (everywhere in Quebec)
**514-527-0140** (Greater Montreal area)
**www.jeu-aidereference.qc.ca/www/homepage_en.asp**

This anonymous bilingual helpline is strictly confidential and available free of charge 24 hours a day, seven days a week. The purpose of this service is to lend an attentive ear and provide useful information about curbing gambling addiction and the resources available in the province of Quebec.

The following websites may help you in your prevention and awareness efforts:

**www.youthgambling.com**
**www.misesurtoi.ca/en/**
**www.responsiblegambling.org/en/index.cfm**
**www.ncpgambling.org**
**www.ciusss-centresudmtl.gouv.qc.ca**
**www.maisonjeanlapointe.com** (available in French only)
**www.toxquebec.com** (available in French only)
**www.legrandchemin.qc.ca** (available in French only)