PROBLEM GAMBLING, GENERAL STRAIN THEORY AND GENDER

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ABSTRACT

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The prevalence of problem gambling has increased in the late 20th Century. Prior research has identified a host of factors that increase the likelihood that an individual will become a problem gambler, most of which would be identified by criminologists as "strains" under the framework of General Strain Theory (GST). Yet, GST has not been widely used as a possible explanation for why people become problem gamblers. In addition, there has been no examination of how gender *interacts* with those variables to affect problem gambling. In this dissertation, I use propositions from General Strain Theory to determine if it provides a framework for understanding why people become problem gamblers and whether gender is a moderating factor in this relationship. Secondary analysis of data collected from the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) study is analyzed to assess types of non-gambling strains, their relationship to problem gambling, and the role gender plays in this relationship. Findings demonstrate that non-gambling strains play a minor role in why people become problem gamblers. More relevant factors include having a non-substance behavioral problem and experiencing strain from a spouse/partner who is a problem gambler. Gender was found to have a strong direct effect on problem gambling (with men more likely to be problem gamblers than women), but few moderating effects were found, with one exception—men were more likely be problem gamblers than women if they experienced strain from their spouse/partner's gambling behavior.

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KEY TO ABBREVIATIONS

APA	American Psychiatric Association
BGPS	Baseline General Population Survey
BOPS	Baseline Online Panel Survey
CPGI	Canadian Problem Gambling Index
DSM	Diagnostic and Statistical Manual of Mental Disorders
GST	General Strain Theory
NODS	NORC Diagnostic Screen for Gambling Problems
PPGM	Problem and Pathological Gambling Measure
SEIGMA	Social and Economic Impacts of Gambling in Massachusetts
SOGS	South Oaks Gambling Screen

CHAPTER 1:

Introduction

Legalized gambling grew substantially throughout the United States in the late 20th Century (Clark & Walker, 2009; National Opinion Research Center, 1999; Walker, 2007; Welte, Barnes, Tidwell, Hoffman & Wieczorek, 2014). This occurred as the result of state funding shortfalls, which allowed the proliferation of casinos, lotteries, and other types of gambling to spread thereby increasing state revenue (National Opinion Research Center; 1999; Volberg, 1994). Easier access to gambling increased gambling prevalence during the late twentieth century, from 68% in 1975 to 86% in 1999 (Korn & Shaffer, 2002).

Broad legalization of gambling throughout the country resulted in increased negative consequences related to gambling (American Psychiatric Association, 2013; Clark & Walker, 2009; Crofts, 2003). One such consequence is a possible growing addiction to gambling, referred to medically as *gambling disorder* but more commonly called "problem gambling" (American Psychiatric Association, 2013; Welte et al., 2014). Problem gambling results in persistent and recurrent maladaptive behavior that may disrupt all aspects of an individual's life, including personal, family, and/or vocational pursuits. With at least 2% of the American adult population experiencing problem gambling and the rapid expansion of gambling opportunities throughout the United States, problem gambling has negative implications for those suffering with the disorder as well as society as a whole (Petry et al., 2005; Shaffer, Hall, & Vander Bilt, 1999). Specifically, problem gambling is associated with many negative financial, relationship, legal and social concerns for individuals, but also impacts society negatively through increased rates of gambling-motivated crime (Adolphe, Khatib, Gainsbury & Blaszczynski, 2018; Banks, 2017;

Binde, 2016; Blaszczynski, McConaghy, & Frankova, 1989; Zorland, Mooss, & Perkins, 2008). Unlike other forms of addiction, however, problem gambling is understudied.

Gender is an important factor in understanding the effects and prevalence of problem gambling (Afifi, Cox, Martens, Sareen, & Enns, 2010; Crisp et al., 2000; Hing, Russell, Tolchard, & Nower, 2016; Nelson, LaPlante, LaBrie, & Shaffer, 2006). Specifically, women may start gambling and become problem gamblers for different reasons than men (Blanco, Hasin, Petry, Stinson & Grant, 2006; Sacco, Torres, Cunningham-Williams, Woods & Unick, 2011; Weatherly & Cookman, 2014). In addition, women have been characterized as primarily "escape" gamblers, gambling to hide from problems; whereas men have been described as "action" gamblers who gamble to boost adrenaline (Blanco, Hasin, Petry, Stinson & Grant, 2006; Sacco, Torres, Cunningham-Williams, Woods & Unick, 2011; Weatherly & Cookman, 2014). Based on these characterizations, the impact of strain on problem gambling may differ for women and men in that strain may represent a larger reason women gamble and potentially become problem gamblers than men.

Although gambling disorder is strongly related to criminal behavior, there has been little criminological theory applied to this issue. One theory that may provide a good fit is General Strain Theory (GST), given its prior use to explain other forms of addiction (Baron, 2004; Ford & Schroeder 2008, Piquero, Fox, Piquero, Capowich & Mazerolle, 2010). GST posits that addiction may be due to negative emotions caused by certain types of strain (Agnew, 1992). There are three primary causes of strain: (1) the failure to achieve positively valued goals, (2) the removal of positively valued stimuli, and (3) exposure to negatively valued strain, each of which may lead to anger and other negative emotions (Agnew, 1992). Such emotions, coupled with a lack of legal coping mechanisms, leads to deviant and potentially criminal behavior. GST has

also been used to study gender differences in offending (Broidy & Agnew, 1997; De Coster & Zito, 2010). Women have been reported to experience different types of strains than men, and to react differently in response to strain (Broidy & Agnew, 1997). For example, in their study within a middle school, De Coster and Zito (2010) found that the combination of anger and depression in response to stress, helped explain why girls were less delinquent than boys, where depression aggravated anger in boys, but lessened the impact of anger in girls.

This dissertation will apply GST as a potential explanation for problem gambling and examine the role of gender as a moderating factor. To examine these issues, I will conduct secondary analysis of data collected in the Baseline General Populations Survey and the Baseline Online Panel Survey from the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) study (SEIGMA, 2020). The SEIGMA study assessed gambling behavior of the general public, motivations for gambling, prevalence of problem gambling (gambling disorder), social and health impacts of gambling, comorbidities with problem gambling, and general demographic backgrounds of the participants (SEIGMA, 2020). These data provide a unique opportunity to examine specific types of strains and their relationship to Gambling Disorder, as few studies of gambling have been this comprehensive. Of the 14,569 total participants, 5,852 were identified as participating in some form of gambling at least monthly within the preceding year, and 446 were scored on the assessment as having a gambling problem (Williams, Pekow, Volberg, Stanek, Zorn, & Houpt, 2017).

This study furthers existing understanding of the relationship between General Strain Theory (GST) and problem gambling, and the role gender plays in this relationship. Additional research is needed, as only four prior studies specifically studied this relationship (Cheung, 2015; Eitle & Taylor, 2010; Greco & Curci, 2016; Kabiri, Shadmanfaat, Winterdyk, Smith, &

O'Dwyer, 2020). This is only the second study to examine this issue with a population from the United States, and the first to study gender as a moderator.

Specifically, this study attempts to answer two main research questions:

(1) Do concepts taken from General Strain Theory provide an adequate explanation for problem gambling among those who gamble regularly?

(2) Does gender moderate the relationship between strain and problem gambling, and if so, how?

The dissertation will proceed as follows: Chapter 2 reviews the literature surrounding research on problem gambling and general strain theory, including discussion of findings on the moderating effects of gender (or lack thereof). In Chapter 3, I describe the SEIGMA data set, including descriptive statistics on the sample and relevant variable descriptions and codings. In addition, I provide insight into the statistical methods that will be used to analyze the data. Chapter 4 contains the results of statistical analysis, including an investigation into how different types of strain may differentially impact problem gambling. I also provide subgroup analysis to determine whether these relationships differ by gender. Finally, in Chapter 5 I summarize my findings, and provide recommendations for how my findings can be used to impact policy. I end the chapter by discussing the limitations of my study as well as suggestions for future research.

CHAPTER 2:

Problem Gambling, Gender and General Strain Theory

In this chapter, I review prior research on problem gambling and General Strain Theory (GST). First, I explore concepts related to problem gambling. Second, I introduce relevant literature related to problem gambling and gender, and present research related to GST. Finally, I propose several hypotheses to be tested using the SEIGMA data to determine whether GST can help explain problem gambling and how gender does (or does not) moderate these relationships.

Understanding Problem Gambling

Legalized gambling in the United States was once something that was limited in scope, with legal gambling primarily occurring in only two jurisdictions: Las Vegas and Atlantic City (Clark & Walker, 2009; National Opinion Research Center, 1999). Relaxed gambling laws in the late 20th Century resulted in and a massive spread of many types of legal gambling throughout the country (Clark & Walker, 2009; National Opinion Research Center, 1999; Walker, 2007; Welte et al., 2014; Williams, Volberg & Stevens, 2012). While some states had earlier legalized some types of gambling, such as horse racing, bingo and raffles, the spread of casino and lottery and other types of legalized gambling in most states was primarily due to state funding shortfalls resulting in new state revenue from gambling (National Opinion Research Center, 1999; Welte at al., 2014). The advent of the Internet also allowed for new forms of legal and illegal gambling to occur from the comfort of one's private computer or mobile device. This accessibility of gambling in multiple forms and avenues resulted in an adult gambling prevalence increase from 68% in 1975 to 86% in 1999 (National Opinion Research Center, 1999). Since the late 90's, gambling prevalence has for the most part remained steady, yet it remains a popular leisure activity for the majority of adults within the U.S. with many people partaking in the activity

formally (such as in lotteries, casinos, racetracks and online) and informally (with friends, office sports betting, etc.) (Korn & Shaffer, 2002; Welte et al., 2014).

Consequently, this has led to increases in people who are addicted to gambling. There are many terms used interchangeably for gambling addiction, including problem gambling, severe problem gambling, pathological gambling, compulsive gambling, and/or gambling disorder. For the purpose of this research, I will use *problem gambling* as the primary term for gambling addiction. Problem gambling can be placed on a continuum that ranges from probable and moderate addiction to severe addiction (Greco & Curci, 2016; Toce-Gerstein, Gerstein, & Volberg, 2003). Over twenty years ago, the National Gambling Impact Study Commission estimated that approximately 15 million people in the U.S. had gambling problems (National Opinion Research Center, 1999). By 2012, 31 states had conducted studies of gambling prevalence, with findings varying drastically. Prevalence rates ranged from a low of 0.6% in Delaware to a high of 8.1% in Puerto Rico (Williams, Volberg & Stevens, 2012). Meta analyses of problem gambling studies indicate that forensic/prison populations have the highest percentage of moderate to severe problem gamblers (14.55%-17.29%), followed by college students (5.05%-10.03%), adolescents (3.38%-9.45%), and adults (1.71%-4.15%) (Binn-Pike et al., 2006; Nowak & Aloe, 2014; Shaffer et al., 1999; Shaffer & Hall, 2001).

There are many personal, familial, and societal problems associated with gambling addictions. Problem gamblers often face problems in relationships, physical and mental health, employment, school, financial difficulties, and legal troubles (Eby et al., 2015; Dowling et al., 2016; Latvala, Lintonen & Konu, 2019; Kalischuk, Nowatzki, Cardwell, Klein, & Solowoniuk, 2007; Wan, 2012; Raisamo, Halme, Murto, & Lintonen, 2013). It is estimated that individual problem gamblers affect the lives of between 10 and 17 individuals, primarily within the family

and work environments (Kalischuk et al., 2007). Issues within the family include high divorce rates, child neglect, child abuse, family dysfunction, and a possible increase in intimate partner violence (Dowling et al., 2016; Kalishuk et al., 2007). The effects of these problems can escalate to the point that problem gamblers become suicidal or so desperate for money that they commit an acquisitional crime (Banks, 2017; Moghaddam, Yoon, Dickerson, Kim & Westermeyer, 2015; Nowak & Aloe, 2014). Approximately twenty percent of problem gamblers will attempt suicide in their lifetime, a rate that is about three and a half times more than the general population (Moghaddam et al., 2015; Newman & Thompson, 2007; Thon et al., 2014). Financial crimes by problem gamblers primarily to obtain money to gamble and/or pay off gambling-related crimes cost the U.S. between $32.4 and $53.8 billion dollars per year (Nowak & Aloe, 2014).

Due to an increase in biological, biosocial, neurological, and psychological research concerning gambling, the American Psychiatric Association (APA) shifted its understanding of problem gambling in 2013 (American Psychiatric Association, 2013). What was previously understood as an impulse control disorder under the Diagnostic and Statistical Manual of Mental Disorders (DSM) fourth edition, is now considered a 'behavioral addiction' under the "substance abuse and addictive disorders" section of the fifth edition of the manual (American Psychiatric Association, 2013). The APA rationalized the inclusion of behavioral addictions due to similarity in experiences, clinical presentation, neurobiological evidence, and treatment indications between substance and behavioral addiction. At this time, gambling is the only behavioral addiction included in the DSM, due to convincing empirical research showing its similarity to Substance Use Disorder in clinical pattern and neural network involvement (American Psychiatric Association, 2013; Greco & Curci, 2016; Nowak & Aloe, 2014; Petry et al., 2014).

Gambling Disorder was added to this section of the DSM because of the strong empirical evidence that specifically link the behavior and brain activity to drug and alcohol addiction (American Psychiatric Association, 2013; Ellis, Allenbaugh, Hunter, & Crawford, 2015; Greco & Curci, 2016; Fauth-Buhler, Mann & Potenza, 2017; Nowak & Aloe, 2014; Petry et al., 2014). Differences have been found in the frontal cortex and middle parts of the brain between gambling addicts and non-gamblers (Ellis, Allenbaugh, Hunter, & Crawford, 2015; Fauth-Buhler et al., 2017; Nowak & Aloe, 2014; Petry et al., 2014). Part of the difference is the need for dopamine and the dopamine rush that gambling addicts receive from their addictive act (Nowak & Aloe, 2014). As with drug and alcohol addiction, gambling addicts experience a dangerous cycle of focus on gambling and money needed for gambling at the expense of everything else in their life. This cycle is explained well by the Nevada Council on Problem Gambling (2010):

> "Problem gambling is a progressive behavioral disorder in which an individual has a psychologically uncontrollable preoccupation and urge to gamble. This results in excessive gambling, the outcome of which is the loss of time, money and self-esteem. As the stress of these consequences increases, the gambler often seeks relief through even more gambling. The gambling can progress to a point at which it compromises, disrupts, and ultimately destroys the gambler's personal life, family relationships, and vocational pursuits." (p. 1)

Supporting the conclusion that gambling addiction is similar to substance addictions, drugs that have been found to help drug and alcohol addicts have been similarly successful at helping problem gamblers, and withdrawal symptoms have also been found to be similar (Nowak & Aloe, 2014). Unlike drug and alcohol addiction, however, gambling addiction is understudied and not as well understood by health care providers.

Not only is gambling addiction similar to substance addiction biologically, but they are also likely to appear simultaneously in individuals, which is known as *comorbidity* (Cowlishaw, Merkouris, Chapman, & Radermacher, 2014; Fauth-Buhler et al., 2017; Gant & Chamberlain, 2020; Kessler et al., 2008; Potenza, 2017; Rash, Weinstock, & Van Patten, 2016; Welte et al., 2001). Approximately one-quarter of problem gamblers have a dependence on alcohol, and around 17% of problem gamblers use illicit drugs (Welte et al., 2001). Substance abuse issues are approximately four to seven times higher for problem gamblers when compared with non-problem gamblers and recreational gamblers (Kessler et al. 2008; Potenza, 20017). It is believed that the comorbidity of substance use and gambling drive each other, and for some individuals engaging in one behavior leads to the desire to engage in the other (Grant & Chamberlain, 2020). Studies on twins show that genetics and the environment may contribute to both problems simultaneously (Potenza, 2017). This relationship is important as a prior study found that General Strain Theory could help explain substance use and gambling addiction (Greco & Curci, 2017).

There are several available assessments to screen for problem gambling. These include the South Oaks Gambling Screen (SOGS), the Canadian Problem Gambling Index (CPGI), the NORC Diagnostic Screen for Gambling Problems (NODS), the Problem and Pathological Gambling Measure (PPGM), use of the DSM diagnosis criteria, among other available tools (National Center for Problem Gambling; Williams & Volberg, 2014). Assessments of problem gambling generally result in a continuum of the severity of gambling behavior (Abbott & Volberg, 2006; Caler, Garcia, & Nower, 2016; Holtgraves, 2008; Williams & Volberg, 2010; Williams & Volberg, 2014). Depending on the measure utilized, the continuum includes several levels that generally range from non-gambler or recreational gambler, to more severe behaviors

typically labeled as pathological or disordered gambling. Studies of the prevalence of problem gambling have used several different instruments, the best of which ensure high response rates, minimal sampling bias, low response distortion, and low false positives/negatives (Williams & Volberg, 2010; Williams & Volberg, 2014). The PPGM has most recently been found to have superior performance in identifying and classifying problem gamblers (Williams & Volberg, 2014).

Problem Gambling and Gender[1]

In 1992, Mark and Lesieur wrote a strong commentary remarking that there was a strong need to better understand the gambling behavior and addiction of women, as nearly all studies to date had only collected data from men. Since that time, research on problem gambling has increasingly focused on the behavior of women and included gender as an explanatory variable. Some of these studies focus specifically on gender differences among problem gamblers that are seeking treatment (Echeburua, Gonzalez-Ortega, de Corral, & Polo-Lopez, 2011; Granero, et al., 2009; Potenza et al., 2001) or study only women's gambling (Boughton & Falenchuk, 2007; Holdsworth, Nuske, & Breen, 2013; McCarthy et al., 2018; Nuske, Holdsworth & Breen, 2015; Schull, 2002). There has also been a growth in research examining gender and gambling outside the U.S., such as Canada (Afifi et al., 2010; Faregh & Derevensky, 2013); Sweden (Abbott, Romild, & Volberg, 2018), France (Bonnaire, Kovess-Masfety, Guignard, du Roscoat, & Beck, 2017), and Australia (Nuske, Holdworth & Breen, 2015). There have additionally been systematic reviews of research on gender and gambling behavior and/or problem gambling (Holdworth, Nuske & Breen, 2012; Merkouris, Thomas, Shandley, Rodda, Oldenhof, &

[1] Most studies on problem gambling that include gender code it as binary, including the current data from the SEIGMA study. The author considers gender more nuanced, although the continuum of gender identity is not possible in this study. Therefore, gender is classified in this study as "men" and "women."

Dowling, 2016). Despite the growth of research exploring various aspects of women's gambling behaviors, few studies have included a theoretical understanding of problem gambling with a focus on gender.

The need to include gender in the study of problem gambling is due, in part, to the expansion of legalized gambling throughout the U.S. which resulted in a larger percentage of women becoming frequent and problem gamblers (LaPlante, Nelson, LaBrie, & Shaffer, 2005; LaPlante et al., 2006; McCarthy et al., 2019; Volberg, 1994; Volberg, 2003). Rates of problem gambling among women are increasing more rapidly than among men (McCarthy et al., 2018). Research concerning problem gambling and gender suggest that while women tend to start gambling later in life they may advance to problem gambling faster than men (Afifi, Cox, Martens, Sareen, & Enns, 2010; Crisp et al., 2000; Hing, Russell, Tolchard, & Nower, 2016; Nelson, LaPlante, LaBrie, & Shaffer, 2006).

There are several important differences between women and men that have been found based on gender and problem gambling. For example, female problem gamblers may gamble for different reasons, as women are more likely than men to gamble in order to "escape" problems in their life (Blanco, Hasin, Petry, Stinson & Grant, 2006; Holdworth, Nuske, & Breen, 2013; Sacco, Torres, Cunningham-Williams, Woods & Unick, 2011; Weatherly & Cookman, 2014; Schull, 2002), such as depression and similar mood disorders, loneliness, boredom and stress (Blanco et al., 2006; Hing et al., 2016; Sacco et al., 2011). As stated by Hing et al. (2016), "there is strong evidence… [that] escape from negative emotions and problems [is] a central motivator for female problem gamblers" (p. 513). What leads to this need to escape may be rooted in trauma the gamblers experienced in childhood (Weatherly & Cookman, 2014). Women are also at the same level or more likely than men to experience comorbidities and consequences from

problem gambling than men; this is especially true for women of color (Holdworth et al., 2013; McCarthy et al., 2019; Schull, 2002). Such consequences include comorbid physical and mental health issues, and substance abuse (McCarthy et al., 2019). There are other important differences between male and female gamblers that warrant the inclusion of gender. For example, demographically, women gamblers are more likely to be married or never married (rather than separated or divorced), have lower educational attainment, and have lower annual income than male gamblers (Afifi et al., 2010; Crisp et al., 2000; Nelson, et al., 2006; Potenza et al., 2002). Some believe that gender may be a proxy for some psychological factors that lead to gambling behaviors and addiction (Nelson et al., 2006), and others suggest that gender differences exist in comorbidities as related to problem gambling (Grant, Odlaug, & Mooney, 2012).

A subset of the SEIGMA data was recently used to study the differences between men and women based on gambling behaviors (Venne, Mazar, & Volberg, 2019). Their study specifically examined differences in gender based on gambling severity (non-gamblers, recreational, at-risk, problem/pathological gamblers). The study did not examine specific strain variables and their relationship with problem gambling and only used a portion of the data - the Baseline General Population Survey but not the Baseline Online Panel Survey (both surveys are explained in the data and methods section below). Venne et al.'s (2019) findings are helpful in establishing that some of the variables in the SEIGMA study relate to problem gambling and deserve further examination.

While gender has been an increased focus of studies on problem gambling, a review of the existing literature found that many holes still exist in understanding gender differences in gambling addiction (Holdworth, Nuske, & Breen, 2013; McCarthy et al., 2019). In addition, the differences that have been identified to date regarding men's and women's patterns in gambling

behaviors suggest that men and women should be studied separately; not only to examine differences in gambling behavior but also evaluate how different factors (such as strain) may provide different explanations based on gender. This dissertation attempts to fill some of these gaps by examining specific types of strain and their relationship with problem gambling using a theoretical approach. Based on the prior research detailed above, GST may be a good way to explain some of the suggested gender differences in problem gambling.

General Strain Theory and Problem Gambling

Strain theories were developed from the general belief that people may experience different types of strain, which can then lead to crime (Agnew 1992). The earliest forms of strain theories (known as Classical strain theories) focused on how an individual's inability to secure financial or social status through legal avenues may lead to criminal activity in order to achieve such goals (Agnew, Cullen, Burton, Evans, & Dunaway, 1996; Merton, 1938; Cloward & Ohlin, 1960). While extremely popular in the field of criminology for many years, tests of these theories indicated they did not adequately explain all forms of crime, especially criminal activity among the middle-class (Agnew et al., 1996; Tittle & Meier, 1990). Additionally, most studies on aspirational and expectation disfunction, the relationship between expectation for success and crime, or crime and measures of stratification had mixed results, most often finding no relationship when controlling for relevant variables (Agnew et al., 1996). Agnew et al. (1996) found, however, that including a measure of strain, such as anger or frustration, resulted in better utility of strain theory.

General Strain Theory (GST) was created as an adaption to Classical Strain by Robert Agnew (1992), offering new conceptualizations and negative emotions in the effects of strain. Agnew's (1992) main strategy was to broaden Merton's (1938) concepts of strain from blocked

aspirations and expectations to include alternative sources of strain and stress (Agnew, 1992; Agnew & White, 1992). In his revision of strain, Agnew (1992) identified three forms of strain: (1) the failure to achieve goals, (2) the removal of positively valued stimuli, and (3) the exposure to negatively valued stimuli. These additional components to strain theory made the theory more applicable to deviance and crime among diverse populations, including women and the middle-class. Agnew's revised strain theory maintained the "failure to achieve goals" from Merton's (1938) original conceptualization of strain. Agnew (1992) extended the understanding to goals beyond economic and social status. He, instead, defines strain as a disconnection between the aspirations and actual achievements of an individual. These goals are those that are meaningful to the individual and may differ between individuals. Therefore, sources of strain can range in degree and type (Agnew, 1992; Baron & Hartnagel, 1997; Ford & Schroeder, 2009). This allowed for greater possibility of what the causes of strain may be and why people may resort to criminal activity. GST also includes negative affective states as the result of strain which may lead individuals into deviant behaviors. Emotions such as anger, disappointment, fear, and rejection can all occur as a result of strain. Agnew (1992) also added three subtypes of strain that people may fail to achieve: (1) blockage between aspirations and expectations; (2) gap between expectations and actual achievements; and (3) confrontation with negative stimuli. The introduction of the two new concepts—removal of positive stimuli and exposure to negatively valued stimuli—sets Agnew's (1992) theory apart from classical strain. This theory also allows for examining the cumulative effect of multiple forms of strain, rather than testing just one strain and controlling for all others. Therefore, composite scales, even when there may be an interactive effect, using GST are appropriate.

Empirical support for GST has generally proven it to be a valid theory for understanding deviance, including addiction, and crime. Research by Broidy (2001) supported each of GST's three sources of strain and that negative emotions were common for those who failed to achieve goals or faced stressful life events. Paternoster and Mazerolle (1994) compared social control theory and GST and found that strain could assist in understanding delinquent behavior. GST has also been shown to support understanding of violent crime (Baron, 2004), juvenile delinquency (Agnew & White, 1992; Cheung and Cheung, 2010; De Coster & Zito, 2010), stalking (Ngo & Paternoster, 2013), and self-harm (Hay & Meldrum, 2010). Additionally, there has been some research showing that GST is effective in understanding other types of addictive behaviors such as prescription stimulants, tobacco, alcohol, and marijuana as well as eating disorders (Baron, 2004; Ford & Schroeder 2008; Preston, 2004; Piquero, Fox, Piquero, Capowich & Mazerolle, 2010). Based on these empirical assessments of GST, it seems suitable to a wide variety of deviant behaviors, including problem gambling.

While not specifically using GST in their research, some studies have found that the concepts embedded in GST are related to gambling behavior. For example, experiencing negative life events and/or stress may increase gambling behavior (Aymami et al., 2014; Bergevin, Gupta, Derevensky & Kaufman, 2006; Elman, Tschibelu, & Borsook, 2010; Felsher, Derevensky, & Gupta, 2010; Kaufman, Derevensky & Gupta, 2002; Korman, Collins, Littman-Sharp, Skinner, McMain & Mercado, 2008; Maniaci, Picone, van Holst, Bolloni, Scardina & Cannizzaro, 2016; McCormick, Delfabbro, & Denson, 2012; Santaella, Cerda, Koenen, Kim, & Martins, 2013; Taber, McCormick, Adkins, & Ramirez, 1987). Childhood maltreatment and abuse has been linked with pathological gambling (Felsher et al., 2010; Santaella et al., 2013). Similarly, trauma and daily stressors experienced by adults are strongly correlated with gambling

problems (Elman et al., 2010; Kaufman et al., 2002; Tabor et al., 1987). Likewise, gambling severity has been linked to stress and negative life events occurring in childhood and adolescence (Bergevin et al., 2006; McCormick et al., 2012), and anger has been connected to severity of gambling behavior (Aymami et al., 2014; Korman et al., 2008; Maniaci et al., 2016).

General Strain Theory (GST) has been included in prior research to explain some aspects of problem gambling (Cheung, 2015; Eitle & Taylor, 2010; Greco & Curci, 2016; Tulloch, Browne, Hing, & Rockloff, 2020). Only four published studies have specifically applied GST to gambling behavior. Using a sample of 2,248 participants from 262 families (where the primary recruitment was students attending a psychology course in Italy), Greco and Curci (2016) found a relationship between strain and both gambling and substance use. Eitle and Taylor (2010) determined that recent stressful life events could help predict problem gambling in young adult male participants. Cheung (2015) studied whether strain from couple dynamics could predict gambling problems among 1,620 married couples in China. This study found that strain experienced by a male partner could predict both his and his wife's likelihood of developing into problem gambling. In contrast, strain by the female partner could predict her likelihood of developing a gambling problem, however there was no association with her husband's gambling behavior. A recent study by Kabiri et al. (2020) used a mediational model of GST to examine illegal sports gambling in Iran through a survey of 392 known gamblers (non-probability convenience sample). While the authors did not specifically examine problem gambling (they studied participation in *illegal* gambling), they found a relationship between GST and gambling in that financial strain and control deficit could help explain participation in illegal sports gambling. While not specifically examining GST in relation to an individual's problem gambling, Tulloch et al. (2020) recently examined data from a general population sample of

15,475 Australian adults and found that GST could help explain the relationship between negative behaviors (such as addictions and criminal behavior) of problem gambler's family members.

This dissertation will be one of the only studies that examines the relationship between strain and problem gambling using a general population data source in the United States, and one of the first to examine whether and how gender moderates the relationship between GST and problem gambling. The types of strain tested primarily focus on one of the three types of strain, exposure to negative valued stimuli. Based on the likely relevant concepts from prior research and those contained in GST, I will be testing the following hypotheses in this analysis, generated from the two main research questions provided in Chapter 1:

- **H1:** The cumulative effect of negative strain will be related to problem gambling.
    - Expected direction: strain will increase problem gambling.
- **H2:** Comorbidity with drug or alcohol addiction in past year will be related to problem gambling.
    - Expected direction: drug/alcohol addiction will increase problem gambling.
- **H3:** Comorbidity with another behavioral problem (not drugs/alcohol) in past year will be related to problem gambling.
    - Expected direction: behavioral problem will increase problem gambling.
- **H4:** Strain from the perceived belief that a friend or family member gambles too much will be related to problem gambling.
    - Expected direction: strain from friend or family member's problem gambling will increase problem gambling.
- **H5:** Gender will moderate the relationship between strain and problem gambling.

- Expected finding: strain will have a stronger relationship with problem gambling for women compared to men.

CHAPTER 3:

Data and Methods

The SEIGMA Study

The data analyzed in this dissertation consist of the Baseline General Population Survey (BGPS) and the Baseline Online Panel Survey (BOPS) from the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) study. The SEIGMA study assessed gambling behavior of the general public, motivations for gambling, prevalence of problem gambling (gambling disorder), social and health impacts of gambling, comorbidities with problem gambling, and general demographic backgrounds of the participants.

Data collection for the BGPS was performed by NORC at the University of Chicago, under contract to the University of Massachusetts Amherst School of Public Health and Health Sciences, from September 2013 through May 2014. With a response rate of 36.6%, the BGPS used multi-mode (telephone (8%), online (40%), and paper/pencil (52%)) address-based sampling, where the adult with the most recent birthday at the address was selected as the survey respondent. Address-based sampling is a random sample from a listing of all residential addresses in Massachusetts.

Data collection for the BOPS was conducted by Ipsos Public Affairs from October 2013 to March 2014 utilizing a stratified sample (based on the U.S. Census) of Massachusetts by age, gender and region. Ipsos is a research corporation which maintains a panel of individuals throughout the country who agree to participate in research studies through the internet. Ipsos continued to reach additional potential participants in the state until at least 5,000 surveys were completed. In order to accomplish this, Ipsos supplemented their database of potential participants with additional vendor databases. The SEIGMA study represents one of few recent

available population-based data assessing problem gambling and gambling behaviors in the United States.

According to SEIGMA researchers, the BOPS survey was included in the study design in order to have a larger sample of regular gamblers than would be obtained with address-based sampling only (Volberg, 2020). Participants in paid online surveys have been found to have a higher level of gambling prevalence than the general population (Williams et al., 2016). The problem gambling prevalence in the BOPS was 6.3% (unweighted) compared to 1.3% in the BGPS (Williams et al., 2016). The key difference between the BGPS and BOPS was that participants in the BOPS were self-selected. Therefore, while the addition of BOPS to the BGPS data allows for better understanding of the effects of social and economic impacts of problem gambling, each used different sampling strategies to collect data from respondents.

The BOPS and BGPS utilized the same questionnaire (Williams et al., 2016). The primary objective of the study was to assess the prevalence of problem gambling prior to the expansion of casinos statewide. The survey went through several revisions and was pre-tested before use in this study. The BGPS received IRB approval from University of Massachusetts and NORC at University of Chicago. The BOPS received IRB approval from the University of Massachusetts. The BGPS contains a representative sample of 9,578 individuals, and the BOPS includes an additional 5,046 participants (all 18 years and older).

The BGPS and BOPS survey data were combined, resulting in a total of 14,624 participants. For the purpose of this study, the sample includes only those individuals who gambled regularly in the past year, defined as gambling at least monthly. While problem gambling was not assessed for the majority of the original study participants, it was assessed for all individuals who stated that they gambled at least monthly, totaling 5,852 respondents. The

focus on those participants who gambled at least monthly allowed for the examination of how strain may affect regular gamblers, focusing on how strain is related to problem gambling. Appendix A contains a diagram explaining the process for inclusion/elimination of participants for this study.

There are several advantages to using the SEIGMA data for this dissertation. First, the SEIGMA study is one the largest gambling-related data sources collected within the past decade. Second, it included survey questions relevant to the hypotheses being tested in this dissertation. Finally, the data were collected by experts in survey analysis using validated sampling strategies, and the results have been deemed valid and reliable (SEIGMA, 2020). Table 1 provides demographic information for each study sample. There were slight differences in demographics between the two samples. The mean age of BGPS participants was approximately 8 years older than BOPS participants, the BGPS had a slightly higher percentage of women (59% to 53%), and were more likely to be married, employed and college educated. BOPS participants were slightly more likely to be White. All demographics were made into dummy variables, allowing for single regression analysis.

Table 1:

Descriptive Statistics on the Samples, Control, Dependent, and Independent Variables

	BGPS	BOPS	Gambled at Least Monthly (Combined BGPS/BOPS)
	N=9,578	N=5,046	N=5,852
Gambled monthly in past 12 months	35.0% (N=3,355)	49.5% (N=2,497)	
Mean age	55.2	47.0	52.6
Women	59.1%	52.9%	46.4%
Married	52.8%	44.2%	50.2%
FT Employed	57.3%	54.9%	57.6%
White (non-Hisp.)	81.7%	85.2%	85.8%
College Educ	53.6%	39.7%	39.1%
Problem gambler on PPGM	1.3% (N=129)	6.3% (N=317)	7.6% (N=446)
Mental health issues			20.3% (N=1,188)
High levels of stress			34.9% (N=2,043)
Poor general health			15.9% (N=932)
Unhappiness			11.2% (N=655)
Suicidal ideation			3.1% (N=184)
Unhappy Childhood			7.9% (N=463)
Comorbidity with alcohol/ drugs			1.4% (N=84)
Comorbidity with another behavior			15.4% N=899
Perceived Problem Gambling of a Family Member/Friend Level of Strain			
0 (N/A)			81.1% (N=4,747)
1 (low strain)			7.3% (N=429)
2			2.1% (N=123)
3			1.4% (N=80)
4			1.5% (N=90)
5			1.7% (N=99)
6			1.1% (N=64)
7			1.2% (N=73)
8			0.8% (N=46)
9			0.5% (N=27)
10 (high strain)			1.3% (N=74)
Relationship to Perceived Problem Gambler			
Spouse/partner			1.9% (N=113)
Parent/step-parent			2.1% (N=123)
Child/step-child			0.8% (N=46)
Other family			5.7% (N=334)
Friend			6.0% (N=350)
Other			2.9% (N=167)
Not applicable			80.6% (N=4,719)

Dependent Variable

The SEIGMA study assessed problem gambling using two validated assessment tools: the Problem and Pathological Gambling Measure (PPGM) and the Problem Gambling Severity Index (PGSI). For this dissertation, results from the PPGM are utilized. Williams and Volberg (2010; 2014) developed the PPGM to address weaknesses in other available measures.

The PPGM assessed gamblers using 14 items broken into three sections (problems, impaired control and other issues) and scored gamblers into five potential categories: non-gambler, recreational gambler, at-risk gambler, problem gambler, or pathological gambler (Williams & Volberg, 2010). In the PPGM, questions in the "problems" category include seven items about consequences of gambling, such as "Has your involvement in gambling caused significant financial concerns for you or someone close to you in the past 12 months?" (Williams & Volberg, 2010). "Impaired control" includes four questions examining gambling behavior, such as gambling frequency and ability to stop gambling if desired. "Other issues" is a category comprised of three questions examining how gambling affects the individual neurologically, such as preoccupation with gambling, having feelings of irritability or cravings, and the need to gamble larger amounts of money to achieve a state of excitement. Scoring the PPGM into the five categories includes several criteria (Williams & Volberg, 2010). As individuals move up the continuum toward pathological gambler, they have an increased likelihood of experiencing gambling-related harms (Ledgerwood, Weinstock, Morasco, & Petry, 2007; Toce-Gerstein et al., 2003; Zorland, Mooss, & Perkins, 2008). The PPGM survey items used and its scoring criteria to assess problem gambling are contained in Appendix B.

Utilizing results from the PPGM assessment, those who score as a problem gambler or pathological gambler were considered a "problem gambler" for the purpose of this study, as

intended by the PPGM (Williams & Volberg, 2010; 2015). Based on the PPGM assessment, those who fall into these categories are most likely to face gambling related harms, therefore, allowing for the best assessment of the potential relationship between strain and problem gambling. Frequency and means for the PPGM are included in Table 1. Relevant to this study, 7.6% of the participants who gambled at least monthly scored on the PPGM as problem or pathological gamblers.

Independent Variables

Variables from the SEIGMA survey used to assess each of the hypotheses are contained in Table 2. Selection of these specific variables were limited by those questions in the SEIGMA study that measured non-gambling related strain. Several potential causes of strain are included in the dependent variable (PPGM), especially the types of strain potentially caused by gambling. Therefore, the independent variables focus on strains not necessarily related to gambling behavior. Relevant variables from the SEIGMA study for this dissertation include responses on the participants' level of stress, unhappiness, mental health issues, suicidal ideation, childhood happiness, general health, comorbidities, and strain from another person's perceived problem gambling. These independent variables provide a greater understanding of potential causes of strain that may result in problem gambling behavior, including possibly helping to explain the "escape" behavior of some gamblers (especially women) explored earlier in Chapter 2.

Table 2:

Hypotheses and Relevant Survey Items from the SEIGMA Survey

H1: Cumulative effect of negative strain will be related to problem gambling.	Combine negative stimuli strains (mental health issues, stress, physical health problems, low levels of happiness, suicidal ideation, & unhappy childhood) through factor analysis.
H2: Comorbidity with drug or alcohol addiction in past year will be related to problem gambling.	Have you had any problems with drugs or alcohol in the past 12 months? By this we mean difficulties in controlling their use that have led to negative consequences for you or other people.
H3: Comorbidity with another behavioral problem (not drugs/alcohol) in past year will be related to problem gambling.	Have you had problems with other behavior in the past 12 months such as overeating, sex or pornography, shopping, exercise, Internet chat lines, or other things?
H4: Strain from the perceived belief that a friend or family member gambles too much will be related to problem gambling.	Overall, on a scale from 1 to 10 how much has this person's gambling affected you negatively during the last 12 months?
H5: Gender will moderate the relationship between strain and problem gambling.	Gender demographic.

Dummy variables were created for most of the independent variables. Mental health, suicidal ideation, and comorbidities were already binary variables in the original data and did not need recoding. Stress and happiness were originally measured as five levels (very low, low, moderate, high, and very high), but were recoded for this analysis. For stress, only those respondents who scored "high" or "very high" were considered as having high levels of stress in the past year. For the happiness variable, only those who scored "very low" or "low" were

considered to be unhappy in the past year. Childhood description was also measured using five levels originally (very happy, happy, neither happy or unhappy, unhappy, and very unhappy), and only those who scored "unhappy" or "very unhappy" were considered to have experienced an unhappy childhood. Dichotomizing most of the independent variables into defined groups does not cause a substantial decrease in measured strength, however it helps provide understandable results for a wider audience than keeping the variables ordinal (Farrington & Lowber, 2000). This is beneficial in this particular study due to the goal of examining the strength of relationship between GST and problem gambling and the broad potential audience who may be interested in the results. Dichotomizing results in this particular study is appropriate since the independent variables were not measured on a Likert scale, instead individuals may have interpreted different meanings for putting themselves within the various categories (low to high on each variable) offered. By dichotomizing the variables in this study, individual interpretations of the ordinal scales offered are less important except for those individuals that put themselves into the highest or lowest categories (depending on the variable).

Strain from the perceived problem gambling of a family member or friend was measured using a Likert scale ranging from 1-10 (with a 1 indicating a low level of strain and 10 indicating a high level of strain caused by the other person's gambling behavior). Those who did not have a family member or friend causing strain from their own gambling were given a score of 0. This variable was not made into a dummy variable, allowing for assessment as an interval variable.

As seen in Table 1, stress in the past year was the most frequently experienced strain among the respondents with 34.9% of those who gamble monthly reporting high levels of stress. Additionally, approximately 20% of respondents reported mental health issues and 16% indicated they had poor general health. Just over 10% of the respondents reported being unhappy

over the past year, with about 3% signifying suicidal ideation. About 8% of respondents also conveyed having an unhappy childhood. Comorbidity with substance use was much less frequent, with only 1.4% of the respondents indicating having difficulties with alcohol/drugs within the past year. However, over 15% reported difficulties with other behaviors (such as sex, pornography, eating or shopping). About 20% of the sample conveyed having a family member or friend that gambles too much, with the strain caused by the other person's gambling generally not causing a high level of strain. Only about 3.8% of respondents indicating the strain they experience from someone else's perceived problem gambling caused strain at a level of 7 or higher (out of 10).

Additionally, gender is used as an independent variable to assess whether gender moderates the relationship between problem gambling and strain. Approximately 46% of people reporting they gambled monthly were women, supporting prior research that women are engaging in frequent gambling at levels similar to men.

Control Variables

As discussed in the literature review, several demographic variables are related to problem gambling. There is also established literature on the differences in demographics based on the gender of problem gamblers. To assess these types of differences in this study, several demographic variables are used as control variables, specifically, age, employment status, marital status, education, and race. Frequencies for all control variables are also included in Table 1. For the participants who gambled at least monthly, the participant mean age was in the early 50's, about half of the participants were married, 39% college educated, 58% employed, and over 85% were White.

Methods

Statistical analysis was conducted using SPSS software. Analysis began with bivariate analysis to identify preliminary relationships between the independent variables and the dependent variable. Because the dependent variable in this study is binary, logistic regression was used to determine if the bivariate relationships hold after controlling for the remaining variables. Finally, subgroup analysis was conducted to determine if the impact of strain on problem gambling differs for male and female respondents.

Since Agnew (1992) encouraged researching the cumulative effect of multiple forms of strain and encouraged composite scales, the six non-gambling specific types of strain were combined through factor analysis to create a regression factor score (Hypothesis 1). All hypotheses (1-5) were tested using logistic regression. Separate regression analysis comparing men and women was completed to determine whether gender was moderating factor in understanding the relationship between problem gambling and strain and Paternoster's Z scores were calculated to determine whether any differences found based on gender were statistically significant (Hypothesis 4). ANOVA testing was conducted to explore the relationship type with problem gambling (Hypothesis 5). In Chapter 5, I review the findings from the analysis and provide tests of the hypotheses.

CHAPTER 4:

Analysis and Results

The analysis for this dissertation was conducted in four stages. I began with bivariate analysis, examining how and whether the independent variables, particularly strain and gender, are related to problem gambling. Following bivariate analysis, I estimated several logistic regression models to control for the effect of relevant independent variables and better understand the relationship between the six non-gambling specific strain variables (high stress in the past year, unhappiness in the past year, unhappy childhood, poor mental health in the past year, suicidal ideation in the past year, and poor general health in the past year) and problem gambling. I also investigated the effect of gender on problem gambling while controlling for strains and other independent variables. Next, I estimated several logistic regression models to examine the relationship between comorbidities and problem gambling as well as a separate analysis that examines the relationship between the negative strain from someone else's perceived problem gambling and problem gambling. For each set of logistic regression models, I conducted subgroup analysis to determine whether gender moderates the relationship between strain and problem gambling.

Bivariate Analysis

I begin by conducting independent-sample t-tests on all relevant demographic and strain variables to determine whether and how the problem gamblers and non-problem gamblers differed, as well as the difference between male and female respondents (Table 3). The bivariate analysis indicates that many variables differ significantly between problem gamblers and non-problem gamblers. Starting with the demographic variables, problem gamblers are younger than non-problem gamblers by about 11 years, and less likely to be college-educated or employed

full-time. Problem gamblers are more likely to be non-white compared with non-problem gamblers. There is no statistical difference between problem gamblers and non-problem gamblers regarding their marital status.

Table 3:

Bivariate Analysis of All Variables by Problem Gambling Status and Gender

	All	Non-Problem Gambler (N=5,406)	Problem Gambler (N=446)	$P^{\dagger}$	Men (N=3,104)	Women (N=2,715)	$P^{\dagger}$
Demographics							
Age	52.56	53.39	42.64	.000**	52.74	52.31	.334
White (non-Hisp.)	0.85	0.86	0.74	.000**	0.85	0.85	.900
Coll. Ed.	0.40	0.40	0.31	.000**	0.42	0.36	.000**
Married	0.59	0.58	0.60	.642	0.60	0.57	.013*
Employed	0.51	0.52	0.34	.000**	0.55	0.46	.000**
PPGM	0.08	-	-	-	0.10	0.05	.000**
Strain Variables							
High Stress	0.35	0.34	0.47	.000*	0.31	0.40	.000*
Unhappiness	0.11	0.10	0.21	.000*	0.11	0.11	.584
Unhappy Childhood	0.08	0.07	0.15	.000*	0.07	0.10	.000*
Poor Mental Health	0.21	0.19	0.45	.000*	0.19	0.24	.000*
Suicidal Ideation	0.03	0.02	0.13	.000*	0.03	0.03	.781
Poor Gen Health	0.16	0.16	0.20	.027*	0.16	0.16	.834
Alcohol/Drugs	0.01	0.01	0.03	.083	0.02	0.01	.159
Non-Substance Problem	0.15	0.14	0.55	.000**	0.15	0.16	.619
Strain from another person's gambling problem	0.69	0.55	2.32	.000**	0.63	0.76	.008*
Relationship Type***							
N/A	-	0.94	0.06		0.53	0.46	
Spouse	-	0.68	0.32		0.38	0.62	
Parent	-	0.84	0.16		0.46	0.54	
Child	-	0.85	0.15		0.44	0.57	
Other Family	-	0.87	0.13		0.47	0.53	
Friend	-	0.88	0.12		0.61	0.39	
Other	-	0.78	0.22		0.59	0.41	

*p<0.05 **p<0.01

*** Due to nature of variable, a Chi-Square was conducted to determine relationship type.

Examining the strain variables, problem gamblers report experiencing higher levels of non-gambling specific strain, including more than twice the level of unhappiness in the past year and having an unhappy childhood. The differences in strain based on poor mental health and suicidal ideation were even greater, especially for suicidal ideation, where 2% of non-problem gamblers but 13% of problem gamblers report suicidal ideation. There is no statistical difference in comorbidity with alcohol and drugs based on problem gambling status, which differs from prior research suggesting a strong relationship between these two variables. Problem gamblers, however, are approximately 2½ times more likely than non-problem gamblers to have issues with a non-substance behavior (such as exercise, gaming, internet chat, or overeating).

Finally, there is a large difference between non-problem gamblers and problem gamblers in terms of the strain they feel based on how they perceived someone else's problem gambling. While non-problem gamblers scored a mean of 0.55 on the 0-10 scale, problem gamblers reported significantly greater strain with a mean score of 2.32. A chi-square test for independence indicated a significant association between problem gambling and the type of relationship with the other person based on gender, χ^2(6, n=5,819) =.07, *p*=.000, *phi*=.07), and with a gambling problem, χ^2 (5, n=5,852) =.189, *p*=.000, *phi*=.189) (Table 3). Based on the analysis, having a spouse/partner that one perceives to gamble too much appears to be the relationship that has the strongest association with the respondent's own problem gambling. As for gender, women have higher values in all relationships, especially spouse (62% of respondents who have strain from their spouse's problem gambling were women), while men have higher values toward a friend (61%) or some other relationship with the problem gambler (59%).

Moving to the analysis broken down by gender, there are several statistically significant differences between men and women. Men in this sample of regular gamblers are more likely to

be college educated, employed full-time and married than women. There are no statistically significant differences in the respondents based on gender in terms of age or race. Men are twice as likely than women respondents to score as a problem gambler on the Problem and Pathological Gambling Measure (PPGM) (10% of men are classified as problem gamblers compared to 5% of women), which is consistent with prior research.

There are several significant relationships between gender and the strain variables, which were coded in binary 0/1 categories. Specifically, several of the non-gambling specific strains are significant by gender. Women are more likely to say they experience higher levels of stress and mental health issues in the past year and more likely to report unhappy childhoods. There are no statistically significant differences based on gender in reporting unhappiness, suicidal ideation or poor general health. In addition, men and women have equal rates of reporting alcohol or drug use, or a non-substance problem (such as overeating, sex, pornography, shopping, exercise, or internet chat lines). This analysis, however, did indicate a strong relationship between experiencing strain from another person's perceived gambling problem (reported on a 0-10 scale) and gender, with women reporting a higher level than men.

Overall, the bivariate results provide preliminary support for most the hypotheses of this dissertation, as well as the findings from prior studies. Next, I estimate a series of logistic regression equations to determine whether these relationships hold after controlling for relevant independent variables.

Regression Analysis

Baseline Models

I begin the multivariate regression models by estimating a baseline model containing only the control variables to determine the proportion of explained variation before entering the key independent variables, which are presented in Table 4. Model 1 includes only the demographic characteristics based on problem gambling status without inclusion of gender. Model 2 adds gender as an independent variable to determine whether gender increases the explanatory power of the model. Finally, Model 3 adds the six non-gambling specific strain variables. Consistent with the bivariate analysis, in Model 3 problem gamblers are more likely to be younger, nonwhite, and are less likely to be college educated. Employment is no longer related to problem gambling after controlling for all other variables, and marital status becomes significant, with problem gamblers less likely to be married than non-problem gamblers.

Table 4:

Baseline Regression Models Based on Problem Gambling Status (Logistic Regression) (N=5,238)

	Model 1: Baseline (demographics)			Model 2: (demographics + gender)			Model 3: (add strain variables)		
	B	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*
Constant	-.174	.178	.840	.153	.186	1.165	-.469*	.219	.626
Women	-	-	-	-.703**	.109	.495	-.839**	.116	.432
Age	-.034**	.003	.967	-.034**	.003	.966	-.030**	.004	.970
White (non-Hisp.)	-.427**	.123	.652	-.424*	.124	.654	-.388*	.129	.678
Coll. Ed.	-.329*	.115	.720	-.345*	.116	.708	-.250*	.121	.779
Married	-.384*	.114	.681	-.410**	.116	.664	-.360*	.120	.697
Employed	-.081	.111	.922	-.109	.112	.897	.004	.119	1.004
High Stress	-	-	-	-	-	-	.013	.121	1.013
Unhappiness	-	-	-	-	-	-	.144	.158	1.154
Unhappy Childhood	-	-	-	-	-	-	.475*	.162	1.608
Poor Mental Health	-	-	-	-	-	-	.656**	.136	1.927
Suicidal Ideation	-	-	-	-	-	-	.717**	.199	2.049
Poor Gen Health	-	-	-	-	-	-	.013	.154	1.013
Pseudo R-Square (Nagelkerke)		.086			.105			.147	

*p<0.05 **p<0.01

Adding gender in Model 2 increases the pseudo R-square in Model 1 from .086 to .105. In this regression, as shown in the bivariate analysis, the odds of women being problem gamblers are .495 lower than for men, when controlling for all the other demographic variables.

Model 3 tests the non-gambling strain variables by adding them independently. Adding the six non-gambling specific strain variables to the model increases the pseudo R-square to .147. Only three of the strain variables are significantly related to problem gambling when controlling for the other variables: unhappy childhood, poor mental health and suicidal ideation. Respondents who experienced an unhappy childhood had an odds ratio of 1.608, and poor mental

health (odds ratio = 1.927) and suicidal ideation (odds ratio = 2.049) also have significant odds ratios. Gender, however, had the highest odds ratio of 2.3[2] when controlling for the other variables, indicating that gender, not strain, may be the strongest predictor of problem gambling when including the strain variables individually.

In order to understand the relative explanatory power of the strain variables on problem gambling, a nested F test was calculated comparing Model 2 to Model 3. Comparing the two nested models, the change in R^2 is small but significant (R^2 difference = 0.042. The critical value of F at 95% probability is much lower (2.10) than the observed value of F (42.87), which means that the null hypothesis that the r-square values are equal is false. This suggests that adding the strain variables to the model significantly increase explained variation. Therefore, the strain variables contribute to understanding problem gambling.

The demographic variables remain significant after adding the strain variables. Prior to adding Model 3, Correlations, VIF and tolerance were checked to determine multicollinearity among the six non-gambling specific types of strain. All VIF values were less than 1.5, so it can be concluded that there are no issues with multicollinearity in these models.

In further understanding the impact individual strains affect problem gambling, logistic regression was performed examining the variables in Model 3, omitting gender, to see whether gender moderates the relationship between the individual strain variables and problem gambling (Model 4). The model is significant for both women and men, with pseudo R-Square of .127 for women and .146 for men, indicating the variables explain slightly more variation in the regression model for men, then for women. Six of the independent variables are significantly

[2] This value was calculated by finding the reciprocal of the odds ratio for women (1/.432). The odds ratios estimate for negative logistic regression coefficients fall between 0 and 1, but the odds ratios for positive logistic regression coefficients can fall from 1 to +∞, thus they cannot be compared directly. The reciprocal of an odds ratio between 0-1 can be directly compared to one in the 1 to +∞ range.

related to problem gambling for men, and two for women, with poor mental health the strongest predictor of problem gambling for men (odds ratio of 2.215) and suicidal ideation the strongest predictor for women (odds ratio of 3.479).

Table 5:

Logistic Regression of Problem Gambling Status with Individual Strain Variables by Gender (Logistic Regression)

	Model 4: Broken down by Gender					
	Women (N=2,430)			Men (N=2,808)		
	B	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*
Constant	-1.521**	.384	.218	-.407	.265	.666
Age	-.026**	.007	.974	-.031**	.005	.970
White (non-Hisp.)	-.353	.225	.703	-.417**	.160	.659
Coll. Ed.	-.146	.216	.864	-.290*	.147	.748
Married	-.163	.204	.850	-.462**	.148	.630
Employed	-.134	.203	.875	.076	.149	1.079
High Stress	-.099	.211	.598	.085	.149	1.089
Unhappiness	.503	.257	1.653	-.088	.202	.916
Unhappy Childhood	.479	.253	1.614	.455*	.215	1.577
Poor Mental Health	.462	.238	1.587	.795**	.166	2.215
Suicidal Ideation	1.247**	.303	3.479	.314	.266	1.368
Poor Gen Health	.014	.258	1.014	.018	.194	1.018
Pseudo R-Square (Nagelkerke)		.127			.146	

*p<0.05 **p<0.01

Since there were different non-gambling specific strains significantly related to problem gambling between men and women, I calculate Paternoster's Z scores to calculate the difference in coefficients on unhappy childhood, poor mental health and suicidal ideation between men and women. For unhappy childhood, the result was not significant (women *B*=.479, *SE*=.253; men *B*=.455, *SE*=.215; *z*=0.072) indicating that the relationship between having an unhappy childhood and problem gambling is similar for men and women. For poor mental health, there is a significant difference in its relationship between gender and problem gambling (women *B*=.462, *SE*=.238; men *B*=.795, *SE*=.166; *z*=-3.918) indicating that for men there is a stronger

relationship between having poor mental health and being a problem gambler, than for women. However, when it comes to suicidal ideation, there is also a significant difference between women and men (women *B*=1.247, *SE*=.303; men *B*=.314 *SE*=.266; *z*=2.309), however this indicates that there is a stronger relationship between suicidal ideation and problem gambling for women, than for men. Therefore, the relationship between problem gambling and certain non-gambling specific strains, in this case poor mental health and suicidal ideation, may differ based on gender (supporting Hypothesis 5). It is important to see if a cumulative strain based on a composite score is also related to problem gambling and whether gender is a moderating factor.

Non-Gambling Related Strain

In order to further understand the cumulative effect that negative strain has on problem gambling and answer Hypothesis 1, as Agnew (1992) encouraged composite scales to examine cumulative effects of strain, the six non-gambling specific strains were combined into one measure using Principal Components Analysis (Table 6). Factor analysis is appropriate to simplify the six strain variables into one dimension and confirm that they are an appropriate scale construction of non-gambling specific strain. Additionally, factor analysis has better validity and reliability over simply sum scoring the variables and it allows the researcher to weigh some items more than others (McNeish & Gordon Wolf, 2020).

Table 6:

Strain Factor Analysis Component Matrix

Poor Mental Health	0.748
Unhappiness	0.673
High stress	0.588
Suicidal Ideation	0.558
Poor General Health	0.509
Unhappy Childhood	0.423

Extraction Method: Principal Component Analysis.

While stress, poor mental health, unhappiness, suicidal ideation, and health all scored over 0.5 on the component matrix, unhappy childhood had a borderline factor loading of 0.423. I decided to keep unhappy childhood in as a source of strain, however, as it was significantly related to problem gambling in the independent sample t-tests and baseline logistic regression models. These six items were combined into one variable as a regression factor score and included in regression models in place of the six individual variables. Cronbach's Alpha was computed to check for reliability of the scale and results indicated that all items should be included in the scale (alpha value=.605 which is an acceptable level of reliability in exploratory research and alpha decreases for every variable if deleted).

Next, I estimate a logistic regression using the factor score measure of strain. The model contains the six demographic variables and the factor strain variable. The full model containing all predictors is statistically significant, indicating that the combination of independent variables explains a significant amount of variation in problem gambling (14.1% total). As shown in Table 7, six of the independent variables are statistically related to problem gambling (age, marital status, race, gender, effect of another person's gambling, and strain), with the strongest predictor remaining gender at an odds ratio of 2.288 (1/.437). The composite strain variable remained significant (odds ratio = 1.46), which indicates that respondents who are experiencing strain (as measured by the factor score) have 1.462 greater odds of being a problem gambler when controlling for the other variables in the model. Overall, the results in Table 7 indicate that gender is the strongest indicator of problem gambling compared to the other variables, but strain is also a strong predictor.

Table 7:

Logistic Regression Predicting Likelihood of Problem Gambling with Strain (N=5,238)

	Model 5: Full Model (N=5,238)			Model 6: Based on Gender					
				Women (N=2,430)			Men (N=2,808)		
	B	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*
Constant	-.119	.202	.887	-1.276	.339	.279	-.021	.246	.979
Women	-.828**	.115	.437	---	---	---	---	---	---
Age	-.032**	.004	.969	-.028**	.006	.973	-.033**	.004	.967
White	-.414*	.128	.661	-.140	.215	.869	-.295*	.145	.744
Coll. Ed.	-.252*	.120	.778	-.111	.200	.895	.068	.147	1.071
Married	-.364*	.119	.695	-.165	.202	.848	-.461*	.147	.631
Employed	-.001	.118	.999	-.366	.221	.693	-.433*	.158	.649
Strain	.380**	.043	1.462	.472**	.070	1.603	.329**	.054	1.390
Pseudo R-Square (Nagelkerke)		.141			.115			.136	

*p<0.05 **p<0.01

The next step in the analysis is to determine whether gender moderates the relationship between strain and problem gambling (Hypothesis 4). In other words, is strain related to problem gambling for both men and women? To test this hypothesis, I split the data file by gender and estimated two logistic regressions, omitting gender as an independent variable. Both models are significant, with pseudo R-squares of .115 (for women), and .136 (for men), indicating that the independent variables explain more variation in the regression model for male respondents than for female respondents. Two of the independent variables are significantly related to problem gambling for women, and five for men, with strain being the strongest predictor of problem gambling for both genders with the coefficient for women larger than for men (for women the odds ratio of 1.603 and for men the odds ratio was 1.390).

I next calculate a Paternoster's Z score to calculate the difference in coefficients for strain between men and women. The result was not significant (women B=.472, SE=.070; men B=.329, SE=.054; z=1.625) indicating that the relationship between strain and problem gambling is similar for men and women. Therefore, while female problem gamblers may be more likely to

experience strain (based on Table 7), Hypothesis 5 that gender moderates the relationship between strain and problem gambling is not supported based on the composite factor score of these six non-gambling specific strains.

Strain as Comorbidities

As discussed in Chapter 2, problem gambling may not be the only result of strain, as Atkins (2002) suggests many potential negative outcomes. One known issue with strain is the high potential for comorbidities of other addictions with problem gambling. Research suggests that problem gamblers are also likely to have an addiction to drugs and/or alcohol, but little is known as to the potential for other types of non-substance behavioral problems. The following analysis considers the relationship between problem gambling and comorbidity with substances and non-substances and tests Hypotheses 2 (comorbidity with drug or alcohol addiction in the past year is related to problem gambling) and 3 (comorbidity with another addiction (not alcohol/drugs) in the past year is related to problem gambling).

In this section, logistic regression is performed to determine whether a relationship exists between comorbidities and problem gambling, controlling for the same demographics as with non-gambling specific strain. Model 7 containing all predictors is statistically significant, indicating that 13.9% of the variation in problem gambling is explained by the independent variables. As shown in Table 8 without the strain variable included, six variables make a unique statistically significant contribution to the model (age, college education, gender, marital status, race, and non-substance problem). The strongest predictor of problem gambling is having a non-substance issue at an odds ratio of 2.928. Respondents who have a drug or alcohol addiction have over 1.4 odds of being a problem gambler when controlling for the other variables, however this is not statistically significant. Results from this regression support Hypothesis 3 that comorbidity

with an addictive behavior (not alcohol/drugs) in the past year is related to problem gambling. However, Hypothesis 2 that comorbidity with drug or alcohol addiction in the past year is related to problem gambling is not supported when gender is not considered separately.

Table 8:

Logistic Regression Predicting Likelihood of Problem Gambling with Comorbidities

	Model 7: Full Model (N=5,852)			Model 8: Based on Gender					
				Women (N=2,715)			Men (N=3,104)		
	B	*SE*	*Exp (b)*	*B*	*SE*	*Exp (b)*	*B*	*SE*	*Exp (b)*
Constant	-.376	.200	.687	-1.186**	.319	.305	-.386	.249	.679
Women	-.717**	.111	.488	---	---	---	---	---	---
Age	-.031**	.003	.969	-.029**	.006	.972	-.032**	.004	.968
White	-.351*	.126	.704	-.444*	.213	.641	-.308	.158	.735
Coll Ed	-.268*	.118	.765	-.216	.208	.806	-.282*	.143	.754
Married	-.378*	.117	.685	-.172	.195	.842	-.482*	.146	.618
Employed	-.050	.114	.951	-.225	.191	.799	.056	.144	1.057
Substance Addiction	.354	.331	1.425	1.046*	.525	2.846	.038	.425	1.039
Non-Substance Behavior	1.074**	.113	2.928	1.159**	.189	3.186	1.039**	.142	2.138
Pseudo R-Square (Nagelkerke)		.139			.111			.140	

*p<0.05; ** p<.001

I then split the data file to see whether this type of strain is moderated by gender (Model 8). The analysis is significant for both genders with pseudo r-squared for men (.14) slightly higher than for women (.11). Four of the variables are significant for women (age, race, and both types of comorbidities). While substance addiction is not significant in the bivariate analysis or full model logistic regression, it is a cause of strain for female problem gamblers with an odds ratio = 2.846. For men, four variables also are significant (age, college education, marital status, and comorbidity with a non-substance behavior). For men, substance addiction is not a predictor of problem gambling with an odds ratio =1.039. The strongest predictor of problem gambling for

both men and women is comorbidity with a non-substance behavior (women's odd ratio =3.186 and men's odd ratio =2.138).

Based on these findings, Paternoster's Z scores were calculated to see whether the difference of each of the comorbidities was significant based on gender. For comorbidity with a substance addiction, women *B*=1.159, *SE*=0.189; for men *B*=1.039, *SE*=0.142; *z*=0.508 indicating no significant difference in the means between men and women. While women problem gamblers are more likely to have a comorbidity with substance abuse, the difference based on gender is not statistically significant. For comorbidity with an addictive behavior, women *B*=1.046, *SE*=0.52; men *B*=0.038, *SE*=0.425; *z*=1.508 indicating that there is not a significant difference in the means for strain from non-substance behavior between men and women who are problem gamblers. Therefore, there appears to be a relationship between substance addiction and problem gambling for women, but not for men, and both men and women show a strong relationship with non-substance behavioral addictions.

I then tested to see whether the cumulative non-gambling strains have a relationship with the comorbidities and problem gambling, by adding the strain factor score to the logistic regression (Model 9). Adding the strain variable increases the odds ratio in most demographics and reduced the odds ratio in substance addiction and non-substance behaviors, while the R^2 increased in the full model to 0.159. The odds ratios also slightly increased, going from 0.111 to 0.137 for women problem gamblers, and 0.140 to 0.156 for problem gamblers who are men (Model 10). Substance addiction odds ratio for women fell from 2.846 to 2.312 and for non-substance behavior from 3.186 to 2.322. Substance addiction was no longer statistically significant for women, although non-substance behaviors remained statistically significant. For men, adding the strain variable decreased the odds ratio of problem gambling for those with

substance addiction but increased slightly for non-substance behaviors (substance odds changed from 1.039 to 0.874 and non-substance behavior odds changed from 2.138 to 2.400). Substance addiction remained non-statistically significant for men and non-substance behavior remained statistically significant.

Table 9:

Logistic Regression Predicting Likelihood of Problem Gambling with Comorbidities and Strain Variable

	Model 9: Full Model (N=5,852)			Model 10: Based on Gender					
				Women (N=2,715)			Men (N=3,104)		
	B	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*
Constant	-.432*	.211	.649	-1.628**	.355	.196	-.326	.257	.721
Women	-.820**	.115	.440	---	---	---	---	---	---
Age	-.030**	.004	.970	-.025**	.006	.975	-.032**	.005	.969
White	-.365*	.130	.694	-.379	.223	.685	-.360*	.161	.697
Coll Ed	-.223	.122	.800	-.113	.217	.893	-.262	.147	.770
Married	-.369*	.120	.691	-.118	.204	.562	-.485*	.148	.616
Employed	.010	.119	1.010	-.069	.203	.933	.062	.149	1.064
Substance Addiction	.160	.338	1.174	.838	.532	2.312	-.135	.433	.874
Non-Substance Behavior	.847**	.125	2.334	.842**	.209	2.322	.875**	.157	2.400
Strain	.271**	.047	1.312	.373**	.075	1.453	.214**	.060	1.239
Pseudo R-Square (Nagelkerke)		.159			.137			.156	

*p<0.05; ** p<.001

Strain from Another Person's Perceived Gambling Behavior

This analysis is conducted separately as it is a strain that is caused by the perceived problem gambling of someone else in the respondent's life. One prior study (using a sample in China) found a relationship between the strain caused by a spouse's problem gambling on the likelihood of the spouse being a problem gambler (Cheung, 2015). In order to assess whether this type of strain has a relationship with problem gambling in the U.S., analysis is conducted to

assess whether strain from another person's perceived problem with gambling (assessed on a 0 (no strain) through 10 (high strain) Likert scale) is related to problem gambling and whether strain from specific relationships (especially that of spouses) has a greater likelihood for a relationship with problem gambling than others.

Logistic regression was performed to determine whether stress from another person's gambling had an impact on problem gambling (Table 10). The full model containing all variables is statistically significant and explains 22.3% of the variation in problem gambling. This value of R-square is larger than any of the prior regressions tested, suggesting that strain from another person's problem gambling may have a stronger relationship with the individual being a problem gambler than the other types of strain tested in this study. As shown in Table 10, three of the independent variables make a unique statistically significant contribution to the model (age, gender and stress from another person's perceived problem gambling). The strongest predictor of problem gambling continues to be gender at an odds ratio of 2.43 (1/.410). Strain from another person's perceived problem gambling is also significant, with an odds ratio of 1.307. This seems to suggest that there is a relationship between strain from someone else's perceived problem gambling and the individual also being a problem gambler, supporting Hypothesis 4.

Table 10:

Logistic Regression Predicting Likelihood of Problem Gambling with Strain from another Person's Gambling

	Model 11: Full Model (N=5,852)			Model 12: Based on Gender					
				Women (N=2,715)			Men (N=3,104)		
	B	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*	*B*	*SE*	*Exp(b)*
Constant	-.975*	.370	.377	-2.101**	.577	.122	-.835	.486	.434
Women	-.892**	.192	.410	---	---	---	---	---	---
Age	-.021*	.006	.979	-.019	.010	.981	-.023*	.008	.978
White	-.321	.214	.725	-.009	.357	.991	-.516	.273	.597
Coll Ed	-.292	.209	.746	-.397	.353	.672	-.264	.263	.768
Married	-.322	.202	.725	-.230	.321	.795	-.365	.263	.694
Employed	-.101	.199	.904	-.310	.309	.733	.025	.262	1.025
Strain from Another Person's Gambling	.268**	.030	1.307	.273**	.047	1.314	.269**	.039	1.308
Pseudo R-Square (Nagelkerke)		.223			.183			.232	

*p<.05; ** p<.001

Similar to the prior logistic regression analyses based on strain, the dataset was split based on gender to see whether gender acted as a modifying variable between strain from another person's perceived problem gambling (Model 12). For men, two variables are significant (age and strain from another person's gambling) and for women only strain from another person's gambling is significant. For both male and female problem gamblers, the strain from another person's gambling had significant odds ratios (men: odds ratio=1.308; women odds ratio=1.314). Paternoster's Z scores were calculated to see whether the difference in the coefficients was significant based on gender. The difference in the coefficients is not significant, for women B=0.273, SE=0.047; for men B=0.269, SE=0.039; z=0.065, indicating that there is not a difference based on gender in the relationship between problem gambling and strain from someone else's perceived gambling.

In order to test whether Cheung's (2015) findings regarding strain from spouse's gambling are supported by these data, I estimated a one-way between-groups analysis of variance (ANOVA) to explore the impact of type of relationship on problem gambling (Table 11). There is a statistically significant difference at the $p<0.05$ level for different types of relationships: F (5, 5852) = 1560.17, $p=0.000$. Post-hoc comparisons using the Tukey HSD test indicated that the mean score between all groups were significantly different. The relationship with a spouse or partner who is a problem gambler shows the largest negative strain (mean=5.61).

The file was then split based on gender and a Two-Way ANOVA was conducted to compare types of relationship with perceived problem gambling (Table 11). There continues to be a statistically significant difference at the $p<0.05$ level for the different types of relationships for both men and women: [men: F(5,3104) = 835.24, $p=0.000$; women: F(5, 2715) = 744.13, $p=0.000$]. Spouse continues to be the relationship with the largest impact. This relationship has a larger impact on men (mean=6.21) than women (mean=5.25).

Table 11:

ANOVA Comparing Types of Relationships with Problem Gambler's and Level of Negative Strain

	All (N=1,133)			Women (N=542)			Men (N=586)		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
Spouse	113	5.61	3.08	69	5.25	3.08	43	6.21	3.05
Parent	123	4.41	2.98	66	4.14	2.96	57	4.74	3.01
Other Fam.	380	3.37	2.89	200	3.71	2.98	177	2.99	2.75
Friend	350	2.84	2.51	137	2.96	2.60	211	2.76	2.46
Other	167	3.29	3.29	69	3.86	3.33	98	2.88	2.72

Based on these findings, it appears that strain from another person's gambling affects men at stronger levels, and while the strain from a spouse continues to have a strong relationship with problem gambling, it is statistically significant for both spouses, with a slightly stronger

relationship between strain from a spouse's problem gambling for men (mean=6.21) than women (mean=5.25).

Logistic regression was then performed using five of the six demographic variables (marital status is not included because of its correlation with strain from a spouse's problem gambling). Relationship type was made into a dummy variable based on whether the relationship causing strain was by a spouse/partner (Table 12). For all participants, the regression is statistically significant and explained about 12% of the variation in problem gambling.

Age, college education, gender and strain from spouse/partner gambling are all significantly related to problem gambling. Strain from spouse/partner's problem gambling shows the strongest relationship with an odds ratio of 6.693, supporting prior research that strain from spousal problem gambling is related to a person's gambling problem. Because large odds ratios may be a sign of multicollinearity, VIF values were calculated and all were less than 1.5, indicating no multicollinearity.

Table 12:

Logistic Regression Predicting Likelihood of Problem Gambling with Strain from Spouse/Partner Gambling

	Model 13: Full Model (N=5,852)			Model 14: Based on Gender					
				Women (N=2,715)			Men (N=3,104)		
	B	*SE*	*Exp (b)*	*B*	*SE*	*Exp (b)*	*B*	*SE*	*Exp (b)*
Constant	.181	.188	1.199	-.589	.294	.555	.150	.233	1.162
Women	-.759*	.111	.468	---	---	---	---	---	---
Age	-.039**	.003	.969	-.035*	.006	.966	-.041**	.004	.960
White	-.378	.125	.685	-.417*	.212	.659	-.343*	.157	.710
Coll Ed	-.377*	.116	.686	-.291	.204	.748	-.427*	.142	.563
Employed	-.216	.112	.806	-.424*	.188	.654	-.087	.141	.917
Strain from Spouse Gambling	1.901**	.224	6.693	1.460**	.335	4.304	2.427**	.332	11.321
Pseudo R-Square (Nagelkerke)		.124			.084			.133	

*p<.05; ** p<.001

In order to compare the relationship based on gender, the data were split and recalculated for men and women (Model 14). Including strain from a spouse's gambling explains 8.4% of the variation in problem gambling for women and 13.3% for men. Both men and women have four variables significant, with strain from a spouse's problem gambling having the largest odds ratio. For women the odds ratio is 4.304 and for men the odds ratio is 11.321. These are the largest odds ratios from any of the types of strain analyzed in this study. Due to the high odds ratios, multicollinearity was checked and all VIF values were under 1.5 for both men and women indicating no multicollinearity.

Paternoster's Z scores were calculated to see whether the difference in the coefficients was significant based on gender. The difference in the coefficients is significant, for women B=1.460, SE=0.335; for men B=2.427, SE=0.332; z=-2.05 indicating that there is a difference based on gender in the relationship between problem gambling and strain from a spouse's

gambling. In contrast to Cheung's (2015) findings, in this study men's problem gambling is better explained by strain from a spouse's problem gambling than for women. Additionally, unlike Cheung's (2015) findings, strain from a spouse's problem gambling is significant for both men and women.

This analysis provides bivariate and logistic regression analysis of several variables connected to strain. Overall, findings support a relationship between strain and problem gambling (research question #1), and that gender does not generally moderate these relationships (research question #2). When conducting regression analysis, some types of strain no longer showed statistical significance and z-scores mostly indicated that the coefficients for strain on problem gambling did not differ based on gender, except men's problem gambling could better be explained from strain from their spouse's problem gambling than women. Table 13 summarizes the study hypotheses and supported findings. The next chapter explores and discusses these findings further.

Table 13:

Study Hypothesis Results Based on Findings

	Supported by Logistic Regression?	**H5:** Does Gender Modify the Relationship?
H1: Cumulative effect of negative strain will be related to problem gambling.	✓	no
H2: Comorbidity with drug or alcohol addiction in past year will be related to problem gambling.	no	partial
H3: Comorbidity with another behavioral problem (not drugs/alcohol) in past year will be related to problem gambling.	✓	no
H4: Strain from the perceived belief that a friend or family member gambles too much will be related to problem gambling.	✓	partial

CHAPTER 5:

Discussion and Conclusions

This study offers several insights into the relationship between GST and problem gambling. This chapter will start by highlighting the main findings of this study and will then discuss implications based on those findings. Study limitations are provided, along with suggestions for future studies that use GST as a framework to better understand problem gambling.

Summary of Findings

This study explored two research questions to advance knowledge of the relationship between GST and problem gambling. The first research question examined whether concepts of strain from General Strain Theory provide an adequate explanation for problem gambling. Drawing on prior research, the included forms of strain were expected to have a relationship with problem gambling (Cheung, 2015; Eitle & Taylor, 2010; Greco & Curci, 2016). This was especially true when examining comorbidities as well as strain from perceived spousal problem gambling based on results from prior studies (Cheung, 2015; Greco & Curci, 2016). Findings from this research support prior research that some forms of strain may help explain problem gambling, however, generally the types of strain studied in this dissertation only provided minimal support other than having a comorbidity to a non-substance behavior and strain caused by a spouse/partners perceived problem gambling.

The second research question examined whether gender moderated the relationship between strain and problem gambling, and if so, in what ways. Based on prior research concerning the reasons women gamble and may become problem gamblers, women were expected to have a stronger relationship between strain and problem gambling than men (Blanco

et al., 2006; Hing et al., 2016; Sacco et al., 2011). In this dissertation, gender was not seen as a significant modifier of the relationship between strain and problem gambling, and where it was, men generally had stronger associations between strain and problem gambling than women.

Non-gambling specific strains. The current study examined several non-gambling specific types of strain, including mental health, stress, physical health, happiness, suicidal ideation, and unhappy childhood with mixed results. Strain caused by mental health, suicidal ideation, and unhappy childhood was found to have a significant relationship with problem gambling. This supports prior research on GST showing that negative life events may influence gambling behavior (Elfman et al., 2010; Felsher et al., 2010; Santaella et al., 2013). These findings are also consistent with prior research showing that childhood experiences may influence gambling severity (Bergevin et al., 2006; McCormick et al., 2012). High levels of stress, physical health problems and low levels of happiness were not found to have a relationship with problem gambling. This was unexpected given past research linking stress and problem gambling (Eitle & Taylor, 2010; Elman et al., 2010; Kaufman et al., 2002; Tabor et al., 1987). These findings most closely conflict with Eitle and Taylor's (2010) results that recent stressful events could predict young male problem gambling. It is possible that the age difference and single gender in their study compared to the current study explains the difference. The current study is the first known study to include physical health problems and level of unhappiness as forms of strain in relation to problem gambling. While bivariate results showed a significant relationship with problem gambling, which strains relate to problem gambling, the lack of a relationship when controlling for all the other variables in the logistic regression indicate that these forms of strain may be more closely aligned with other factors than as a form of strain.

When combining the six forms of non-gambling specific strains into a combined factor score, there was a significant relationship between higher factor scores and problem gambling. This supports the general research question on whether strain is related to problem gambling. While several types of strain did not have an independently significant relationship with problem gambling, there appears to be a relationship (albeit minor with a r-square of only 14.1%) between cumulative strain and problem gambling. This finding offers support for Hypothesis 1.

There were differences in gender when examining the non-gambling strains individually, but gender did not act as a mediator in understanding the relationship between cumulative non-gambling forms of strain and problem gambling. Gender was, however, frequently the strongest direct predictor of problem gambling in the regression models. While women problem gamblers in this study have a slightly higher level of strain than men, the difference is not significant. This is an important finding, as prior research on problem gambling and gender found that women problem gamblers may gamble for different reasons, "escape" rather than "action" (Blanco, Hasin, Petry, Stinson & Grant, 2006; Sacco, Torres, Cunningham-Williams, Woods & Unick, 2011; Weatherly & Cookman, 2014). The current research suggests that women problem gamblers may be no more likely than men to be escaping these specific non-gambling types of strain, although this study did not directly test the concept of "escape" from strain.

Comorbidities. Findings concerning comorbidities with alcohol/drugs or non-substance behaviors were mixed. Unlike prior studies, there was not a strong relationship between drug/alcohol dependence and problem gambling. Women, but not men, did have statistically significant findings of comorbidity of alcohol/drug abuse with problem gambling. Generally, these findings conflict with prior studies showing a strong relationship between alcohol/drug comorbidity and problem gambling (Greco & Curci, 2016; Korman et al., 2008). Results directly

conflict with Greco and Curci's (2016) Italian study linking GST with problem gambling and substance abuse. The difference may again be due to age and population, as Greco and Curci's (2016) was conducted on family members of undergraduate students and the current study is an older general population study. A possibility for the current study findings may be the fact that the data only studied behavior in the prior year, which ignores the possibility that an individual struggled with alcohol/drugs in the past, but crossed over into problem gambling when they stopped using substances. The results of finding a lack of relationship between strain, substance addiction and problem gambling deems Hypothesis 2 null.

Non-substance addictive behaviors, however, showed a strong relationship with problem gambling. This was true for men and for women. While strain appears to increase the likelihood of this relationship, the difference is minor. Though prior studies have examined the relationship between non-substance addictive behaviors and GST (such as Piquero et al.'s (2004) study on GST and eating disorders), this is the first known study to examine these behaviors in relationship with GST with problem gambling. These results support Hypothesis 3.

Strain from Another Person's Problem Gambling. This study found a strong relationship between the level of strain the respondent had from another person's problem gambling and the respondent also being a problem gambler. This was true for men and for women and applied to many types of relationships (friend, family member, and spouse). For both men and women, the strongest relationship to have this link was when the spouse/partner was perceived to have a gambling problem. In this study, men have a stronger relationship between their problem gambling when they have strain based on the perception that their spouse/partner has a gambling problem than women. These findings seem to support Cheung's (2015) study of married couples in China that strain from the spouse's gambling could predict both the men's and women's

problem gambling, however men having the stronger effect is a new finding from this study. Since the current study did not pair up married couples, there is no ability to test whether strain by one partner could predict their spouse's gambling behavior. These findings support Hypothesis 4.

Gender. The most consistent direct relationship in this study was the strong direct relationship that gender had with problem gambling, however as indicated in the discussion above, gender played only a minor role in understanding the relationship between GST and problem gambling in this study. Prior research on GST and problem gambling did not specifically examine gender, except for Cheung's (2015) study considering married spouses. It was anticipated in the current study that women problem gamblers would have greater levels of strain than men, however this was not the finding. Women problem gamblers in the current study generally had lower pseudo r-squared results than men, indicating that other forms of strain or other factors likely have a stronger relationship to their problem gambling than the types of strain included in this study. Where differences in gender were found, z-scores generally showed no significance between men and women problem gamblers except men had a slightly greater relationship between strain from their spouse/partner's perceived problem gambling and their own problem gambling. These findings suggest that gender may not generally be a moderating factor between GST and problem gambling, except possibly for men based on their perception of their spouse's problem gambling. Overall, findings do not support Hypothesis 5.

Demographic Variables. Demographic variables are discussed here briefly, as most studies examining problem gambling have not been based on large population-based data and findings in this research may help inform whether prior demographic findings based on problem gambling, as well as differences in gender, remain constant when using population-based data.

This study found mixed results among the relationship between several demographic criteria and problem gambling, especially based on gender. According to this study, problem gamblers averaged over a decade younger, were more racially diverse, had less college education, and were less likely to be married than non-problem gamblers. Employment status was not related to problem gambling status.

When comparing the demographics by gender among problem gamblers, only age remained a significant demographic for women, where women problem gamblers continued to be about a decade younger than non-problem gamblers. This differs from prior research indicating that women problem gamblers tended to be older, middle aged (Afifi et al., 2010). Men were about twice as likely to be problem gamblers than women, supporting prior research that men are more likely to be problem gamblers. There were many more differences for men, where younger age, non-white race/ethnicity, marital status (unmarried) and employment (less full-time employed) were all significantly related to problem gambling. Such findings support the need to continue to examine problem gambling demographics based on gender, as there may be strong differences in research related to problem gambling.

Implications

The strong relationship between other forms of addictive behaviors and problem gambling found in this study is important. Many of the behaviors listed in this question (i.e. shopping, pornography, sex, etc.) fall under different categories in the DSM-5 (such as impulse control) similar to where problem gambling used to be categorized. Given their relationship to problem gambling in this study, reclassification of some addictive behavior may be appropriate, as discussed by Potenza (2017) concerning compulsive sexual behaviors. The finding that GST, however, was only mildly related to whether these behaviors related to problem gambling leads

to additional questions concerning how these types of behaviors are related to problem gambling. Perhaps these behaviors could be considered strains in themselves, causing an increase in likelihood of problem gambling or they are potential outcomes of having the same types of strain.

The findings based on gender are informative in better understanding problem gambling comparing men and women. Most research studies suggest strong differences based on the gender of problem gamblers (Afifi et al., 2010; Blanco, et al., 2006; Sacco, et al., 2011; Crisp et al., 2000; Hing et al., 2016; Nelson, et al., 2006; Potenza et al., 2001; Weatherly & Cookman, 2014). The current study, however, suggests there are few differences when considering the relationship between strain and their problem gambling (other than in some demographics). While not applying GST to their particular studies, several researchers have linked some types of strain, such as mental health issues, with problem gambling specifically for women (Blanco et al., 2006; Hing et al., 2016; Sacco et al., 2011). For the past 30 years, many studies refer to women as primarily "escape" gamblers, trying to hide from problems (potential sources of strain) in their lives, and men as "action" seeking gamblers (Blanco et al., 2006; Sacco et al., 2011; Weatherly & Cookman, 2014). The current study conversely suggests that men and women may both have a relationship between some types of strain and problem gambling and may therefore use problem gambling as an "escape." At the same time, the current study does not examine whether strain may account for "action" type gambling and does not specifically examine whether the respondents personally identified as "escape," "action-seeking" or a combination of both in their pursuit of gambling.

One benefit of this study was the population-based design. Each of the prior studies that used GST to explain problem gambling had limitations based on the population studied. Greco

and Curci (2016) focused on family members of students attending a psychology course in Italy, limiting inquiry to primarily people in family units with children of a certain age. Eitle and Tayler (2010) surveyed young adult males, not allowing for inquiry into women's problem gambling and limiting inquiry to problem gambling in youth, which often has a different trajectory than those that start gambling later in life or become problem gamblers as adults. Cheung's (2015) study in China only included married couples, and therefore is unable to generalize to the general public and unmarried couples. Kabiri's (2020) study only included known gamblers in Iran and did not specifically study problem gamblers. Therefore, the current study is one of only two known studies applying GST to problem gambling in the United States, and the only one using data from a general adult population.

Findings from the current study may help identify and treat problem gamblers. Since there appears to be a relationship between strain and problem gambling, it is important that mental health professionals include gambling assessments in their intake and counseling regimens. Individuals seeking mental health treatment may not automatically expose their gambling behavior. A simple assessment of all clients may help in identifying at-risk and potential problem gamblers before they face the extreme consequences of having a gambling disorder, such as the three question Brief Biosocial Gambling Screen (Gebauer, LaBrie, & Shaffer, 2010) (Appendix C). By screening all clients, people seeking help for strain in their lives may be identified as problem gamblers earlier and helped prior to developing into severe problem gamblers. Furthermore, understanding the relationship between strain and problem gambling helps with designing treatment programs. Problem gamblers seeking treatment may be offered new ways to handle strains in their life. For example, the link between unhappy

childhood and problem gambling encourages treatment to include helping problem gamblers overcome negative emotions caused by childhood maltreatment.

Another potential implication of this research is understanding and potentially reducing gambling-motivated crime. As indicated earlier, problem gambling results in increased rates of crime, especially financially motivated crimes to keep gambling and/or pay off gambling debts (Adolphe, Khatib, Gainsbury & Blaszczynski, 2018; Banks, 2017; Binde, 2016; Blaszczynski, McConaghy, & Frankova, 1989; Zorland, Mooss, & Perkins, 2008). According to prior research, over 50% of problem gamblers seeking help commit a crime related to gambling (Binde, 2016; James, 2017; Zorland et al., 2008). While the current study did not explore the relationship between problem gambling and crime, having greater understanding of the relationship between strain and problem gambling may help with identifying potential problem gamblers prior to their desperation for seeking an outlet such as crime to try and "fix" their gambling related problems.

Limitations

There are several limitations in this study. For example, it is likely that gambling-specific related strains have a stronger relationship for all problem gamblers, however that could not be tested in this particular study due to their being included in the dependent variable (problem gambler status). Different measures of strain, including economic, social and legal consequences of gambling, may have a strong relationship with severity of problem gambling. Additionally, it is possible that there are different relationships between GST and specific types of gambling, which was not assessed in this study.

Another limitation of this study was the inability to examine whether the strains studied herein resulted in specific negative emotions – such as anger or frustration, which is a step in applying GST. This study was able to examine forms of strain, but not whether the individuals

developed positive or negative coping mechanisms for handling such strains, which may account for some of the findings of minimal relationship between the causes of strain studied and problem gambling. Negative emotions could mediate this relationship and potentially help in understanding the minor relationship between strain and problem gambling found in this study. A longitudinal study, such as the Massachusetts Gambling Impact Cohort data would better understand whether strains cause negative emotions and if there is a relationship between the negative emotions and problem gambling

This study was also limited by primarily examining the behavior and strain of gamblers only within the past year. This limited the ability of understanding directionality of the strains studied and problem gambling. The only strain studied that potentially included directionality was having an unhappy childhood, which showed a significant relationship with problem gambling, with an odds ratio of 1.608. A longitudinal study would allow for better understanding whether the strains included in this study led to gambling behavior or if gambling behavior resulted in the strains suffered. Since the SEIGMA study is conducting follow-ups over time, it may be possible to examine results in future follow-ups to see if there is a relationship between an increase in strains suffered over that time and increased gambling prevalence and problem gambling. Other studies, such as future follow ups (as participants move more into adulthood) to the National Longitudinal Study of Adolescent to Adult Health may also be relevant to examine the relationship between GST and problem gambling over time.

This study was also limited by the binary gender data in the study. This limited the account for individuals who do not identify specifically on the binary gender spectrum. Similarly, in the analysis of strain caused by spousal/partner perceived problem gambling, the spouse/partner's gender identity is unknown. With so few studies concerning problem gambling

including LGBTQ type data, it is important that future studies include the ability to account for diverse identities.

While the data were obtained using a general population method within the United States, it is limited to just one state, Massachusetts, which did not have land casinos at the time the data was gathered. Therefore, this study is limited in not including the whole population of the U.S. and not including respondents from states with more available forms of gambling. While respondents may have travelled to casinos if that was their preferred form of gambling, it may be less likely that they did so at least monthly due to distance. Similarly, distance from casino gambling may limit the identification of problem gamblers in the current study, as this analysis specifically included respondents who gambled at least once per month, which left out potential problem gamblers identified as binge gamblers, who may not gamble once per month, but have a gambling problem (for example, gamble 1-2x per year but with large amounts of money and have the similar consequences of problem gamblers who gamble more frequently).

Future Research

Based on the findings of this study, there are several opportunities for future studies of GST and problem gambling. Results from this study show a relationship between several forms of strain and problem gambling, while other forms of strain do not appear to have a relationship. Other factors and/or types of strain than the ones included in this study likely have stronger relationships with problem gambling and future research should consider a number of additional potential strains to study their relationship with problem gambling.

The strong relationship found in this study on non-substance comorbidity encourages future research on non-substance behaviors as comorbidities with strain or as forms of strain. Increased studies on these other behaviors may help recategorize them as addictions, similar to

Gambling Disorder, which may help in providing resources and treatments. Future studies should include assessments to see whether specific types of these behaviors have a stronger relationship with problem gambling.

Further studies on the relationship between alcohol/drug comorbidity, problem gambling and strain are appropriate to see whether the lack of finding a relationship in the current study is a fluke or the relationship is less than understood in prior studies. Researchers should consider including questions that examine past substance abuse behavior, as well as present, to see if there is a comorbidity, as well as the possibility of stopping one type of addiction and crossing over into problem gambling. GST may help explain changing addictions, as abstaining from one addiction, but not dealing with underlying causes of strain, could potentially result in a new addictive behavior. Future studies may want to examine the potential relationship between GST, substance addiction, and problem gambling.

Since the results of this study also support prior research that there is a relationship between some forms of strain and problem gambling, future research should examine these strains on a longitudinal basis to see whether the experience of these strains results in a higher likelihood to become a problem gambler or whether problem gambling may lead to a higher experience of strain (both gambling-specific and general strain). It is likely that problem gambling adds strain to one's relationships and economics, so a longitudinal study could potentially focus on the relationship between problem gambling, GST and gambling-related strains.

Inclusion in research design and data for potential negative emotions and negative/ positive coping mechanisms to strain would help in better understanding whether GST helps explain problem gambling. Future studies should include questions related to emotional reactions

to having specific types of strain so this could be better measured. Including sub-questions on emotional reactions for those indicating having specific types of strain in their lives, may help in examining which types of strain are most likely lead to negative emotions and whether exhibiting such emotions has a relationship with problem gambling.

Another suggestion for future researchers is to deconstruct the PPGM, and/or create another problem gambling measure, that is not confounded with gambling harm indicators. It is possible to build a measure based on other indicators, such as non-gambling specific strains enabling a future research study that measures how gambling strains, and the negative emotions caused by such strains, relate to problem gambling, further examining whether GST is a good theory in explaining why some people become problem gamblers.

The current study encourages future research on problem gambling to consider results based on gender. More studies that compare findings based on gender are needed, including an examination of whether descriptions of women as primarily "escape" gamblers and men as primarily "action" gamblers continue to be true. Studies should examine whether men and women continue to have a relationship between certain kinds of strain and whether they choose to gamble to "escape" feeling these strains.

A study in the U.S. that delves deeper into the relationship between strain from a spouse's problem gambling and the other spouse also being a problem gambler is also warranted. The current study could not examine whether strain by one partner could predict the likelihood of developing gambling problems based on gender, as Cheung's (2015) study found. Since this study did find that strain from a spouse's gambling was related to problem gambling, especially for men, a future study is warranted to see if Cheung's (2015) overall findings are consistent for couples in the U.S.

LGBTQ identities and more detailed racial breakdown (other than White and non-White), and other identity markers were not possible in this study (for example, race could not be studied due to small cell size of several variables and LGBTQ identities were not asked). Future studies should consider the relationship between diverse identities, GST and problem gambling. It is important to have a greater understanding the relationship between strain and problem gambling for different populations, as reactions to strain and coping mechanisms may differ.

Conclusions

This dissertation focused on specific types of strain to see whether there was a relationship between GST and problem gambling. Results show a relationship between some types of strain and problem gambling. Specifically, unhappy childhood, mental health issues, suicidal ideation, cumulative non-gambling specific strain, comorbidity with a non-substance behavior, and strain from perceived spouse/partner problem gambling all showed a relationship with problem gambling. Conversely, high levels of stress, poor health, unhappiness, and comorbidity with alcohol/drugs did not show a relationship with problem gambling. Continued research into GST may help to identify the exact types of strain likely to have a relationship with problem gambling.

The most surprising finding of this study was the lack of relationship between alcohol/drug abuse and problem gambling for men, which has consistently been found to have a relationship since early gambling studies. The lack of relationship encourages continued research to understand why the results from the current study differ from most prior studies. The strong relationship between problem gambling and non-substance addictions, however, encourages additional research to better understand the association.

The results based on gender showed that generally, there was very little difference in the relationship between GST and problem gambling. These results are important as there is far less research on women problem gamblers than men. Most research tends to find several differences based on gender, unlike this study. Where differences were found, men in this study generally had stronger relationships between strain and their problem gambling. These are important findings and encourage future researchers on problem gambling to include women in their studies and compare results based on gender.

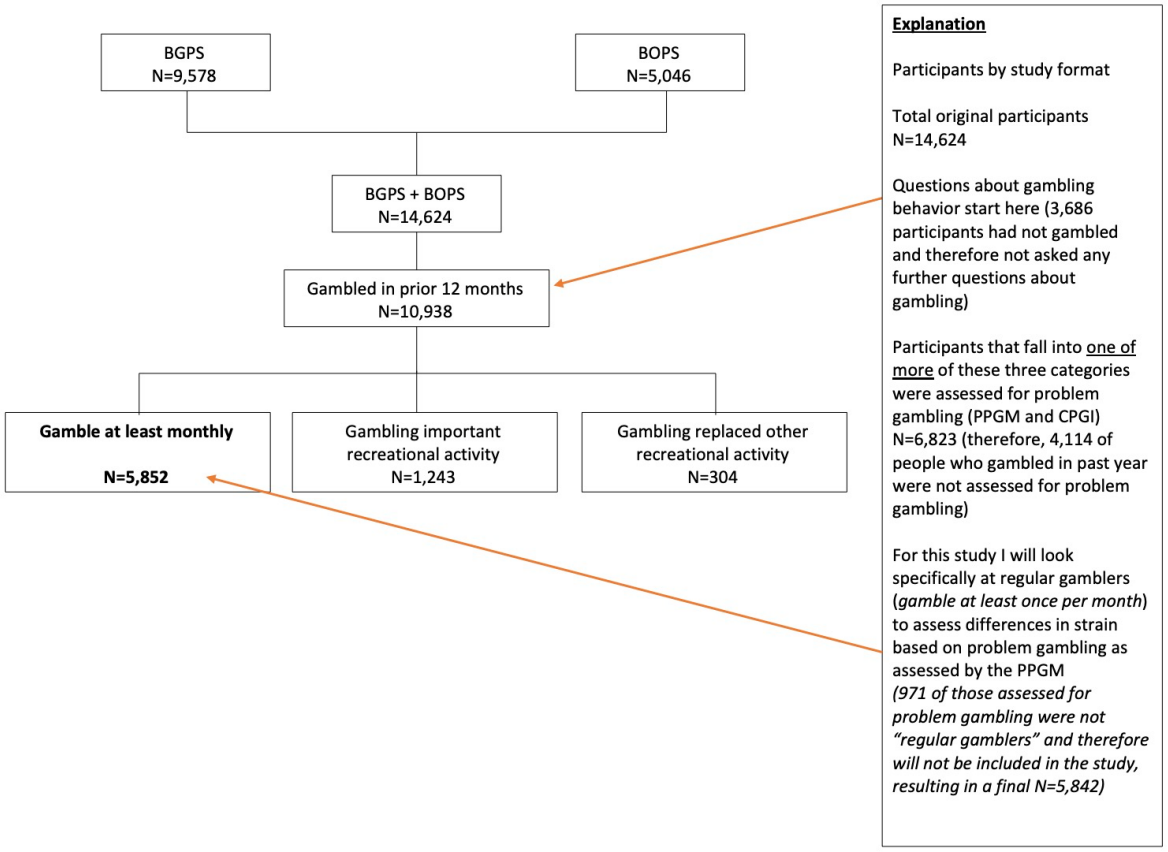
APPENDICES

APPENDIX A:

Process for Inclusion of Participants

Figure 1

Inclusion of Participants Chart



APPENDIX B:

"Problem and Pathological Gambling Measure (PPGM)"

1a. Has your involvement in gambling caused you either to borrow a significant 23 amount of money or sell some of your possessions in the past 12 months? (Yes/No).

1b. Has your involvement in gambling caused significant financial concerns for you or someone close to you in the past 12 months? (Yes/No). (Note: do not score 1 for 1b if 1 has already been scored for 1a).

2. Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months? (Yes/No).

3a. Has your involvement in gambling caused serious problems 24 in your relationship with your spouse/partner, or important friends or family in the past 12 months? (Note: Family is whomever the person themselves defines as "family")(Yes/No).

3b. Has your involvement in gambling caused you to repeatedly neglect your children or family in the past 12 months? (Yes/No). (Note: do not score 1 for 3b if 1 has already been scored for 3a).

4. Has your involvement in gambling resulted in significant health problems or injury for you or someone close to you in the past 12 months? (Yes/No).

5a. Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months? (Yes/No).

5b. Has your involvement in gambling caused you to miss a significant amount of time off work or school in the past 12 months? (Yes/No). (Note: do not score 1 for 5b if 1 has already been scored for 5a).

6. Has your involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other illegal acts to support your gambling in the past 12 months? (Yes/No).

7. Is there anyone else who would say that your involvement in gambling in the past 12 months has caused any significant problems regardless of whether you agree with them or not? (Yes/No).

PROBLEMS SCORE /7

8. In the past 12 months, have you often gambled longer, with more money or more frequently than you intended to? (Yes/No).

9. In the past 12 months, have you often gone back to try and win back the money you lost? (Yes/No).

10a. In the past 12 months, have you made any attempts to either cut down, control or stop your gambling? (Yes/No). (go to 11 if 'no') (this item not scored)

10b. Were you successful in these attempts? (Yes/No). (score '1' for no and '0' for yes)

11. In the past 12 months, is there anyone else who would say that you have had difficulty controlling your gambling, regardless of whether you agreed with them or not? (Yes/No).

IMPAIRED CONTROL SCORE /4

12. In the past 12 months, would you say you have been preoccupied with gambling? (Yes/No).

13. In the past 12 months, when you were not gambling did you often experience irritability, restlessness or strong cravings for it? (Yes/No).

14. In the past 12 months, did you find you needed to gamble with larger and larger amounts of money to achieve the same level of excitement? (Yes/No).

OTHER ISSUES SCORE /3

TOTAL SCORE /14

Scoring: PPGM Scoring and Classification

PATHOLOGICAL GAMBLER (4)

1. Problems Score of 1 or higher, plus

2. Impaired Control Score of 1 or higher, plus

3. Total Score of 5 or higher, plus

4. Reported gambling frequency of at least once a month on some form of gambling.

PROBLEM GAMBLER (3)

1. Problems Score of 1 or higher, plus

2. Impaired Control Score of 1 or higher, plus

3. Total Score of 2 to 4, plus

4. Reported gambling frequency of at least once a month on some form of gambling.

OR

1. Total Score of 3 or higher, plus

2. Frequency of gambling AND average reported gambling loss (not net loss) median for unambiguously identified Problem and Pathological Gamblers in the population (i.e., as established by the most recent population prevalence survey).

AT RISK GAMBLER (2) (this category also includes people who may be problem gamblers in denial)

1. Does not meet criteria for Problem or Pathological gambling, plus

2. Total Score of 1 or higher

OR

1. Frequency of gambling AND average reported gambling loss (not net loss) > median for unambiguously identified Problem and Pathological Gamblers in the population (i.e., as established by the most recent population prevalence survey).

RECREATIONAL GAMBLER (1)

Gambler who does not meet criteria for Pathological, Problem or At-Risk gambler.

NON-GAMBLER (0)

No reported gambling on any form in past year"

(Williams & Volberg, 2010)

APPENDIX C:

Brief Biosocial Gambling Screen

A "yes" answer to any of the questions means the person is at risk for developing a gambling problem.

1. During the past 12 months, have you become restless, irritable or anxious when trying to stop/cut down on gambling?

___ Yes ___ No

2. During the past 12 months, have you tried to keep your family or friends from knowing how much you gambled?

___ Yes ___ No

3. During the past 12 months, did you have such financial trouble as a result of your gambling that you had to get help with living expenses from family, friends or welfare?

___ Yes ___ No

(Gebauer, LaBrie, & Shaffer, 2010)

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