EXPLORING PATHWAYS TOWARDS AND AWAY FROM PROBLEMATIC GAMBLING

by

Natalie Louise Hearn

A thesis submitted in partial fulfilment for the requirements for the degree of Doctor of Philosophy at the University of Central Lancashire

May 2019

STUDENT DECLARATION

Concurrent registration for two or more academic awards

I declare that while registered for the research degree, I have not been a registered candidate or enrolled student for another award of the University or other academic or professional institution.

Material submitted for another award

I declare that no material contained in the thesis has been used in any other submission for an academic award and is solely my own work.

Use of a Proof-reader

No proof-reading service was used in the compilation of this thesis.

Signature of Candidate: 

Print Name: Natalie Louise Hearn

Type of Award: Doctor of Philosophy (PhD)

School: School of Psychology

ABSTRACT

This PhD aimed to explore the pathways towards and away from problem gambling. It intended to test key aspects of the Pathways towards Problem and Pathological Gambling Model (Blaszczynski & Nower, 2002). In addition to the assessment of risk factors, it aimed to examine protective factors for gambling, that have had limited attention in the literature and in theoretical models. The research aimed to propose a model of gambling, inclusive of both risk and protective factors. Three studies were employed using student and gambling forum user samples.

Study one recruited 694 participants (204 students and 490 forum users; 522 men and 140 women) to initially explore key variables in Blaszczynski and Nower's (2002) model, including gambling severity, gambling motives, anxiety and depression and drug and alcohol use. It also explored the utility of classifying gamblers into subgroups based on their primary motives for gambling. Multiple regression analyses were adopted to determine the associations of the key variables with problem gambling. Those with a primary social motive for gambling displayed less severe gambling and anxiety than those without a primary social motive. Participants within the primary coping subgroup displayed the most anxiety and depression. Those who gambled primarily to enhance positive affect reported severe gambling.

Study two examined whether there are subgroups of gamblers similar to the behaviourally conditioned and emotionally vulnerable subtypes (Blaszczynski & Nower, 2002), utilising measures of gambling severity, anxiety and depression, impulsivity, gambling beliefs, negative life events and the association with others who gamble. It recruited 670 participants, which comprised of 404 gambling forum users and 265 students (422 men and 248 women). Using a Cluster Analysis, MANCOVA's and a series of ANOVA's, a

group emerged similar to the behaviourally conditioned pathway, with lower levels of premorbid and current anxiety and depression, negative life events and impulsivity. Another group emerged, similar to the emotionally vulnerable pathway, comprising those who scored higher on each of these variables. In contrast to the prediction, those in the emotionally vulnerable sub-group reported more severe cognitive distortions than the behaviourally conditioned subgroup.

Study three aimed to build on studies one and two by exploring factors associated with the antisocial impulsivist pathway in the Pathways Model (Blaszczynski & Nower, 2002), including gambling severity, impulsivity, psychopathy, anxiety and depression and offending behaviour. It also examined for the moderating effects of protective factors (satisfaction with life, social support, self-control and resilience) on the risk factors. Prior to the main study, a pilot study was undertaken to test the reliabilities and correlation coefficients of the measures being used (n = 88 men and 42 women). The main study recruited 579 participants (413 men and 166 women; 201 students and 378 gambling forum users). As predicted, three distinct gambler subgroups emerged. Using MANOVA and ANCOVA analyses, it was found that the first of these subgroups comprised individuals reporting lower levels of psychopathology and the highest levels of protective factors. The second were characterised by heightened pre-existing anxiety and depression, and moderate levels of protective factors. The third subtype of gamblers were distinguished by heightened impulsivity, the most severe psychopathy and offending behaviour and the least protective factors. A hierarchical multiple regression analysis with the protective factors as interaction terms revealed that life satisfaction and social support moderated the relationships between impulsivity and gambling severity. Furthermore, social support and self-control moderated the relationships between psychopathy and gambling severity.

The thesis postulates a preliminary model that integrates gambling related risk and protective factors into a theoretical framework. Awareness of the different subgroups of gambler will help professionals understand an individual's pathology and tailor services to meet their specific needs.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

Never in my wildest dreams would I have thought it was possible for a girl like me to embark upon such journey. I would like to thank a number of people who have helped me over recent years.

Firstly, I would like to thank my parents and family for their continued support, love and encouragement. Mum and dad, I really don't think I would have taken the opportunities that I have without your encouragement and faith in me. Thank you for helping me through this and for supporting me in everything I do. Thank you also for reminding me about what's important in life.

I would like to thank those who have supervised me throughout this research, Professor Jane Ireland, Professor John Fisk and Dr Mike Eslea. You have all been invaluable in guiding me through this research. I am very grateful for all of the support, motivation, patience and words of wisdom you have given me. Most of all, thank you for believing in me. Jane, I am very thankful for everything you have done for me over the years and for the opportunities you have given me.

I would like to mention my clinical supervisor, Lisa Hewitt, and my previous clinical supervisor and current boss, Sally Fitzpatrick, within my role as a Trainee Forensic Psychologist at HMP Wakefield. Thank you for allowing me some time from work to complete this PhD. Thank you also for providing me with your support, supervision, patience and knowledge and for helping me to understand myself more and challenge myself to become a reflective, competent Forensic Psychologist.

A special thanks to all of my wonderful friends, old and new. A particular thank you to Kirsty Strinati, Kay Hughes and Amy Hunter. If there is anything the last few years has taught me, it is that amazing friends like you are hard to find. Thank you for your friendship, laughter, encouragement, food and your listening ears. You are all one in a million, thanks for being you.

My thanks also extend to some of my fellow UCLan PhD students who I have shared this experience with. I appreciate all of those discussions about statistics, theory and general life.

Finally, my appreciation goes to all of the participants who have volunteered their time to engage in the research. It would not have been possible without your generosity. Thank you.

CHAPTER 1.
UNDERSTANDING GAMBLING

1.1 Introduction

This Chapter provides an introduction to gambling and problem gambling. It provides an overview of the measurement of gambling disorder. This includes both historical and current clinical diagnoses of gambling disorder and the measurement tools for problematic gambling in community and clinical settings. Throughout this Chapter, the nature and extent of problem gambling across different populations is presented including community, student and forensic. A discussion on sex differences in problem gambling is also provided.

1.2 Introduction to gambling

Gambling has been defined as an activity that involves placing money on uncertain events in an attempt to gain more money (Ladouceur et al., 2001). Gambling has been a recreational activity in many cultures for several centuries (Raylu & Oei, 2004). Over time, gambling has become increasingly liberalised (Kingma, 2007). Thus, availability has increased substantially in a range of establishments such as casinos, bookmakers, bingo halls, arcades, pubs and clubs, and on the internet (Gambling Commission, 2017).

The growth of the gambling industry has been paralleled by the growth of problematic gambling and addiction (Nowak & Aloe, 2014; Shaffer, Hall & Vander-Bilt, 1997). Problem gambling is described as a state where gambling impairs or damages personal, family or recreational pursuits (Lesieur & Rosenthal, 1991). Inherent in all forms of gambling is the element of uncertainty and risk taking, with gambling itself being a risk taking behaviour (Myrseth, 2011). For many, gambling can be a leisure activity with no negative consequences. However, for some, it has severe negative consequences in their

relationships with partners, friends, colleagues and family members (Myrseth, 2011). Gambling can also impact on an individual's physical, mental and emotional health, as well as having an impact on the wider society through crime (Public Health England, 2013).

It has been suggested that individuals rarely seek professional services for gambling problems as their primary concern and seek other support in the first instance, such as for financial or mental health concerns (Public Health England, 2013). In contrast to other addictions (i.e. substance misuse), problem gambling is not easily detected due to its symptoms not being as physical as those of substance misuse (Emshoff et al., 2008). Therefore, for its sufferers there are often severe consequences before its detection. Thus, the need for a greater understanding of gambling and what contributes towards and maintains it appears warranted.

1.3 History of pathological gambling diagnosis

The term 'pathological gambling' was first added to the Diagnostic and Statistical Manual (DSM-III) by the American Psychiatric Association in 1980, where it was recognised as a disorder within its own right and not a manifestation of broader antisocial tendencies (Zimmerman, Meeland & Krug, 1985). This was largely due to the work of Dr Robert Custer, who had written about and treated pathological gamblers for several years (Reilly & Smith, 2013). However, at this time, the diagnostic criteria for pathological gambling was not based on scientific testing, rather Dr Custer's and other professional's clinical experiences with those with gambling problems (Reilly & Smith, 2013).

In the DSM-III, pathological gambling was originally classified as an *Impulse Control Disorder*. The classification criteria comprised seven items, with an emphasis on damage and disruption to the individual's family, personal or vocational pursuits and financial

concerns (Reilly & Smith, 2013). The next edition of the DSM (IV) maintained the classification as an Impulse Control Disorder. However, the criteria were revised to reflect similarities with substance use disorders. As such, a criterion of "repeated unsuccessful attempts to control, cut back or stop gambling" was included (Reilly & Smith, 2013, pg. 2). According to the DSM-IV, to be diagnosed as a pathological gambler, an individual must meet at least five of the following 10 diagnostic criteria, (1) has a pre-occupation with gambling, (2) needs to gamble with increasing amounts in order to achieve the desired excitement, (3) is restless or irritable when attempting to cut down or stop gambling, (4) gambles as a way of escaping from problems or relieving dysphoric mood, (5) chases losses after losing, (6) lies to conceal the extent of involvement with gambling, (7) has repeated unsuccessful efforts to control, cut back or stop gambling, (8) has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling, (9) has jeopardized or lost a significant relationship, job, educational or career opportunity because of gambling and (10) relies on others to provide money to relieve a desperate financial situation caused by gambling (American Psychiatric Association, 2000).

1.4 Current gambling disorder diagnosis and measurement

The publication of the DSM-V (American Psychiatric Association, 2013) provided a change in the classification of 'gambling disorder'. The disorder was moved from the *Impulse Control Disorder* section and placed in the *Substance Related and Addictive Disorders* category. This new classification was based on empirical evidence revealing common elements of gambling disorder with substance use disorders (Reilly & Smith, 2013). This link was not only related to the external consequences of gambling disorder, such as financial problems and the destruction of relationships, but also to internal causes (Reilly & Smith, 2013). According to Dr Charles O'Brien (Chairman of the Substance

Related Disorders Work Group for the DSM 5), brain imaging studies and neuro-chemical tests indicated that gambling activates the reward systems in the brain in the same way that substances do (Breiter et al., 2001). Both gambling and substances stimulate the brain to release up to ten times more dopamine, thus mimicking the effects of substance addictions (American Psychiatric Association, 2013; Breiter et al., 2001).

The changes within the DSM-V also saw the term 'Pathological Gambling' changed to 'Gambling Disorder' due to concerns that 'pathological' is a derogatory term that reinforces the social stigma of being a 'gambler' (Reilly & Smith, 2013). Other important changes in the DSM-V included exclusion of the diagnostic criteria 'has committed illegal acts such as forgery, fraud, theft or embezzlement to finance gambling', a reduction in the cut-off criteria for diagnosis (from meeting five to four criteria), and the possibility of specifying the severity and state (episodic, persistent or in early or sustained remission) of the disorder, based on the number of diagnostic criteria met.

The rationale for the aforementioned change came from a low prevalence of illegal acts among individuals with a gambling disorder. That is, limited research has found that assessing criminal behaviour helps distinguish between those with a gambling disorder and those without (Reilly & Smith, 2013). Consequently, 'committing illegal acts' is no longer part of the diagnostic criteria for gambling disorder. However, the DSM-V states; "*Individuals may lie to family members, therapists, or others to conceal the extent of involvement with gambling; these instances of deceit may also include, but are not limited to, covering up illegal behaviors such as forgery, fraud, theft, or embezzlement to obtain money with which to gamble*" (DSM-V: American Psychiatric Association, 2013, pg. 586). Therefore, it is recognised that there is an element of criminal behaviour and deceit associated with gambling disorder. However, it is not a primary focus of the diagnosis.

Despite the changes made in the DSM-V, the criteria for gambling disorder remain largely similar to the prior version. These include: 1) needing to stake increasing monetary amounts; 2) experiencing restlessness or irritability when attempting to reduce gambling; 3) an inability to control or stop gambling; 4) preoccupation with gambling; 5) gambling in response to negative affect; 6) gambling to recoup losses; 7) lying about gambling; 8) jeopardizing relationships, work, or educational opportunities due to gambling; and 9) relying on financial bailouts from others to relieve financial pressures related to gambling. A diagnosis of gambling disorder is met when four or more criteria are present in a 12-month period. Gambling disorder is classified on three different levels; those who endorse four to five of the criteria are diagnosed as having mild gambling disorder, those who endorse six to seven as having a moderate gambling disorder and those who endorse most or all (eight to nine) as having a severe gambling disorder (DSM-V). The DSM-V is currently the only recognised *clinical* tool for diagnosing gambling disorder.

1.5 Sub-clinical gambling

Whilst the DSM-V criteria diagnose the presence or absence of a clinical disorder, sub-clinical gambling problems are considered to be of greater prevalence (Reilly & Smith, 2013). Sub-clinical gamblers are those who meet fewer DSM-V criteria than required to be diagnosed as suffering from gambling disorder. However, these individuals can be considered problem gamblers as harmful and negative effects from gambling are experienced by not only themselves but also their families, friends, and colleagues (Rash & Petry, 2014). The National Research Council (1999) emphasised that gambling behaviour is dynamic. Individuals who are social or recreational gamblers can become problem gamblers and problem gamblers can develop a gambling disorder and can also return to social or recreational gambling.

Within the literature, there are a number of ways researchers have referred to problem gambling, such as 'compulsive' and 'pathological' (Potenza et al., 2002). However, 'excessive', 'disordered', 'at risk', 'in-transition', 'level two and three', 'degenerate' and 'potential pathological' are also used within the literature (e.g. State of Victoria Department of Justice, 2005). As such, a plethora of terms will be referred to when discussing the literature included in this thesis. Due to the current research adopting the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) in the studies, when generally referring to gambling problems generally, the term 'problem gambling' will be used.

1.6 Measuring problem gambling

A number of instruments or screens exist to measure problem gambling. As yet, there is no gold standard instrument (Bowden-Jones & George, 2015). Community prevalence surveys measure gambling severity through general screening tools, such as the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) and the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987). The SOGS was based on the DSM-III criteria and identifies the presence of Pathological Gambling in clinical and general population samples (Lesieur & Blume, 1987). With this scale, participants are categorised into one of three categories; non-problem gambler, problem gambler, and probable pathological gambler (Lesieur & Blume, 1987). The SOGS has been widely used within the literature. However, over time there has been a shift in the preferred measure from the SOGS to the PGSI (Office for Problem Gambling; Australia, 2013).

The PGSI is part of the larger Canadian Problem Gambling Index. It was developed by Ferris and Wynne (2001) over a three-year period. As a scale within its own right, the PGSI was developed within a general population survey of over 3,000 Canadian residents.

The instrument has been subject to critical evaluation and was revised in 2003. It consists of nine items and each is assessed on a four-point scale: never, sometimes, most of the time, and almost always. It categorises individuals into one of four categories, (1) problem gambler, (2) moderate risk gambler, (3) low risk gambler, and (4) non-problem gambler. Therefore, the scale takes into consideration problem gamblers and sub-threshold gamblers. The scale authors reported that expert consensus suggests that the scale measures both the construct and operational definition of problem gambling very well. Subsequent statistical factor analysis of the PGSI confirmed that the nine items load onto one factor, which the researchers labelled problem gambling. Consequently, the authors concluded that the PGSI has very good content validity as a measure of problem gambling. The PGSI has been shown to have high diagnostic accuracy with an area under the curve of .94 (Dellis et al., 2014).

Throughout the remainder of this Chapter, the prevalence of problem gambling across different populations, including general population, students and prisoners are discussed. Sex differences in gambling is also accounted for.

1.7 General population prevalence

Population prevalence rates of problem/pathological gambling serve an important purpose in establishing the levels of problem and non-problem gambling in populations. This information is useful in understanding the number of problem gamblers that would benefit from intervention.

The incidence of problem gambling within general populations has been shown to vary. The British Gambling Prevalence Survey (BGPS) in 2010 (Wardle et al., 2011) sampled 7,756 adults using two measures (DSM–IV criteria and the PGSI) and reported 73% of the adult population had taken part in some form of gambling activity in the previous

year. The prevalence of problem gambling varied amongst measures. According to the DSM-IV, 1.5% of men, 0.3% of women and 0.9% overall were reported to be pathological gamblers, whereas a slightly reduced incidence of 1.3%, 0.2% and 0.7% were identified as problem gamblers by the PGSI for men, women and the overall sample. The BGPS revealed higher rates of problem gambling amongst younger adults and lower amongst older adults, for both men and women. The gambling behaviour in Great Britain in 2015 report (Conolly et al., 2017) documented slightly lower prevalence rates than the BGPS with 1.3% of men, 0.2% of women and 0.7% overall classified as a problem gambler according to the DSM-IV. In relation to the PGSI, 1.1% of men, 0.1% of women and 0.6% overall were classified as problem gamblers. However, no national gambling prevalence survey has used the DSM-V as a measure tool, therefore, little is known about more current prevalence rates provided by this criteria.

The Welsh Gambling Prevalence Survey (Gambling Commission, 2016) was designed to be representative of the adult population in Wales aged 16 and over. The authors interviewed 4,048 people from 69 interviewing points throughout Wales. Excluding the national lottery, nearly 45% of respondents reported gambling in the previous 12 months. Just over one percent of individuals were identified as problem gamblers, measured either by the PGSI or DSM IV criteria. Similar to the BGPS, the problem gambling rate was higher for men than women (1.9% and 0.2%, respectively).

Worldwide prevalence rates have been found to vary, which also appears to have been impacted by the use of different measurement tools. For example, in the Gambling Prevalence in South Australian Adults Survey (The Social Research Centre, 2012), 9,402 individuals were randomly sampled using telephone interviews. Using the PGSI to measure the incidence of problem gambling, 0.6% of all South Australian adults were

estimated to be problem gamblers. This is lower than that found in the BPGS. Likewise using the same measure, a comparatively higher prevalence rate was found in the first representative Northern Ireland Gambling Prevalence Survey NIGPS in 2016 (Dunne, Flynn & Sholdis, 2017). The NIGPS reported 4.6% of men, 0.2% of women, and 2.3% were overall classified as problem gamblers, with younger individuals and men showing the highest prevalence. Large meta-analysis studies have also been used to identify gambling prevalence.

Using a meta-analysis, Williams, Volberg and Stevens (2012) identified 202 studies between the years of 1975 and 2012, which involved a jurisdiction wide survey of problem gambling. This was an attempt to standardise problem gambling prevalence rates to allow for comparison between jurisdictions and across time. They found that dependant on the jurisdiction sampled and the time frame of sampling, the prevalence rates of problem gambling varied between 0.5% and 7.6%, with an average rate across all of the countries of 2.3%. The authors reported the lowest standardised prevalence rates of problem gambling tended to occur in Europe, with intermediate rates in North America and Australia and the highest rates in Asia.

Similar to the prior national prevalence surveys, Williams, Volberg and Stevens (2012) found men generally gambled at more severe levels than women. This is also supported by a wealth of previous research that has shown male gender and younger age to be risk factors for problem gambling (Hayatbakhsh et al., 2006; Johansson et al., 2009; Kessler et al., 2008; Volberg et al., 2001; Welte et al., 2002). The number of women gambling is, however, suggested to be increasing (Abbott & Volberg, 1999). As discussed previously, gambling has become increasingly liberalised and this could play a role in any increase in women gambling.

1.8 Prevalence and nature of gambling in student populations

Student populations have been found to display high levels of problem gambling. For example, Ladouceur, Dube, and Bujold (1994) sampled 1,471 Quebec college students and found 90% had gambled previously, whilst 22% reported gambling once a week or more. Similarly, Oster and Knapp (2001) found that between 22% and 24% of college students from the USA gambled once a week or more. LaBrie et al., (2003) reported findings from a USA national survey of college student's gambling behaviour, noting forty-two percent of students reported gambling in the previous year.

It has also been suggested that students gamble at more severe levels than the general population (Blinn-Pike, Worthy & Jonkman, 2007; Lesieur et al., 1991). Shaffer et al., (1999) conducted the first meta-analysis, comparing the reported prevalence rates of disordered gambling among adults and college students in 14 empirical studies from the USA and Canada. For adults in the general population, the mean lifetime prevalence estimates for levels 1, 2 and 3[1] gamblers were 93.9%, 4.2%, and 1.9%, respectively. For students the corresponding problem gambling prevalence estimates were 83.1%, 10.9%, and 5.6%, respectively. This shows the that student gambling prevalence for level 2 and 3 gamblers were considerably higher than the general population. The authors attributed this to risk taking behaviour being normative for young people. Similar to the general population literature, men were more likely to gamble at increased levels in comparison to women.

[1] Although the authors identified over 150 prevalence studies of problematic gambling, the prevalence within the studies was identified through a wide array of criteria and labels to reflect the different severities of the disorder. Therefore, to allow the authors to integrate, categorise and compare the studies, they adopted a system to integrate all of the studies into one severity system: Level 1 referred to non-gamblers and gamblers who experienced no problems; Level 2 referred to problem or at-risk gamblers who experienced problems at a sub-clinical level; and, Level 3 referred to pathological gamblers.

Blinn-Pike, Worthy and Jonkman (2007) conducted the second attempt at using a meta-analysis on studies reporting prevalence rates of disordered gambling among college students in the United States and Canada. They selected 15 studies that used the SOGS measurement tool, with a cut-off point of five or greater to identify disordered gambling. The authors estimated a disordered gambling prevalence rate of 7.9% for students. This rate is substantially higher than the prior meta-analysis (Shaffer et al., 1999) and the discussed national prevalence surveys that used the same measurement tool.

More recently, Nowak and Aloe (2014) extended the meta-analytical literature by conducting an international analysis to establish the prevalence of probable pathological gambling among college students. Their analysis included over 13,000 students from 18 studies between 2005 and 2013. Equivalent to the work of Blinn-Pike, Worthy and Jonkman (2007), they used a SOGS cut off point of five or greater. Their estimated prevalence of probable pathological gambling amongst students was found to be 10.2%. This prevalence marks an increase on the previous meta-analysis (Blinn-Pike, Worthy & Jonkman, 2007) and more than double the prevalence rate reported in the meta-analysis by Shaffer et al., (1999). This suggests that whilst students gamble at much higher rates than the general population, the *severity* of student gambling is also increasing over time. It will remain of interest whether the prevalence is increasing over time in both student and general population gamblers due to increased availability of gambling opportunities. Alternatively, whether students are a specific stand-alone population with unique gambling risk factors, where gambling will reduce in adulthood.

An explanation for the high prevalence rates amongst students comes from Nowak and Aloe (2014) who suggested that students are more susceptible to developing a gambling addiction due to a range of interacting factors that they termed ‘The Five A’s; *Age*, with

research suggesting college students are more susceptible to engaging in a range of risky behaviours due to their young age; *Availability* of a range of gambling opportunities, including online gambling; *Acceptability* of gambling amongst society and in student culture; *Advertising* and the media that promote gambling and portray it as a sport/skilled exercise; and *Access* to monetary funds through student loan and overdraft credit allowances. Furthermore, Arnett (2004) suggested that individuals between 18 and 25 years of age are a unique group of 'emerging adults'. Arnett (2004) suggests that this stage of a person's life is marked by increased risk taking, identity exploration, instability and self-exploration without the protective factors of parental and social controls, which are present during adolescence. Should Arnett's theory hold true, it would suggest that rates of disordered gambling will decrease as students' progress into adulthood. Nevertheless, the substantially higher rates of gambling within this population suggests a need for its awareness in theoretical models and for prevention and treatment effort provisions within universities.

Forensic populations are also samples that have been found to gamble at increased levels. This will be discussed further in the ensuing section.

1.9 Prevalence in forensic populations and gambling and offending.

Despite the DSM-V removing "has committed illegal acts such as forgery, fraud, theft or embezzlement to finance gambling" from the Gambling Disorder diagnostic criteria, research has suggested that a large proportion of those with gambling problems commit crimes (Emshoff, 2008). The types of illegal acts committed by individuals with gambling problems have been found to be largely related to a need to obtain money for continued gambling (Folino & Abait, 2009). Blaszczynski, McConaghy and Frankova (1989) for example, found that 54.1% of problem gamblers seeking help reported having committed

criminal offences, with the majority being non-violent property crimes. Similarly, Meyer and Stadler (1999) interviewed 437 gamblers from self-help groups and found comparable results, with over half the participants reporting committing a financial gambling-related offence. In another study that sampled those who telephoned a gambling helpline, Potenza et al., (2001) concluded that nearly half of the participants reported committing criminal acts specifically related to their gambling. Not all studies have found such trends however. Sommers (1988) found only 3.8% of 83 randomly selected Gamblers Anonymous members committed or considered offending to finance their gambling. This suggests that whilst offending is reported in those seeking treatment for their gambling problems, it is not reported by all gamblers seeking support. Notwithstanding, it does appear that gamblers seeking treatment who do offend tend to do so for financial gain. The literature regarding prisoner samples shows somewhat different outcomes.

Prisoners have been found to gamble at increased rates in comparison to the general population (Abbott & McKenna, 2005; Abbot, McKenna & Giles, 2005; May-Chahal et al., 2012). This was demonstrated in a UK based prison study where 10.4% of men and 5.9% of women prisoners were identified as problem gamblers (May-Chahal et al., 2012). This is higher than the 1.3 and 0.2% prevalence rates found for men and women respectively, using the same measure in a general population survey (British Gambling Prevalence Survey, 2010). Yet, it is unclear whether this gambling or prior to or during their incarceration. However, May-Chahal et al., (2012) recruited small samples from two prisons, with a large proportion of prisoners aged 25 years and younger. As discussed previously, young adults have been found to gamble at more severe levels. Therefore, it is plausible that younger prisoners may gamble at increased levels in comparison to adult prisoners. As such, May-Chahal et al's., (2012) research may not be representative of the

wider prisoner population, nor cannot it be reliably compared with general population studies.

Williams, Royston and Hagen (2005) reviewed the problem gambling prevalence literature in forensic populations. They identified 27 published and unpublished studies, the majority of which took place in the USA, New Zealand and Australia. They found that one-third of the prisoners were problem or pathological gamblers. In addition, they reported that the percentage of gambling-related crime committed by prisoners who were either problem or pathological gamblers ranged between 11% and 100%, with an average of 50%. Whilst these estimates indicated that on average half of the prisoners committed crimes *unrelated* to gambling, their parameter shows a large disparity between the studies with regard to gambling related crime. The 50% average, therefore, provides little information.

In another study, Abbot and McKenna (2005) sampled 94 newly sentenced women prisoners. Only 26% of the sample reported that they had been convicted of a gambling related crime. The problem gamblers reported both first offending and being convicted earlier than non-problem gamblers. However, only two participants reported that their early offending was related to gambling. Furthermore, the problem gamblers reported a range of both gambling-related and non-gambling related criminal activities and involvement with the criminal justice system. This suggests that there is a difference in the nature of offending committed between treatment seeking problem gamblers and problem gambler prisoners, with the latter displaying criminal diversity and not merely acquisitive offending to finance gambling. However, this study utilised a small sample of female prisoners that cannot be generalised to all prisoners.

Research using male prisoners have found similar findings. For example, using a sample of 357 newly sentenced male prisoners, Abbott, McKenna and Giles (2000) found forty-three percent of the identified pathological gamblers had committed a financial gambling-related crime. However, general offending preceded gambling-related offending in 95% of the sample. Likewise, in a larger study, Westphal, Rush and Stevens (1998) sampled 1,673 prisoners from 18 prisons in the USA and found that 40 percent were identified as problem gamblers. Of these individuals, only 4% reported that their imprisonment was related to gambling activities. Similar findings have also been reported in young offenders. Winters, Stinchfield and Fulkerson (1993) for example, sampled 843 young offenders from the USA and identified that 29% were problem gamblers and an additional 39% pathological gamblers. The authors reported that only 9% were imprisoned due to offences related to their gambling. This suggests that in contrast to treatment seeking gamblers, prisoner problem gamblers display diversity within their offending and do not offend solely for financial gain.

Support for a link between both gambling related and non-gambling related offending comes from Blaszczynski and Nower's (2002) Pathways Model of Problem and Pathological Gambling. This model proposes that there is a subtype of gambler, Antisocial Impulsivist gamblers, who are impulsive and antisocial in nature and engage in a variety of criminal behaviour independent of their gambling. Research examining the Pathways Model is limited. However, the prisoner-based studies support the Antisocial Impulsivist pathway, which suggests that there is generally an antisocial subgroup of gamblers, rather than gamblers that offend only to gain money for continued gambling, which the model does not support. It is therefore a plausible explanation that there are different subgroups of gamblers and treatment seeking gamblers represent a unique

population who are not generally antisocial, however can turn to offending as their problems escalate.

Whilst both prisoner and treatment studies are useful to explore gambling and offending, value can also be given to community studies. There has been some, albeit limited, community research suggesting a link between gambling and aggression. The US National Gambling Impact Study Commission (1999) proposed that increases in gambling availability would increase violent crime, particularly domestic violence and child abuse. A study that supports this assertion was completed by Muellman et al., (2002) who sampled 286 women admitted to an emergency department in a US Hospital. They found that those participants whose partner was a problem gambler were 10.5 times more likely to be a victim of intimate partner violence (IPV). The authors concluded that problem gambling predicted intimate partner violence in the sample.

Whilst a wealth of research has used convenient or treatment seeking samples, Roberts et al., (2016) used data from a large UK general population survey to examine the relationship between gambling and violence including IPV. Pathological and problem gamblers were more likely to report committing violence. Whilst this relationship reduced after controlling for mental illness, impulsivity and drug and alcohol misuse, it remained significant. Whilst the relationship between gambling and violence is still emerging, this research suggests a clear link in a general population sample. Yet, the nature of the violence used by gamblers remains unknown and further research is needed to fully understand this.

In a recent large US nationally representative survey, Roberts et al., (2018) used data from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC) and examined links between problem gambling and future intimate partner violence. The

authors found that perpetration of IPV increased with gambling severity for both men and women. Whilst this association remained after controlling for the effects of other disorders (e.g. mood and anxiety disorders, alcohol and drug abuse and personality disorders), it was substantially reduced. A relative strength of this research is the large data set it used from a longitudinal design. Yet, it does suggest that a multitude of factors play a role in both IPV and gambling behaviour. As such, in understanding gambling behaviour, value can be sought from psychological perspectives and also theoretical models that incorporate numerous factors related to gambling.

In summary, this Chapter has discussed what gambling disorder is and how it is measured in both clinical and community surveys. It has also discussed the prevalence rates of gambling disorder in community and student gamblers and within forensic populations. Whilst the latter two groups are suggested to display more severe gambling, prevalence rates alone do not provide information regarding the motivations or functions for gambling. It is clear that there is disparity in the gambling severity and behaviours of gamblers, which suggests all gamblers do not represent one group with the same traits. There is a range of psychopathology that has been linked to gambling disorder and the ensuing section will discuss this along with motivators of gambling behaviour. Understanding gambling related comorbidities and motivations will help to gain a deeper understanding of the heterogeneity of the disorder. In turn, this will also assist in the ongoing development of theoretical models of gambling.

CHAPTER 2.
GAMBLING MOTIVATIONS, CORMOBIDITIES AND PROTECTIVE FACTORS

2.1 Introduction

Knowledge regarding the motivations for gambling and its co-morbidity is important for understanding the aetiology of problem gambling, as well as for the design of integrated multifactorial models of gambling behaviour. Few large representative population and national studies of co-morbidity in the gambling field have been conducted, and a sophisticated understanding of these relationships is lacking (Petry, et al., 2005). Most studies of this nature that have been conducted have focussed on telephone surveys that have had low response rates. Other studies have explored comorbid psychopathology in treatment seeking gamblers, which cannot be generalised to the wider gambling population. This Chapter provides an overview on motivation to gamble, comorbidities and protective factors for problem gambling. It commences with a discussion on the commonly reported motivators for gambling. It then moves on to discuss the literature in relation to comorbidities, which are common co-occurring disorders with problem gambling, including mood/affective disorders, substance use, impulsivity and personality disorders. A focus will be placed on population surveys as they have been suggested to represent the most accurate account of co-morbidity (Myrseth, 2011). It will also discuss literature from specific populations such as community sampled gamblers, students, and treatment seeking gamblers.

This Chapter will finalise with a discussion of the emerging protective factors for problem gambling including resilience, life satisfaction, social support and having self-control. The inclusion and exploration of protective factors aims to allow the potential for a model

to be built that is based not only on risk factors for problem gambling, but also protective factors that have been neglected from current theoretical models of gambling.

2.2 Motivation to gamble

Researchers have identified that individuals gamble for many different reasons (Chantal, Vallerand & Vallieres, 1995). This includes gambling to experience excitement (Platz & Millar 2001) or as a means of 'escaping' from their daily routines (Loroz, 2004). For others, it may provide a means to socialise (Lee et al., 2006), or to win money (Park et al., 2002). Therefore, gambling can be either intrinsically (e.g. entertainment, enjoyment, coping) or extrinsically (e.g. financial gain) motivated.

Stewart and Zack (2008) proposed a three-factor model to explain motivations for gambling behaviour. It comprises three motives; a coping motive that reduces negative affect; a social motive, for those who gamble with friends as a leisure activity; and an enhancement motive, which has a function of increasing positive affect (Lee et al., 2007). The Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008) showed the enhancement, coping and social subscales to have good reliability[2] and concurrent validity in measuring gambling motives.

In addition, it has been well validated within the literature (e.g. Dechant, 2014; Mackinnon, Lambe & Stewart, 2016; Rodriguez et al., 2015). Similar to the coping and enhancement motives within the GMQ (Stewart & Zack, 2008), Rickwood et al., (2010) suggest that there are two main functions of gambling behaviour; to enhance positive affect (when gamblers experience subjective excitement and arousal), and to reduce or

[2] Stewart and Zack (2008) reported Cronbach's alpha score of .91, .81 and .86 for the enhancement, social and coping subscales respectively.

escape from negative affect (such as stress, anxiety and/or depression). Similar functions of gambling were also suggested by Jacobs (1986).

Jacobs (1986) suggested that gamblers have an ability to narrow their attention and escape from unpleasant affect. This has been suggested as an explanation as to why, for some, gambling is a maladaptive coping strategy that helps them forget their problems or reduce emotional distress and/or tension. In a qualitative study of 50 adult problem gamblers, Wood and Griffiths (2007) sought to further explore the role of coping by seeking to understand the role gambling plays in the participant's lives. The sample reported that gambling to 'escape' was the main function for continued gambling, despite persistent losses and participants recognising that it would not solve their problems. In addition, the participants suggested that gambling helped them to escape from reality by temporarily modifying their mood or arousal through fantasies of winning or experiencing a high from gambling.

A range of other studies have found that individuals gamble as a function of maintaining optimal levels of arousal. This has been shown to be prevalent in both general gambler (Blaszczynski & Nower, 2002; Lloyd et al., 2010; Raylu & Oei, 2002; Wood & Griffiths, 2007) and student (Gupta & Derevensky, 1998) populations. Subsequently, it forms a major part of a number of theoretical models of gambling (e.g. Blaszczynski & Nower, 2002; Jacobs, 1986).

In a study assessing the motivations to gambling in a sample of 184 students, Neighbours et al., (2002) found similar motivations for gambling to the GMQ, such as for fun (23%), socialising (11.2%) and excitement (7.3%). The greatest reported motivator for the students, however, was to win money (42.7%), a motive not accounted for by the GMQ. Similarly, in a 1995 random telephone survey by Mississippi State University Gambling

Group, 1,522 adults were sampled and asked about their motivations to gamble. The strongest motivation reported was financial gain (50.5%), followed by entertainment (33.4%), excitement (18.4%), curiosity (10.6%) and socialisation (9.5%) (Lee et al., 2007). Whilst financial gain has been suggested as a motivator to gamble in both students and community samples, this does not serve to explain why people do not stop gambling when they lose significant amounts of money and when it has detrimental impacts on their employment and relationships.

As a possible explanation, Shead and Hodgins (2009) reported that thoughts of increased financial gain generates excitement and enhances positive affect in gamblers. They further reported that the social aspect of gambling adds to this positive affect through enhancing social integration, stimulation, self-esteem and a positive sense of recreation/leisure. Therefore, whilst gamblers may specifically report gambling for financial gain, it is possible that their gambling is also facilitated by a need to manipulate affective states.

Rickwood et al., (2010) suggest that problem and non-problem gamblers show similar motivations for their gambling. However, for problem gamblers, the motivation is reported to be more intense. In particular, for problem gamblers, winning money (chasing losses) and relieving stress, tension and emotional distress have been shown as strong moderators of continued gambling (Rickwood et al., 2010). However, there is little research with regard to the motivations of gamblers who gamble at different severities (i.e. non-problem, low risk, moderate risk and problem gamblers). Therefore, Rickwood's (2010) assertion has not yet received empirical support and further research is needed.

The focus of the next section of this Chapter will be on discussing in more detail the link between gambling and affective states, which have been suggested to be a key feature in

problem gambling. It will also discuss the links between gambling and other related comorbidities that have had a strong presence within the literature, such as substance use, impulsivity and personality disorders.

2.3 Gambling comorbidities

Comorbidity is defined as the co-occurrence of one or more disorders either at the same time or in some causal sequence (Kessler, 1995). There are several explanations as to why comorbid disorders occur (Caron & Rutter, 1991). The first of these is that there is a direct causal relationship between the disorders, with the presence of one disorder making another more likely to develop (Teesson et al., 2005). An example of such causal relationship is where an individual who suffers with a mental health problem uses substances to cope with their illness and develops a dependency on the substances (Khantzian, 1985). Alternatively, substance use problems can precipitate mental health problems (Teesson et al., 2005), such as drug use influencing the onset of psychosis or depression (Blanchard et al., 2000; Schuckit et al., 1997).

Whilst there is evidence for causal relationships between two disorders, they do not account for potential other variables that could account for such association. For instance, it has been suggested that common predisposing factors may play some role in increasing the likelihood of two disorders occurring (Teesson et al., 2005; Tsuang et al., 1998). This argument suggests that pathways and/or risk factors can be the same for more than one disorder. For example, some common etiological factors have been found to be predisposing factors for multiple disorders, including neurotransmitter function (Koob & Le Moal, 2001), genetic vulnerability (True et al., 1999), personality (Eysenck & Eysenck, 1991) and social and environmental factors (True et al., 1999).

Knowledge of the common co-occurring disorders with gambling are important in understanding the broad spectrum of the disorder. This understanding also has important implications for the development of robust integrated models of problem gambling that incorporate the heterogeneity of the disorder. Affective disorders have been widely related to problem gambling within studies and theory (e.g. Blaszczynski & Nower, 2002). The link between gambling and affective disorders will be documented next, followed by other problem gambling comorbidities.

Mood/affective disorders

Affective disorders have been widely linked to increased gambling severity. In one of the largest and most methodologically rigorous epidemiological studies completed to date, Petry, Stinson and Grant (2005) used data from the National Epidemiologic Survey on Alcohol and Related Conditions. They used face to face interview data from a large sample of 43,093 individuals aged 18 years and older in the United States. A strength of this study is that they examined gambling severity differences and a range of mental disorders using the DSM-IV diagnostic criteria. The researchers found significantly higher rates of major depression, dysthymia and bipolar/manic episodes for pathological gamblers (37%, 13%, and 23%, respectively) compared to non-gamblers (12%, 4%, and 3%, respectively). The associations between the disorders and gambling were stronger among women than men.

In a later study, Kessler et al., (2008) also used data collected in face-face interviews for a nationally representative household survey (US National Comorbidity Survey Replication) assessing the lifetime prevalence of problem gambling along with other disorders. Similar to Petry et al's., (2005) survey, Kessler et al., (2008) found over half of the problem gamblers suffered from a mood disorder. The authors also obtained

information regarding age of onset for each of these disorders, which other studies have largely neglected. They found that the age of onset for anxiety disorders was earlier than the onset of problem gambling, whilst major depressive disorders and alcohol/drug disorders occurred after the onset of problem gambling. This study suggests that some mental disorders are risk factors for problem gambling, whereas others could be a consequence of problem gambling. Yet, these disorders were reported by the participants retrospectively and as such could be subject to recall bias. Furthermore, whilst this provides useful information with regard to the order of onset of disorders, it does not provide any information regarding potential causal links or other factors that have influenced the development of problem gambling. For example, the prevalence of anxiety within the UK has been estimated to be approximately 6.6% (McManus et al., (2016). This is significantly higher than the prevalence rate for problem gambling within the UK documented in Chapter One. Consequently, this suggests other factors in addition to anxiety, play a role in the development of problem gambling, such as impulsivity, personality disorders and other mood disorders.

El-Guebaly et al., (2006) completed another large national prevalence study using a random sample of Canadian community residents (14,934 participants, aged 18-64). In contrast to previous nationally representative studies (e.g. Kessler et al., 208; Petry et al., 2005) that have made comparisons using dichotomous variables (e.g. pathological vs non-pathological gamblers), El-Guebaly et al., (2006) compared participants within the gambling severity categories of the PGSI. However, due to having limited participants within the 'problem gambling' group, they merged the moderate risk and problem gambling groups, subsequently having three comparison groups. This allowed them to make comparisons throughout the spectrum of the disorder in community residents using a well validated tool designed for general population surveys. Although the authors did

not identify cause and effect between mood and problem gambling, they found that the moderate risk/problem gamblers were 1.7 times more likely to have a mood or anxiety disorder. In addition, those with both a mood/anxiety and a substance/alcohol disorder were five times more likely to be moderate/high severity gamblers, suggesting a strong comorbidity between affective and addictive disorders in the general population.

In a recent study, Barrault, Bonnaire and Herrmann (2017) recruited 416 participants from an online poker forum. Yet again, they did not identify differences between participants along the spectrum of gambling disorder and focussed solely on comparing differences between problem and non-problem gamblers. They also did not attempt to identify any causal effects. Nevertheless, they recruited a sample that has had limited representation in the literature and found that anxiety and depression were significantly higher among problem gamblers than non-problem gamblers.

Anxiety and/or depression has also been linked to gambling in samples other than the general population, such as in students and treatment seeking gamblers. For instance, in a study of 155 students, Oei and Goh (2015) revealed both anxiety and depression to be related to more severe gambling involvement. Likewise, Atkinson et al., (2012) recruited 448 college students and found gambling severity to be significantly associated with negative affect. Further, in a sample of 1,430 US university students, Martin et al., (2014) found that disordered gambling, problem drinking, anxiety and depression were all significantly associated with each other. This was, however, with the exception of disordered gambling and anxiety that were, surprisingly, not related to each other. In contrast to the documented nationally representative surveys, the sample sizes of the aforementioned student samples were small, which limits the generalisability of the findings to the wider student population, particularly outside the USA. Nevertheless, there

does appear to be a link between affective disorders and increased gambling in this population.

As discussed in Chapter One, students have been shown to report increased gambling in comparison to adult counterparts (Blinn-Pike, Worthy & Jonkman, 2007). Research has also indeed found that students report increased anxiety and depression (Eisenberg et al., 2007). Whilst it is clear that these two disorders are present at increased levels, it remains unclear why this is the case and the causal link between them. As such, further research exploring gambling comorbidities in students populations is certainly needed.

Treatment seeking gamblers are also a population that have been found to display high levels of comorbid psychiatric disorders. In a sample of 75 pathological gamblers seeking behavioural treatment, Blaszczynski and McConaghy (1989) reported that pathological gamblers had significantly increased levels of anxiety and depression. In a later study of 127 treatment seeking problem gamblers, Hounslow et al., (2011) explored the predictors of gambling severity. They found that their sample reported in the extremely severe range on the depression (37.5%), anxiety (22.8%) and stress (20.5%) scales. Depression emerged as a significant predictor of problem gambling severity. Anxiety, however, did not significantly predict problem gambling severity. Treatment seeking gambler studies have recruited small sample sizes, which could limit the generalisability to wider problem gamblers. In addition, the studies have relied on looking at the nature of the comorbidities that are present in problem gamblers and have not used non-problem gamblers as a control sample. It is possible that the anxiety and depression reported by treatment seeking problem gamblers could in part be a result of other factors related to their gambling, such as potential problem with relationships, employment and finances. However, such variables do not appear to have been explored in the aforementioned research.

Nevertheless, they have used a specific clinical sample, which could explain the limited recruitment of participants, with fewer participants being available and willing to take part in research. Overall it would appear that there is a high comorbidity of anxiety and depression in those seeking treatment for gambling problems.

The discussed literature has identified links between some affective disorders and gambling severity in a range of samples. However, there remains uncertainty in the type of affective disorders specifically linked to gambling. With the exception of Kessler et al's., (2008) nationally representative study, there has been little focus on whether the affective disorders have been a risk factor for, or a consequence of, gambling. It has been suggested (e.g. Thomsen et al., 2009) that those with a major depressive disorder gamble as a means of escaping their depression. This suggests that depression commences prior gambling involvement. In contrast, however, other studies have reported that depression does not precede gambling and is instead a reaction to the negative consequence of gambling disorder (i.e. Becona, Del Carmen Lorenzo & Fuentes, 1996). Therefore, there remains limited information regarding the cause and effect between gambling and affective disorders and further research is needed.

A factor that has been linked to both affective disorders and problem gambling is that of substance misuse. The next section will discuss the research that has been conducted on the association between substance misuse and gambling. Knowledge of the multimorbidity of gambling is crucial in both understanding the disorder and to the development of integrated models of gambling pathology.

Substance use

As discussed in Chapter One, there appears to be overlap in the construct that is present in the DSM-V gambling disorder and alcohol and drug use disorders (Rash, Weinstock

& Van Patten, 2016). For example, with both gambling and substance use, 'tolerance' increases as the problem behaviour escalates. There are also similarities in the withdrawal symptoms of substances and gambling, such as irritability, restlessness and low mood (Rosenthal, 1992).

An association between substance misuse and gambling has been supported within the literature. Individuals with substance dependence are reported to be five times more likely to report experiencing moderate/high gambling severity (e.g. El-Guebaly et al., 2006). Such link has been supported in large nationally representative studies. For example, in a telephone survey of 2,631 adult US residents, the National Gambling Impact Study Commission (1998) found that problem gamblers had approximately seven times the amount of alcohol dependence in contrast to the general population or recreational gamblers (National Opinion Research Centre, 1999). Similar findings have been reported in the British Problem Gambling Prevalence Survey (2010), where problem gambling prevalence was significantly higher in those who consumed high levels, compared to moderate levels, of alcohol.

Petry, Stinson and Grant (2005) conducted a nationally representative US survey on a much larger scale than the National Gambling Impact Study Commission (1998). Sampling 43,093 households, they found that almost three quarters (73.2%) of the identified pathological gamblers had an alcohol use disorder, and 38.1% and 60.4% had a drug use disorder and nicotine dependence, respectively. In another study, Kessler et al., (2008) used data from a nationally representative US household survey of 9,282 participants aged 18 and older. Nearly half of the problem gamblers in this study reported that they had sought treatment for either a mental disorder or a substance use disorder. Kessler et al., (2008) extended the nationally representative literature base by exploring

the onset of gambling and substance misuse and found that problem gambling predicted the onset of substance dependence. This could suggest that problem gamblers are using substances as a way of coping with their gambling problems.

Whilst a wealth of studies examining co-morbid addictive disorders have been conducted in the US, Roberts et al., (2017) adopting a large (n=3,025 men between the ages of 18 and 64) nationally representative sample of UK men. They assessed the relationship between gambling, trauma and life stressors, whilst also considering the roles that drug and alcohol use may play. The authors found that both pathological gamblers and problem gamblers were more likely to report drug and alcohol dependence. Furthermore, pathological gamblers were more likely to report having experienced a traumatic event and a stressful life experience. This suggests that there is a link between affective disorders, substance misuse and gambling. Consequently, all three variables should be considered in understanding problem gambling and taken into consideration in theoretical models of gambling. The authors adopted a cross-section design and as such causality between gambling, drug and alcohol use cannot be inferred. Nevertheless, they found clear comorbidity between current problem gambling and substance use in a nationally representative sample, which suggests that there is a strong link between the disorders.

As discussed previously, research has suggested that students are a population who engage in multiple risky behaviours, including gambling and substance use. A study examining such link was conducted by Cronce et al., (2016) who sampled 1,834 students and explored the association between the independent and co-occurring use of alcohol and cannabis before and during gambling. They found that those who reported using alcohol and/or cannabis prior to/during gambling reported gambling more severely than

those who used substances generally, but not whilst gambling. This suggests that alcohol and/or cannabis can increase risk taking behaviour if used when gambling. This study was, however, conducted at a single campus and thus cannot be generalised to the wider student population.

In another study, Afifi et al., (2016) completed both a cross sectional and a longitudinal study regarding 'at risk' gambling, problem gambling and substance use disorders in a sample of 517 young adults. The authors found that at-risk and problem gambling was associated with increased alcohol dependence and illegal drug use in both their cross sectional and longitudinal studies. Although speculative, this could suggest that problem gamblers use substances as a means to escape from their gambling problems. Yet, as discussed, young adults have been found to engage in various risky activities and therefore these could represent some of the problematic behaviours they engage in.

Studies using treatment seeking samples of problem gamblers have also found comorbid substance use disorders. For example, Crockford and El-Guebaly (1998) found that with both community and treatment seeking samples, between 25% and 63% of problem gamblers met the criteria for a substance use disorder. Further, in a sample of sixty-nine pathological gamblers who applied to a specialised treatment program, Ibanez et al., (2001) found that 33% reported alcohol dependence. However, these studies did not document the onset and function of the substance misuse. It also remains unclear whether substance use has the same function as gambling for those seeking treatment or whether it is a method of coping with the problems associated with their gambling. As such, the research thus far does not explain the presence of the comorbidity.

Kausch (2003) extended the literature by assessing the onset of substance use and gambling disorder in a sample of 113 inpatients admitted to a gambling treatment

programme. Approximately 66% of pathological gamblers had a lifetime history of substance abuse or dependence at some point in their lives, with alcohol being the most commonly used substance, followed by marijuana and cocaine. They reported that, in gamblers with comorbid disorders, the onset of substance dependence preceded the onset of problem gambling. However, this directly contradicts the documented findings of Afifi et al's., (2016) longitudinal study. Whilst Kausch (2003) relied on retrospective reporting, the inconsistent findings raise questions with regard to the relationship between gambling and substance misuse. It was also reported in this study that pathological gamblers engaged in other impulsive behaviours, including suicide attempts and compulsive sexual behaviours. It is therefore possible that these gamblers did not begin to use substances to cope with their gambling problems, rather they are a population more prone to generally engaging in risk taking behaviours. A small sample was adopted in this study that cannot be widely generalised. As such, it is becoming apparent that further research is needed in a range of samples to understand the association between gambling and substance use.

Research has also examined pathological gambling among those being *treated* for substance abuse. In a review of the problem gambling and substance misuse literature, Spunt et al., (1998) found that problem gambling rates among those who abuse substances (alcohol and other drugs) was four to ten times that of the general population. Furthermore, in a recent study, Himelhoch et al., (2016) sampled 185 participants from a methadone maintenance programme in the US. Nearly half (46.2%) of participants met the DSM-V criteria for gambling disorder. Langenbucher and Merrill (2001) analysed data from 372 participants at eight addiction treatment centres in five north-eastern states in the USA. A strength of this study is that it sampled participants from multiple sites, which previous studies have neglected to do. The researchers found that 14% of male and 10% of female participants were identified as pathological gamblers. Furthermore, the

participants who were identified as having both a substance use and gambling disorder also displayed significantly increased rates of impulsivity and antisocial personality symptoms. This suggests that individuals with more than one addictive disorder also have dysfunctional personality related symptomology that needs to be understood and integrated in theoretical models. Again, this research suggests that there are clearly high rates of comorbidity between gambling and substance misuse in those seeking treatment. It is plausible that patients receiving treatment, by definition, may be more likely to have more severe psychopathology. Nevertheless, the literature suggests a link between problem gambling and substance use regardless of it being an epidemiological, treatment seeking or student sample.

In relation to wider gambling related psychopathology, research supports the notion that gambling and substance misuse have similar associated risk factors. For example, Winters and Anderson (2000) noted the likelihood of gambling and substance misuse having overlapping comorbidities such as depression, experiences of sexual abuse, and delinquency. Other research with male youths has viewed both problem gambling and substance misuse as underlying behavioural disorders with similar risk factors, such as impulsivity, low parental supervision, deviant friends, theft and violence (Vitaro et al., 2001; Wanner et al., 2009). However, whilst this has been found in youth gamblers, in adult gamblers it has been suggested that antisocial behaviour does not precede gambling but is a consequence of addictions (Ferentzy, Skinner & Matheson, 2013).

Within the literature, there is a clear co-occurrence between problem gambling and substance use, with these disorders co-occurring in a range of samples. This has led some researchers to conclude that problem gambling is best understood from a broader ‘addictive behaviours spectrum’, with problem gambling and substance misuse having

the same underlying construct (Jacobs, 2000; Molde et al., 2009). As discussed in Chapter One, the view that substance use and gambling disorder sharing an underlying construct has also been illustrated in the DSM-V through the reclassification of gambling to an addictive disorder.

As noted, there have been associations between personality traits and gambling disorder. A trait that has been particularly associated with both problem gambling and offending is that of impulsivity.

Impulsivity

Impulsivity has been defined as a predisposition toward rapid, unplanned reactions to internal or external stimuli with little thought given to the negative consequences of these reactions (Moeller et al., 2001). Impulsivity is generally viewed as a multidimensional construct that encompasses affective, cognitive and behavioural components that vary in severity between individuals (Hodgins & Holub, 2015). Clinically, it has been shown to be associated with numerous mental health and personality disorders, such as antisocial and borderline personality disorders, attention deficit, eating and substance use (Sharma et al., 2014; Turner, Sebastian & Tuscher, 2017).

Impulsivity is one of the most robust characteristics associated with problem gambling (MacKillop et al., 2014). Like substance use disorders, gambling disorder has been associated with heightened impulsivity and deficits in impulse control (Leppink, Redden & Grant, 2016). Therefore, despite the reclassification of gambling disorder in the DSM-V from an Impulse Control Disorder to an Addictive Disorder, impulsivity remains a robust characteristic positively associated with problem gambling (American Psychiatric Association, 2013; MacKillop et al., 2014).

A wealth of studies have identified significantly higher levels of impulsivity in problem gamblers compared with non-problem gamblers/control groups (e.g. Brevers et al., 2012; MacLaren et al., 2011; Steel & Blaszczynski, 1996; Petry, 2001). For instance, meta-analyses have found the difference between problem gamblers and control groups to be of medium effect size and statistically robust across studies (MacKillop et al., 2011; MacLaren et al., 2011). In correlational studies, indices of impulsivity have been positively associated with problem gambling (Alessi & Petry, 2003; MacKillop et al., 2014; Raylu & Oei, 2002; Shead et al., 2010). For example, in an exploration of 23 predictors of problem gambling severity, Chiu and Storm (2010) found that trait impulsivity was the strongest predictor.

Whilst the aforementioned cross-sectional studies cannot infer directionality, longitudinal designs argue for a causal etiological role between impulsivity and gambling (Cyders & Smith, 2008; Vitaro, Arseneault, & Tremblay, 1999). For example, a number of studies (e.g. Liu et al., 2013; Nower, Derevensky, & Gupta, 2004) have found adolescents who display high levels of impulsivity are more likely to develop a gambling problem in adulthood. Likewise, measuring impulsivity through a battery of cognitive, sensory and motor tasks in children at aged seven, Shenassa et al., (2012) found that children exhibiting impulsivity were three times more likely to develop gambling problems in adulthood. Furthermore, in a sample of students, Cyders and Smith (2008) found that impulsivity prospectively predicted increases in gambling over the course of the academic year. This suggests that trait impulsivity is an important factor contributing to the risk of gambling becoming a problematic behaviour for the impulsive individual.

Impulsivity has also been found to be related to gambling in clinical samples. Whilst such studies using specific samples are useful to understand the disorder in those seeking help

for their problems, as with the treatment studies illustrated in the prior sections, they have all adopted small sample sizes which limits the generalisability that can be made. Nevertheless, large nationally representative surveys regarding links between impulsivity and gambling remain to be undertaken, therefore, value can be taken from treatment studies. In a sample of 103 pathological gamblers seeking treatment, Gonzalez-Ortega et al., (2013) found impulsivity in men predicted problem gambling severity, but not women. Leblond, Ladouceur and Blaszczynski (2003) found impulsivity to be related to drop-out from gambling treatment. Similarly, Maccallum, Blaszczynski and Ladouceur (2007) found impulsivity to be associated with treatment failure and relapse in a sample of treatment enrolled problem gamblers. Therefore, whilst impulsivity has been linked with increased gambling, it has also been implicated as an interfering factor in those seeking treatment due to those with increased impulsivity having a tendency to make rash decisions.

Notwithstanding a breadth of supportive findings, there have been studies that have not supported a link between impulsivity and gambling. For instance, Langewisch and Frisch (1998) explored gambling behaviour and pathology in relation to impulsivity, sensation seeking and risky behaviour in a sample of 144 male undergraduate university students. Nearly 33% of the students were classified as pathological gamblers. However, in contrast to the prior documented research, impulsivity was not a unique predictor of pathological gambling. The authors, however, failed to compare the levels of impulsivity between the pathological and non-pathological gambler students, which could have provided useful information.

Despite utilising a small sample size and an absence of matching the control group with the pathological gamblers on demographic characteristics or other factors that could have

influenced levels of impulsivity, Allcock and Grace (1988) found that pathological gamblers did not differ from the non-patient group on either sensation seeking or impulsivity. This suggests that whilst there is a clear link between gambling and increased impulsivity, not all problem gamblers display this trait. Thus far this Chapter has identified that there is other negative pathology associated with problem gambling. Consequently, it appears that there could be groups of problem gamblers that report different personality, affective and addictive traits and symptoms.

Inconsistencies within the gambling literature could also arguably be due to variations in how impulsivity has been measured (i.e. self-report, clinician-administered, or computerized) (Leppink, Redden & Grant, 2016). Cyders et al., (2007) defined the components of impulsivity as follows: (1) lack of planning (a failure to plan ahead); (2) lack of perseverance (a failure to maintain vigilant attention on a task); (3) sensation seeking (the tendency to pursue novel or thrilling experiences); (4) negative urgency (the tendency to act rashly when upset); and (5) positive urgency (the tendency to act rashly when experiencing an unusually positive mood). Empirical studies have found that only some of these factors are related to problem gambling, whilst others are not.

MacLaren et al., (2011) undertook a meta-analysis to investigate impulsivity traits as predictors of pathological gambling. They found significant effects for both increased negative urgency and lack of premeditation, but no substantial effects for lack of perseverance or sensation seeking. Likewise, Blain, Gill and Teese (2015) conducted a cross-sectional study of 200 community recruited Australian gamblers and found negative urgency, positive urgency and sensation seeking to be positively related to problem gambling, while lack of premeditation and lack of perseverance were unrelated. In addition, multiple regression analyses revealed that positive urgency and negative

urgency[3] were the only significant predictors of problem gambling, suggesting that individuals who have a tendency to act rashly when in a positive or negative mood are more likely to become problem gamblers. As noted previously in this Chapter, increased affective states have been linked with problem gambling. This highlights the importance of the multiple-comorbidities associated with gambling being understood.

Impulsivity has also been found to be highly related to other comorbidities of gambling behaviour. Estevez et al., (2015), for example, explored the symptomology of gambling behaviour in 1,241 adolescents and young adults. Both adolescent and adult problem gamblers displayed increased levels of anxiety, depression, hostility, obsessive–compulsive behaviour and somatisation, as well as sensation seeking, impulsivity and addictive behaviour. Moreover, impulsivity partially mediated the presence of anxiety, depression and psychosis and perfectly mediated somatization, obsessive–compulsive behaviour, interpersonal sensitivity, paranoid ideation and hostility, with gambling severity. Furthermore, impulsivity has also been shown to be a mediator between depression and problem gambling (Clarke, 2006). This illustrates that gambling is a complex addiction that is associated with other disorders and personality traits. The knowledge of such relationships and co-occurrence is crucial in order for it to be fully captured within models of gambling.

Impulsivity thus appears to play a significant role in the aetiology of problem gambling across a range of samples. The majority of these studies have focused on pathological gamblers, with less being known about the role impulsivity plays in non-pathological gamblers, but those who still experience gambling problems. The reason for the enduring

[3] Positive and negative urgency refer to the tendency to engage in rash, poor-considered behaviour when experiencing strong emotions positive and negative emotions, respectively.

nature of problem gambling is unclear, which points to a more significant role perhaps of personality.

Personality Disorder

A personality disorder is an enduring pattern of experience or behaviour that differs markedly from the expectations of an individual's culture, is pervasive and inflexible, constant over time and leads to impairment (American Psychiatric Association, 2013).

Pathological gamblers have been found to have significantly higher rates of personality disorders than non-pathological gamblers (e.g. Vachon & Bagby, 2009). Desai and Potenza (2008) conducted a large epidemiological study involving 43,093 individuals grouped into non-gamblers, low risk, moderate risk and problem gambler categories. A number of personality disorders were screened for, namely avoidant, dependent, antisocial, obsessive-compulsive, paranoid, schizoid and histrionic. The authors found that as the number of gambling problems increased, the likelihood of having more than one personality disorder increased. However, with the exception of antisocial and histrionic personality disorders, the authors did not assess for any cluster B[4] personality disorders, which have been suggested to be the most prevalent in problem gamblers (Pietrzak & Petry, 2005).

Antisocial and borderline personality disorders have been found to occur at disproportionately higher rates in clinically disordered gamblers (Bagby et al., 2008; Blaszczynski & Steel, 1998; Fernandez-Montalvo & Echeburua, 2004; Pietrzak & Petry, 2005). MacLaren et al., (2011) suggested that it is the excessive reward-seeking behaviour

[4] The ten personality disorders within the DSM-V are grouped into three clusters: Cluster A (paranoid, schizoid and schizotypal), which are characterised as odd or eccentric; Cluster B (antisocial, borderline, histrionic and narcissistic) which are characterised as dramatic, emotional or erratic and Cluster C personality disorders (avoidant, dependent and obsessive–compulsive), which are described as anxious or fearful (American Psychiatric Association, 2013).

and impulsivity that is typical of antisocial and borderline personality disorders that may be an important contributor to its association with problem gambling.

In support of the strong link between antisocial and borderline personality disorders, Fernandez-Montalvo and Echeburua (2004) used a robust method of clinically interviewing 50 non treatment seeking pathological gamblers to assess for personality disorder. They identified that borderline personality disorder was the most prevalent personality disorder, reported in 16% of the sample. This was followed by antisocial, paranoid and narcissistic, which were present in 8% of the sample. The presence of a personality disorder was associated with greater gambling severity and more severe anxiety, depression and alcohol abuse. Despite this study using a small sample size, which limits the general conclusions that can be drawn from it, they used clinical methods to assess for personality disorder, which provides a more in-depth and accurate assessment than self-report measures (Bagby et al., 2008). This study shows that personality disorders are linked with other gambling related comorbidities, which presents a complex picture of gamblers. Yet, as noted, not all problem gamblers display increased levels of each comorbidity. Consequently, an understanding of the manifestation or absence of this pathology is critical in understanding gambling disorder.

In a large community based study, the American National Epidemiologic Survey on Alcohol and Related Conditions (2001-2002), sampled 43,093 adults. Of those surveyed, only a very small percent had a gambling problem (0.4%). However, over 60% of those who were problem gamblers had features of personality disorders, including 23.3% with antisocial personality disorder (Petry et al., 2005). However, this study did not assess for borderline, narcissistic or schizotypal personality disorders. Therefore, these rates could

underestimate the total prevalence of people with gambling problems who also have a personality disorder.

Another study that found a link between problem gambling and antisocial personality disorder comes from Slutske et al., (2001). The authors conducted a structured telephone interview with 7,869 men from the Vietnam Era Twin (VET) Registry[5]. Those with a history of problem gambling were found to have significantly elevated levels of antisocial personality disorder. Specifically, the odds of a lifetime diagnosis of antisocial personality disorder were 6.4 times greater among pathological gamblers in this sample in comparison to non-pathological gamblers. As noted in Chapter One, research has indeed found a link between gambling and offending (Emshoff, 2008). The high prevalence of antisocial personality disorder in gamblers could serve to explain such link. For instance, it is plausible that there is a sub-population of gamblers who are antisocial and impulsive in nature and commit a wide range of problem behavior, include gambling (Blaszczynski & Nower, 2002). Yet, this assertion requires further examination.

The association between personality disorders and gambling is also evident in treatment seeking samples. For example, Dowling et al., (2017) conducted a meta-analysis on the prevalence of comorbid personality disorders among treatment seeking problem gamblers. They reported that nearly half (47.9%) of the problem gamblers displayed comorbid personality disorders. These were most likely to display Cluster B disorders (17.6%), with smaller proportions reporting Cluster C (12.6%) and Cluster A (6.1%) disorders. The authors reported that the most prevalent were antisocial (14.0%), avoidant (13.4%), obsessive-compulsive (13.4%), and borderline (13.1%) personality disorders.

[5] The Vietnam Era Twin (VET) Registry is composed of 7369 middle-aged male-male twin pairs both of whom served in the military during the time of the Vietnam conflict (1965-1975) (Goldberg et al., 2002).

In contrast to the other studies that have used clinical interviews and gained a small sample size, Pietrzak and Petry (2005) interviewed 237 pathological gamblers entering treatment for gambling problems. They found that nearly 17% of the sample met the DSM IV diagnostic criteria for antisocial personality disorder.

The variability seen in the prevalence rates for personality disorders in both community and treatment-seeking gamblers could be attributed to methodological differences, such as the use of different measurement techniques (e.g. self-report vs. structured interview). For example, in a review, Bagby et al., (2008) found studies that adopted self-report measures of personality disorder report higher rates than those that use semi-structured interviews.

Very few studies have used both clinical interviews and self-report scales to assess for personality disorder. The research of Bagby et al., (2008) used both methodologies in 66 non-treatment seeking pathological gamblers and 138 non-pathological gamblers. There was also an equal split of men and women in this sample, which is another strength of the study. Unsurprisingly, for the problem gamblers, personality disorder prevalence rates with the self-report measure were high (92%); and considerably lower with the interview tool (23%). This was also consistent in the non-problem gamblers, with a 79% prevalence with the self-report measure and 5% with the clinical interview. This study illustrates the problems with research that has used self-report measures as these appear to overestimate personality disorder (Bagby et al., 2008).

A number of studies have found problem gamblers *with* personality disorders to also have high levels of other comorbidities. For example, Blaszczynski and Steel (1998) found that problem gamblers with a paranoid, schizotypal, antisocial, borderline, histrionic, narcissistic or avoidant personality disorder also had significantly higher levels of

impulsivity, anxiety and depression than those without a personality disorder. Other studies have also reported that alongside personality disorders, problem gamblers have been found to report comorbid mental health conditions, including alcohol and drug use disorders, mood and anxiety disorders and impulse control disorders (e.g. Crockford & El-Guebaly, 1998; Petry, 2005; Westphal & Johnson, 2007). Pervasive impulsivity and affective instability are diagnostic criteria for a number of personality disorders and therefore this comorbidity is unsurprising. Due to all of these disorders being identified as related to problem gambling, it is likely that multiple manifestations will be present, rather than one disorder alone. Yet, the documented studies have varied with regard to the nature of the personality disorder and the prevalence in those with problem gambling. As such, further research is needed to understand the aetiology of gambling and identify whether there are specific subgroups of gamblers that display increased gambling related pathology.

The focus of this chapter has been on discussing the disorders that are related to problem gambling. However, there are emerging factors within the literature that are suggested to have a protective effect on and reduce gambling severity. The next section of this Chapter will discuss protective factors for gambling that have been identified thus far in the literature.

2.4 Protective factors

In contrast to risk factors, protective factors reduce the likelihood of problematic behaviour (Arthur et al., 2002). These factors can either directly eliminate the risk or moderate the effect of the risk (Arthur et al., 2002). Protective factors are an emerging field of study with roots within developmental psychology (Sabina & Banyard, 2015). They are increasingly becoming a key component in other areas including positive

psychology, clinical and forensic psychology, to name a few (Sabina & Banyard, 2015). Protective factors, such as resilience, social support and life satisfaction have been studied more widely in relation to other complex problems, such as substance misuse (Rumpold et al., 2006), aggression (Kramer-Kuhn & Farrell, 2016), violence (Abidin et al., 2013) and trauma (Cherry et al., 2017). Yet they remain an emerging issue within the field of the psychology of gambling (Fraser, Richman & Galinsky, 1999). Furthermore, whilst models of gambling behaviour delineate multiple risk factors that increase the risk of problem gambling, there is an apparent neglection of protective factors within models of gambling behaviour (e.g. Pathways Model; Blaszczynski & Nower, 2002). This is surprising given that they, arguably, offer protection against the risk of developing problem gambling (Dickson, Derevensky, & Gupta, 2002). The remainder of this Chapter will introduce protective factors that are emerging in relation to gambling. These include resilience, life satisfaction, social support and self-control. A deeper understanding of the protective factors for problem gambling and the role they play will allow for the incorporation of them into multifactorial models of gambling.

Research into protective factors has generally been derived from studies on resilience (Lussier et al., 2007). Resilience can be defined as successful adaptive behaviour following exposure to stressors. Studies based on resilience have existed for more than half a century (Cowen & Work, 1988) and has been identified as a possible protective factor for gambling (Lussier et al., 2007). In essence, resilience theory suggests that responses to risk vary and that some succumb to stress and adversity whilst others respond well (Rutter, 1987).

Several studies have linked resilience to addictions, such as substance misuse (e.g. Larm et al., 2010; Powers, 2017). Yet, despite substance misuse and gambling addiction sharing

similarities (e.g. increased tolerance for the behaviour, withdrawal symptoms and concealing the behaviour family and friends), there has been little research applying resilience to gambling disorder (Rash, Weinstock & Van Patten, 2016). A study that has been conducted exploring resilience and gambling was undertaken by Lussier et al., (2007) who sampled 1,273 Canadian adolescents. The researchers found a negative relationship between increased resilience and gambling severity. The pathological gamblers within the sample were also found to report less resilience than non-pathological gamblers. These findings suggest that individuals that are more resilient can be more internally protected against the risk of developing gambling problems. This research, however, did not assess for any other protective factors or any risk factors. Therefore, there could be risk factors playing a role in those individuals that are less resilient. Likewise, there could be other protective factors present, such as social support, self-control and life satisfaction that are creating the resilience in the non-pathological gamblers.

In a study that explored gambling and different dimensions of resilience, Monacis et al., (2014) sampled 879 gamblers from the community. The authors examined dimensions of resilience (personal competence, social competence, family coherence, social support, and personal structure) in relation to gambling severity. They found that only the family cohesion and social competence resilience factors had a direct effect on gambling outcomes. Family cohesion was negatively associated with increased gambling. This suggests that those who perceive quality support from their family are more protected against the risk of becoming a problem gambler. The dimension of social competence, however, was positively associated with problem gambling, which suggests that being competent in social situations is not protective against gambling severity. Whilst it is useful to know the levels of resilience that gamblers of different severities have, little is

known about the role that resilience plays in relation to problem gambling or the risk factors for problem gambling.

Oei and Goh (2015) furthered the literature in relation to protective factors for gambling two-fold. They explored resilience, life satisfaction and gambling refusal self-efficacy as protective factors and the roles these have on risk factors (gambling cognitions, gambling urges, psychological distress). In their sample of 310 Singaporean students and members of the public, they found that life satisfaction and gambling refusal self-efficacy, were significantly negatively correlated with problem gambling severity. Self-perceived resilience did not correlate significantly with problem gambling severity. However, it did negatively correlate with each of the risk factors and have a positive association with life satisfaction. This study provides a useful extension to the literature with regard to broadening the samples that protective factors and gambling have been assessed in. However, in this study only two participants were classified as problem gamblers. The associations between problem gambling and the protective factors are therefore questionable. Furthermore, it cannot be generalised to other students and community members who are problem gamblers. As such, more research is needed to examine resilience, life satisfaction and other protective factors in different samples and with larger sample sizes.

A factor that has been found to be related to both resilience and life satisfaction is social support (Callaghan & Morrissey, 1993; Sahin-Baltaci & Karatas, 2015). Social support refers to an individuals' perceptions of the supportive behaviours provided by other people in their social network, which enhances their functioning and may protect them from adversity (Malecki & Dermaray, 2002). Research suggests that low levels of social support can play a contributory role in developing addictive disorders, including

gambling disorder (Petry, 2009). It has also been identified as playing a strong protective role generally (Petry, 2009). Thomas et al., (2011), for example, found that high levels of subjective social support was a direct protective factor against gambling frequency.

Social support has been found to be a protective factor for gambling in a range of samples. For example, Weinstock and Petry (2008) and Hardoon, Gupta and Derevensky (2004) found that students with higher levels of perceived social support were less likely to become problem gamblers. Similarly, Dickson et al., (2008) explored protective factors in 2,179 adolescents and found that the pathological gamblers were less likely to report being connected to their families and friends. It therefore appears that positive social support from families and peers is protective against problem gambling. However, there could be other factors, such as resilience and life satisfaction that play a role in both gambling severity and social support. Therefore, more research is needed to ascertain any interactions between risk and protective factors for gambling. Furthermore, these studies do not inform as to whether an individuals' gambling behaviour has caused them to be less connected to family and friends or whether a lack of support has influenced the progression of problem gambling.

The relationship between social support and gambling has also been shown to remain in adult pathological gamblers and in those seeking treatment for gambling problems. For instance, in a sample of 200 pathological gamblers, Petry and Weiss (2009) found that social support was both related to positive outcomes in abstaining from gambling and was negatively related to both the presence of anxiety and depression. In treatment seeking gamblers, Oei and Gordon (2008) found that social support and involvement in Gamblers Anonymous meetings were the most strongly associated factors with abstinence from gambling. Similarly, in a study of 60 outpatients of a problem gambling treatment

programme, Gomes and Pascual-Leone (2009) found emotional and instrumental support to be associated with a greater abstinence from gambling, increased self-confidence and a reduction in depression. As noted previously in this Chapter, both anxiety and depression are risk factors for gambling and therefore it is likely that this negative association shows a protective effect. However, further research is needed to specifically assess the moderating effects that protective factors potentially have on gambling related risk factors. Furthermore, whilst social support has been found to help problem gamblers abstain from the behaviour, it remains unknown whether the samples did not have social support prior to them developing gambling problems and gained this support once the disorder had progressed. Alternatively, whether they had the same social support, however, actively sought this assistance when their gambling progressed. Should the latter hold true, it would appear that other factors have influenced the development of gambling problems and not specifically a lack of support. More research is needed in a range of samples to provide a clearer picture of what protective factors there are for gambling and the role they play.

Mass (2016) found that the amount of social support that a person receives was related to reduced gambling. However, the number of relationships from which a person receives social support was not related to problem gambling. This finding suggests that it is the quality of social support that is associated with fewer gambling related problems, rather than the size of a person's social support network.

Whilst protective factors for gambling are emerging in the literature, there remains few studies that have assessed them. From the literature that has been completed, it appears that there are some constructs that are associated with reduced gambling and better treatment outcomes. Yet, more research is needed to establish the factors that are

protective for gambling and the roles they play with gambling risk factors. In addition, protective factors for gambling have been neglected within theoretical models of gambling. As such, further research and knowledge will assist in potentially incorporating protective factors within an integrated framework that promotes strengths as well as deficits.

This Chapter has discussed motivators of gambling and the gambling related comorbidities that have been identified in the literature, including personality, affective and addictive disorders. As noted, it is apparent that gamblers present a complex clinical picture with multiple manifestations of pathology. Yet, not all studies have found all of these comorbidities to be present in gamblers, which suggests that there are different types of gamblers with different related symptoms. Similarly, whilst protective factors are emerging within the gambling literature, little is known about the specific role they play for gamblers. A range of perspectives have been proposed to explain the development and maintenance of gambling. These will be presented in the ensuing Chapter along with the introduction of integrated models of gambling and studies that have attempted to subgroup gamblers based on the presence or absence of psychopathology.

CHAPTER 3.
GAMBLING PERSPECTIVES AND INTEGRATED MODELS OF GAMBLING.

3.1 Introduction to Chapter

Addiction based theories, biological, behavioural, social learning and cognitive perspectives have been proposed to understand and explain gambling behaviour. This Chapter will provide an overview of each of these perspectives. It will also discuss integrated models that take into account the heterogeneity of problem gambling and propose and explain different subtypes of gambler.

3.2 Addiction Based Theories

The addiction model is currently a dominant theoretical paradigm in explaining problematic gambling (Blaszczynski & Nower, 2002; National Research Council, 1999). This view has gained further support in the recent changes in DSM-V, with gambling now being viewed as an addictive disorder with a compulsion criteria similar to that of substance addiction (Reith & Dobbie, 2012). Historically, the term 'addiction' was used with regards to the recurrent use of external substances (e.g. drugs and/or alcohol), which are characterised by cravings, excessive preoccupations, compulsive urges to consume the substance and negative consequences associated with its use and withdrawal from it (Rickwood et al., 2010). The concept of dependence is now being used to encapsulate a broader range of non-substance behavioural addictions, including gambling disorder (Holden, 2001). Within this context, gambling is viewed as a 'natural addiction' characterised by compulsive behaviour with non-substance related rewards (Tamminga & Nestler, 2006). Furthermore, similarities in the motivations, patterns of behaviour and

the consequences of the behaviour are suggested to be similar to that of a substance addiction (Rickwood et al., 2010).

The phenomenon of 'cross-addiction' suggests that those who may experience one form of addiction may be more susceptible to developing other addictions. This is due to common etiological factors potentially contributing to more than one addictive disorder (National Research Council, 1999). For example, similar to substance addiction, those with gambling problems have been found to have experienced repeated unsuccessful efforts to control, cut back or stop their gambling (El-Guebaly et al., 2012). They have also reported feeling restless or irritable when attempting to reduce their gambling and have a reduced ability to control the impulse to gamble (El-Guebaly et al., 2012). Further similarities between substance misuse and problem gambling include a pre-occupation with the activity, where gamblers seek out excitement, thrill and tension and an aroused euphoric state similar to sexual excitement/arousal or a drug induced 'high' (Spunt, 2002). It has been suggested that when a gambler experiences this euphoric state, they gamble for longer and with more money than they intended to (Spunt, 2002). Furthermore, similar to substance misuse, a gambler's tolerance increases, with them increasing the size of their bets to achieve the same level of excitement (Spunt, 2002).

A theory that attempts to explain why various problematic behaviours co-occur and which could apply here is Hirschi and Gottfredson's (1994) *Generality of Deviance Perspective*. This theory argues that individuals engage in many forms of risk-related behaviours due to low levels of self-control. It suggests that deviance of all forms is characterised by individuals who seek short-term pleasure without considering the long-term consequences. According to this perspective, the mediating factor is an individuals' lack of self-control; with certain individuals engaging in numerous problematic behaviours

simultaneously due to limited self-control (Barnes et al., 2005). Support for this perspective is provided by Spunt et al., (1998) who found that gamblers with substance misuse disorders were more likely to use substances before or during gambling to reduce the negative affect of losing and to enhance the pleasure of winning. An alternative argument, however, is that those with a substance use disorder may gamble predominantly in an attempt to fund their drug habit (e.g. Spunt, 2002).

According to *Jacobs General Theory of Addictions* (e.g. Jacobs, 1986) certain individuals engage in risky, repetitive behaviours in order to cope with chronic stress or as an escape mechanism (McCormick, Delfabbro & Denson, 2012). This theory suggests that gambling can provide the individual with relief from stressors and thus it becomes associated with positive feelings and mood states, increased self-esteem and feelings of excitement, which are not gained from other events in their life. Consequently, the individual becomes dependant on the activity as a coping strategy and becomes increasingly unable to withdraw from it (McCormick, Delfabbro & Denson, 2012).

Jacobs General Theory of Addictions also suggests that there are certain physiological and psychological characteristics and experiences, which can contribute to a person's susceptibility to addiction. At the physiological level, individuals take part in gambling to modulate their arousal (e.g. excitement/increased arousal or calming/decreased arousal). At the psychological level, gamblers may experience low self-esteem, mood disturbances, traumatic childhood memories or significant negative life events (McCormick, Delfabbro & Denson, 2012). Here, gambling may serve to enhance or protect a person's sense of self-worth, blocking out traumatic thoughts and memories (Petry & Steinberg, 2005). For these individuals, risk taking behaviour (e.g. substance

misuse) is likely to be increased due to these activities serving a similar purpose as gambling (e.g. El-Guebaly et al., 2006; MacCullum & Blaszczynski, 2002).

The addiction based theory places importance on using substances or gambling as a coping strategy and/or to regulate emotions. However, it ignores a range of other factors that have been strongly linked to gambling severity, such as biological vulnerabilities, cognitive distortions and social learning. Another perspective that has aimed to explain the development of problem gambling are biological perspectives.

3.3 Biological Perspectives

Biochemical, functional neuroimaging and genetic studies have found that gambling activates reward systems in the brain, similar to the way substances do (APA, 2013). According to this perspective, problem gambling occurs due to biological factors within the individual, such as a neurochemical imbalance or a genetic predisposition to addictive behaviour (Jazaeri & Habil, 2012).

A variety of neurochemical imbalances have been implicated in problem gambling, including dopamine, serotonin, norepinephrine and the opioid systems (Linnet et al., 2011). The Dopamine System plays a key role in reward, reinforcement and addiction (Boileau et al., 2012). Pharmacological studies have suggested that alterations of the dopaminergic pathways may underlie the seeking of rewards (such as gambling or drugs) that trigger the release of dopamine and generates pleasurable feelings (Conversano et al., 2012). Studies have shown that problem gamblers, in contrast to healthy individuals, have a lower dopamine concentration (e.g. Bergh et al., 1997). In addition, in contrast to non-gamblers, problem gamblers have been found to have increased levels of dopamine in their blood whilst completing a gambling task (Meyer, Schwertfeger & Exton, 2004).

The neurotransmitter serotonin is involved in regulating a range of functions and behaviour, such as anxiety, mood and cognition and has been implicated in problem gambling (Grant, Brewer & Potenza, 2006). For example, research has found lower levels of serotonin in problem gamblers and those with a substance use disorder (Potenza, 2001; Schlosser et al., 1994). Lower levels of serotonin have also been related to impairment in satisfying urges and in reward processing (Grant, Brewer & Potenza, 2006). Thus, it can be argued that lower levels may lead to increased motivation to satisfy gambling urges

Other brain chemicals that have been linked to gambling disorder are Endogenous Opioids. They are opiate-like substances, such as endorphins, that are produced naturally within the body and contribute to feelings of well-being and lessen feelings of pain (Grant, Brewer & Potenza, 2006). Similar to serotonin, research has shown that individuals with dysfunction in their opioid system may have difficulties controlling gambling behaviour due to experiencing strong positive feelings when engaging in the activity (Dackis & O'Brien, 2005).

This perspective is further supported by genetics research that has suggested that some problem gamblers have at least one family member who also has difficulties controlling their gambling behaviour (Felsher, Derevensky & Gupta, 2003; Shah et al., 2005). For example, Black et al., (2006) found that first degree relatives of problem gamblers are eight times more likely to have gambling problems. In addition, further support for the role of genetic factors comes from the Vietnam Era Twin Registry. Here, researchers reported that between 35 and 62% of the variance in problematic gambling was attributed to genetic factors (Shah et al., 2005). This certainly suggests that a genetic vulnerability accounts for some of the risk for developing a gambling disorder.

In summary, brain chemical and family studies suggest that there is a genetic and a strong biological influence in the development and maintenance of gambling problems. However, this perspective does not take into account environmental, learning, or cognitive influences, which also have empirical support. Therefore, whilst the biological perspective provides insight into one of the contributory areas, alone it cannot fully explain the development of gambling disorder. Furthermore, the biological perspective does not take into account affective states and emotional arousal that has been linked to gambling involvement (Petry, 2005). Furthermore, it does not place value on how gambling behaviour has been reinforced within individuals. A perspective which does serve to explain how gambling is reinforced emotionally and socially is the behavioural perspective. This will be discussed in more detail in the following section.

3.4 Behavioural Perspective

From a behavioural perspective, gambling is conceptualised as a learned maladaptive behaviour that is reinforced through principles of operant and classical conditioning (Coventry & Constable, 1999). Both positive and negative reinforcement increase the chances of gambling and serve to explain the maintenance of gambling behaviour (Anderson & Brown, 1984; McConaghy, 1980). Positive reinforcement occurs when gambling stimulates excitement and emotional arousal, which serves to maintain gambling behaviour (Coventry & Constable, 1999). Alternatively, negative reinforcement occurs when gambling serves as an emotional escape, reducing negative affective states such as depression, stress, anxiety, boredom and life stressors (Petry, 2005). Reinforcement principles are thought to allow gambling to be maintained sufficiently long enough for gambling related stimuli alone (i.e. gambling websites, venues, advertisements, or friends who gamble) to trigger feelings of arousal and

excitement or, alternatively, to alleviate negative affective states (e.g. depression, anxiety), triggering the temptation to gamble (APS, 2010).

When gambling, players may win in some instances, but not all. This is a form of partial reinforcement (Knapp, 1976). Through this, it is suggested that gambling behaviour can become highly resistant to extinction, allowing it to be maintained for long periods of time without reward. Furthermore, the greater the potential reward, the more resistant it is to extinction (Skinner, 1969). This could explain the maintenance of gambling despite some individuals suffering significant financial and social loss. Nevertheless, this approach has been criticised for not accounting for the role of punishment (e.g. the financial and social losses) in the reduction of gambling (Blaszczynski & Silove, 1995).

Several researchers (e.g. Custer, 1984; Griffiths, 1994) have suggested that a 'big win' early in a gambling career could lead to persistence in gambling due to people wanting the feelings of joy and elation that were stimulated by the initial win. The early big win is incorporated in Custer and Milt's (1985) *Three Phase Model of Pathological Gambling*. This model describes the progression of gambling addiction across three phases: the winning phase, losing phase and desperation phase. According to this model, many problem gamblers that experience a big win or a series of wins close to when they first began gambling are more likely to develop problems. The experience of the 'big win' leaves them with unrealistic optimism that the winning will continue. This, alongside the excitement that was generated from the wins, acts as reinforcement for them to continue to gamble with larger stakes (Kassinove & Schare, 2001). According to this model, gamblers in the losing phase begin to tell others about their big wins and start to gamble alone, thinking of ways they can obtain money to gamble, either legally or illegally, in an attempt to win back their losses, whilst increasing the sizes of their bets. The gamblers

also begin to isolate themselves from family and friends and 'chases their losses' (i.e. wanting to gamble after a loss in an attempt to win their money back). In the desperation phase, there is a further increase in their time spent gambling, which is accompanied by feelings of guilt and remorse, blaming others and alienating themselves from friends and family. Eventually, gamblers may engage in illegal acts to finance their gambling. They may also experience suicidal thoughts and/or attempts, arrests, relationship breakdowns, emotional breakdowns and abuse alcohol or drugs to cope with feelings of helplessness and depression (Gluck, 2008).

However, even though the aforementioned model largely shadows many of the current DSM-V compulsion criteria, it is a descriptive model and gambler early 'big wins' have not widely been tested empirically. Further, the studies that have tested this assertion (e.g. Kassinove & Schare, 2001; Weatherly, Sauter & King, 2004) have not found an 'early big win' to be predictive of persistence in gambling and the development of an addiction. Research has suggested that individuals naturally prefer immediate over delayed rewards (Hariri et al., 2006). Applying this to gambling may explain further why gamblers become tempted with the opportunity for an almost instant financial gain (Hariri et al., 2006). In addition, the consequences of gambling being frequently delayed may further explain the maintenance of gambling (Weatherly & Dixon, 2007).

Interestingly, Reid (1986) noted that a gambler's experiences of 'near misses' also encourages gambling behaviour. A near miss is an occasion where a player is very close to winning but is ultimately unsuccessful. From a behavioural perspective, the near miss becomes a conditioned stimulus as long as it is occasionally followed by a win (Kassinove & Schare, 2001). The association made between the near miss and the winning triggers feelings of joy and elation, which the gamblers seek to experience further through

continued gambling (Kassinove & Schare, 2001). There has been empirical support for this. Strickland and Grote (1967) and Chantal and Valler (1996), for example, found that participants who have had gambling attempts close to winning were more likely to continue their play. Kassinove and Schare (2001) noted that near misses, to a point, provide the gambler with signals that a win will come soon. In their sample, Kassinove and Schare (2001) found that a near miss rate of 30% led participants to persist. Yet, the near miss effect can also be viewed from a cognitive perspective, where the gamblers search for control, allowing for them to predict and master their gambling. The gamblers' view gambling as a skilled situation where practice will improve performance as they do not differentiate between skill and chance situations, hence persistence in play (Kassinove & Schare, 2001).

Whilst the literature suggests that individuals can become conditioned to gambling through the affective rewards (reinforcement) experienced whilst winning (or nearly winning), there is literature that suggests that gambling behaviour can be reinforced socially. This is suggested to be through observing others gambling and the emotions others display whilst gambling. This is known as the Social Learning Perspective and is captured next.

3.5 Social Learning Perspective

Social Learning Perspectives suggest that individuals learn, model and maintain behaviours that are observable and reinforced (Bandura, 1971). Thus, individuals who observe family and friends gambling may be more likely to gamble themselves (Abrams & Kushner, 2004). Meyer et al., (2009) noted that it is possible that many young people could become problem gamblers by learning through parental modelling and imitation. In this instance, modelling gambling behaviour is rewarded through interactions with

their parents (Stinchfield, 2001). Other research has suggested the influence a parental figure can have in introducing their children to gambling (see Kalischuk et al., 2006). For example, parents could model gambling by asking children to scratch scratch-cards for them or through playing online gambling games with them. Importantly, modelling gambling behaviour does not necessarily mean someone will become addicted to gambling, however, through differential reinforcement and modelling, gambling could become a maladaptive and dominant strategy to cope and deal with stressful life situations (Kalischuk et al., 2006).

Bandura (1971) suggests that emotional responses can be learnt through vicarious learning; observing the affective reaction of other people going through painful or pleasurable experiences (e.g. viewing lottery winners in the media). That is, responses of excitement and elation could be vicariously learnt and modelled by those in the same families or social circles of gamblers. However, in contrast, Bandura (1971) also suggests that behavioural inhibitions can also be vicariously learnt through seeing others punished for their actions (e.g. loss of friends, family, employment, and finances), known as vicarious punishment. However, it could be argued that many people experience exposure to behaviours that they do not engage in themselves. The Social Learning Perspective does not suggest that through social learning a person will become a problem gambler, rather, that a person can learn this behaviour, but it can also be unlearned and other alternative coping strategies established (Gupta & Derevenski, 1997).

Although there is a lack of research examining the prevalence rates of problem gambling amongst families, a number of studies have identified that those whose parents gamble, particularly at problematic levels, have a greater chance of developing a gambling problem when they reach adulthood (Derevensky & Gupta, 2007; Raylu & Oei, 2002).

Through their own participation in the activity, family members may display attitudes that normalise and endorse gambling. In a large study, Lesieur et al., (1991) sampled 1,771 university students. Of those who reported either of their parents having a gambling problem, 19% reported a gambling problem themselves, compared to 5% from the sample who did not report their parents to have a gambling problem.

Several studies have reported that problem gamblers are more likely than non-problem gamblers to have relatives with gambling problems, especially parents (Grant & Kim, 2001; Black et al., 2006). For example, Moran (1970) sampled 50 problem gamblers and found that half of them reported a family background of gambling. Similarly, Dell, Ruzicka and Palisi (1981) reported a family history of gambling in the aetiology of compulsive gambling. However, this could be a result of other explanations, such as biological and genetic explanations, rather than social learning. Although behavioural and learning theory explains a number of aspects of the development of problem gambling and plays a major role in a number of conceptual frameworks (e.g. Blaszczynski & Nower, 2002: A Pathways Model), it does not explain why for some gambling remains recreational and for others progresses to an addiction. In addition, these approaches do not explain why people continue to gamble when it has caused them tension, depression and large losses; both monetary and socially, which theoretically could lead to a reduction or extinction of gambling (Rickwood et al., 2010). Furthermore, behavioural/learning theories fail to account for individual motivations, emotions and cognition which have been found to play a key role in problem gambling (Raylu & Oei, 2002). Thus, although offering some insight/explanation into gambling maintenance, behavioural and learning theories alone do not offer a comprehensive conceptual framework to explain problematic gambling.

A factor that plays a key role in theoretical models but has been neglected thus far is that of cognition. The literature surrounding the link between gambling and cognition is presented next.

3.6 Cognitive Perspective

The cognitive approach argues that behaviours are formed through an individual's perceptions, thinking processes and beliefs (Rogers, 1998). According to this perspective, individuals experience irrational thought processes and erroneous beliefs, also known as cognitive distortions, about the randomness of the odds of gambling and skilled versus chance determined events (Rickwood et al., 2010). Due to these faulty beliefs, gamblers overestimate their knowledge and skill in relation to the outcome of gambling. They subjectively consider they have an increased chance of winning; higher than what the objective odds of winning would suggest (Ladouceur & Walker, 1996; Petry, 2005). Although the origin of these irrational and erroneous beliefs and distortions remain unknown, the literature has suggested that social and learning experiences of family and friends gambling, previous gambling experiences, and the media contribute (Blaszczynski & Nower, 2002; Petry, 2005). These factors can shape an individuals' attitude towards gambling as a recreational activity, whilst also being a method of gaining income (Rickwood et al., 2010). Cognitive distortions are important to recognise in understanding why, for some, gambling remains a leisure activity, but for others develops into addictive behaviour. Irrational beliefs are arguably present in every gambler and play a key role in the development and maintenance of problem gambling, with problem gamblers showing more distortions than social gamblers (e.g. Goodie & Fortune, 2013; Griffiths, 1994).

Research suggests that gamblers have been found to exhibit a number of gambling related cognitive distortions. These include perceived personal skill/luck, superstitious beliefs, an ability to control outcomes, selective recall, flawed perceptions of randomness, near miss effects and attributional distortions (Blaszczynski & Nower, 2002; Goodie & Fortune, 2013; Hodgins & Holub, 2007). In exploring cognitive distortions in gamblers, there has been a major focus on the 'thinking aloud method' (Gadboury & Ladouceur, 1989) where gamblers are required to verbalise their thought processes during gambling situations. This method is useful as it allows researchers to obtain high numbers of irrational beliefs. It has been noted that up to 70% of gamblers' vocalisations while gambling contain erroneous beliefs, such as 'I have a lucky technique that I use when I gamble', and 'if I continue to gamble, it will eventually pay off and I will make money' (Delfabbro & Winefield, 2000; Gadboury & Ladouceur, 1989).

There has been development in the assessment of distortions through the development of psychometrically validated measures (e.g. Gambling Belief Questionnaire: Steenbergh et al., 2002), where questions are focused around a number of distortions and gamblers are required to state whether they believe this in themselves (e.g. 'If I am gambling and losing, I should continue because I don't want to miss a win'). This has allowed researchers to explore the most commonly held distortions and, in turn, identify areas for treatment.

Problem gamblers are reported to be more likely than social gamblers to endorse cognitive distortions (Joukhador, Maccallum, & Blaszczynski, 2003; Myrseth, Brunborg, & Eidem, 2010). Thus, a number of studies have found a link between gambling severity and cognitive distortions. For example, a recent and representative study of community gamblers by Cunningham, Hodkins and Toneatto (2014) found that those who reported

more severe gambling problems displayed a higher number of gambling related cognitive distortions.

Cognitive explanations have empirical support for their role in the maintenance of gambling (Goodie & Fortune, 2013). They are also included within theoretical frameworks (e.g. Blaszczynski & Nower's, 2002: Pathways Model). However, they do not account for aspects of arousal and conditioning. Further, they do not explain the interaction between arousal, conditioning and cognitive activity, or explain why for some gambling remains recreational, but for others, becomes problematic. It could be that some develop a gambling problem as a result of increased gambling cognitive distortions (Goodie & Fortune, 2013). However, gambling excessively could also cause an increase in cognitive distortions (Petry, 2005). In addition, cognitive distortions have been shown to be present in non-problem gamblers (Petry, 2005). Therefore, alone they cannot predict problem gambling.

Currently, problem gambling is understood through an array of perspectives, each of which acknowledge an interaction between variables in the aetiology of problem gambling. However, each perspective places importance on different critical processes. Each perspective typically conceptualises problem gamblers as a single, homogenous population. However, it is clear that problem gambling is heterogeneous in nature. Whilst some of their assertions are relevant for some gamblers, other are not. Therefore, they have failed to account for the heterogeneity in the development and maintenance of problem gambling (Blaszczynski & Nower, 2002). Thus, there is a clear need for integration of the perspectives into theoretical frameworks to explain the maintenance of gambling.

There has been literature that has emphasised the heterogeneity of problem gambling through finding subgroups of gamblers with different pathology. Such studies are useful as they help to understand the diversity within gambling which, in turn, can aid the development of theoretical frameworks. A review of this literature and the associated limitations is carried out next.

3.7 Integrated models of gambling

The Development of Integrated Models

A number of researchers (e.g. Blaszczynski & Nower, 2002; Milisevic & Ledgerwood, 2010) have suggested the importance of classifying problem gamblers into different subtypes to account for the variety in aetiological, psychopathological, social, personality and motivational factors in the development and maintenance of problem gambling.

Subtyping studies have a long history in gambling, with the earliest empirical attempt to subtype problem gamblers proposed by Moran in 1970. Moran was one of the first to recognise gambling as a heterogeneous entity. He noted that pathological gambling can only be understood through a variety of approaches rather than one singular perspective (Moran, 1970). Moran conducted structured clinical interviews with 50 men that were problem gamblers. He proposed five subtypes of gambler; the *Subcultural* gambler, who has a history of heavy gambling and gambles due to their environment and pressures from family/peers. The *Neurotic* gambler, alternatively, develops gambling problems through emotional difficulties and/or stressful life experiences. The *Impulsive* gambler, which Moran states is the most serious subgroup of problem gambler. This group experience a strong loss of control regarding their gambling and are ambivalent towards the activity; having an intense urge to gamble despite strong negative consequences. Within this subgroup, individuals continue gambling until they have no further money, or until

something else prevented them, such as imprisonment. The *Psychopathic* gamblers' gambling is a function of a broader psychopathic disorder[6]. Lastly, the *Symptomatic* group's gambling is a symptom of a pre-existing mental illness. That is, their gambling is one of many symptoms of a mental illness, most commonly depression (Moran, 1970).

In all of Moran's subtypes there was some form of psychological dependence on the activity, maximised in the impulsive subgroup and found the least in the subcultural. Moran concluded that problematic gambling can be the result of three elements; (1) individual characteristics, (2) access to opportunities to gamble and (3) the opportunity do so excessively. However, Moran noted that it could be due to other factors that as are not yet understood.

While Moran (1970) argued for heterogeneity in problem gambling and provided a basis for further subtyping studies, his subgroups were descriptive in nature and it was not indicated how they were derived. There was no data analysis to support the theory. The subtypes appear based solely on themes identified from interviews with the gamblers and not based on psychological testing or theory.

Zimmerman, Meeland and Krug (1985) extended the work of Moran by creating subgroups that were not merely based on retrospective methods of observation. They sampled 83 problem gamblers and 61 non-gamblers; their inclusion of non-problem gamblers is a further strength of the research. Using Moran's (1970) research as a framework, they factor analysed responses on the Inventory of Gambling Behaviours. They extracted five factors that differentiated problem gamblers from a non-problem gambling control group. Their *Neurotic* gambler was their strongest factor and was

[6] A psychopathic disorder has been defined as a persistent disorder of mind which results in abnormally aggressive and seriously irresponsible conduct on the part of the person concerned (Hare, 1980).

somewhat similar to Moran's (1970) classification. This subtype represented individuals who had underlying anxiety and maladjustment, who view gambling as an escape from affective states. This group also showed feelings of inadequacy and relationship difficulties. Moran (1970) labelled his *Psychopathic* gambler on the basis of them having psychopathy, however, Zimmerman et al., (1985) labelled theirs *Psychopathic* due to having schizoid features, describing themselves as not generous and becoming easily bored in social situations[7]. Their *Impulsive* gambler, alternatively, differed from Moran's description as Zimmerman, Meeland and Krug (1985) found them to be high energy risk takers, who initiated projects and described themselves as workaholics. The fourth factor *White Collar Crime* comprised individuals who had been convicted of fraud, embezzlement and tax evasion, and their fifth factor *Employment Problems* revolved around individuals getting into problem at their workplace due to their gambling involvement (Zimmerman et al., 1985). The researchers overall concluded that problem gambling is a complex expression of neurotic, psychopathic and impulsive factors. Yet, the authors aimed to develop diverse subgroups based on analysis of one measure alone and using a small sample, which largely questions its generalisability. A strength of this study, however, is that it used measures to produce its subtypes, rather than observation alone, which Moran (1970) relied on. Furthermore, it acknowledged that a multi-dimensional construct provides a more precise model for differentiating the behaviours of problem gamblers from non-problem gamblers.

In another early subgroup study, Graham and Lowenfeld (1986) conducted the first study examining personality traits in problem gamblers. Using medical chart data from 100 men receiving inpatient treatment for gambling problems, they performed a cluster analysis

[7] It is of note, however, that these traits do not accurately represent the construct of psychopathy.

on Minnesota Multiphasic Personality Inventory (MMPI) scores. The authors found four distinct clusters of gambler. The first, labelled *personality disorder*, included individuals described as immature, rebellious, grandiose and hostile, who were also noted to have emotional problems. They labelled their second cluster as *paranoia*, represented by individuals described as paranoid, suspicious, jealous, rigid, withdrawn, irritable and hostile. However, these can also be traits of personality disorders, therefore, it is unclear on what basis they differentiated this subgroup from their *personality disorder* group. The third cluster represented individuals with depressive, anxious symptoms and alcoholism and their final cluster; *passive aggressive or emotionally unstable* individuals, were noted to be immature, tense, impulsive and to have a low tolerance for frustration. Their third and fourth clusters both appear to include individuals with emotional and affect regulation difficulties. Thus, it is unclear what factors specifically differentiate these clusters from each other. Furthermore, the latter two typologies also appear to display pathology of personality disorders, which according the presented subgroups, could be encapsulated under their *Personality Disorder* cluster. Although Graham and Lowenfeld (1986) failed to validate their clusters using additional independent variables, their analysis provided a basis for understanding the broad psychopathology of problem gamblers. Yet, other studies have received more empirical support for their clusters, such as the research of McCormick (1987).

McCormick (1987) suggested that amongst gamblers, motivations for gambling greatly differ. He used observations in an attempt to integrate the data on problem gambling and to propose the *Parsimonious 'Need State' Model*. He suggested two pathways by which gambling behaviour is driven. The first; *Recurringly Depressed* gamblers was very similar to Moran's *Symptomatic* gambler, having a long history of depression that is pervasive in their lives and predates their gambling problems. This group also reported

histories of childhood trauma and a 'depressive cognitive style', which is pervasive. He further suggested that this could also be paralleled with a biochemical imbalance. The second; *Chronically Under-Stimulated* gamblers, appear to be similar to Zimmerman et al's (1985) neurotic gambler; easily prone to boredom and having a strong need for constant stimulation and excitement, poor impulse control, hyperactivity, low frustration tolerance and a constant search for novel arousal.

Although McCormick's (1987) research was based solely on clinical observations, its components have received empirical support (i.e. enhance positive affect and reduce negative affect; Jacobs General Theory of Addictions, 1986). Support for the *Boredom Proneness* and *Under-Stimulated* subtypes comes from Blaszczynski, McConaghy and Frankova (1990), who compared 48 patients attending therapy for gambling problems with 40 patients attending a family physician for non-gambling related problems. They found that the problem gamblers scored higher on a boredom proneness and a depression scale. This lends further support to the assertion that gambling is a maladaptive way of coping with negative affect. Due to boredom proneness and depression being correlated in their sample, they suggested a third subtype of problem gamblers that are prone to both depression and boredom.

The aforementioned subtyping studies have either largely focused on men or not stated the gender of their samples. Lesieur and Blume (1991) addressed this issue through interviewing 50 female gamblers attending Gamblers Anonymous. With similar findings to McCormick's (1987) typologies, the authors classified the participants into two subgroups; *Action Seekers and Escape Seekers. Action Seekers* gamble to stimulate feelings of arousal and excitement, to gain attention and fulfil a desire to impress others. In contrast, *Escape Seekers* gamble to reduce negative affective states, such as depression

and anxiety. Indeed, such subgroups echo some of the aforementioned research with regard gambling serving to modulate affective states (e.g. Moran's *Neurotic* subtype; Zimmerman, Meeland and Krug's *Neurotic* subtype; Graham and Lowenfeld's *Depressive, Anxious Symptoms and Alcoholism* subtype). Thus, it appears apparent that this is a key area in understanding the development and maintenance of gambling. Yet, such subgroups alone do not account for the full heterogeneity in problem gambling. For example, the aforementioned studies have identified other subtypes, such as those with increased impulsivity and antisocial behaviour and personality, and those without any psychopathology. Blaszczynski and Nower (2002) used the subtype studies to date to propose a comprehensive theoretical framework of problem and pathological gambling.

Blaszczynski and Nower (2002) proposed *A Pathways Model of Problem and Pathological* Gambling that incorporates a range of perspectives including addiction based theories, biological, social learning, cognitive and behavioural perspectives. This model will be outlined next, followed by studies that have attempted to explore it.

3.8 Pathways Model of Problem and Pathological Gambling and Associated Literature

This model acts as a framework for understanding three different pathways towards problematic gambling, characterised by distinct psychological variables. The model was constructed through clinical observations with problem gamblers as well as a review of the literature (Blaszczynski & Nower, 2002). The authors did not, however, note the number of clinical observations that it was constructed from, or provide any data analysis to support their model.

The first pathway in the model, *Behaviourally Conditioned*, argues that problematic gambling develops through environmental factors and behavioural reinforcements, rather

than through psychopathological issues, which gamblers in this subtype lack. Individuals in this pathway often fluctuate between normal, heavy and excessive gambling as a result of repeated exposure to gambling activities, cognitive distortions regarding winning prospects and personal skill, bad judgements and poor decisions, rather than because of impaired control. Those in this pathway can also report substance misuse issues, anxiety and depression. However, these are considered a consequence of gambling, not the cause (Blaszczynsky & Nower, 2002). They also do not manifest signs of major psychopathology, substance misuse, impulsivity or disorganised thoughts. Research has also suggested the prospect of winning combined with increased arousal and subjective excitement contributes significantly to this pathway (Ledgerwood & Petry, 2010).

The second pathway, *Emotionally Vulnerable*, has similar antecedents to the first, through the availability of gambling, which subsequently includes conditioning, cognitive processes and cognitive schemas. However, this group arguably gamble to reduce pre-existing negative affect, such as stress, anxiety and depression. They are argued to have poor emotional coping and problem solving skills, low self-esteem and have suffered negative life events (Blaszczynsky & Nower, 2002).

The third pathway, *Antisocial Impulsivist,* present similarly to the emotionally vulnerable pathway but also have an increased likelihood of attention deficit and a history of antisocial personality disorder/behaviours. Individuals in this pathway display increased traits of impulsivity and are more likely to engage in non-gambling related criminal acts and substance misuse. Even though arousal and excitement is linked with this and the prior pathways, it is argued to potentially be more significant with the *Antisocial Impulsivist* pathway (Blaszczynsky & Nower, 2002).

The Pathways Model can be viewed as the leading model explaining gambling subtypes due to its incorporation of several risk factors into a bio-psycho-social model of gambling. It represents an attempt to integrate factors that are proposed within the social, biological and psychological perspectives to understand the development of problem gambling. Nevertheless, as discussed in Chapter 2, protective factors for gambling are beginning to emerge within the literature. Yet, the Pathways Model considers only risk factors for gambling and does not attempt to capture factors that could offer gamblers protection. Thus, the need for an integrated model of both risk and protective factors is needed within the field.

Research investigating the pathways model is relatively limited. There is some empirical support for the existence of subgroups of gamblers, closely related to the three described in the Pathway Model. Yet, some studies have not found subtypes similar the three proposed in the Pathways Model, particularly when sub-clinical gamblers are excluded. This suggests that studies including samples with severe problem gambling only, may not exhibit the same subtypes found in more varied samples. The remainder of this Chapter will present and discuss the research that has been undertaken thus far with regard to exploring the Pathways Model.

Ledgerwood and Petry (2006) sampled 149 participants from gambling treatment sites in the USA. Through a factor analysis of gambling experiences, they found three factors: escape, dissociation and egotism. The authors validated these factors using various measures of psychopathology and personality traits. Their escape factor represented gambling as a means to escape from problems and negative affect. This factor was related more to women than men and was moderately related to general dissociation. Their second factor related to dissociation experiences, such as feeling “outside” oneself,

having a “memory blackout” and feeling as if they were another person. Finally, their egotism factor was characterised by gambling to impress others and was associated with heightened impulsivity and with men.

Ledgerwood and Petry (2006) noted that their escape and egotism factors resembled Blaszczynski and Nower’s (2002) emotionally vulnerable and antisocial impulsivist gamblers. They did not, however, find a gambler profile similar to the behaviourally conditioned gambler. A plausible explanation for this finding could be due to them sampling gamblers in treatment who might not represent behaviourally conditioned gamblers as they are seen to have less severe gambling and may be able to refrain independently. The authors, did not, however, include any measures to specifically explore the behaviourally conditioned pathway. Therefore, it is possible that they may have found such a subtype if they had included these measures. In addition, they failed to measure some variables relevant to the other pathways, such as antisocial personality and behaviour, substance abuse and a history of experiencing negative affect. Nevertheless, this study provides evidence that gamblers are not an homogenous group that fit into a singular conceptualisation. Furthermore, it provides more clarification with regard to the various types of gambler that exist.

In two separate studies, Stewart and colleagues (Stewart & Zack, 2008; Stewart et al., 2008) examined the utility of subtyping gamblers based on motivations to gamble. In one study Stewart and Zack (2008) conducted a principal component analysis on the Gambling Motives Questionnaire (GMQ: Stewart & Zack, 2007) in 193 community recruited pathological gamblers and 39 non-pathological gamblers. Three factors were extracted: gambling to decrease negative affect/negative reinforcement (coping), gambling to increase positive affect/positive reinforcement (enhancement), and gambling

for social purposes. Similar to previous literature, they found women problem gamblers scored higher on the coping motives than men. Interestingly, however, they also found women problem gamblers scored higher than men on the social motives for gambling scale. This study provided evidence that the gambling motives questionnaire had been validated in a sample of pathological and non-pathological gamblers. In addition, it supports the general consensus that individuals gamble as a function of increasing positive affect, decreasing negative affect and for social purposes. The authors did not, however, include measures to specifically test the subgroups within the pathways model and therefore it fails to represent a test of the model.

In their other study (Stewart et al., 2008), they explored the utility of subtyping gamblers based on their motivations to gamble. They sampled 158 community recruited pathological gamblers and performed a cluster analysis based on responses to the Inventory of Gambling Situations (Turner & Littman-Sharp, 2006). The clusters were validated using the gambling motives questionnaire. Their first cluster was characterised by positive scores on the Positive Gambling Situations factor and negative scores on the Negative Gambling Situation factor and was labelled *enhancement gamblers*. This cluster of individuals gambled primarily for positive reinforcement (i.e. to increase positive emotions and excitement). The second cluster obtained high scores on both the Positive and Negative Gambling Situations Factors, especially elevated on the latter, and was labelled *coping gamblers* due to negative reinforcement. That is, they gambled to alleviate unpleasant affective states. Their third cluster were characterised by low scores on both the positive and negative factors and were labelled *low emotion regulation* gamblers, because they gamble for reasons other than to modulate affective states.

Stewart et al., (2008) likened their coping and enhancement gamblers to Blaszczynski and Nower's (2002) emotionally vulnerable and antisocial impulsivist subtypes, respectively. A strength of the study is that they sampled non-treatment pathological gamblers, which previous research has neglected. The authors identified that they did not find a 'pure coping' gambler and concluded that among non-treatment seeking gamblers, coping based gambling most often occurs in combination with enhancement based gambling. They have linked their *enhancement gamblers* to the antisocial impulsivist subtype based on a need to increase positive affect alone. According to Blaszczynski and Nower's (2002) model, in the absence of antisocial features or impulsivity, those who gamble to stimulate positive affect are incorporated into the emotionally vulnerable pathway, alongside those who gamble to alleviate negative affect. Therefore, this does not support Blaszczynski and Nower's (2002) antisocial impulsivist subtype. In addition, the authors have likened their subtypes to the pathways model without including variables empirically included in the model, such as a history of negative affect. Furthermore, similar to other studies (e.g. Ledgerwood & Petry, 2006), they have not included any measures specifically related to Blaszczynski and Nower's (2002) antisocial impulsivist pathway. Therefore, despite likening their findings to the Pathways Model, they have neglected to explore key parts of it.

A further study by Turner et al., (2008) attempted to validate Blaszczynski and Nower's (2002) pathways model using a sample of 141 community recruited gamblers. They performed a Principle Component Analysis using measures to explore each of the pathways in Blaszczynski and Nower's (2002) model. This included: impulsivity, depression, anxiety, erroneous beliefs and early gambling wins. A strength of this study is that it examined the validity of the pathways model in more depth than prior studies, with the inclusion of measures to test each of the specified pathways. They found a four-

factor model that fitted with their hypotheses; *emotional vulnerability, impulsivity, erroneous beliefs* and *early-win-experiences.* These were predictive of problematic gambling, with emotional vulnerability having the largest effect. Their emotional vulnerability and impulsivity subtypes supported Blaszczynski and Nower's (2002) proposed emotionally vulnerable and antisocial impulsivist pathways, respectively. They found two factors underpinned the behaviourally conditioned pathway, namely, erroneous beliefs and experiences of wins. The authors commented that their erroneous beliefs and early win experience factors were the second and third most important components in predicting the severity of pathological gambling, and above that of their impulsivity component. Collectively these factors predicted 50 percent of the variance in pathological gambling. This is surprising as this does not support Blaszczynski and Nower's (2002) model, which suggests that behaviourally conditioned gamblers display the least severe gambling and antisocial impulsivists the most severe.

As with previous studies examining the validity of the pathways model, Turner et al., (2008) failed to explore 'antisocial' factors in the antisocial impulsivist pathway, such as antisocial behaviour and personality and criminality. In addition, although there is merit to this research due to them sampling non-treatment seeking gamblers, they relied on recruitment through advertisements in a newspaper, rather than obtaining a specific sample of community gambling participants. This is a pertinent point as given their small sample, the research cannot be generalised to a specific sample within the community or the wider general population.

Another study that proposed gambling subtypes comes from Bonnaire et al., (2009) who sampled 141 pathological gamblers from four different gambling venues: cafe's, racetracks, a casino slot machine room and a casino traditional gambling room. Sampling

participants from various locations is a relative strength of this study as the prior research has tended to only recruit from single locations. The authors attempted to validate the pathways model by dividing participants into subtypes based on where they were recruited and what types of games they were playing when they were recruited. The researchers explored differences between each of their constructed subgroups based on measures including gambling severity, sensation seeking, alexithymia and depression.

They reported that their first subtype (racetrack sample) played active games, such as horserace gambling that requires some knowledge and skill. These individuals scored higher on sensation seeking and alexithymia, and lower on depression. The authors concluded that this subtype matched Blaszczynski and Nower's (2002) antisocial impulsivist gamblers. However, this was concluded based solely on this group scoring higher on sensation seeking in contrast to the other subgroups. Their second subtype, recruited from a slot machine room, consisted of gamblers who played passive games, such as slot machines that required less knowledge of the game. These individuals scored low on sensation seeking and high on depression. The authors reported that this group do not gamble to increase arousal, but as an 'escape'; proposing that this subtype mirrored the emotionally vulnerable pathway described by Blaszczynski and Nower (2002). Yet, again this was due to this sample of gamblers scoring high on depression alone as they did not explore other factors proposed to be present in this pathway. Their third subtype included pathological gamblers who played games that involved strategies, especially roulette gambling. This subtype displayed low levels of sensation seeking, alexithymia and depression. The authors likened this subtype to Blaszczynski and Nower's (2002) behaviourally conditioned subtype, despite the authors failing to measure *any* of the factors suggested to incorporate this subtype.

Whilst Bonnaire et al., (2009) reported their study to be the only one to have explored preferred gambling types, they recruited very small samples from each of their sampled venues. They also created subtypes based on where they sampled participants, rather than deriving subtypes using a statistical test or being theory driven. As such, this study does not represent a test or exploration of the pathways model, rather an exploration of differences based on where they sampled their participants.

In the same year, Vachon and Bagby (2009) conducted a cluster analysis of the personality traits of 90 pathological gamblers and 138 non-pathological gamblers as a control sample, recruited through a newspaper advertisement. According to the authors, their best fitting model identified three clusters of pathological gambler, with each cluster characterised by a unique personality trait profile. Their clusters were validated by comparing them on various measures of psychopathology. Their first cluster, *simple pathological gamblers* reflected personality trait scores near to the normative mean, with an absence of comorbid psychopathology. Their second cluster, *hedonic pathological gamblers* were characterised by moderate levels of psychopathology, with an attraction to excitement and pleasure, being careless, and acting with little forethought. Their third cluster, labelled *demoralised pathological gamblers*, were characterised by high levels of psychopathology, including extreme negative affect, with high scores on neuroticism, anxiety, angry hostility, depression, vulnerability, impulsivity, substance use, distrust and poor motivation. The authors found no sex differences between their clusters. The authors also reported that their simple pathological gamblers were indistinguishable from their control participants, however, their hedonic and demoralised gamblers showed significantly higher gambling pathology when compared with the control group.

Although it is an asset to the field that Vachon and Bagby (2009) used community recruited non-treatment seeking gamblers, each of their pathological gambling subtypes only consisted of 30 individuals, making findings consequently difficult to generalise. In addition, they formed their clusters using the pathological gamblers alone, not pursuing the opportunity to subtype their control group. The authors reported that their results suggest a conceptualisation of pathological gambling as an impulse control disorder with each subtype characterised by a different impulsivity-trait profile. The research provides some support for the pathways model (Blaszczynski & Nower, 2002), such as finding a gambler who experiences less psychopathology. They appear to have also found two subtypes similar to the antisocial impulsivist pathway, with heightened impulsivity. Yet, they did not find a clear subtype similar to the emotionally vulnerable pathway, despite a wealth of theory and research supporting this type of gambler. An explanation for this finding could be that they failed to explore some factors associated with the emotionally vulnerable pathway, such as a history of traumatic life experiences or premorbid anxiety and depression.

A study based more specifically on Blaszczynski and Nower's (2002) pathways model was carried out by Ledgerwood and Petry (2010). The authors sampled 229 pathological gamblers entering a clinical trial of psychosocial treatment for pathological gambling and placed them into subgroups based on their scores on measures of depression, anxiety and impulsivity. Participants who scored lower than one standard deviation above the mean on depression or anxiety were placed into the *behaviourally conditioned* subtype. Among those participants who scored high on the depression and anxiety measures, those who scored lower than one standard deviation above the mean on the impulsivity measure were assigned to the *emotionally vulnerable* subtype, and those who scored high on impulsivity were assigned to the *antisocial impulsivist* subtype. As such, the authors

organised participants into subtypes directly to explore the proposed subgroups by Blaszczynski and Nower (2002), which provides clear value.

Ledgerwood and Petry (2010) reported that their behaviourally conditioned gamblers represented the smallest subtype. These individuals experienced less severe gambling problems, had relatively lower levels of psychopathology, and fewer family or social problems compared with the antisocial impulsivist and emotionally vulnerable gamblers. This group also had lower rates of antisocial personality disorder and were less likely to have sought drug or alcohol treatment than antisocial impulsivist gamblers. The lack of psychopathology within these participants provides support to Blaszczynski and Nower's (2002) behaviourally conditioned subtype. However, it is noteworthy that similar to the prior documented studies, the authors relied on an absence of such traits to identify this subtype, instead of using measures to specifically explore this subtype.

Similar to previous findings, women had greater representation in Ledgerwood and Petry's (2010) *emotionally vulnerable* subtype. This group had significantly higher psychiatric severity than behaviourally conditioned gamblers, but had fewer legal problems, were less likely to have an antisocial personality and fewer addiction-related problems than antisocial impulsivist gamblers. Their derived *antisocial impulsivist* subtype had high rates of antisocial personality disorder and the most severe psychosocial problems. This provides support to Blaszczynski and Nower's (2002) model. However, the authors did not assess for pre-morbid psychopathology, which is a crucial element of the pathways model. Nor did they find a difference in the coping skills between the behaviourally conditioned and emotionally vulnerable gamblers, which does not support the model. This failure to assess for pre-existing affective states and trauma is not unique to this study. The research discussed thus far in this chapter have also neglected such

variables. This is surprising given that pre-existing negative affect is the key component suggested in the emotionally vulnerable pathway. As such, there remains a clear gap in the literature base with regard to the validation of this subgroup.

Nower et al., (2012) recognised that the subtyping studies to date lend limited support to the pathways model and the existence of distinct subgroups of problem gamblers. They commented that this is due to a failure to examine fully the range of factors identified by the model. To address this, Nower et al., (2012) used data collected through interviews in the National Epidemiological Survey on Alcohol and Related Conditions (NESARC). They used latent class analysis to derive empirical subtypes of gamblers, based on characteristics described in the pathways model. Their sample consisted of 581 community non-treatment seeking disordered gamblers. Within the latent class analysis, the authors used various measures of psychopathology, including the DSM-IV pathological gambling criteria, substance misuse, major depressive disorder, dysthymia, bipolar disorder, specific phobia and panic, anxiety disorder, attention deficit/hyperactivity disorder and personality disorders.

As predicted, their best fitting model was a three-class solution. A strength of this study is that the three subtypes roughly corresponded to the subtypes in the pathways model. For example, those in their first class reported the lowest overall levels of psychopathology, including gambling severity and mood disorders, which they likened to the behaviourally conditioned subtype. Their second class emerged as generally consistent with the emotionally vulnerable pathway, being characterised by substance use, personality disorders, depression and mood disorders. The authors reported their third class was also generally consistent with the antisocial impulsivist pathway, with the

highest levels of personality, mood and substance use disorders, alcohol-related fights and antisocial personality.

Nower et al., (2012) noted limited participants within their second class and thus reported that, contrary to the pathways model, this could suggest that disordered gamblers are largely characterised by two overarching groups; those without significant psychopathology and those who have severe biological based psychopathology. This is surprising due to previous research finding a clear subtype experiencing severe negative affect who gamble primarily to cope. However, as discussed, previous studies have failed to include a range of measures relevant to the pathways model, which could serve to explain the conflicting results. Another explanation is that it could be due to the sample; they sampled pathological gamblers from the general population whereas other studies have largely focussed on treatment seeking samples. Therefore, there could be differences in the number and nature of subtypes based on the sample. However, more research across a range of samples is needed to fully understand this.

Suomi, Dowling and Jackson (2014) sampled 212 clients in gambling treatment programmes across three Australian states. They conducted a hierarchical cluster analysis using a scale of psychiatric distress, emotion regulation, impulsivity and alcohol use. They validated their clusters using the PGSI and other scales measuring coping, anger and hostility and substance misuse. They proposed four subgroups of gambler. Their first, *psychological distress,* reported higher scores on psychological distress, close to average scores on impulsivity and lower scores on alcohol abuse. Their second subtype, *low comorbidity,* comprised individuals with lower gambling severity and lower scores on psychological distress, alcohol abuse and impulsivity. Their third, *alcohol abuse,* reported higher scores on alcohol use and stimulant drug use and lower scores on psychological

distress and impulsivity. The fourth group, *multimorbidity,* reported high levels of psychological distress, alcohol abuse and impulsivity. The computed psychological distress and multimorbid clusters appeared similar to the emotionally vulnerable and antisocial impulsivist subtypes suggested within the pathways model (Blaszczynski & Nower, 2002). Notwithstanding this research represents another example of a gambler subgroup study based on the pathways model that has proposed finding a subgroup similar to the emotionally vulnerable subtype by relying on assessing current affective states instead of pre-existing. In addition, they have neglected to explore for other key variables suggested within the pathways model such as cognition, antisocial personality and offending behaviour. Therefore, whilst it is positive that they employed a range of measures in the research, it does not represent a comprehensive exploration of the pathways model.

Another study that adopted a robust sample yet failed to include sufficient measures to adequately explore the pathways model was conducted by Lobo et al., (2014). They recruited a clinical and two separate community samples (pathological and subclinical gamblers) in an attempt to explore the pathways model based on personality traits. When analysing the samples together, the best fitting model was a two-class solution. Their first class were characterised by lower levels of gambling severity and normative TCI trait levels, which they likened to the Blaszczynski and Nower's (2002) behaviourally conditioned subtype. Their second class reported high levels of novelty seeking, harm avoidance and lower self-directedness and normative scores on the other TCI measures, which they linked to the emotionally vulnerable subtype.

Lobo et al., (2014) used limited measures to specifically explore the antisocial impulsivist subgroup, hence no such subtype emerged. Of interest, the authors did not find any

subtypes when the subclinical gamblers were excluded from their analysis (i.e. only using disordered gamblers). This is surprising given that previous studies have largely focussed on specific clinical samples and have found distinct subgroups. Nevertheless, this shows the importance of including subclinical gamblers within explorations of gambler subgroups. As noted previously, sub-clinical gamblers represent a substantial proportion of the gambling population and thus further research is needed to understand the nature of the subtypes within this population.

A recent subtyping study based on the pathways model was conducted by Valleur et al., (2016). The authors sampled 372 problem gamblers and provided unique contributions to the field by not only including those that are and are not seeking treatment, but also by assessing for premorbid negative affect. The research employed a range of scales, including gambling severity, gambling beliefs, suicide ideation, ASPD, anxiety disorder, mood disorder, addictive disorders, ADHD in childhood and personality traits. The authors defined their subtypes based on characteristics described in the Pathways Model. To define the emotionally vulnerable subtype, the authors used a single criterion of whether the participants reported suffering from at least one episode of anxiety or depression prior to reporting that there gambling problems commenced. The antisocial impulsivist subtype was distinguished by isolating those scoring high on ASPD or novelty seeking. The authors decided that those participants who had not been classified in the emotionally vulnerable or antisocial impulsivist subtypes, were behaviourally conditioned gamblers. The behaviourally conditioned subtype represented the largest group, where 40% of participants reported a history of mood disorders, 20% a history of anxiety disorder and 30% an addictive disorder other than gambling. Their emotionally vulnerable subgroup comprised a higher proportion of individuals who reported a history of a mood (80%) or anxiety disorder (75%) and another addictive disorder apart from

gambling (46%). In their antisocial impulsivist group, 53% reported a history of a mood disorder, 36% an anxiety disorder and 50% another addictive disorder. Interestingly, their logistic regression analysis revealed that the emotionally vulnerable gamblers were more likely to endorse the DSM IV item of *committing illegal acts to finance the gambling*. This is surprising given that, according to the pathways model, those who commit illegal acts would be more likely to be antisocial impulsivist gamblers.

Valleur et al's., (2016) research provides some support for Blaszczynski and Nower's (2002) behaviourally conditioned, emotionally vulnerable and antisocial impulsivist pathways. For instance, they found a subtype with lower levels of psychopathology, a group characterised by higher levels of mood and anxiety disorders and one with higher levels of ASPD and/or novelty seeking. Yet, the authors failed to use a specific measure of impulsivity, which is crucial to the antisocial impulsivist subtype. Therefore, whilst it supports the notion of there being distinct gambler subgroups and echoes many aspects of the pathways model, it does not represent a comprehensive test of it.

This Chapter has discussed different perspectives that aim to explain the development and maintenance of gambling behaviour. Each of them have their own merit through being supported by literature. However, as documented, alone they do not offer a comprehensive conceptual framework to explain gambling behaviour as they fail to account for the heterogeneity of gamblers. Thus, within the literature there has been a shift to the introduction of integrated models that incorporate numerous perspectives and propose subgroups of gamblers. The current Chapter has introduced the Pathways Model (Blaszczynski & Nower, 2002) that includes biological, psychological and social influences into a conceptual framework. Yet, whilst this model provides a unique and important contribution to the literature through its focus on the heterogeneity of gambling,

there remains limitations to the model. For instance, it focuses solely on the risk factors for gambling and neglects protective factors that could lead an individual away from problem gambling. Studies that have attempted to explore the pathways model have been introduced. However, there remains a number of limitations to their exploration of the model. The next Chapter will summarise the key elements of importance and the missing areas identified in this and the previous Chapters. It will utilise this to present a rationale for the research together with the aims and predictions of the current research.

CHAPTER 4.
ADDRESSING THE RESEARCH PROBLEM

4.1 Introduction

This Chapter describes how the gaps in the literature will inform the aims and predictions of the research. Attention will be directed towards gambling subgroup studies that have attempted to test the Pathways Model of Problem and Pathological Gambling (Blaszczynski & Nower, 2002). The Chapter will conclude by drawing aims and predictions for the research based on the review of the literature.

4.2 Rationale for the research

The literature to date has presented some empirical support for aspects of the Pathways Model. However, there are inconsistencies in relation to the number and nature of the subtypes produced (e.g. Bonnaire et al., 2009; Ledgerwood & Petry, 2006, 2010; Lobo et al., 2014; Nower et al., 2012; Stewart & Zack, 2008; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009). Indeed, there appears to be some findings that are emerging more consistently, such as some of the pathology within the gambling subgroups. These will be outlined below.

A number of studies have identified a group of gamblers that lack any *severe* levels of psychopathology. It is argued that this 'normal' subgroup of gamblers gamble due to factors such as socialisation and conditioning processes. This subgroup has been referred to in the literature as *Subcultural* (Moran, 1970), *Otherwise Normal* (Lesieur, 2001), *Behaviourally Conditioned* (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010), *Social* (Stewart & Zack, 2008), *Low Emotion Regulation* (Stewart et al., 2008), *Erroneous Beliefs and Early Win Experiences* (Turner et al., 2008), *Simple* (Vachon & Bagby, 2009) and *Low Comorbidity* (Suomi, Dowling & Jackson, 2014) gamblers. This group of

gamblers appear to be similar to Blaszczynski and Nower's (2002) behaviourally conditioned subtype in relation to the lack of severe psychopathology that they report. However, as discussed previously, some studies have failed to find a subgroup similar to this (e.g. Graham & Lowenfeld, 1986; Ledgerwood & Petry, 2006; Lesieur & Blume, 1991; Zimmerman, Meeland & Krug, 1985).

A second subtype emerging in the literature is one characterised by increased levels of depression, anxiety, stress and/or other debilitating affective states. Throughout the literature, this subtype has been referred to as *Neurotic* (Moran, 1970; Zimmerman, Meeland & Krug, 1985) *Recurringly Depressed* (McCormick, 1987), *Action and Escape Seekers* (Lesieur & Blume, 1991), *Psychologically Distressed* (Steel & Blaszczynski, 1996; Suomi, Dowling & Jackson, 2014), *Emotionally Vulnerable* (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010; Turner et al., 2008), *Escape* (Ledgerwood & Petry, 2006), *Coping* (Stewart & Zack, 2008; Stewart et al., 2008) and *Demoralised* (Vachon & Bagby, 2009).

A number of the aforementioned studies provide limited support for the emotionally vulnerable subtype suggested by Blaszczynski and Nower (2002). For instance, some of the studies (e.g. Nower et al., 2012; Vachon & Bagby, 2009) have also found this subgroup to report high levels of impulsivity, personality disorders and hostility, which according to the pathways model would primarily present in antisocial impulsivist gamblers. In addition, the majority of studies (e.g. Bonnaire et al., 2009; Ledgerwood & Petry, 2010; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008) have relied on exploring *current* levels of negative affect, rather than assessing emotional dysfunction that commenced *prior* to their gambling, as suggested by the pathways model. Other studies have likened their subgroups to this pathway without testing for

other factors suggested within this pathway. Furthermore, there has also been research that has not found a specific subtype similar to Blaszczynski and Nower's (2002) emotionally vulnerable subtype.

A number of studies have also found a subtype of individuals who display marked impulsivity. This type of gambler has been referred to as *Impulsive* (Moran, 1970; Zimmerman, Meeland & Krug, 1985), *Chronically Under Stimulated* (McCormick, 1987), *Action Seekers* (Lesieur, 2001), *Antisocial Impulsivist* (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010), *Egotism* (Ledgerwood & Petry, 2006), *Enhancement* (Stewart & Zack, 2008; Stewart et al., 2008), *Impulsive* (Turner et al., 2008), *Demoralised* (Vachon & Bagby, 2009), and *Multimorbid* (Suomi, Dowling & Jackson, 2014).

Similar to the behaviourally conditioned and emotionally vulnerable subgroups, some of the studies noted do not provide support to the antisocial impulsivist pathway proposed in Blaszczynski and Nower's (2002) pathways model. Whilst some of these studies have identified a subtype with increased levels of impulsivity (Ledgerwood & Petry, 2006, 2010; Suomi, Dowling & Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009), they have failed to employ other variables suggested to be present within this pathway, such as antisocial behaviour and personality. Furthermore, other studies have likened their computed subgroups to this pathway without sufficiently measuring any of the constructs suggested to be present in antisocial impulsivist gamblers (e.g. Bonnaire et al., 2009; Lobo et al., 2014; Stewart & Zack, 2008; Stewart et al., 2008).

A review of the literature revealed that a wealth of the gambler subgroup studies have focused on recruiting treatment seeking gamblers, who are, arguably, a subset of the gambling population that may not readily generalise. Furthermore, of the studies that have recruited community participants, the majority have only used those who were identified

as pathological gamblers. Whilst the pathways model was originally conceptualised for problem and pathological gamblers, it is intended to identify subgroups applicable to the development of gambling problems *across* the spectrum of disorder (Nower et al., 2012). Yet, there has been very little research with regard to the pathways model in those who gamble regularly but have not been identified as pathological/problem gamblers. No studies to date appear to have examined the pathways model (Blaszczynski & Nower, 2002) in either a sample of gamblers recruited from online gambling forums or in university students. Exploration of gambler subgroups within these populations will allow for the potential development of a model in samples that have had limited attention in the literature.

4.3 Aims and predictions of the research

The overarching aim of this thesis is to draw from the pathways model and develop a model of the different types of gamblers, incorporating clinical correlates of problem gambling including motivations, mental health, personality, substance use, cognition, offending and psychopathy. It intends to utilise samples that have had limited attention in the literature to date; students and gambling forum users. Currently the pathways model only accounts for problem and pathological gamblers. Yet, this does not account for a large majority of gamblers who do not meet the criteria to be a problem or pathological gambler. Therefore, there is a clear need for a model inclusive of such gamblers. Finally, the pathways model is based solely on risk factors for gambling and is not inclusive of protective factors that could lead an individual away from problematic gambling. Therefore, the inclusion of protective factors seems vital to the ongoing development of theoretical models of gambling.

The following aims and predictions are indicated.

Study 1

Aims:

To explore the utility of classifying gamblers into subtypes based on their primary motives for gambling. To then provisionally explore the behaviourally conditioned, emotionally vulnerable and antisocial impulsivist pathways in Blaszczynski & Nower's (2002) Pathway's Model based on primary social, coping, and enhancement motives for gambling. To also explore the levels of anxiety, depression, drug and alcohol use in each subgroup and establish if these levels are similar to that proposed in the Pathways Model.

Predictions:

1). Those whose primary motive for gambling is either enhancement or coping will report severe levels of gambling, whereas those with a primary social motive will report the least severe levels of gambling (Stewart & Zack, 2008; Stewart et al., 2008).

2). Those with a primary social motive for gambling will display significantly less anxiety, depression, alcohol and drug use than those without a primary social motive for gambling (Stewart & Zack, 2008; Stewart, Zack, Collins, Klein & Fragopoulos, 2008). This will manifest by a significantly lower regression coefficient and beta values.

3). Those with a primary coping motive for gambling will display significantly higher anxiety and depression than those without coping as their primary gambling motive. Anxiety and depression will be the most predictive of gambling severity in this group (Stewart & Zack, 2008; Stewart, Zack, Collins, Klein & Fragopoulos, 2008). This will manifest by a significantly higher regression coefficient and beta values.

4). Those with a primary enhancement motive will display significantly increased levels of alcohol and drug use than those without enhancement as their primary gambling motive

(Stewart & Zack, 2008; Stewart, Zack, Collins, Klein & Fragopoulos, 2008). This will manifest by significantly higher beta values.

Study 2

Study two will build on study one by assessing in more detail the behaviourally conditioned and emotionally vulnerable pathways, including variables that were largely neglected in study one. It will specifically examine gambling beliefs, association with peers who gamble, current and premorbid psychological distress, negative life events and impulsivity.

Aim:

To explore whether there is a subtype of gambler similar to the behaviourally conditioned and emotionally vulnerable pathways in Blaszczynski and Nower's (2002) Model. It will explore this in samples that have been neglected in the literature; students and gambling forum users.

Predictions:

5). There will be a cluster of gamblers similar to Blaszczynski and Nower's (2002) behaviourally conditioned pathway, with lower levels of premorbid and current anxiety and depression, impulsivity, and negative life experiences (Lesieur, 2001; Ledgerwood & Petry, 2010; Stewart & Zack, 2008; Vachon & Bagby, 2009; Suomi, Dowling & Jackson, 2014).

6). There will a be a cluster of gamblers similar to Blaszczynski and Nower's (2002) emotionally vulnerable pathway with increased levels of premorbid and current anxiety and depression, negative life events and impulsivity (Ledgerwood & Petry, 2006, 2010;

Steel & Blaszczynski, 1996; Stewart & Zack, 2008; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009).

7). There will be no significant differences between the clusters with regard to levels of gambling related cognitive distortions and the number of family and friends who gamble (Blaszczynski & Nower, 2002).

8). Those categorised as low on premorbid anxiety and/or depression will report the least severe gambling, current anxiety and depression, self-reported negative life events, and impulsivity than those high on premorbid anxiety and/or depression (Blaszczynski & Nower, 2002; Valleur et al., 2016).

9). Those categorised as high on premorbid anxiety and/or depression will report significantly higher levels of gambling severity, current anxiety and depression, impulsivity and self-reported negative life events (Blaszczynski & Nower, 2002; Valleur et al., 2016).

10). There will be no significant difference between those who are categorised as high and low on premorbid anxiety and depression with regard to the levels of cognitive distortions and the number of friends and family who gamble (Blaszczynski & Nower, 2002).

Study 3

Study three will also have a core focus on assessing protective factors for gambling and the moderating effects they have. It will also explore the risk factors associated with the antisocial impulsivist pathway (Blaszczynski & Nower, 2002) that have not been sufficiently explored in studies one and two, such as antisocial personality, offending behaviour and impulsivity.

Aims:

Prior to study 3 being undertaken, a Pilot study will be completed. This aims to test the reliabilities and correlation coefficients of the measures prior to them being used in the larger study. This is due to the final study using measures that have had limited attention in the literature and that have not previously been used in this thesis (e.g. protective factor measures).

Study 3 aims to extend study 2 by exploring whether there is a subgroup of gamblers similar to the antisocial impulsivist pathway in Blaszczynski and Nower's (2002) Pathways Towards Problem and Pathological Gambling Model. This study also aims to explore for levels of and moderating effects of protective factors within each of the gambler subgroups. This aims to allow for the proposal of a model that is inclusive of both risk and protective factors.

Predictions:

12). Those within the antisocial impulsivist subgroup will report more severe anxiety and depression than those within the emotionally vulnerable subtype (Blaszczynski & Nower, 2002).

13). Those within the antisocial impulsivist subgroup will report more psychopathy; dissocial tendencies, emotional detachment, disregard for others, and lack of sensitivity to emotion than those within the emotionally vulnerable and behaviourally conditioned subtypes **(**Blaszczynski & Nower, 2002).

14). Those within the antisocial impulsivist subgroup will report committing more acquisitive, drug-related, violent and other antisocial behaviour offences than those within the behaviourally conditioned and emotionally vulnerable subgroups (Blaszczynski & Nower, 2002).

15). Those in the behaviourally conditioned subtype will report the highest levels of protective factors and those in the antisocial impulsivist will report the least.

16). The associations between impulsivity, psychopathy psychological distress and gambling severity will be moderated by life satisfaction, social support, self-control and resilience.

CHAPTER 5.

Study 1: A PRELIMINARY EXPLORATION OF THE THREE SUBTYPES IN THE PATHWAYS TO PROBLEM AND PATHOLOGICAL GAMBLING MODEL.

5.1 Introduction

This study aimed to explore the utility of classifying gamblers into subtypes based on their primary motives for gambling. It also aimed to provisionally explore the behaviourally conditioned, emotionally vulnerable and antisocial impulsivist pathways in Blaszczynski & Nower's (2002) Pathway's Model based on primary social, coping and enhancement motives for gambling. It also intended to explore the levels of psychological distress and substance misuse in each subgroup and establish if these levels are similar to that proposed in the Pathways Model. To achieve this, the study utilised samples that have not been utilised in the gambling subtype literature; students and those who frequent gambling forums.

5.2 Participants

Six hundred and ninety four participants took part in the research; nearly 80% (n = 552) were men and just over 20% (n = 140) were women. Two hundred and four participants were students and 490 were online gambling forum users. With regard to students, 78% (n = 159) were 18 to 25 years of age, 13% (n = 27) were 26 to 35, 5% (n = 11) were 36 to 45 years of age and 4% (n = 8) were 46 to 55. There were no students 55 years of age or older. With regard to gambling forum users, 30% (n = 141) were 18 to 25, 39% (n = 190) were 26 to 35 years of age, 17% (n = 83) were 36 to 45, 10% (n = 51) were 46 to 55 years of age, and 5% (n = 24) were 55 years of age or older.

To recruit student participants, the study was advertised on an online newsletter. Posters detailing the research were also placed in various social areas in the university. To recruit those from gambling forums, the study was advertised on three gambling forums specifically designed for individuals to discuss gambling. The response rate for completion of the questionnaires was 39%[8].

5.3 Measures

Six questionnaires were used:

1. DSM-V Diagnostic Criteria for Disordered Gambling[9], taken from the fifth edition of the Diagnostic and Statistics Manual (DSM-V). The criteria comprise nine items regarding gambling behaviour within the lasts 12 months (e.g. Have you needed to gamble with increasing amounts of money in order to achieve the desired excitement?). Each item required a yes/no response. Gambling severity was based on the number of criteria endorsed (responded 'yes' to). The DSM-V scores participants into one of three categories; Mild Gambling Disorder (scoring 4 to 5), Moderate Gambling Disorder (scoring 6 to 7), and Severe Gambling Disorder (scoring 8 to 9).

2. The Problem Gambling Severity Index (PGSI: Ferris & Wynne, 2001) is a scale designed to measure the severity of gambling. It consists of nine items (e.g. How often have you bet more than you could really afford to lose). The scale is rated and scored on a four-point Likert Scale: (0) never/almost never, (1) Sometimes, (2) Most of the time, (3) Almost Always. A score of zero classifies participants as a 'non-problem gambler', one to two as a 'low risk' gambler, three to seven as

[8] Due to the research being an online study with a web-link to access the study, it is unknown how many individuals viewed the original advertisement. The response rate is calculated from the number of people who followed the link and viewed the research information sheet.
[9] Persistent and recurrent problematic gambling behaviour leading to clinically significant impairment or distress.

'moderate risk' gamblers and a score of eight or more as 'problem gamblers'. The authors reported the overall Cronbach alpha reliability coefficient as .84.

3. Gambling Motives Questionnaire (GMQ: Stewart & Zack, 2008) is a 15 item measure of gambling motives. It consists of three subscales: Social Motives, Enhancement Motives, and Coping Motives. Each subscale contains five items rated on a four-point Likert scale: (1) never, (2) almost never, (3) sometimes, and (4) almost always. The authors noted good internal consistency, with a Cronbach alpha of .91, .81 and .86 for the enhancement, social and coping motive subscales respectively.

4. Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983) is a 14 item scale that measures states of anxiety and depression, whilst also measuring the severity of the disorders. The scale consists of seven items for the anxiety scale and seven items for the depression scale. Each of the two subscales were rated on a four point Likert scale: e.g. (1) not at all, (2) occasionally, (3) quite often, and (4) very often. The scale has been widely used in clinical and general population samples. A review of the scale found it to have high internal consistency, with an average Cronbach alpha of .83 and .82 for the anxiety and depression scales respectively (Bjelland et al., 2002).

5. The Alcohol Use Disorder Identification Test (AUDIT: Babor et al., 2001) is a 10 item scale that measures harmful use, abuse and dependence of alcohol. Each of the scale items are rated on a five point Likert scale: (1) Never, (2) Less than monthly (3) Monthly, (4) Weekly, (5) Daily or almost daily. Davey, Obst and Sheehan (2000) have shown the scale to have high internal reliability (Cronbach's alpha .81).

6. Drug Abuse Screening Test - 10 (DAST-10: Skinner, 1982) is a 10 item brief screening tool that assesses drug use, not including alcohol or tobacco, in the past 12 months. Each item requires a yes/no response (e.g. Do you abuse more than one drug at a time). Items that are answered yes are allocated a score of one, the higher the score the more severe the drug use. Villalobos-Gallegos et al., (2015) showed the DAST-10 to have high internal reliability (Cronbach's alpha .80).

5.4 Procedure

Ethical approval for the research was obtained through the Psychology Department's Ethics Committee at The University of Central Lancashire. The questionnaires were administered online using Survey Gizmo[10]. The advertisement on the posters, online newsletter and on the gambling forums consisted of a paragraph of information about the research and provided a web-link. This web-link took participants to the information sheet, which detailed what the study explored and how long it would take to complete the questionnaires. After viewing this, if individuals agreed to take part, they were asked to click on a "next" button that took them to the questionnaires. Each measure had a paragraph at the top of the page detailing the nature of the measure and how to complete it. On completion of the study, or withdrawal, participants were provided with additional information, including details pertaining to the research aims, contact details for gambling support agencies, and the contact details for the researchers. By submitting their questionnaires participants were consenting to take part in the research (See Appendix 1 for the materials).

[10] Survey Gizmo is an online service that allows users to create their own web-based questionnaires and surveys.

5.5 Results

This section will commence by outlining the data screening process. This will be followed by preliminary analyses exploring the internal consistencies and descriptive statistics of the measures employed. It will also identify the prevalence of problem gambling in the populations sampled through categorising participants into gambling severity categories based on the DSM-V gambling disorder criteria and the PGSI. The PGSI will be utilised to explore differences between the gambling severity categories and psychological distress and substance misuse. Participants will be classified into a subgroup based on their primary motive for gambling. The results will conclude with a series of hierarchical multiple regressions exploring whether anxiety, depression, alcohol and drug use are predictive of gambling severity in those with a primary social, coping or enhancement motive for gambling.

5.6 Data Screening

Data screening procedures were conducted on the student and forum user samples separately. All variables within the data set were examined to check for missing values, normality and the occurrence of univariate and multivariate outliers. One hundred and eight values were identified as missing. Little's MCAR test revealed the data was missing completely at random for student sample (χ^2 (660) = 706.676, p = .101), and the forum user sample (χ^2 (792) = 821.067, p = .230). Mahalanobis distance was calculated to identify multivariate outliers, with a chi-square cut off value of 24.3. This resulted in the exclusion of 16 cases, leaving 694 for the analysis. In relation to univariate outliers, scores identified as an outlier were assigned a score one unit lower (or higher) than the next most extreme score in the distribution. Prior to the main analyses, checks were performed to ensure each analysis met all necessary assumptions. The only violation found was the data on each measure was slightly skewed to the left. In view of the size of the sample,

which would increase robustness of data analyses, it was decided not to transform the data (Tabachnick & Fidell, 2013).

5.7 Reliability and preliminary analyses

Internal reliabilities of each measure for the student and gambling forum user participants were calculated using Cronbach's alpha. All item-to-total correlations were positive and all measures showed high reliability for the student and forum user samples. The values are presented in Table 1, along with the mean and standard deviation values for each measures for men, women, students and forum users.

Table 1: Cronbach alpha values for the samples, and descriptive statistics for each of the measures overall and between sex.

	Cronbach's Alpha		**Men**						**Women**						**Overall**					
	Student	Forum Users	Students (n=141)		Forum users (n=412)		Total (n=553)		Students (n=64)		Forum Users (n=76)		Total (n=140)		Student (n=205)		Forum users (n=490)		Total (n=695)	
Measure			**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
DSM-V	-	-	2.9	2.7	2.6	2.7	2.7	2.7	1.2	1.6	1.2	2.0	1.2	1.8	2.4	2.5	2.4	2.7	2.4	2.6
PGSI	.86	.90	4.4	4.1	4.7	4.6	4.6	4.5	2.1	3.0	2.6	3.9	2.3	3.5	3.7	4.0	4.4	4.6	4.2	4.4
GMQ subscales																				
Coping	.77	.74	7.1	2.4	7.1	2.1	7.1	2.2	6.3	1.9	6.7	2.2	6.5	2.1	6.9	2.3	7.0	2.1	7.0	2.2
Social	.70	.70	8.4	2.7	7.8	2.3	8.0	2.4	8.3	2.4	7.6	2.0	7.9	2.2	8.4	2.6	7.8	2.3	8.0	2.4
Enhancement	.86	.85	11.2	2.5	12.1	3.2	11.8	3.3	9.9	3.6	10.0	3.5	9.9	3.6	10.8	3.6	11.7	3.4	11.5	3.5
HADS subscales																				
Anxiety	.78	.84	6.1	4.2	5.3	4.0	5.5	4.1	7.1	3.9	6.4	3.8	6.8	3.9	6.4	4.2	5.5	4.0	5.8	4.1
Depression	.78	.82	3.6	3.6	3.4	3.5	3.5	3.5	3.8	3.1	4.1	3.7	4.0	3.5	3.6	3.4	3.6	3.6	3.6	3.5
AUDIT-10	.83	.81	10.5	6.9	10.5	6.4	10.5	6.5	9.5	6.1	7.4	5.0	8.4	5.6	10.2	6.7	10.0	6.3	10.0	6.4
DAST-10	-	-	1.0	1.9	1.1	1.8	1.1	1.9	1.0	1.9	0.7	1.4	1.1	1.9	1.0	1.9	1.1	1.8	1.0	1.8

Note: GMQ=Gambling Motives Questionnaire; CMS= Coping Motives Scale; SMS= Social Motives Scale; EMS= Enhancement Motives Scale; HADS= Hospital Anxiety and Depression Scale; AUDIT-10= Alcohol Use Disorder Identification Test; DAST-10= Drug Abuse Screening Test.

Exploring gambling severity for covariates

To explore for differences between sample type and sex on gambling severity, a 2 x 2 factorial ANOVA was performed with sample (student/forum user) and sex (men/women) as independent variables and the PGSI total scale score as the dependant variable.

There was no main effect of sample type on gambling severity (F [1, 689] = .88 ns). There was, however, a significant main effect of sex on gambling severity (F [1, 689] = 27.5, $p<.001$, $Eta^2 = .038$), with men (M = 4.6, S.D = 4.4) reporting more severe gambling than women (M = 2.3, S.D = 3.5). There was no interaction between sex and sample type, (F [1, 689] = .02 ns).

5.8 Prevalence of problem gambling defined by the PGSI and the DSM-V

The number and percentage of men, women, students and gambling forum users in each gambling severity category were calculated across the PGSI and the DSM-V[11]. These are presented in Table 2. Once the gambling severity categories were established, the mean and standard deviation values for each measure were computed. These values can be seen in Table 3.

[11] The DSM-V severity categories are recognised as a clinical disorder in the Fifth Edition of the Diagnostic and Statistical Manual.

Table 2: DSM-V and PGSI gambling severity groups in total and by sex and sample type.

	Men			**Women**			**Total**		**Total**
	Students	**Forum users**	**Total**	**Students**	**Forum users**	**Total**	**Students**	**Forum users**	
Measures	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
DSM-V(Disordered gambling)	**N=141**	**N=411**	**N=552**	**N=64**	**N=75**	**N=139**	**N=205**	**N=488**	**N=696**
Non-clinical levels	92 (65.2)	275 (66.7)	367 (66.2)	60 (93.8)	64 (84.2)	125 (88.7)	152 (74.1)	339 (69.2)	492 (70.5)
Mild disorder	27 (19.1)	59 (14.3)	87 (15.7)	2 (3.1)	5 (6.6)	7 (5.0)	29 (14.1)	65 (13.3)	96 (13.8)
Moderate disorder	6 (4.3)	47 (11.4)	53 (9.6)	1 (1.6)	5 (6.6)	6 (4.3)	7 (3.4)	53 (10.8)	60 (8.6)
Severe disorder	16 (11.3)	30 (7.3)	46 (8.3)	1 (1.6)	1 (1.3)	2 (1.4)	17 (8.3)	31 (6.3)	48 (6.9)
PGSI (Gambling severity)									
Non-problem	26 (18.4)	62 (15.0)	88 (15.9)	25 (39.1)	31 (40.8)	56 (40.0)	51 (24.9)	93 (19.0)	144 (20.6)
Low risk	32 (22.7)	108 (26.2)	140 (25.3)	21 (32.8)	20 (26.3)	41 (29.3)	53 (25.9)	128 (26.1)	182 (26.1)
Moderate risk	52 (36.9)	156 (37.9)	209 (37.7)	14 (21.9)	17 (22.4)	31 (22.1)	66 (32.2)	174 (35.5)	242 (34.8)
Problem gambler	31 (22.0)	86 (20.9)	117 (21.1)	4 (6.3)	8 (10.5)	12 (8.6)	35 (17.1)	95 (19.4)	130 (18.6)

Table 3: Descriptive statistics for each variable by the DSM-V and PGSI gambling severity groups

	DSM-V				**PGSI**				**Overall**
	Non-Clinical Levels	**Mild Disorder**	**Moderate Disorder**	**Severe Disorder**	**Non-Problem Gambler**	**Low Risk Gambler**	**Moderate Risk Gambler**	**Problem Gambler**	
Variables	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
Gambling motives									
Coping	6.4 (1.7)	7.5 (2.1)	8.3 (2.6)	9.8 (2.9)	5.6 (0.9)	6.4 (1.4)	7.2 (2.1)	5.6 (0.9)	7.0 (2.2)
Social	7.9 (2.3)	8.2 (2.6)	7.7 (2.3)	8.2 (2.9)	7.1 (1.9)	8.0 (2.3)	8.4 (2.5)	8.0 (2.6)	8.0 (2.4)
Enhancement	10.8 (3.4)	12.7 (2.9)	13.3 (2.6)	13.2 (4.1)	8.7 (2.8)	11.0 (3.2)	12.3 (3.0)	13.5 (3.2)	11.5 (3.5)
HADS									
Anxiety	4.8 (3.6)	6.6 (3.7)	7.7 (4.0)	11.3 (4.1)	5.0 (4.1)	4.5 (3.4)	5.2 (3.6)	9.4 (3.9)	5.8 (4.1)
Depression	2.8 (3.0)	4.2 (3.4)	4.9 (3.7)	8.2 (4.0)	2.76 (3.18)	2.9 (3.0)	2.9 (2.9)	6.7 (4.0)	3.6 (3.5)
AUDIT (alcohol)	9.0 (5.9)	11.8 (6.5)	12.4 (5.7)	13.7 (8.8)	7.4 (5.4)	8.7 (5.5)	11.0 (5.9)	13.0 (7.7)	10.0 (6.4)
DAST (drug)	0.8 (1.4)	1.3 (1.8)	1.4 (2.2)	2.8 (3.3)	0.8 (1.8)	0.8 (1.5)	1.0 (1.6)	1.7 (2.4)	1.0 (1.8)

The sex of participants had an effect on gambling severity, with men gambling more severely. Consequently, two one-way MANCOVAS were performed on the data; one with psychological distress (anxiety and depression) as the dependent variables and one with substance misuse (alcohol and drug use) as the dependent variables. The results are as follows:

Psychological distress

Using Wilks' Lambda, sex was found to be significantly related to psychological distress, $F(2, 688) = 15.3$, $p<.001$; Wilk's $\Lambda = 0.96$, partial $\eta^2 = .04$[12], with women scoring higher than men. There was also a significant effect of gambling severity on psychological distress, $F(6, 1376) = 33.5$, $p<.001$; Wilk's $\Lambda = 0.76$, partial $\eta^2 = .13$. Using a Bonferroni adjustment ($p<.025$), significant main effects were found for gambling severity on levels of anxiety, $F(3, 689) = 60.0$, $p<.001$, partial $\eta^2 = .21$, and depression, $F(3,689) = 53.7$, $p<.001$, partial $\eta^2 = .19$. Planned contrasts showed that problem gamblers scored significantly higher than moderate risk, low risk and non-problem gamblers on levels of anxiety and depression ($p<.001$).

Substance misuse

Sex was not significantly related to substance misuse, $F(2, 669) = 1.2$ ns. However, there was a significant effect of gambling severity on substance misuse, $F(6,1338) = 12.3$, $p<.001$; Wilk's $\Lambda = 0.90$, partial $\eta^2 = .05$. Significant main effects were found for gambling severity on alcohol use, $F(3,670) = 21.3$, $p<.001$, partial $\eta^2 = .09$, and drug use, $F(3,670) = 7.8$, $p<.001$, partial $\eta^2 = .03$. Problem gamblers scored significantly higher

[12] Wilks Lambda is the proportion of variance in the dependant variables that is not accounted for by the independent. Therefore, the lower the value the more variance in the model accounted for by the independent variables.

than moderate risk, low risk and non-problem gamblers on levels of alcohol and drug use ($p<.001$).

5.9 Exploring primary motives for gambling

To determine which of the three gambling motives was the primary motive for each participant, the scores of the three gambling motive scales (enhancement, social and coping) were converted into standardised residuals (z-scores) in order to compare the residuals from the three motives. The motive with the highest z-score was allocated as the participants' primary motive for gambling. The mean and standard deviation values of each gambling motive for men, women, students and forum users are presented in Table 4.

Table 4: Descriptive statistics for each variable by Primary Motive, Sex, and Sample type.

	Men			Women			Overall		
Primary Motive	**Student**	**Forum User**	**Total**	**Student**	**Forum User**	**Total**	**Student**	**Forum User**	**Total**
	M (SD)	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
Enhancement	**N= 35**	**N=155**	**N= 190**	**N=8**	**N=16**	**N= 25**	**N= 43**	**N=172**	**N=217**
PGSI	4.7 (3.4)	4.5 (3.9)	4.5 (3.8)	3.0 (3.2)	2.8 (3.0)	2.8 (3.0)	4.4 (3.4)	4.3 (3.9)	4.3 (3.8)
Anxiety	4.8 (3.6)	4.6 (3.5)	4.7 (3.5)	5.8 (3.0)	5.0 (2.3)	5.2 (2.5)	5.0 (3.5)	4.7 (3.4)	4.7 (3.4)
Depression	3.0 (3.3)	2.6 (2.8)	2.7 (2.9)	3.6 (4.0)	2.3 (2.3)	2.7 (2.9)	3.1 (3.4)	2.6 (2.8)	2.7 (2.9)
Alcohol	10.1 (7.0)	11.1 (6.4)	10.9 (6.5)	7.0 (6.2)	7.4 (4.3)	7.4 (4.7)	9.6 (6.9)	10.7 (6.4)	10.5 (6.5)
Drugs	0.8 (1.1)	1.2 (1.9)	1.1 (1.8)	1.1 (1.7)	0.5 (1.1)	0.7 (1.3)	0.9 (1.2)	1.1 (1.9)	1.0 (1.7)
Coping	**N=51**	**N=132**	**N=183**	**N=16**	**N=21**	**N=37**	**N=67**	**N=153**	**N=221**
PGSI	5.5 (5.0)	6.5 (5.7)	6.2 (5.3)	2.9 (4.8)	5.1 (6.0)	4.1 (5.5)	4.9 (5.1)	6.3 (5.8)	5.9 (5.6)
Anxiety	7.5 (4.9)	7.1 (4.70)	7.2 (4.7)	8.0 (4.4)	9.3 (4.1)	8.7 (4.3)	7.6 (4.7)	7.4 (4.7)	7.4 (4.7)
Depression	4.9 (4.3)	5.1 (4.1)	5.0 (4.2)	3.9 (2.6)	6.9 (4.4)	5.6 (4.0)	4.7 (3.9)	5.3 (4.2)	5.1 (4.1)
Alcohol	10.7 (8.0)	10.2 (7.1)	10.4 (7.3)	6.7 (5.1)	8.6 (6.7)	7.7 (6.1)	9.7 (7.6)	10.0 (7.1)	9.9 (7.2)
Drug	1.6 (2.8)	1.1 (1.9)	1.2 (2.2)	1.2 (2.3)	1.2 (2.2)	1.2 (2.2)	1.5 (2.7)	1.1 (2.0)	0.9 (1.5)
Social	**N= 55**	**N=125**	**N= 180**	**N=40**	**N=39**	**N=79**	**N=95**	**N=165**	**N=260**
PGSI	3.1 (3.3)	3.2 (3.5)	3.1 (3.4)	1.6 (1.8)	1.1 (1.6)	1.4 (1.7)	2.5 (2.8)	2.7 (3.2)	2.6 (3.1)
Anxiety	5.5 (3.7)	4.5 (3.3)	4.8 (3.5)	7.05 (3.8)	5.5 (3.4)	6.3 (3.7)	6.2 (3.8)	4.7 (3.4)	5.2 (3.6)
Depression	2.7 (2.7)	2.7 (3.0)	2.7 (8.9)	3.8 (3.2)	3.4 (3.0)	3.6 (3.1)	3.2 (2.9)	2.9 (3.0)	3.0 (3.0)
Alcohol	10.7 (5.8)	9.9 (5.3)	10.1 (5.4)	11.1 (6.1)	6.7 (4.3)	9.0 (5.7)	10.9 (5.9)	9.1 (5.2)	9.8 (5.5)
Drug	0.7 (1.2)	1.1 (1.6)	0.9 (1.5)	0.9 (1.8)	0.5 (0.8)	0.7 (1.4)	0.7 (1.5)	0.9 (1.5)	0.8 (1.5)

Prediction 1: Those whose primary motive for gambling is either enhancement or coping will report severe levels of gambling, whereas those with a primary social motive will report the least severe levels of gambling.

A one way ANCOVA revealed significant differences between the participants' primary motive (social, coping or enhancement) and gambling severity. The covariate, sex, was significantly related to gambling severity $F(1, 689) = 18.7$, $p<.001$, with men reporting more severe gambling than women. There was also a significant effect of primary motive on gambling severity after controlling for sex, $F(2, 689) = 4.0$, $p = .02$. Planned contrasts revealed that having a primary coping motive for gambling significantly increased gambling severity compared to having a primary social motive, $t(689) = -3.2$, $p = .001$, but not compared with having a primary enhancement motive, $t(689) = -1.8$ ns.

5.10 Exploring the utility of predicting gambling severity based on primary motive to gamble and levels of anxiety, depression, alcohol and drug use.

To determine whether psychological distress (anxiety and depression) and substance misuse (alcohol and drugs) were predictive of gambling severity in those with primary enhancement, coping and social motives, a series of hierarchical multiple regressions were performed with each primary motive as an interaction term[13]. Due to sex having an effect on gambling severity, sex and sample type were entered as predictor variables into each regression in step 1 to control for any possible effects[14]. Anxiety, depression, alcohol and drug use were entered into each regression in step 2.

[13] This consists of three hierarchical regressions for each primary motive. The first regression for each motive included that particular motive as an interaction terms for anxiety, depression, drug use and alcohol use. The interaction term, if significant, shows a significant difference between those with that particular motive as their primary gambling motive and those without that motive as their primary gambling motive for each predictor variable. The second hierarchical regression in each series included only data from individuals who had that specific gambling motive as their 'primary' gambling motive. The third regression in each series included only individuals who did not have that specific motive as their primary gambling motive.

[14] A minus sign indicates that men scored significantly higher than women on gambling severity.

Prediction 2: Those with a primary social motive for gambling will display significantly less anxiety, depression, alcohol and drug use than those without a primary social motive for gambling. This will manifest by a significantly lower regression coefficient and beta values.

The first step was to perform a hierarchical regression to explore whether there were any interactions; significant differences in levels of anxiety, depression, alcohol and drug use between those who have a primary social motive for gambling and those who do not. This is presented in Table 5.

Table 5: Predicting gambling severity from anxiety, depression, drug and alcohol use alone and with social motives as an interaction term.

Predictor Variables	**B**	**SE B**	**ß**	**T**
Step 1				
Constant	5.94	.90		
Sex	-2.11	.43	-.19	-5.00***
Student	0.45	.37	.05	1.19
Step 2				
Constant	1.93	.83		
Sex	-1.80	.37	-.16	-4.90***
Student	0.42	.32	.04	1.34
Anxiety	0.36	.06	.33	6.21***
Depression	0.26	.07	.20	3.90***
Alcohol use	0.12	.03	.17	4.42***
Drug use	0.06	.09	.03	0.64
Interaction terms				
Anxiety x Primary Social Motive	-0.32	.11	-.24	-3.00**
Depression x Primary Social Motive	0.03	.13	.01	0.21
Alcohol use x Primary Social Motive	-0.04	.05	-.05	-0.76
Drug use x Primary Social Motive	0.27	.19	.06	1.46

R^2=.04, Adjusted R^2=.04 (Block 1); R^2= .35, Adjusted R^2=.34 (Block 2). R^2 change=.04 (Block 1), R^2 change= .31 (Block 2). ***p<.001, **p<.01, *p<.05.

The results revealed the first regression was significant on step 1, F (2, 669) = 14.5, MSE = 18.8, p<.001, and step 2, F (11, 660) = 32.8, MSE=12.9, p<.001. The proportion of variance explained by the whole model was 34%. Anxiety emerged as a significant interaction term. In order to determine the direction of the difference in levels of anxiety, two hierarchical regressions were performed; one including only data for participants who

have a primary social motive for gambling, the other including those who do not have a primary social motive for gambling[15]. These are presented in Tables 6 and 7.

Table 6: Predicting gambling severity from anxiety, depression, drug and alcohol use for with a primary social motive for gambling.

Predictor Variables	**B**	**SE B**	**ß**	**T**
Step 1				
Constant	5.12	.95		
Sex	-1.78	.42	-.26	-4.22***
Student	-0.12	.40	-.02	-0.29
Step 2				
Constant	2.84	1.03		
Sex	-1.89	.40	-.30	-4.77***
Student	0.10	.38	.02	0.25
Anxiety	0.04	.07	0.04	0.49
Depression	0.29	.09	.27	3.41**
Alcohol use	0.08	.03	.14	2.24*
Drug use	0.35	.13	.17	2.75**

R^2=.07, Adjusted R^2=.06 (Block 1); R^2=.22, Adjusted R^2= .20 (Block 2). R^2 change= .07 (Block 1); R^2 change= .16 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression was significant on step 1, F (2, 250) = 9.10, MSE = 9.05, p = <.001, and on step 2, F (6, 246) = 11.71, MSE = 7.68, p<.001. The proportion of variance explained by the whole model was 20%. For primary social gamblers increased depression, alcohol use, and drug use emerged as significant predictors of gambling severity. The beta values indicate that depression was the most predictive (.27), followed by drug use (.17) and alcohol use (.14).

[15] This group have either a coping or enhancement motive as their primary gambling motive.

Table 7: Predicting gambling severity from anxiety, depression, drug and alcohol use for those without a primary social motive for gambling.

Predictor Variables	**B**	**SE B**	**ß**	**T**
Step 1				
Constant	6.01	1.33		
Sex	-1.51	0.69	-.11	-2.20*
Student	0.47	0.55	.04	0.86
Step 2				
Constant	1.46	1.18		
Sex	-1.73	0.59	-.12	-3.00**
Student	0.65	0.46	.06	1.42
Anxiety	0.36	0.07	.32	5.56***
Depression	0.26	0.07	.20	3.48**
Alcohol use	0.12	0.03	.17	3.91***
Drug use	0.06	0.10	.03	0.60

R^2=.02, Adjusted R^2=.01 (Block 1); R^2=.32, Adjusted R^2=.31 (Block 2). R^2 change=.02 (Block 1); R^2 change=.31 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression was significant on step 1, F (2, 416) = 3.10, MSE = 23.02, p =.046, and on step 2, F (6, 412) = 32.67, MSE = 15.99, p<.001. The proportion of variance explained by the model was 31%. For those without a primary social motive, increased anxiety, depression and alcohol use were significantly predictive of gambling severity. The beta values indicate that anxiety (.32) was the most predictive, followed by depression (.20) and drug use (.17). The interaction term, anxiety, was significantly more predictive of gambling severity than those without a primary social motive for gambling.

Prediction 3: Those with a primary coping motive for gambling will display significantly increased anxiety and depression than those without coping as their primary gambling motive. Anxiety and depression will be the most predictive of gambling severity in this group. This will manifest by a significantly higher regression coefficient and beta values.

Table 8: Predicting gambling severity from anxiety, depression, drug and alcohol use alone and with coping motives as an interaction term.

Predictor Variables	B	SE B	ß	T
Step 1				
Constant	5.94	0.90		
Sex	-2.11	0.43	-.19	-5.00***
Student	0.45	0.37	.05	1.20
Step 2				
Constant	2.47	0.86		
Sex	-2.08	0.36	-.19	-5.73***
Student	0.59	0.31	.06	1.87*
Anxiety	0.16	0.07	.15	2.48*
Depression	0.18	0.08	.14	2.38*
Alcohol use	0.09	0.03	.13	2.85**
Drug use	0.28	0.11	.11	2.50*
Interaction terms				
Anxiety x Primary Coping Motive	0.24	0.10	.24	2.43*
Depression x Primary Coping Motive	0.13	0.12	.10	1.12
Alcohol use x Primary Coping Motive	0.07	0.05	.10	1.53
Drug use x Primary Coping Motive	-0.34	0.16	-.11	-2.08*

R^2=.04, Adjusted R^2=.04 (Block 1); R^2= .35, Adjusted R^2=.34 (Block 2). R^2 change=.04 (Block 1), R^2 change= .31 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression was significant on step 1, F (2, 669) = 14.5, MSE = 18.8, p<.001, and step 2, F(11, 660) = 31.9, MSE = 13.5, p<.001. The proportion of variance explained by the model was 34%. Anxiety and drug use emerged as significant interactions; showing significant differences between those with primary coping motives and those without. The regression coefficients for those with and without coping motives as their primary gambling motives are presented in Tables 9 and 10.

Table 9: Predicting gambling severity from anxiety, depression, drug and alcohol use for with a primary coping motive for gambling.

Predictor Variables	B	SE B	ß	T
Step 1				
Constant	.09	1.74		
Sex	-1.73	1.02	-.12	-1.70
Student	1.32	0.84	.11	1.57
Step 2				
Constant	0.09	1.74		
Sex	-2.03	0.84	-.14	-2.43*
Student	1.21	0.70	.10	1.80
Anxiety	0.41	0.10	.34	4.34***
Depression	0.30	0.11	.22	2.80**
Alcohol use	0.16	0.05	.21	3.50**
Drug use	-.10	0.15	-.02	-.34

R^2=.03, Adjusted R^2=.02 (Block 1); R^2=.39, Adjusted R^2= .37 (Block 2). R^2 change= .03 (Block 1); R^2 change= .36 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression emerged as significant on step 1, F (2, 209) = 3.1, MSE = 30.4, p = .046, and on step 2, F (6, 205) = 21.8, MSE = 19.5, p<.001. The proportion of variance explained by the model was 37%. In this group, increased anxiety, depression, and alcohol use emerged as significantly predictive of gambling severity. The beta values indicate that anxiety (.34) was the most predictive, followed by depression (.22) and alcohol use (.21). The interaction term, anxiety, was significantly more predictive of gambling severity in this group than in those without coping motives as their primary gambling motive.

Table 10: Predicting gambling severity from anxiety, depression, drug and alcohol use for those without a primary coping motive for gambling.

Predictor Variables	B	SE B	ß	T
Step 1				
Constant	5.81	0.86		
Sex	-2.09	0.40	-.24	-5.24***
Student	0.07	0.36	.01	.200
Step 2				
Constant	3.05	0.89		
Sex	-2.11	0.38	-.25	-5.61***
Student	0.30	0.33	.04	0.87
Anxiety	0.15	0.06	.15	2.70**
Depression	0.19	0.07	.15	2.74**
Alcohol use	0.09	0.03	.14	3.18**
Drug use	0.28	0.10	.13	2.91

R^2=.06, Adjusted R^2=.06 (Block 1); R^2=.20, Adjusted R^2=.19 (Block 2). R^2 change=.06 (Block 1); R^2 change=.14 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression emerged as significant on step 1, F (2, 457) = 14.5, MSE = 11.7, p<.001, and on step 2, F (6, 453) = 19.3, MSE = 10.03, p<.001. The proportion of variance explained by the model was 19%. In this group, increased anxiety, depression and alcohol use emerged as significant predictors of gambling severity. However, the beta values indicate that, in this group, anxiety (.15), depression (.14) and alcohol use (.14) were less predictive than in those with primary coping motives for gambling. Drug use did not emerge as a significant predictor of gambling severity. However, within this group drug use was more predictive of gambling severity than in those with primary coping motives for gambling.

Prediction 4: Those with a primary enhancement motive will display significantly increased levels of alcohol and drug use than those without enhancement as their primary gambling motive. This will manifest by significantly higher beta values.

Table 11: Predicting gambling severity from anxiety, depression, drug and alcohol use alone and with enhancement motives as interaction terms.

Predictor Variables	**B**	**SE B**	**β**	**T**
Step 1				
Constant	5.94	0.90		
Sex	-2.11	0.43	-.20	-5.00***
Student	0.45	0.37	.05	1.19
Step 2				
Constant	1.29	0.87		
Sex	-2.18	0.37	-.20	-5.90***
Student	.64	0.32	.07	2.00*
Anxiety	0.27	0.06	.45	4.46***
Depression	0.36	0.07	.28	5.29***
Alcohol use	0.13	0.03	.18	4.45***
Drug use	0.12	0.10	.05	1.27
Interaction terms				
Anxiety x Primary Enhancement Motive	0.05	0.11	.03	0.41
Depression x Primary Enhancement Motive	-0.26	0.13	-.12	-2.03*
Alcohol use x Primary Enhancement Motive	-.06	0.05	-.08	-1.16
Drug use x Primary Enhancement Motive	0.10	0.18	.03	0.57

R^2=.04, Adjusted R^2=.04 (Block 1); R^2= .32, Adjusted R^2=.31 (Block 2). R^2 change=.04 (Block 1), R^2 change= .28 (Block 2). ***p<.001, **p<.01, *p<.05.

The first regression was significant on step 1, F (2, 669) = 14.5, MSE = 18.8, p<.001, and step 2, F (11, 660) = 28.4, MSE = 13.5, p<.001. The proportion of variance explained by the model was 31%. Depression emerged as an interaction term; showing a significant difference between those with a primary enhancement motive and those without. The regression coefficients for those with and without enhancement motives as their primary gambling motives are presented in Tables 12 and 13.

Table 12: Predicting gambling severity from anxiety, depression, drug and alcohol use for with a primary enhancement motive for gambling.

Predictor Variables	B	SE B	ß	T
Step 1				
Constant	6.50	1.60		
Sex	-1.60	0.85	-.13	-1.87
Student	-0.22	0.65	-.02	-0.33
Step 2				
Sex	-1.33	0.80	-.11	-1.67
Student	-.23	0.60	-.02	-0.38
Anxiety	0.30	0.09	.27	3.27**
Depression	0.10	0.10	.08	1.00
Alcohol use	0.08	0.04	.14	1.90
Drug use	0.24	0.15	.11	1.62

R^2=.02, Adjusted R^2=.01 (Block 1); R^2=.19, Adjusted R^2= .17 (Block 2). R^2 change= .02 (Block 1); R^2 change= .17 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression emerged as non-significant on step 1, F (2, 204) = 1.8, MSE = 14.2 ns. However, it was significant on step 2, F(6, 200) = 7.8, MSE = 11.9, p<.001. The proportion of variance explained by the model was 17%. In this group, increased anxiety emerged as significant predictor of gambling severity.

Table 13: Predicting gambling severity from anxiety, depression, drug and alcohol use for those without a primary enhancement motive for gambling.

Predictor Variables	B	SE B	ß	T
Step 1				
Constant	5.74	1.09		
Sex	-2.22	0.50	-.20	-4.41***
Student	0.67	0.46	.07	1.46
Step 2				
Constant	1.00	1.00		
Sex	-2.34	0.42	-.21	-5.56***
Student	0.92	0.38	.09	2.42*
Anxiety	0.28	0.06	.25	4.51***
Depression	0.36	0.07	.28	5.03***
Alcohol use	0.13	0.03	.17	4.33***
Drug use	0.12	0.10	.05	1.20

R^2=.05, Adjusted R^2=.05 (Block 1); R^2=.36, Adjusted R^2=.36 (Block 2). R^2 change=.05 (Block 1); R^2 change=.31 (Block 2). ***p<.001, **p<.01, *p<.05.

The regression emerged as significant on step 1, F(2, 462) = 12.4, MSE = 20.2, p<.001, and on step 2, F(6, 458) = 43.7, MSE = 14.1, p<.001. The proportion of variance explained

by the model was 36%. In this group, increased anxiety, depression and alcohol use emerged as significantly predictive of gambling severity.

5.11 Discussion

This study provides some evidence for the Pathways towards Problem and Pathological Gambling Model (Blaszczynski & Nower, 2002) with regard to subtyping gamblers into distinct groups. It placed individuals into subgroups based on their primary motivation to gamble. There was a relatively equal number of participants in each group, with 37%, 32% and 31% reporting primary social, coping and enhancement motivations to gamble, respectively. Those with a primary social motive for gambling displayed less severe gambling than primary coping or enhancement gamblers. In primary social gamblers, increased depression, drug and alcohol use were predictive of gambling severity. Anxiety was significantly less predictive of gambling severity than in those who gambled for coping and enhancement purposes. Those who gambled primarily to cope displayed the most severe levels of psychological distress. Anxiety was significantly more predictive of gambling severity in this group in comparison to those who gamble for social and enhancement reasons. Individuals who gamble for enhancement purposes reported significantly less depression than those with primary social and coping gambling motives.

More students and women made up the primary social gambling group, but more men comprised the primary coping and enhancement groups, along with a relatively equal number of students and forum users in the primary coping group. There were more forum users than students in the enhancement motives group. This refutes literature that suggests women gamble primarily as a function of coping and 'escaping' (Delfabbro & Winefeld, 2000; Grant & Kim, 2002; Ledgerwood & Petry, 2010). It also does not support research that has found young people (i.e. students) act more impulsively in response to extremely

positive moods and thus demonstrate more enhancement and coping motives (e.g. Canale et al., 2015).

The prevalence of problem gambling was 17% and 19% for the student and forum user samples. This was similar to some previous studies using the same measure (e.g. Barrault & Varescon, 2013), lower than others (e.g. MacLaren, Harrigan & Dixon, 2012), and considerably higher than some studies (Canale et al., 2015; McGrath et al., 2010). This is surprising for the student sample due to the prevalence rate being considerably higher than other studies that have used student participants and the same measurement tool as the current study (e.g. Canale et al., 2015). There was no difference in gambling severity between students and gambling forum users. Due to the opportunity sampling used in the current study, it is a plausible explanation that for both samples, those who gamble at increased levels may have chosen to engage in the research. It is, however, unsurprising that those directly recruited from gambling forums gamble at increased levels than the general population. There is no literature that has adopted a specific gambling forum user sample, which limits the ability to compare prevalence rates to such a sample. With regard to sex differences in gambling severity, the finding that men gambled more severely was also not a surprise given that the literature consistently reports that men gamble more severely than female counterparts (Blinn-Pike et al., 2007; Martin et al., 2014).

In relation to the risk factors employed in this study, problem gamblers displayed significantly higher levels of anxiety, depression, drug and alcohol use compared to moderate risk, low risk and non-problem gamblers. This directly supports previous literature that suggests that problem gamblers display higher levels of affective and substance disorders than non-problem gamblers (e.g. Barnes et al., 2005; Black & Shaw, 2008; Getty, Watson & Frisch, 2000; Ledgerwood & Petry, 2010; Lloyd, Chadwick, &

Serin, 2014; Martin et al., 2014; Spunt, 2002). The current research has shown that these trends remain the same in students and gambling forum users.

This study provides support for some of the subgroups proposed in Blaszczynski and Nower's (2002) pathways model. Similar to this model, a subgroup (social gamblers) emerged who reported lower levels of gambling and psychological distress, a subtype with higher levels of gambling and psychological distress (coping gamblers) and a group who display higher levels of gambling and drug and alcohol use (enhancement gamblers).

The prediction that those who gamble primarily for social motives would report less severe anxiety and depression was supported. Primary social gamblers displayed lower levels of depression than primary coping and enhancement gamblers. In addition, in this group, anxiety was less predictive of gambling severity than in primary coping and enhancement gamblers collectively. It was also predicted that this group would report lower levels of drug and alcohol use. This was partially supported; in primary social gamblers, drug and alcohol use was significantly predictive of gambling severity. However, this was not significantly more or less predictive of gambling severity than in those without a primary social motive for gambling. In addition, on average, this group displayed the lowest levels of drug and alcohol use. It was also predicted that this group would display the least severe gambling. This was supported, with 13% of problem gamblers in the current study having a primary social motive for gambling compared with 32% and 55% having enhancement and coping motives respectively.

The primary social subgroup is partially consistent with Blaszczynski and Nower's (2002) behaviourally conditioned gambler, Lesieur's (2001) conceptualisation of the 'normal' gambler, Ledgerwood and Petry's (2010) behaviourally conditioned gambler, and Suomi, Dowling and Jackson's (2014) low comorbidity gambler. That is, they display

low levels of gambling alongside low levels of other gambling related comorbidities, such as psychological distress and substance use.

Whilst for primary social gamblers, depression, alcohol and drug use were significantly predictive of gambling severity, it is possible that these vulnerabilities developed as a consequence of gambling. This would provide support to Blaszczynski and Nower's (2002) behaviourally conditioned pathway. According to this model, individuals can present with increased levels of anxiety, depression and alcohol use as a *consequence* of their gambling, such as impaired family, work and social relationships, and negative financial implications (Ferland et al., 2008).

Notwithstanding the finding that drug use emerged as predictive of gambling severity in primary social gamblers fails to support the behaviourally conditioned pathway. It can be argued, however, that individuals who gamble for social purposes engage in other risky behaviours for social purposes, such as consuming large quantities of alcohol and using drugs. For instance, Meisel et al., (2013) found problem gamblers had more peers who gamble and use substances than non-problem gamblers. It is also possible that depression, drug and alcohol use were significantly predictive of gambling severity in the regression analysis due to a lack of other measures to specifically explore the 'social' aspect of the pathway. This will be reflected in the study's limitations.

The lower levels of gambling severity and gambling related comorbidities within the social gambling subtype appears suggestive of a more recreational pathway, however, where gambling problems can develop. Thus, it could be suggested that social motives are lower-risk motives for gambling. Whilst a subgroup of gamblers with an apparent absence of severe psychopathology has been found in community and treatment seeking gamblers (e.g. Stewart et al., 2008; Turner et al., 2008; Vachon & Bagby, 2009), the

current study suggests that such a subgroup, who gamble predominantly to socialise, is also represented in students and gambling forum users.

It was also predicted that those with a primary coping motive for gambling would display high levels of gambling severity, anxiety and depression. This prediction was supported, with anxiety, depression and alcohol use all being significantly predictive of gambling severity. In addition, for this group, anxiety emerged as significantly more predictive of gambling severity than in those with primary social and enhancement motives collectively. As noted, this group also had the highest number of problem gamblers. This provides direct support for Blaszczynski and Nower's (2002) emotionally vulnerable gambler. According to this model, emotionally vulnerable gamblers present with significant premorbid anxiety and/or depression and increased alcohol use as a consequence of their gambling. Although the current study did not assess the function of the alcohol use, it is possible that primary coping gamblers also use alcohol as a coping strategy. This could serve to explain why alcohol use was predictive of gambling severity in primary coping gamblers.

The primary coping subtype that emerged in this study also supports literature that has identified a subtype of individuals with increased negative affect (e.g. Steel & Blaszczynski, 1996; Suomi, Dowling & Jackson, 2014; Ledgerwood & Petry, 2006, 2010; Turner et al., 2008; Stewart & Zack, 2008; Stewart et al., 2008). The current research extends the literature by finding that this type of gamblers is also present in students and gambling forum users and that these individuals gamble as a function of coping. Research has indeed found that students report increased anxiety and depression (Eisenberg et al., 2007). It therefore appears that for a subset of students who gamble, they use this activity as a means of coping.

Drug use, for primary coping gamblers, emerged as less predictive of gambling severity than in both the primary social and enhancement subtypes. This provides further support for Blaszczynski and Nower's (2002) emotionally vulnerable gambler. According to this model, drug use would be prevalent in the antisocial impulsivist pathway and not the emotionally vulnerable subtype. Yet, it is unclear why primary coping gamblers endorsed using alcohol and not drugs. Although speculative, an explanation for this could come from the legalities of alcohol and drug use. Due to alcohol being legal it is possible that primary coping gamblers also use this this as a coping strategy, whereas gamblers who use drugs could represent a specific subset of gamblers. Blaszczynski and Nower (2002) do indeed suggest that there is a distinct subtype of gambler, antisocial impulsivists, who are antisocial in nature and consume illegal substances.

It was predicted that those who gamble for enhancement motives would report significantly higher levels of drug and alcohol use than those with primary social and coping motives. This prediction was partially supported. In this group, only anxiety emerged as significantly predictive of gambling severity. On average, this group reported the highest levels of drug and alcohol use. However, this was not significantly more predictive of gambling severity than in primary coping and social gamblers. The enhancement subgroup in the current study also displayed a high level of problem gambling, which provides support to the antisocial impulsivist pathway.

Other studies (e.g. Ledgerwood & Petry, 2010) have found individuals placed in the antisocial impulsivist subtype based on their levels of anxiety, depression and impulsivity, were more likely to have a history of engaging in drug or alcohol treatment. However, Ledgerwood and Petry (2010) sampled treatment seeking problem gamblers which represents a different population to the current study and could serve to explain the

difference. In addition, Ledgerwood and Petry (2010) measured impulsivity, which is characteristic of the antisocial impulsivist pathway, whereas the current study measured the antisocial impulsivist subgroup through solely adopting an enhancement motives for gambling scale. Therefore, more measures are needed to fully explore this pathway. This will be reflected in the limitations of this study.

Despite some consistencies with the pathways model, the current research does not fully support it. For example, the current study explored the emotionally vulnerable pathway for individuals who had a primary coping motive for gambling and the antisocial impulsivist pathway for individuals who had a primary enhancement motive for gambling. According to the pathways model (Blaszczynski & Nower, 2002), coping and enhancement gamblers could both theoretically be in the emotionally vulnerable pathway, which includes those who gamble to cope with negative affect and to enhance positive affect. Therefore, whilst enhancement motives alone may not have been adequate enough to explore the antisocial impulsivist pathway, different levels of anxiety, depression, drug and alcohol use were found in individuals with primary coping and enhancement motives. In addition, the comorbidities noted here were differentially predictive of problem gambling in the primary coping and enhancement gamblers. This suggests that these two types of gamblers represent different subgroups of gamblers. That is, those who gamble to reduce negative affect and those who gamble to enhance positive affect, and not solely in one 'emotionally vulnerable' pathway.

5.12 Limitations of this study

The current study has several limitations that need to be acknowledged. The student sample emerged as younger than the online gambling forum user sample, which could affect the direct comparisons that can be made. It explored the antisocial impulsivist

pathway using an enhancement motives for gambling scale alone. Therefore, the inclusion of other measures, such as impulsivity, would have been beneficial to explore this pathway. In addition, a premorbid measure of anxiety and depression would have been more suited to explore the emotionally vulnerable pathway due to the pathways model arguing that pre-existing negative affect is a key feature of this subgroup. Furthermore, this study relied on exploring the behaviourally conditioned pathway through looking for an absence of comorbidities rather than using specific measures to explore factor within subgroup. Employing measures of cognition and exploring whether the participants family/friends gamble would have been of benefit to explore the behaviourally conditioned subtype.

5.13 Conclusion

It is apparent that there is no single factor that contributes to the development and maintenance of problematic gambling. This study provides some support to Blaszczynski and Nower's (2002) Pathways towards Problem and Pathological Gambling Model. This was through identifying subgroups of gamblers with different etiological and clinical characteristics somewhat similar to the behaviourally conditioned, emotionally vulnerable and antisocial impulsivist pathways identified by primary social, coping and enhancement motivations for gambling. However, to fully explore this model, further research is needed that explores the model in more detail. The following study will attempt to address this by providing more exploration of the factors associated *with* the behaviourally conditioned pathway, such as gambling beliefs and the number of family/friends who gamble. Whilst this study explored negative affect, study two will provide an extension through assessing for pre-existing negative affect and a history of negative life events.

CHAPTER 6.

STUDY 2: EXPLORING THE BEHAVIOURALLY CONDITIONED AND EMOTIONALLY VULNERABLE PATHWAYS OF THE PATHWAYS TO PROBLEM AND PATHOLOGICAL GAMBLING MODEL (Blaszczynski & Nower, 2002).

6.1 Introduction

This study aims to explore whether there is a subgroup of gamblers similar to the behaviourally conditioned and emotionally vulnerable pathways in Blaszczynski and Nower's (2002) Pathways towards Problem and Pathological Gambling Model. Whilst Study 1 explored key variables within the three subtypes suggested in the Pathways Model, it did not provide a comprehensive exploration of each subtype. Due to the high number of variables within the Pathways Model, Study 2 will adopt measures to specifically explore in detail the behaviourally conditioned and emotionally vulnerable subgroups.

6.2 Participants

Six hundred and seventy participants took part; 63% (n = 422) were men and 37% (n = 248) were women. Two hundred and sixty five participants were students and 404 were gambling forum users. With regard to student participants, 77% (n = 205) were 18 to 25 years of age, 16% (n = 43) were 26 to 35 years of age, 4% (n = 10) were 36 to 45 years of age, 2% (n = 6) were 46 to 55 years of age, and 0.4% (n = 1) were 55 years of age or older. With regard to gambling forum users, 24% (n = 98) were 18 to 25 years of age, 37% (n = 150) were 26 to 35 years of age, 18% (n = 72) were 36 to 45 years of age, 14% (n = 56) were 46 to 55 years of age, and 7% (n = 27) were 55 years of age or older. Ninety-six percent identified themselves as a recreational gambler and 4% identified themselves as a professional gambler. Thirty seven percent (n = 250) of the sample identified

themselves as single, 38% (n = 256) as in a relationship, 22% (n = 144) as married, 2% (n = 15) as divorced and 0.1% (n = 1) as widowed.

As in study 1, student participants were recruited through advertising the study on an online newsletter. For the current study, students were also recruited through advertising the research on student discussion forums for eight UK universities. As in study 1, gambling forum users were recruited on online forums designed for individuals to discuss gambling. For this study, the research was advertised on five online forums. The response rate for completion of the questionnaires was 35%[16].

6.3 Measures

Seven questionnaires were used:

1. DSM-V Diagnostic Criteria for Disordered Gambling. See study 1.
2. The Problem Gambling Severity Index (PGSI: Ferris & Wynne, 2001). See study 1.
3. Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983). This was the same measure used in study 1. For the current study, this measure was presented twice; once using the scale as it stands, measuring states of anxiety and depression in the past couple of weeks (for the purpose of this study, this is named C-HADS), and again, asking participants the same questions, however, in relation to before they started to gamble (named P-HADS).
4. Gamblers' Beliefs Questionnaire (GBQ: Steenbergh, Meyers, May, & Whelan, 2002) is a 21 item scale that measures gambling-related cognitive distortions for all forms of gambling. The scale is rated and scored on a five-point Likert Scale:

[16] As with Study 1, this was 35% of people that viewed the information sheet. It is not known how many people viewed the original advertisements.

(1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. The scale authors reported two factors within the scale: luck/perseverance and illusion of control. A high score on the GBQ indicates a high level of cognitive distortions. The authors reported good internal consistency for the overall scale (α=.92), the Luck/Perseverance scale (α=.90) and the Illusion of Control scale (α=.84).

5. The Barratt Impulsivity Scale (BIS-15: Spinella, 2007) is a 15 item scale that measures non-planning impulsivity, motor impulsivity, and attentional impulsivity. The scale is rated on a four-point Likert Scale: (1) Rarely/Never, (2) Occasionally, (3) Often, (4) Almost Always/Always. Higher scores indicate increased levels of impulsivity. Spinella (2007) found the scale to have good internal consistency (α=.79).
6. Negative Life Events Scale. This is a four item scale designed by the researchers to measure previous negative life experiences (e.g. I have had many bad things happen to me). The scale is rated and scored on a four-point Likert Scale: (0) Does not apply, (1) Applies a bit, (2) Applies quite a lot, (3) Totally applies. A higher score indicates increased levels of negative life experiences.
7. Gambling Associates Scale. This was designed for the current study to measure the extent to which the participants' parents, friends, family, and colleagues gamble (e.g. How often do your friends gamble). The scale is rated and scored on a five-point Likert Scale: (0) I don't know, (1) Never, (2) Sometimes, (3) Most of the time, (4) Always. Higher scores indicate increased levels of associates who gamble.

6.4 Procedure

Ethical approval for the research was obtained through the Psychology Department's Ethics Committee. As in Study 1, the questionnaires were administered online using Survey Gizmo[17]. An advertisement of the research was placed onto the online student newsletter and the student and gambling discussion forums, which informed participants of the nature of the research and provided the web-link to the study. If participants chose to take part in the research they were instructed to follow the link to the information sheet and the questionnaires. On completion of the study, or withdrawal, participants were provided with details pertaining to the research aims, contact details for gambling support agencies and the researchers contact details. Through submitting their questionnaires participants were consenting to take part in the research. See Appendix 2 for the materials used in Study Two.

6.5 Results

This section will commence by describing the data screening process. This will be followed by the preliminary analyses of a cluster analysis on the measures included, except the gambling[18] measure. Subtypes based on premorbid anxiety and depression will then be formed to distinguish subgroups similar to the behaviourally conditioned and emotionally vulnerable subtypes. These subtypes will then be compared on the measures included to establish differences within the pathways.

6.6 Data Screening

Data screening procedures were conducted on the student and forum user samples separately. All variables were examined for missing values, the occurrence of

[17] Survey Gizmo is an online organisation that allows its users to create their own web-based questionnaires and surveys.
[18] The gambling measure was not used in the cluster analysis as this was used to evaluate the clusters.

multivariate and univariate outliers and normality. Sixty data points were identified as missing. Little's MCAR test indicated that this data was missing completely at random for student sample, χ^2 (38) = 43.084, p = .674, and gambling forum user sample, χ^2 (40) = 60.740, p = .449. The missing values were replaced with the population mean.

Using Mahalanobis distance, twenty-two cases were identified as multivariate outliers and were removed from the dataset, leaving 670 for the analysis. In relation to univariate outliers, these values were made less deviant by modifying their overall value to one unit lower (or higher) than the next most extreme value within the distribution.

Prior to the main analyses, checks were performed to ensure each analysis met all necessary assumptions. In both samples, the data were skewed to the left on the DSM-V, PGSI and HADS subscales. No further violations were found. However, due to these scales being clinical in nature, this was expected. Therefore, in view of the sample size, which would increase robustness of data analyses, it was decided not to transform the data (Tabachnick & Fidell, 2013).

6.7 Reliability analyses

The internal reliabilities of each measure for the student and gambling forum user participants were calculated using Cronbach's alpha. All item-to-total correlations were positive. All measures showed a good reliability (α value greater than .70). This was with exception to the gambling associates scale[19] which showed poor reliability. The values are presented in Table 14.

[19] This was a four-item scale designed by the researchers.

Table 14: Descriptive statistics for each of the measures overall and between sex.

	Cronbach's alpha		Men			Women			Overall		
	Students	**Forum Users**	**Students**	**Forum Users**	**Total**	**Students**	**Forum Users**	**Total**	**Students**	**Forum Users**	**Both samples**
			N=163	**N=258**	**N=421**	**N=100**	**N=146**	**N=246**	**N=263**	**N=404**	**N=667**
Measures (n)[20]			**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
DSM-V	-	-	2.4 (2.6)	2.4 (2.8)	2.4 (2.7)	1.1 (2.0)	0.7 (1.6)	0.9 (1.8)	1.9 (2.5)	1.8 (2.5)	1.8 (2.5)
PGSI (9)	.91	.91	4.6 (4.6)	4.2 (4.2)	4.4 (4.3)	2.3 (3.9)	1.5 (2.9)	1.8 (3.4)	3.7 (4.5)	3.2 (4.0)	3.4 (4.2)
GBQ (21)	.89	.89	55.6 (11.2)	52.7 (11.4)	53.8 (11.4)	45.7 (12.9)	40.6 (11.4)	42.7 (12.3)	51.8 (12.8)	48.4 (12.8)	49.7 (12.9)
BIS-15 (15)	.84	.84	32.8 (6.5)	31.7 (6.7)	32.1 (6.6)	32.46 (7.82)	31.4 (7.3)	31.8 (7.5)	32.7 (7.0)	31.6 (6.9)	32.0 (7.0)
P-HADS subscales											
Anxiety (7)	.88	.90	5.6 (4.5)	4.9 (4.1)	5.2 (4.3)	7.6 (5.0)	5.7 (5.0)	6.5 (5.1)	6.4 (4.8)	5.2 (4.5)	5.7 (4.6)
Depression (7)	.79	.84	3.3 (3.3)	2.9 (3.2)	3.0 (3.3)	3.9 (3.6)	3.0 (3.4)	3.3 (3.5)	3.5 (3.4)	2.9 (3.3)	3.1 (3.4)
C-HADS subscales											
Anxiety (7)	.87	.87	6.4 (4.4)	5.1 (3.8)	5.6 (4.1)	8.0 (4.9)	5.8 (4.4)	6.7 (4.7)	7.0 (4.7)	5.3 (4.1)	6.0 (4.4)
Depression (7)	.75	.75	3.5 (3.3)	2.9 (2.8)	3.2 (3.0)	4.2 (3.4)	3.1 (3.2)	3.6 (3.3)	3.8 (3.3)	3.0 (2.9)	3.3 (3.1)
Negative life events (4)	.74	.75	3.5 (2.3)	3.8 (2.3)	3.7 (2.3)	4.5 (2.6)	4.0 (2.7)	4.2 (2.7)	3.9 (2.5)	3.8 (2.5)	3.9 (2.5)
Gambling associates (4)	.26	.35	7.3 (1.7)	7.6 (1.7)	7.5 (1.7)	7.3 (1.7)	7.5 (1.7)	7.4 (1.7)	7.3 (1.7)	7.6 (1.7)	7.5 (1.7)

[20] n = Number of items for each measure.

6.8 Prevalence of problem gambling

To establish prevalence rates of problem gambling, men, women, students and forum users were categorised into gambling severity groups based on their DSM-V and PGSI scores. The number and percentage of participants in each severity category are presented in Table 15. Once the gambling severity groups were established, the mean and standard deviation values for each measure were computed, these are presented in Table 16.

Table 15: DSM-V and PGSI gambling severity groups overall and between sex and sample type.

	Men			**Women**			**Overall**		
	Students	**Forum users**	**Total**	**Students**	**Forum users**	**Total**	**Students**	**Forum users**	**Total**
Measure	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
PGSI (Gambling severity)	**N=163**	**N=258**	**N=421**	**N=100**	**N=146**	**N=246**	**N=263**	**N=404**	**N=667**
Non-problem	36 (22.1)	51 (19.8)	87 (20.6)	49 (48.0)	88 (60.3)	137 (55.2)	85 (32.1)	139 (34.4)	224 (33.4)
Low risk	38 (23.3)	64 (24.8)	103 (24.4)	27 (26.5)	29 (19.9)	56 (22.6)	65 (24.5)	93 (23.0)	159 (23.7)
Moderate risk	50 (30.7)	90 (34.9)	140 (33.2)	15 (14.7)	22 (15.1)	37 (14.9)	65 (24.5)	112 (27.7)	177 (26.4)
Problem gambler	39 (23.9)	53 (20.5)	92 (21.8)	10 (9.8)	7 (4.8)	17 (6.9)	49 (18.5)	60 (14.9)	109 (16.3)
DSM-V (Disordered gambling)	**N=157**	**N=253**	**N=410**	**N=98**	**N=144**	**N=242**	**N=255**	**N=397**	**N=652**
Non-clinical levels	113 (69.3)	182 (70.5)	296 (70.1)	85 (83.3)	133 (91.1)	218 (87.9)	198 (74.7)	315 (78.0)	514 (76.7)
Mild disorder	17 (10.4)	28 (10.9)	45 (10.7)	7 (6.9)	8 (5.5)	15 (6.0)	24 (9.1)	36 (8.9)	60 (9.0)
Moderate disorder	20 (12.3)	22 (8.5)	42 (10.0)	4 (3.9)	1 (0.7)	5 (2.0)	24 (9.1)	23 (5.7)	47 (7.0)
Severe disorder	7 (4.3)	21 (8.1)	28 (6.6)	2 (2.0)	2 (1.4)	4 (1.6)	9 (3.4)	23 (5.7)	32 (4.8)

Table 16: Descriptive statistics for each variable split by the DSM-V and PGSI gambling groups

	DSM-V				**PGSI**				**Overall**
Variables	**Non-Clinical Levels**	**Mild Disorder**	**Moderate Disorder**	**Severe Disorder**	**Non-Problem Gambler**	**Low Risk Gambler**	**Moderate Risk Gambler**	**Problem Gambler**	
	N=514	**N=60**	**N=47**	**N=32**	**N=224**	**N=159**	**N=177**	**N=109**	
	M (SD)	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
GBQ	47.2 (12.2)	56.9 (11.6)	60.7 (9.2)	60.3 (12.7)	40.9 (10.6)	49.5 (11.3)	54.6 (10.9)	60.1 (10.7)	49.7 (12.9)
BIS-15	31.0 (6.8)	33.8 (5.4)	35.9 (6.0)	38.6 (5.1)	29.4 (6.7)	31.3 (7.0)	33.1 (6.5)	36.6 (5.4)	32.0 (7.0)
P-HADS									
Anxiety	5.2 (4.5)	6.8 (4.4)	6.6 (4.63)	9.06 (5.49)	4.5 (5.2)	5.3 (4.5)	6.0 (4.7)	7.9 (4.7)	5.7 (4.6)
Depression	2.7 (3.0)	4.2 (3.6)	4.4 (3.6)	6.4 (4.6)	2.1 (2.6)	2.7 (2.9)	3.3 (3.4)	5.6 (4.1)	3.1 (3.4)
C-HADS									
Anxiety	5.5 (4.2)	6.9 (4.7)	7.3 (4.1)	10.1 (4.8)	5.2 (4.2)	5.7 (4.2)	5.6 (4.1)	8.7 (4.5)	6.0 (4.4)
Depression	3.0 (3.0)	3.6 (2.8)	4.3 (3.0)	6.2 (3.2)	2.5 (2.6)	3.3 (3.1)	3.2 (3.0)	5.2 (3.4)	3.3 (3.1)
Negative Life Events	3.6 (2.4)	4.3 (2.3)	4.6 (2.4)	5.6 (2.5)	3.5 (2.4)	3.7 (2.3)	3.6 (2.4)	5.2 (2.2)	3.8 (2.4)
Associates Gambling	7.4 (1.5)	7.5 (1.4)	7.5 (1.5)	7.5 (1.5)	7.2 (1.5)	7.5 (1.5)	7.6 (1.6)	7.5 (1.4)	7.4 (1.5)

6.9 Exploring gambling severity for covariates

To explore for differences between sample type and sex on gambling severity, a 2 x 2 factorial ANOVA was performed on the data with sample (student/forum user) and sex (men/women) as independent variables and the PGSI total scale score as the dependant variable.

There was no main effect of sample type on gambling severity ($F [1, 664] = 2.8$ ns). There was, however, a significant effect of sex on gambling severity ($F [1, 664] = 60.1$, $p<.001$, $Eta^2 = .08$), with men reporting more severe gambling than women. There was no interaction between sex and sample type, ($F [1, 664] = 0.57$, ns).

6.10 Preliminary tests: Differences in gambling severity

Due to sex being a covariate, two one-way MANCOVAS were performed on the data; one with premorbid psychological distress (anxiety and depression) as the dependant variables, and one with current psychological distress (anxiety and depression) as the dependant variables.

There was a significant effect of gambling severity on premorbid psychological distress, $F(6,1326) = 19.6$, $p<.001$; Wilk's $\Lambda = 0.84$, partial $\eta^2 = .08$. Significant main effects were found for anxiety levels, $F(3,664) = 24.9$, $p<.001$, partial $\eta^2 = .10$, and depression levels, $F(3,664) = 38.7$, $p<.001$, partial $\eta^2 = .15$, with problem gamblers reporting more severe anxiety and depression than non-problem gamblers ($p<.001$).

There was also a significant effect of gambling severity on current psychological distress, $F(6,1324) = 15.6$, $p<.001$; Wilk's $\Lambda = 0.87$, partial $\eta^2 = .07$. Significant main effects were found for anxiety levels, $F(3,663) = 24.948$, $p<.001$, partial $\eta^2 = .101$, and depression

levels, $F(3,663) = 26.7$, $p<.001$, partial $\eta^2 = .11$. Problem gamblers reported more severe anxiety and depression than non-problem gamblers ($p<.001$ level).

A one-way ANCOVA revealed a significant effect of gambling severity on impulsivity after controlling for the effect of sex, $F(3,664) = 36.1$, $p<.001$, with problem gamblers reporting significantly increased impulsivity levels compared to non-problem gamblers $t(664) = -10.1$, $p<.001$. There was also a significant effect of gambling severity on levels of cognitive distortions, $F(3,664) = 60.5$, $p<.001$, with problem gamblers having significantly more distortions than non-problem gamblers, $t(664) = -12.6$, $p<.001$.

A one-way ANOVA revealed a significant effect of gambling on self-reported negative life experiences, $F(3,665) = 14.1$, $p<.001$. Problem gamblers reporting significantly more negative life experiences than non-problem gamblers ($p<.001$). There was a significant effect of gambling severity on the number of participants' family/friends who gamble, $F(3,665) = 3.1$, $p= .027$, however, there was no significant difference between problem and non-problem gamblers.

6.11 Exploring for clusters of gamblers

Prediction 5: There will be a cluster of gamblers similar to Blaszczynski and Nower's (2002) behaviourally conditioned subtype with lower levels of premorbid and current anxiety and depression, impulsivity, and negative life experiences.

Prediction 6: There will be a cluster of gamblers similar to Blaszczynski and Nower's (2002) emotionally vulnerable subtype with increased levels of premorbid and current anxiety and depression, negative life events and impulsivity.

Prediction 7: There will be no significant differences between the clusters on levels of gambling related cognitive distortions and the number family/friends who gamble.

In order to explore for homogenous subgroups within the data set, a two-step cluster analysis was performed on the current and premorbid anxiety and depression scales, gambling beliefs, impulsivity, negative life events and gambling associates scales. Due to there being no population difference, the cluster analysis was performed on the entire dataset. This also allowed for exploration of how many students, forum users, men and women emerge in each of the clusters. The PGSI scale was not entered as a variable in the formation of the clusters. Instead, it was entered into the analysis as an evaluation variable to allow for exploration of differences between the clusters in the levels of gambling severity reported. The analysis was not constrained to an expected number of clusters.

The analysis yielded two clusters based on Schwarz's BIC and the Log-likelihood distance measures (ratio of distances measures = 3.52). Cluster 1, 'low comorbidity', represented 42.8% (n=286) of the sample, and cluster 2, 'high comorbidity', represented 57.2% (n=383) of the sample. Sixty percent of men emerged into the low comorbidity cluster and 40% were in the high comorbidity cluster. With regard to women, 52% were in the low comorbidity cluster and 48% in the high comorbidity cluster. The level of importance of the variables in determining the clusters showed that the premorbid anxiety and depression, followed by the current anxiety and depression, and negative life events showed the largest importance in forming and distinguishing the clusters. The descriptive statistics for each measure in both clusters were computed. Significant differences between each of the variables in both clusters were also explored for. These are presented in Table 17.

Table 17: Cluster Profiles: Mean and SD values for each measure for both cluster and for each cluster.

Variables	**Low Comorbidity (Cluster A)**					**High Comorbidity (Cluster B)**					
	Men (n=254)	Women (n=129)	Students (n=125)	Forum Users (n=258)	Total (n=382)	Men (n=167)	Women (n=119)	Students (n=140)	Forum Users (n=146)	Total (n=286)	Total sample (n=670)
	M (SD)	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
P-anxiety	2.8 (2.5)	2.8 (2.6)	2.9 (2.5)	2.8 (2.5)	2.8 (2.5)	8.7 (4.0)	10.5 (3.9)	9.5 (4.2)	9.4 (3.9)	9.4 (4.1)	5.7 (4.6)*
P-depression	1.2 (1.3)	1.1 (1.3)	1.2 (1.3)	1.2 (1.3)	1.2 (1.3)	5.8 (3.4)	5.8 (3.6)	5.6 (3.4)	5.9 (3.5)	5.8 (3.5)	3.1 (3.4)*
C-anxiety	3.4 (2.5)	3.4 (2.8)	3.7 (2.8)	3.2 (2.4)	3.4 (2.6)	9.0 (3.8)	10.3 (3.7)	10.0 (3.9)	9.0 (3.7)	9.5 (3.9)	6.0 (4.4)*
C-depression	1.6 (1.5)	1.5 (1.6)	1.5 (1.4)	1.5 (1.6)	1.5 (1.6)	5.6 (2.9)	5.9 (3.2)	5.9 (3.1)	5.6 (3.0)	5.7 (3.1)	3.3 (3.1)*
N. L. E	2.7 (1.9)	3.1 (2.3)	2.6 (2.0)	3.0 (2.0)	2.9 (2.0)	5.1 (2.1)	5.3 (2.5)	5.1 (2.2)	5.2 (2.3)	5.1 (2.3)	3.8 (2.4)*
G. A	7.5 (1.5)	7.3 (1.6)	7.3 (1.7)	7.5 (1.5)	7.4 (1.5)	7.4 (1.5)	7.4 (1.5)	7.3 (1.5)	7.5 (1.5)	7.4 (1.5)	7.4 (1.5) ns
Impulsivity total	29.9 (5.7)	28.3 (6.5)	29.6 (6.4)	29.2 (5.8)	29.4 (6.0)	35.5 (6.5)	35.7 (6.7)	35.4 (6.5)	35.8 (6.6)	35.6 (6.6)	32.0 (7.0)*
N. P. impulsivity	10.7 (3.2)	9.9 (3.2)	10.3 (3.2)	10.5 (3.3)	10.4 (3.3)	13.5 (3.6)	12.6 (3.4)	12.5 (3.1)	13.8 (3.9)	13.1 (3.6)	11.6 (3.7)*
M. impulsivity	10.0 (2.4)	10.0 (2.6)	10.0 (2.7)	10.0 (2.4)	10.0 (2.5)	11.2 (3.1)	11.8 (3.1)	11.6 (3.3)	11.3 (3.0)	11.4 (3.1)	10.6 (2.9)*
A. impulsivity	8.9 (2.4)	8.2 (2.4)	9.0 (2.6)	8.5 (2.3)	8.7 (2.4)	10.9 (2.6)	11.3 (2.9)	11.4 (2.6)	10.8 (2.8)	11.1 (2.7)	9.7 (2.9)*
Gambling beliefs	52.2 (11.0)	39.4 (11.4)	50.3 (13.5)	46.7 (12.1)	47.9 (12.7)	56.3 (11.6)	46.3 (12.2)	53.1 (12.1)	51.2 (13.5)	52.1 (12.8)	49.7 (12.9)*
Illusion of Control	24.0 (5.4)	16.9 (5.4)	22.2 (6.7)	21.3 (6.2)	21.6 (6.4)	23.5 (5.5)	19.7 (5.2)	22.4 (5.7)	21.6 (5.7)	22.0 (5.7)	21.7 (6.1) ns
Luck/Perseverance	28.5 (7.1)	22.0 (7.1)	28.1 (8.1)	25.5 (7.4)	26.3 (7.7)	33.0 (8.3)	26.6 (8.9)	30.9 (8.5)	29.9 (9.6)	30.4 (9.1)	28.1 (8.6)*
Evaluation Variable											
PGSI	2.9 (3.1)	1.1 (2.6)	2.5 (3.5)	2.1 (2.9)	2.3 (3.1)	6.7 (4.9)	2.6 (3.8)	4.7 (5.0)	5.2 (4.9)	5.0 (4.9)	3.4 (4.2)*

NB: Two cluster solution: Schwarz's BIC 3084.81; BIC Change -725.00; Ratio of BIC changes 1.00; Ratio of distance measures 3.53. N.L.E= Negative Life Events; G. A= gambling associates; N. P impulsivity= Non-planning impulsivity; M. impulsivity= Motor Impulsivity; A. impulsivity= Attentional impulsivity. * = significant difference between the two clusters at P<.001 level; ns = no significant difference between the two clusters.

A MANCOVA was performed to compare differences between the low and high comorbidity clusters on gambling severity using the PGSI and DSM-V as the dependant variables, with sex as a covariate.

There was a significant effect of cluster type on gambling severity, $F(2, 648) = 49.54$, $p<.001$; Wilk's $\Lambda = 0.87$, partial $\eta^2 = .13$, with a significant effect of cluster type on both the PGSI, $F(1, 649) = 97.62$, $p<.001$, partial $\eta^2 = .13$, and the DSM-V, $F(1, 649) = 79.50$, $p<.001$, partial $\eta^2 = .11$. Those in the high comorbidity cluster reported significantly higher levels of gambling than those in the low comorbidity cluster.

6.12 Creating and testing subtypes of gamblers.

To explore and differentiate between the behaviourally conditioned and emotionally vulnerable pathways, subtypes were formed based on scores on premorbid anxiety and depression scales[21]. The premorbid anxiety and depression scales were split into 'low' and 'high'[22] based on their scale score; individuals categorised as high on either scale were assigned to the emotionally vulnerable subtype. The subtypes were then used to explore differences on the measures within the study.

Prediction 8: Those categorised as low on premorbid anxiety and/or depression will report the least severe gambling, current anxiety and depression, self-reported negative life events, and impulsivity than those high on premorbid anxiety and/or depression.

Prediction 9: Those categorised as high on premorbid anxiety and/or depression will report significantly higher levels of gambling severity, current anxiety and depression, impulsivity and self-reported negative life events.

[21] Subtypes were formed using scores on the premorbid anxiety and depression scales due to these showing the greatest importance in differentiating between the clusters. In addition, these are variables which specifically differentiate between the Behaviourally Conditioned and Emotionally Vulnerable pathways in Blaszczynski and Nower's (2002) Model.

[22] Participants were categorised into 'high' or 'low' on the anxiety and depression scale if they scored higher than the scale cut off point of >8. This was the cut-off point from normal to mild anxiety/depression proposed by the scale authors and which has been used in the literature widely since.

Prediction 10: There will be no significant difference between those who are categorised as high and low on premorbid anxiety and depression with regard to the levels of cognitive distortions and the number of friends and family who gamble.

Once the behaviourally conditioned and emotionally vulnerable subtypes were established, the mean and standard deviation values on each measure and for each subtype were computed. The prevalence of problem gambling in the behaviourally conditioned and emotionally vulnerable subtypes for men, women, students and forum users were also computed. These are presented in Tables 18 and 19.

Table 18: The Mean and SD values for each variable in total and split by subtype and sex.

	Behaviourally Conditioned					**Emotionally Vulnerable**				
Variables	Men (n=301) **M (SD)**	Women (n=149) **M (SD)**	Students (n=157) **M (SD)**	Forum Users (n=292) **M (SD)**	Total (n=450) **M (SD)**	Men (n= 120) **M (SD)**	Women (n= 99) **M (SD)**	Students (n=107) **M (SD)**	Forum Users (n=112) **M (SD)**	Total (n=219) **M (SD)**
PGSI	3.5 (3.8)	1.2 (2.8)	3.1 (4.1)	2.6 (3.3)	2.7 (3.6)	6.7 (4.8)	2.7 (4.0)	4.6 (4.8)	5.1 (4.9)	4.9 (4.9)
DSM-V	1.9 (2.4)	0.6 (1.4)	1.7 (2.4)	1.4 (2.1)	1.5 (2.2)	3.7 (3.0)	1.3 (2.1)	2.3 (2.6)	2.8 (3.2)	2.6 (2.9)
GBQ total	52.5 (10.9)	40.5 (11.7)	50.6 (12.9)	47.5 (12.2)	48.6 (12.5)	57.0 (12.0)	46.0 (12.5)	53.5 (12.6)	50.7 (14.0)	52.1 (13.4)
Illusion of control	23.7 (5.3)	17.3 (5.5)	22.1 (6.3)	21.3 (6.1)	21.6 (6.2)	24.1 (5.8)	19.6 (5.1)	22.5 (6.0)	21.7 (5.9)	22.1 (5.9)
Luck/perseverance	29.1 (7.2)	22.6 (7.7)	28.5 (8.1)	26.2 (7.7)	27.0 (7.9)	33.2 (8.6)	26.6 (9.1)	31.2 (8.6)	29.3 (10.1)	30.3 (9.4)
C-anxiety	4.2 (3.2)	4.3 (3.5)	4.9 (3.8)	3.8 (2.9)	4.2 (3.3)	9.1 (4.1)	10.3 (4.0)	10.1 (4.1)	9.2 (4.0)	9.6 (4.1)
C-depression	2.3 (2.3)	2.2 (2.6)	2.4 (2.4)	2.2 (2.3)	2.3 (2.4)	5.4 (3.3)	5.7 (3.3)	5.9 (3.3)	5.2 (3.2)	5.5 (3.3)
N.L.E	3.2 (2.1)	3.5 (2.4)	3.1 (2.3)	3.4 (2.20	3.3 (2.2)	4.9 (2.3)	5.2 (2.5)	5.1 (2.3)	4.9 (2.5)	5.0 (2.4)
Impulsivity total	31.0 (6.5)	29.3 (7.2)	31.3 (7.3)	30.0 (6.5)	30.4 (6.8)	34.9 (6.2)	35.7 (6.3)	34.7 (6.2)	35.7 (6.2)	35.3 (6.3)
N.P impulsivity	11.3 (3.6)	10.2 (3.3)	10.9 (3.4)	11.0 (3.6)	10.9 (3.5)	13.0 (3.6)	12.8 (3.4)	12.1 (3.0)	13.7 (3.8)	12.9 (3.5)
M impulsivity	10.3 (2.6)	10.3 (2.9)	10.6 (3.2)	10.1 (2.5)	10.2 (2.7)	11.0 (3.0)	11.6 (3.0)	11.1 (3.1)	11.5 (2.9)	11.3 (3.0)
A impulsivity	9.2 (2.5)	8.6 (2.8)	9.5 (2.8)	8.7 (2.5)	9.0 (2.6)	11.0 (2.7)	11.4 (2.7)	11.4 (2.7)	10.9 (2.8)	11.2 (2.7)
G. A	7.4 (1.5)	7.3 (1.6)	7.2 (1.7)	7.4 (1.5)	7.3 (1.6)	7.5 (1.5)	7.5 (1.5)	7.3 (1.5)	7.8 (1.4)	7.5 (1.5)

Note: PGSI= Problem Gambling Severity Index; DSM-V= Diagnostic and Statistical Manual- fifth edition; GBQ= Gambling Beliefs Questionnaire; N.L.E= Negative Life Events; N. P impulsivity= Non-planning impulsivity; M. impulsivity= Motor Impulsivity; A. impulsivity= Attentional impulsivity; G. A= gambling associates.

Table 19: Number and percent of each gambling severity category, split by subtype, sex and sample type.

	Behaviourally Conditioned					Emotionally Vulnerable				
	Men	**Women**	**Student**	**Forum Users**	**Total**	**Men**	**Women**	**Students**	**Forum Users**	**Total**
PGSI	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Non-problem gambler	76 (25.2)	97 (65.1)	59 (37.6)	114 (39.0)	173 (38.4)	10 (8.3)	40 (40.4)	25 (23.4)	25 (22.3)	50 (22.8)
Low risk gambler	83 (27.6)	28 (18.8)	41 (26.1)	69 (23.6)	111 (24.7)	20 (16.7)	28 (28.3)	24 (22.4)	24 (21.4)	48 (21.9)
Moderate risk gambler	102 (33.9)	16 (10.7)	34 (21.7)	84 (28.8)	118 (26.2)	38 (31.7)	21 (21.2)	31 (29.0)	28 (25.0)	59 (26.9)
Problem gambler	40 (13.3)	7 (4.7)	22 (14.0)	25 (8.6)	47 (10.4)	52 (43.3)	10 (10.1)	27 (25.2)	35 (31.3)	62 (28.3)
DSM-V										
Non-clinical levels	233 (77.4)	134 (89.9)	121 (77.1)	245 (83.9)	367 (81.6)	62 (51.7)	84 (84.8)	76 (71.0)	70 (62.5)	146 (66.7)
Mild gambling disorder	24 (8.0)	9 (6.0)	12 (7.6)	21 (7.2)	33 (7.3)	21 (17.5)	6 (6.1)	12 (11.2)	15 (13.4)	27 (12.3)
Moderate gambling disorder	25 (8.3)	1 (0.7)	14 (8.9)	12 (4.1)	26 (5.8)	17 (14.2)	4 (4.0)	10 (9.3)	11 (9.8)	21 (9.6)
Severe gambling disorder	12 (4.0)	1 (0.7)	4 (2.5)	9 (3.1)	13 (2.9)	17 (14.2)	3 (3.0)	6 (5.6)	14 (12.5)	20 (9.1)

Exploring the subtypes for covariates

Two chi-square tests of independence were performed to examine associations between subtype, sex, and sample type. The association between sex and subtype was significant, X^2 (2, n = 669) = 9.24, p = .002; men were more likely to be in the behaviourally conditioned pathway than women, although this association had a small effect size (*w* = *.12).* The association between sample type and subtype was also significant, X^2 (1, n = 669) = 11.89, p = .001; forum users were more likely to be in the behaviourally conditioned pathway than students, although this association also had a small effect size (*w* = -.13).

6.13 Exploring differences between the behaviourally conditioned and emotionally vulnerable pathways.

To determine if there was a significant difference between the subtypes on levels of gambling severity, a one-way MANCOVA was performed with the PGSI and DSM-V scales as the dependent variables, subtype as the independent variable, and sex and sample type as covariates. There was a significant effect of subtype on gambling severity, F(2, 646) = 28.37, p<.001; Wilk's Λ = 0.92, partial η^2 = .08. There was also a significant effect of subtype on both the PGSI, (F(1, 647) = 56.35, p<.001, partial η^2 = .08), and the DSM-V scales, (F(1, 647) = 44.94, p<.001, partial η^2 = .06).

A one-way MANCOVA and a series of one-way ANCOVAS were performed to determine differences between the behaviourally conditioned and emotionally vulnerable subtypes on levels of current psychological distress (anxiety and depression), gambling beliefs, self-reported negative life events and gambling associates.

Current psychological distress

Using Wilks' Lambda, sex was not significantly related to current psychological distress, F (2, 663) = 1.9 ns. However, there was a significant effect of sample type, F (2, 663) = 6.5, p =.002; Wilk's Λ = 0.98, partial η^2 = .02, with students scoring higher in current psychological distress. There was also a significant effect of subtype on current psychological distress, F (2, 663) = 170.0, p<.001; Wilk's Λ = 0.66, partial η^2 = .34. Significant main effects were found for subtype on anxiety levels, F(1,664) = 306.0, p<.001, partial η^2 = .32, and depression levels, F(1,664) = 203.6, p<.001, partial η^2 = .24, with the emotionally vulnerable subtype reporting significantly higher levels of current anxiety and depression than the behaviourally conditioned subtype.

Impulsivity

A one-way ANCOVA was performed to determine differences between the subtypes on impulsivity levels. The covariates were not significantly related to impulsivity: sex, F (1,664) = 2.52 ns, sample type, F(1, 664) = 0.89 ns. There was, however, a significant effect of subtype on impulsivity, F (1,664) = 76.95, p<.001, with the emotionally vulnerable pathway reporting significantly higher levels of impulsivity than the behaviourally conditioned pathway.

Gambling beliefs

Sex and sample type were significantly related to gambling related cognitive distortions: sex, F (1,664) = 161.26, p<.001, sample type, F (1,664) = 11.8, p=.001, with men and students reporting significantly higher cognitive distortions in both subtypes. There was also a significant effect of subtype on levels of cognitive distortions after controlling for the effect of sex and sample type, F (1,664) = 22.0, p<.001, with the emotionally vulnerable pathway reporting significantly higher levels of gambling related cognitive distortions than the behaviourally conditioned pathway.

Negative Life Events

There was a significant effect of subtype on self-reported negative life experiences, $F(1,664) = 81.4$, $p<.001$, with the emotionally vulnerable pathway reporting higher levels than the behaviourally conditioned pathway.

Gambling associates

There was no effect of subtype, on self-reported gambling associates, $F(1,664) = 3.45$ ns.

6.14 Discussion

The analyses yielded two distinct groups of gamblers. The first resembled the primary social subgroup identified in Study 1 and comprised of individuals who scored low on pre-existing and current anxiety and depression, impulsivity, negative life events and gambling related cognitive distortions. The second cluster reported higher scores on each of the identified variables. Based on the Pathways to Problem and Pathological Gambling Model (Blaszczynski & Nower, 2002), the behaviourally conditioned and emotionally vulnerable subgroups constructed in this study were distinguished by self-reported levels of premorbid anxiety and/or depression; a key feature of the emotionally vulnerable subgroup proposed by Blaszczynski and Nower (2002). Similar to the cluster analysis, more men and forum users constituted the behaviourally conditioned subgroup and more women and students emerged in the emotionally vulnerable subgroup. This supports literature reporting that women in particular use gambling as a way of modulating aversive mood states (Coman et al., 1997; Grant & Kim, 2002; Ladd & Petry, 2002; Ledgerwood & Petry, 2010; McCallum & Blaszczynski, 2002; Potenza et al., 2001). It also echoes literature that suggests students are a population that experience increased affective disturbances (Eisenberg et al., 2007). From the current study and the results of Study 1, it could be speculated that gambling could be a way of modulating affective states for students.

Similar to that suggested in the Pathways Model (Blaszczynski & Nower, 2002), it was predicted that there would be a subgroup of gamblers who would display significantly lower levels of pre-existing and current anxiety and depression, negative life events and impulsivity and a subgroup who would report increased levels of these variables. These predictions were supported. The analyses showed that premorbid psychological distress emerged as the key variable in differentiating the clusters. This provides direct support to Blaszczynski and Nower's (2002) emotionally vulnerable pathway who are reported to be distinct from the behaviourally conditioned pathway through their premorbid affective disturbances.

The two groups in the current study provide support to some previous research that has explored gambling subgroups. For instance, the subgroup that emerged with lower pre-existing anxiety, depression, negative life events, impulsivity and cognitive distortions resembles Blaszczynski and Nower's (2002) behaviourally conditioned gambler. Furthermore, this group is also similar to the primary social subgroup identified in Study 1 and shows a similar makeup to other studies that have found a group of gamblers absent of significant psychopathology (Nower et al., 2012; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009 Valleur et al., 2016). The current research does not support studies that have failed to find a subgroup of gambler absent of severe psychopathology (e.g. Ledgerwood & Petry, 2006). Increasing studies are finding such a subtype, which provides strong support for the presence of a type gambler absent of psychopathology and who perhaps primarily gambles for social purposes (Stewart & Zack, 2008).

The two subgroups in the current study were derived based on participants scores on premorbid anxiety and depression. Those who scored higher on premorbid anxiety and/or

depression also reported increased current anxiety, depression and impulsivity. This indicates that there is a type of gambler who experiences significant premorbid emotional difficulties, which is a long-standing problem due to the increased current affective dysfunction and gambling severity. This provides support to previous literature that has proposed a subtype of gambler with increased negative affect who gamble as a means of coping/escaping from this emotional dysfunction (e.g. Ledgerwood & Petry, 2006; Ledgerwood & Petry, 2010; Lesieur & Blume, 1991; McCormick, 1987; Stewart & Zack, 2008; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014). Of importance, the current study provides an extension to the literature by finding that this negative affect is both current and also pre-dates gambling behaviour. This provides support the Pathways Model (Blaszczynski & Nower, 2002), which suggests that emotionally vulnerable gamblers have a predisposition to gambling through increased pre-existing negative affect. It also provides support to previous research that has found a link between problem/pathological gambling and stressful life events (e.g. Roberts et al., 2016).

Whilst there are similarities with previous subgroup studies, there also remains differences. For example, Suomi et al., (2014), Gutpa et al., (2013) and Ledgerwood and Petry's (2010) all found a subgroup who reported high levels of affective disorders and impulsivity. Yet, they also found a separate group of gamblers who reported high levels of affective disorders and moderate levels of impulsivity, which differs from the current study. Nower et al., (2012) also found that this subtype reported increased personality disorders, which according the pathways model would be within the antisocial subgroup. As such, Nower et al., (2012) proposed that there may be two subgroups of gamblers; those that have extreme psychopathology and those that do not. Nevertheless, Nower et al., (2012), Suomi et al., (2014) and Ledgerwood and Petry (2010) did not assess pre-existing negative affect and as such their subgroups provide limited support to the

emotionally vulnerable pathway proposed by Blaszczynski and Nower (2002). Therefore, it can be argued that the current study provides more evidence for the emotionally vulnerable subtype through the inclusion of pre-existing and current anxiety and depression scales and a measure of previous negative life events.

Whilst a gambler absent of significant psychopathology is becoming increasingly consistent, there remains uncertainty with regard to the nature of other subgroups of gambler. It is apparent that there is a group of gamblers that report increased psychopathology. However, there remains questions with regard to nature of the factors that underpin the subtype with increased psychopathology. Furthermore, it remains unclear as to whether this type of gambler is represented by one subgroup or two groups that both experience increased psychopathology, however differing in nature.

It is a plausible explanation that two clusters emerged in the current study as a result of adopting measures to specifically investigate the first two pathways in Blaszczynski and Nower's (2002) model. Therefore, if measures were included to investigate the antisocial impulsivist subgroup proposed in the pathways model, it is possible that an additional subgroup could have emerged. However, as such measures were not included, this is speculative.

It was also predicted that the behaviourally conditioned and the emotionally vulnerable subgroups would report a similar number of gambling related cognitive distortions and family/friends who gamble. This was partly supported. Those in the subgroup resembling emotionally vulnerable gamblers reported significantly more cognitive distortions than those within the behaviourally conditioned group. This does not support Blaszczynski and Nower's (2002) model, which suggests that those in the emotionally vulnerable subgroup present with identical conditioning processes and cognitive schemas as the

behaviourally conditioned subtype. However, it is of note that the pathways model does not stipulate whether these are identical in terms of the beliefs themselves or the number of them.

Previous literature has indeed shown that negative psychological states can influence the development and maintenance of cognitive distortions through an interaction process (Raylu & Oei; 2004; Oei & Raylu, 2008). Therefore, the cognition of those in the emotionally vulnerable subtype may be interacting with their heightened affective states, which could explain why they were found to have more cognitive distortions than the behaviourally conditioned group. Furthermore, cognitive distortions are widely linked with gambling severity (Griffiths, 1994; Myrseth, Brunborg & Eidem, 2010). Those within the group resembling emotionally vulnerable gamblers reported significantly increased gambling. Therefore, collectively, it is possible that these individuals reported increased distortions due to their heightened levels of negative affect and more severe gambling. Yet, questions remain as to whether the nature of the cognitive distortions vary between different subgroups of gambler. In addition, it is unclear how the severity of the cognitive distortions specifically escalated within the emotionally vulnerable group.

There was no difference between the subgroups with regard to the number of family/friends who gamble. Study 1 indeed found that there is a distinct group of individuals who gamble primarily for socialisation. Furthermore, association with others who gamble has been shown to influence gambling severity (Abrams & Kushner, 2004). This could serve to explain how gamblers within the behaviourally conditioned pathway can become problem gamblers. Yet, it suggests that other factors, apart from gambling with others, influence the development of problem gambling in an emotionally vulnerable subgroup of gamblers.

Regarding impulsivity, the current study found problem gamblers reported significantly higher levels of impulsivity than non-problem, low risk and moderate risk gamblers. This supports previous research that has suggested impulsivity is a key feature in gambling disorder (Verdejo-Garcia, Lawrence & Clark, 2008) and a strong predictor of gambling severity (Chiu & Storm, 2010; MacLaren et al., 2011; Marmurek et al., 2015). Of interest, the current study found the emotionally vulnerable subtype to display high levels of impulsivity; a trait which, according to the pathways model, is highly prevalent in the antisocial impulsivist pathway. The third pathway proposed in Blaszczynski and Nower's (2002) model was not addressed the current study however. Further research is indeed required to explore for factors associated within the antisocial impulsivist subgroup.

6.15 Limitations of this study

The present study is not without its limitations. Firstly, the participants were required to recall affective states prior to their gambling involvement. This could be subject to recall bias, which could affect the accuracy of the data. Another key limitation is the current studies' exclusion of measures to explore the antisocial impulsivist subtype within Blaszczynski and Nower's (2002) pathways model. Inclusion of measures proposed in this subgroup could have led to a third subgroup/cluster of gamblers emerging. This also would have provided a more thorough exploration of the pathways model. Finally, similar to study one, the student participants were younger than the forum users, which could have affected the reported gambling severity.

6.16 Conclusion

Despite the identified limitations, the findings provide evidence for identifiable clinical subtypes of student and forum user gamblers, which supports major tenets of the Pathways towards Problem and Pathological Gambling Model (Blaszczynski & Nower,

2002). That is, there is a clear subgroup of gamblers who are absent of severe psychopathology, cognitive distortions, and low levels of gambling involvement (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010; Lesieur, 2001; Stewart & Zack, 2008; Stewart et al., 2008; Turner et al., 2008; Suomi, Dowling & Jackson, 2014; Vachon & Bagby, 2009). There is also a pathway characterised by significant affective instability (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010; Lesieur & Blume, 1991; McCormick, 1987; Steel & Blaszczynski, 1996; Stewart & Zack, 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008).

Unique to the current study is that it tested aspects of the behaviourally conditioned pathway through exploring gambling beliefs and participants' friends and family who gamble, rather than relying on an 'absence' of other features to test this pathway. In addition, a wealth of studies have identified a subgroup of gambler with significant emotional vulnerabilities (e.g. Ledgerwood & Petry, 2010; Lesieur & Blume, 1991; McCormick, 1987; Steel & Blaszczynski, 1996; Stewart & Zack, 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008). However, the current study extended this through finding a subtype characterised by pre-existing affective vulnerabilities and negative life events, alongside severe current affective disorders and increased cognitive distortions.

A third pathway which is key in the model of interest was not specifically examined, and this is a clear limitation of this study. Therefore, further exploration of the antisocial impulsivist pathway subgroup of gambler is needed (Blaszczynski & Nower, 2002). Furthermore, whilst the Pathways Model proposes subgroups of gamblers incorporating different gambling related risk factors, it completely neglects protective factors that could lead a person away from problem gambling (Dickson, Derevensky, & Gupta, 2002; Lussier et al., 2007).

The ensuing study will therefore specifically adopt factors associated with the antisocial impulsivist subgroup of gamblers, including impulsivity, psychopathy and offending behaviour (Blaszczynski & Nower, 2002). Many of the factors suggested to be in this pathway have not been widely examined within the literature base. Consequently, it is crucial that these are explored in order to provide a comprehensive exploration of all three pathways in Blaszczynski and Nower's (2002) pathways model. With the exploration of protective factors that have been neglected within current theoretical models, this could lead to the proposal of a model incorporating both risk and protective factors for gambling.

CHAPTER 7.
STUDY 3: AN EXAMINATION OF FACTORS RELATED TO THE ANTISOCIAL IMPULSIVIST SUBTYPE OF GAMBLER AND THE MODERATING EFFECTS OF PROTECTIVE FACTORS.

7.1 Introduction

The present study will continue to explore factors related to the Pathways to Problem and Pathological Gambling Model (Blaszczynski & Nower, 2002). Study 2 did not assess factors related to the antisocial impulsivist subtype proposed in the Pathways Model. This is required in order to provide a comprehensive exploration of the Pathways Model and propose a new model pertaining to the pathways towards gambling in samples that have been neglected in the literature; students and gambling forum users.

The current study will extend the two prior studies by exploring for levels of protective factors within each of the subgroups. It will also examine for moderating effects of protective factors on the risk factors used within this study. Protective factors for gambling remain under researched in the literature base. Therefore, their inclusion will allow for the proposed model to incorporate both risk and protective factors for gambling.

Due to the current study measuring some protective factors that have not been widely researched in the gambling literature and adopting samples that have had limited attention, a Pilot study will be undertaken prior to the main analyses. This aimed to test the reliabilities and correlation coefficients of the measures prior to them being used in the larger study. This chapter will firstly present the Pilot Study.

7.2 Pilot study

7.3 Participants

One hundred and thirty participants completed the measures. Sixty eight percent (n = 88) were men and 32% (n = 42) were women. With regard to the age of participants, 35% (n = 46) were 18 to 25 years of age, 28% (n = 36) were 26 to 35 years of age, 21% (n = 27) were 36 to 45 years of age, 13% (n = 17) were 46 to 55, and 3% (n = 4) were 55 years of age or older.

The same recruitment procedure used in Study 2 was adopted in the current study. In summary, ethical approval was obtained through the Psychology Department's Ethics Committee. Students were recruited through advertising the study on an online newsletter, including through online student discussion forums across UK universities. Gambling forum users were recruited on online gambling forums.

7.4 Measures

Six questionnaires were used:

1. The Problem Gambling Severity Index (PGSI: Ferris & Wynne, 2001). See studies 1 and 2.
2. The Barratt Impulsivity Scale (BIS-15: Spinella, 2007). See study 2.
3. Psychopathic Processing and Personality Assessment (PAPA-2: Lewis, Ireland & Abbott, 2014) is a 28 item measure of psychopathy. Example items are 'I am only interested in myself' and 'if I am caught out on a lie I can quickly think of a way out'. The scale is rated and scored on a five-point Likert Scale: (1) Very unlike me, (2) Not really like me, (3) Neither agree or disagree, (4) Somewhat like me, (5) Very like me. The scale authors reported four factors within the scale: Dissocial tendencies, Emotional detachment, Disregard for others, and Lack of

sensitivity to emotion. The authors reported the scale to be a reliable measure with a Cronbach Alpha of .88 (Lewis et al., 2017).

4. Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983). See study 2.

   The protective measures are as follows.

5. The Satisfaction with Life Scale (Diener et al., 1985) is a 5-item measure of the satisfaction with life as a whole, such as 'in most ways my life is close to my ideal'. The scale is rated and scored on a seven-point Likert Scale: (1) Strongly disagree, (2) Disagree, (3) Slightly disagree, (4) Neither agree nor disagree, (5) Slightly agree, (6) Agree, (7) Strongly agree. The scale classifies participants as: Extremely satisfied, Satisfied, Slightly satisfied, Neutral, Slightly dissatisfied, Dissatisfied, Extremely dissatisfied. The authors developed the scale in a sample of University Students and reported a Cronbach alpha of .87.
6. Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988) is a 12-item scale that measures social support. An example item is 'I get the emotional help and support I need from my family'. The scale is rated and scored on a seven-point Likert Scale: (1) Very Strongly Disagree, (2) Strongly Disagree, (3) Mildly Disagree, (4) Neutral, (5) Mildly Agree, (6) Strongly Agree, (7) Very Strongly Agree. The scale has been found to have very good reliability, with a Cronbach alpha of .88 (Dahlem, Zimet & Walker, 1991).
7. The Brief Self-Control Scale (BSCS; Tangney, Baumeister & Boone, 2004) is a 13-item measure of self-control. An example item is 'I say inappropriate things'. The scale is rated and scored on a five-point Likert Scale: (1) Not at all like me, (2) A little like me, (3) Somewhat like me, (4) Mostly like me, (5) Very much like

me. The scale has shown good reliability, Cronbach Alpha .85 (Malouf et al., 2014).

8. The Brief Resilience Scale (Smith et al., 2008) is a six item measure of resilience, such as 'I usually come through difficult times with little trouble'. The scale is rated and scored on a five-point Likert Scale: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree. The scale authors reported it to have a Cronbach Alpha of .85, showing high reliability.

9. Measure to assess offending behaviour This measure was designed by the researcher to examine the extent of offending behaviour. It examined whether participants had committed a violent, acquisitive, drug-related or other antisocial behaviour offence. An example question is 'whether you have been convicted or not have you ever committed a violent offence'. The scale response format required a response of either yes/no.

7.5 Preliminary pilot study analyses

Reliability analyses and Correlations

Internal reliabilities of each measure were calculated using Cronbach's alpha. All item-to-total correlations were positive and all measures showed high reliability. The mean and standard deviation values for each of the measures and correlation coefficients between the measures were computed. These values are presented in Table 20.

All measures were deemed sufficiently reliable to proceed to the main study. Furthermore, all measures performed well together in the correlation and are all relevant variables for the main study.

Table 20. Descriptive statistics, internal consistency and correlation coefficients for each measure.

Variables	PGSI	BIS	PAPA	HADS-A	HADS-D	SLS	PSS	SCS	RS
Descriptive statistics									
Mean	3.6	30.7	63.5	6.9	4.8	21.7	62.4	40.3	20.1
Standard deviation	4.2	5.8	15.4	5.1	3.5	7.7	14.1	8.9	5.1
Maximum	26	50	115	21	21	35	84	60	30
Minimum	0	16	35	0	0	5	14	17	6
Internal consistency									
Cronbach's alpha	.88	.76	.87	.87	.71	.91	.92	.83	.88
Correlation coefficients									
PGSI	_	.22* [.07 - .36]	.30** [.14 - .48]	.22* [-.02 - .44]	.21* [.05 - .35]	-.20* [-.38 - -.03]	-.09 [-.26 - .06]	-.23* [-.44 - -.07]	-.27** [-.48 - -.03
BIS		_	.53*** [.36 - .66]	.27** [.05 - .46]	.39*** [.17 - .58]	-.36*** [-.51 - -.20]	-.17 [-.34 - .03]	-.62*** [-.71 - -.49	-.35*** [-.54 - -.15]
PAPA			_	.34*** [.13 - .52]	.41*** [.23 - .56]	-.38*** [.-52 - -.23	-.34*** [-.50 - -.19	-.60*** [-.72 - -.47]	-.23* [-.43 - -.03]
HADS-A				_	.59*** [.44 - .70]	-.39*** [-.56 - -.21]	-.27** [-.44 - -.08]	-.30** [-.50 - -.07]	-.36*** [-.54 - -.14]
HADS-D					_	-.44*** [-.58 - -.29]	-.35*** [-.49 - -.16]	-.29** [-.47 - -.08]	-.32** [-.50 - -.12]
SLS						_	.48*** [.31 - .63]	.45*** [.30 - .59]	.48*** [.32 - .62]
PSS							_	.16 [-.03 - .35]	.29** [.08 - .47]
SCS								_	.31** [.14 - .48]
RS									_

Note: PGSI = Problem Gambling Severity Index; BIS = Barratt Impulsivity Scale; PAPA = Psychopathic Processing and Personality Assessment-2; HADS-A = Hospital Anxiety and Depression Scale (anxiety subscale); HADS-D = Hospital Anxiety and Depression Scale (depression subscale); SLS = Satisfaction with Life Scale; PSS = Multidimensional Scale of Perceived Social Support; SCS = Self-Control Scale; RS = Resilience Scale. CI's reported in [brackets]; *p<.05; **p<.01; ***p<.001.

7.6 Study 3: AN EXAMINATION OF FACTORS RELATED TO THE ANTISOCIAL IMPULSIVIST SUBGROUP OF GAMBLER, AND THE MODERATING EFFECTS OF PROTECTIVE FACTORS

7.7 Participants

Five hundred and seventy nine participants took part; 71% (n = 413) were men and 29% (n = 166) were women. Two hundred and one participants were students and 378 were gambling forum users. With regard to the student participants, 81% (n = 163) were 18 to 25 years of age, 12% (n = 25) were 26 to 35 years of age, and 7% (n = 13) were 36 to 45 years of age. No students were older than aged 45. With regard to the gambling forum user sample, 19% (n = 73) were 18 to 25 years of age, 34% (n = 127) were 26 to 35 years of age, 21% (n = 78) were 36 to 45 years of age, 16% (n = 61) were 46 to 55 years of age, and 10% (n = 39) were 55 years of age or older.

Twenty two percent of participants (n = 127) reported being unemployed, 21% (n = 119) were in part-time employment, and 58% (n = 333) reported being in full-time employment. The majority of the sample described themselves as White British ethnic origin (79.4%, n = 460) and the remainder as White Irish (7.3%, n = 42), White other (7.1% n = 41), Asian (1.2%, n = 7), Black Caribbean (0.5%, n = 3), Black African (0.7%, n = 4), Mixed ethnic origin (2.7%, n = 16), and Other ethnic origin (0.2%, n = 1). Five preferred to not report their ethnic origin.

7.8 Measures

The same measures as the Pilot Study were used.

7.9 Procedure

With regard to the recruitment of participants, the same procedure as adopted in the pilot study was used. For this study, the research was advertised on seven online forums and a number of university groups. The response rate for completion of the questionnaires was 35%[23]. The rate of participation was observed throughout data collection and the research was re-advertised on the forums/groups periodically. Through submitting their questionnaires participants were consenting to take part in the research (see appendix 3 for the materials used in Study 3).

7.10 Results

This section will present the findings of the study. The data screening process will be outlined first, followed by the internal consistency of each measure adopted and preliminary analyses investigating the prevalence of problem gambling and descriptive statistics in the populations sampled. The results section will create further subgroups based on those suggested in Blaszczynski and Nower's (2002) Pathways to Problem and Pathological Gambling Model, with a focus on exploring for an antisocial impulsivist subtype that was missing from study 2. It will then explore factors specifically related to the antisocial impulsivist pathway. Lastly, it will explore for protective factors in the three computed subtypes and examine for moderating effects of the protective factors on the risk factors used in the study.

7.11 Data Screening

Data screening procedures were conducted on the student and forum user samples separately. All variables were examined for missing values, the occurrence of

[23] Due to the research being an online study with a web-link to access the study, it is unknown how many individuals viewed the original advertisement. The response rate is calculated from the number of people who followed the link and viewed the research information sheet.

multivariate and univariate outliers and normality. Less than one percent of the data values were missing (50 values). Little's MCAR test revealed the data was missing completely at random for student sample (χ^2 (2142) = 2203.48, p = .17), the forum user sample (χ^2 (2345) = 2398.84, p = .22) and overall (χ^2 (4079) = 4183.80, p = .12). The missing values were replaced with the population mean for each variable.

Mahalanobis distance was calculated to identify multivariate outliers, with a chi-square cut off value of 27.8. This resulted in the exclusion of six cases, leaving 573 cases for the analysis. Twenty three were identified as an outlier and assigned a score one unit lower (or higher) than the next most extreme score in the distribution.

Prior to the main analyses, checks were performed to ensure each analysis met all necessary assumptions. In both samples, the data were slightly skewed to the left on the PGSI and HADS subscales. No further violations were found. However, due to these scales being clinical in nature, this was expected.

Homogeneity of variance between the gambling forum users and students was assessed. Levene's Homogeneity of variance test showed that the variances were equal between the two groups for all measures, apart from the PGSI. Accounting for all normality tests, and in view of the sample size, which would increase robustness of data analyses, it was decided not to transform the data (Tabachnick & Fidell, 2013).

7.12 Preliminary analyses

Reliability analyses and descriptive statistics

The internal reliabilities of each measure for the student and gambling forum user participants were calculated using Cronbach's alpha. The values are presented in Table 21, along with the mean and standard deviation values of each of the measures for men,

women, students and gambling forum users. All item-to-total correlations were positive and all measures showed a good reliability (α value greater than .70).

The prevalence of problem gambling rates within the samples were also computed. The number and percentage of men, women, students and gambling forum users in each severity category are presented in Table 22. The mean and standard deviation values of each measure for men, women, students and gambling forum users in each of the gambling severity categories were computed and are presented in Tables 23 and 24. The number of offences committed are also included in Tables 23 and 24.

Table 21. Internal consistency for each of the measures, and descriptive statistics split by sex and sample type.

	Cronbach's alpha		Men			Women			Overall		
	Students	Forum Users	Students N=124	Forum Users N=287	Total N=411	Students N=76	Forum Users N=86	Total N=162	Students N=200	Forum Users N=373	Both samples N=573
Measures			M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
PGSI	.89	.92	3.9 (3.7)	4.8 (4.8)	4.5 (4.5)	2.2 (3.3)	2.8 (4.6)	2.6 (4.0)	3.2 (3.6)	4.3 (4.8)	4.0 (4.4)
BIS-15	.82	.84	32.1 (6.5)	30.7 (6.9)	31.2 (6.8)	32.1 (7.1)	32.9 (7.5)	32.5 (7.3)	32.1 (6.7)	31.2 (7.1)	31.5 (7.0)
PAPA-2	.88	.89	66.7 (14.9)	65.1 (15.6)	65.6 (15.4)	60.2 (15.9)	57.3 (16.6)	58.6 (16.3)	64.2 (15.6)	63.3 (16.2)	63.6 (16.0)
Anxiety	.79	.81	6.5 (4.2)	6.2 (4.0)	6.3 (4.1)	7.5 (4.4)	7.3 (4.9)	7.4 (4.7)	6.9 (4.3)	6.4 (4.3)	6.6 (4.3)
Depression	.74	.73	4.5 (3.1)	4.7 (3.0)	4.6 (3.1)	4.5 (3.3)	4.0 (3.3)	4.2 (3.3)	4.5 (3.2)	4.5 (3.1)	4.5 (3.1)
Protective Factors											
Life Satisfaction	.89	.89	20.7 (7.5)	20.7 (7.4)	20.7 (7.4)	24.3 (7.1)	22.2 (7.6)	23.2 (7.4)	22.1 (7.5)	21.0 (7.5)	21.4 (7.5)
Social Support	.91	.94	60.8 (15.1)	61.2 (14.6)	61.1 (14.7)	66.3 (12.3)	63.8 (7.7)	65.0 (15.4)	62.9 (14.4)	61.8 (15.4)	62.2 (15.0)
Self-control	.84	.86	37.9 (9.2)	41.4 (9.8)	40.3 (9.7)	41.9 (9.6)	41.1 (10.0)	41.5 (9.8)	39.4 (9.5)	41.3 (9.8)	40.7 (9.8)
Resilience	.89	.87	20.3 (5.4)	20.7 (5.0)	20.6 (5.1)	19.0 (6.1)	20.5 (5.2)	19.8 (5.6)	19.8 (5.7)	20.7 (5.0)	20.4 (5.3)

Prevalence of problem gambling defined by PGSI

Table 22: PGSI gambling severity groups overall and split between sex and sample type.

	Men			Women			Overall		
	Students N=124	**Forum users N=287**	**Total N=411**	**Students N=76**	**Forum users N=86**	**Total N=162**	**Students N=200**	**Forum users N=373**	**Total N=573**
Measure	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
PGSI									
Non-problem	21 (16.9)	49 (17.1)	70 (17.0)	34 (44.7)	37 (43.0)	71 (43.8)	55 (27.5)	86 (23.1)	141 (24.6)
Low risk	34 (27.4)	68 (23.7)	102 (24.8)	17 (22.4)	24 (27.9)	41 (25.3)	51 (25.5)	92 (24.7)	143 (25.0)
Moderate risk	52 (41.9)	107 (37.3)	159 (38.7)	20 (26.3)	13 (15.1)	33 (20.4)	72 (36.0)	120 (32.2)	192 (33.5)
Problem gambler	17 (13.7)	63 (22.0)	80 (19.5)	5 (6.6)	12 (14.0)	17 (10.5)	22 (11.0)	75 (20.1)	97 (16.9)

Table 23. Descriptive statistics of the measures used within the study, split by gambling severity categories and sex.

	Gambling Severity Categories							
	Men				Women			
	Non-problem N=70	Low risk N=102	Moderate risk N=159	Problem N=80	Non-problem N=71	Low risk N=41	Moderate risk N=33	Problem N=17
Measures	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
PGSI	0 (0)	1.5 (0.5)	4.5 (1.3)	12.3 (3.4)	0 (0)	1.3 (0.5)	4.3 (1.5)	12.8 (3.5)
BIS-15	28.5 (6.2)	29.8 (5.5)	31.7 (6.80	34.2 (7.5)	30.8 (7.5)	32.6 (6.4)	33.2 (6.4)	38.3 (7.5)
PAPA-2	58.2 (12.8)	63.4 (12.4)	65.8 (13.8)	74.5 (19.6)	53.1 (15.5)	61.9 (15.5)	62.7 (15.5)	66.1 (17.1)
Anxiety	5.0 (3.4)	6.0 (4.4)	6.3 (3.7)	7.7 (4.4)	6.0 (4.2)	8.3 (5.1)	8.7 (4.3)	8.7 (4.6)
Depression	3.6 (2.9)	4.1 (2.8)	4.7 (2.9)	6.0 (3.4)	3.5 (3.3)	4.8 (3.2)	4.8 (3.5)	4.8 (2.8)
Protective Factors								
SLS	22.1 (7.2)	22.1 (7.2)	20.6 (7.3)	18.0 (7.4)	25.6 (6.1)	22.7 (7.5)	23.3 (6.9)	14.2 (6.3)
Social Support	62.9 (13.4)	62.1 (13.4)	61.6 (14.0)	57.0 (17.9)	69.0 (13.8)	60.1 (18.5)	65.3 (10.6)	59.5 (17.7)
Self-control	45.6 (9.5)	42.4 (8.4)	39.2 (9.2)	35.4 (9.6)	44.8 (9.9)	41.0 (8.5)	39.2 (8.4)	33.1 (8.8)
Resilience	21.7 (4.9)	21.3 (5.1)	20.4 (5.1)	19.2 (5.1)	21.0 (5.9)	19.3 (5.7)	19.1 (4.8)	18.1 (5.2)
Offending	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Acquisitive	6 (8.6)	5 (4.9)	5 (3.1)	6 (7.5)	2 (2.8)	0	0	0
Drug related	11 (15.7)	26 (25.5)	31 (19.5)	20 (25.0)	5 (7.0)	5 (12.2)	2 (6.1)	5 (29.4)
Violent	2 (2.9)	10 (9.8)	17 (10.7)	16 (20.0)	3 (4.2)	4 (9.8)	1 (3.0)	2 (11.8)
Other antisocial	9 (12.9)	16 (15.7)	34 (21.4)	20 (25.0)	4 (5.6)	3 (7.3)	2 (6.1)	5 (29.4)
Any offence	15 (21.4)	33 (32.4)	47 (29.6)	25 (43.8)	10 (14.1)	7 (17.1)	3 (9.1)	7 (41.2)
PNTS	2 (2.9)	7 (6.9)	9 (5.7)	5 (6.3)	2 (2.8)	4 (9.8)	2 (6.1)	0
Linked to gambling[24]	0	1 (1.0)	1 (0.6)	11 (13.8)	0	0	1 (3.0)	8 (47.1)

[24] The participants were asked if any of the offences they have reported committing are directly linked to their gambling involvement.

Table 24. Descriptive statistics of the measures used within the study, split by gambling severity categories and sample.

	Gambling Severity Categories							
	Students				Forum Users			
	Non-problem N=55	Low risk N=51	Moderate risk N=72	Problem N=22	Non-problem N=86	Low risk N=92	Moderate risk N=120	Problem N=75
Measures	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
PGSI	0 (0)	1.4 (0.5)	4.5 (1.4)	11.5 (2.6)	0 (0)	1.5 (0.5)	4.4 (1.3)	12.7 (3.6)
BIS-15	31.5 (7.6)	30.4 (5.4)	33.3 (6.6)	33.7 (7.0)	28.4 (6.3)	30.7 (6.2)	31.1 (6.7)	35.3 (7.8)
PAPA-2	55.6 (15.7)	64.8 (12.9)	68.0 (12.1)	72.2 (22.0)	55.7 (13.5)	62.0 (13.5)	63.6 (15.0)	73.3 (18.7)
Anxiety	5.5 (4.0)	6.9 (4.7)	7.6 (3.8)	8.4 (4.6)	5.5 (3.8)	6.6 (4.7)	6.2 (3.9)	7.7 (4.4)
Depression	3.3 (3.1)	4.8 (2.7)	4.7 (3.2)	5.8 (3.6)	3.7 (3.1)	4.0 (2.9)	4.7 (2.9)	5.8 (3.2)
Protective Factors								
SLS	24.6 (7.5)	23.5 (6.6)	20.8 (7.3)	16.6 (7.0)	23.4 (6.5)	21.5 (7.6)	21.2 (7.3)	17.5 (7.5)
Social Support	66.9 (14.2)	63.5 (12.3)	61.8 (12.9)	54.9 (20.0)	65.3 (13.8)	60.4 (16.4)	62.6 (14.0)	58.2 (17.2)
Self-control	42.6 (10.5)	40.7 (8.1)	36.9 (8.8)	36.6 (9.8)	46.9 (8.9)	42.8 (8.5)	40.6 (9.0)	34.5 (9.4)
Resilience	21.0 (5.9)	20.0 (5.7)	18.8 (5.8)	19.5 (4.7)	21.6 (5.2)	21.1 (5.1)	20.6 (4.5)	19.1 (5.2)
Offending	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Acquisitive	2 (3.6)	2 (3.9)	0	1 (4.5)	6 (7.0)	3 (3.3)	5 (4.2)	5 (6.7)
Drug related	7 (12.7)	12 (23.5)	11 (15.3)	6 (27.3)	9 (10.5)	19 (20.7)	22 (18.3)	19 (25.3)
Violent	0	4 (7.8)	4 (5.6)	2 (9.1)	5 (5.8)	10 (10.9)	14 (11.7)	16 (21.3)
Other antisocial	4 (7.3)	6 (11.8)	12 (16.7)	5 (22.7)	9 (10.5)	13 (14.1)	24 (20.0)	20 (26.7)
Any offence	8 (14.5)	16 (31.4)	15 (20.8)	7 (31.8)	17 (19.8)	24 (26.1)	35 (29.2)	35 (46.7)
PNTS	2 (3.6)	4 (7.8)	3 (4.2)	2 (9.1)	2 (2.3)	7 (7.6)	8 (6.7)	3 (4.0)
Linked to gambling	0	0	1 (1.4)	1 (4.5)	0	1 (1.1)	1 (0.8)	10 (13.3)

7.13 Developing subtypes of gambler and exploring for differences between the subtypes on psychological distress, psychopathy and offending behaviour

To explore and differentiate between the behaviourally conditioned, emotionally vulnerable, and antisocial impulsivist pathways, subtypes were formed based on premorbid anxiety, depression and impulsivity scores. Key factors that differentiated the emotionally vulnerable from the behaviourally conditioned subgroups in Study 2 was the presence of pre-existing depression and/or anxiety. Thus, the current study used a similar method as the previous study[25] to create subtypes based on those suggested in the Pathways Model (Blaszczynski & Nower, 2002).

The premorbid anxiety and depression scales were both split into 'low' and 'high' groups. A score lower than the scale cut off point[26] (eight) were classified into the 'low' group and those at or above this value classified into the 'high' anxiety and/or depression group. A median split was performed on the impulsivity scale to separate participants into 'high' and 'low' levels of impulsivity. The median was 31 and those scoring above were classified into the 'high' group and those at or below this value into the 'low' group.

Individuals categorised as low[27] on anxiety, depression and impulsivity were assigned to the behaviourally conditioned subgroup. Those who scored high on either anxiety or depression and low on impulsivity were assigned to the emotionally vulnerable group. Those who scored high on impulsivity and either anxiety or depression were assigned to the antisocial impulsivist subgroup. The means and standard deviation values for the measures were computed for each subgroup. These are presented in Table 25.

[25] Ledgerwood & Petry (2010)
[26] This was the cut-off point from normal to mild anxiety/depression proposed by the scale authors and that has been widely used in the literature.
[27] This was the recommended cut off points for low and high by the scale authors.

Table 25. Descriptive statistics for each of the measures split by subtype and sex.

	Behaviourally Conditioned						Emotionally Vulnerable						Antisocial Impulsivist					
	Men N=250		**Women N=83**		**Total N=333**		**Men N=57**		**Women N=29**		**Total N=86**		**Men N=104**		**Women N=50**		**Total N=154**	
Measures	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
PGSI	3.2	3.9	1.6	3.1	1.9	3.2	3.7	2.8	2.6	4.2	3.3	3.4	6.8	5.7	4.1	4.9	5.9	5.6
BIS-15	29.8	6.2	30.8	6.9	30.0	6.4	25.9	3.5	27.3	2.3	26.4	3.2	37.3	5.1	38.5	5.8	57.7	5.4
Anxiety	3.8	2.0	3.7	2.4	3.8	2.1	9.0	3.8	11.1	2.4	9.7	3.5	10.7	3.1	11.6	3.0	11.0	3.1
Depression	3.2	2.1	2.5	2.1	3.0	2.1	6.7	2.9	5.6	3.1	6.3	3.0	6.8	3.1	6.4	3.4	6.7	3.2
PAPA	61.5	13.3	52.7	14.9	59.3	14.2	66.1	13.2	57.7	14.5	63.3	14.2	75.2	16.9	69.1	14.6	73.2	16.5
PAPA subscales																		
DT	15.6	4.7	13.4	5.1	15.1	4.9	14.4	4.4	13.2	3.3	14.0	4.1	19.7	6.4	18.6	6.0	19.3	6.3
ED	9.4	3.4	7.9	3.4	9.0	3.5	9.8	3.5	8.1	4.1	9.2	3.7	10.9	3.3	9.8	3.4	10.6	3.4
DfO	19.0	5.8	15.4	5.7	18.1	6.0	20.6	6.7	16.3	6.8	19.1	7.0	22.7	7.6	19.9	6.9	21.8	7.4
LoE	17.5	4.8	15.6	4.8	17.0	4.9	21.6	5.3	19.3	5.1	20.8	5.3	22.4	5.9	20.9	5.0	21.9	5.6
Protective factors																		
SLS	22.5	6.8	25.5	6.8	23.3	6.8	21.5	6.4	22.3	5.9	21.6	6.2	15.9	7.4	19.8	7.9	17.2	7.8
Social Support	64.7	12.6	68.4	14.8	65.6	13.3	62.3	14.0	64.0	17.5	62.8	15.2	51.7	15.8	60.0	13.9	54.4	15.7
Self-control	42.4	9.2	44.0	10.2	44.8	9.4	43.6	7.3	45.0	7.8	42.1	7.4	33.5	8.9	18.0	5.4	34.1	8.5
Resilience	22.1	4.5	22.0	4.7	22.1	4.6	19.7	4.6	16.4	5.9	18.6	5.3	17.3	4.9	18.0	5.4	17.5	5.1

Note: DT = Dissocial tendencies; ED = Emotional detachment; DfO = Disregard for others; LoE = Lack of sensitivity to emotion.

Prediction 12: Those within the antisocial impulsivist subgroup will report more severe pre-existing anxiety and depression than those within the emotionally vulnerable subgroup.

Pre-existing anxiety and depression

A one-way MANOVA revealed that there was a significant difference between those within the behaviourally conditioned, emotionally vulnerable and antisocial impulsivist subtypes on the combined dependant variables (pre-existing anxiety and depression), F (4, 1140) = 138.7, P<.001; Pillai's Trace[28] = .66. When the anxiety and depression scales were considered separately, a significant difference between subtypes was found for anxiety (F(2, 570) = 460.6, p<.001) and depression (F(2, 570) = 132.9, p<.001. Tukey HSD post hoc comparison tests revealed that pre-existing anxiety was more severe for those in the antisocial impulsivist pathway in comparison to the emotionally vulnerable pathway (p<.001). There was no difference in the pre-existing depression scores of those in the emotionally vulnerable and antisocial impulsivist pathways.

Prediction 13: Those within the antisocial impulsivist subtype will report more psychopathy (globally), dissocial tendencies, emotional detachment, disregard for others, and lack of sensitivity to emotion than those within the emotionally vulnerable and behaviourally conditioned subtypes.

Psychopathy

To test for differences between each of the subtypes on level of psychopathy, dissocial tendencies, emotional detachment, disregard for others, lack of sensitivity to emotion, a series of one-way ANCOVA's were performed with sex as a covariate. There was a significant effect of subgroup on levels of psychopathy, F (2, 569) = 53.4, p<.001, with a

[28] In line with the recommendations of Tabachnick and Fidell (2013), Pillai's Trace was used due to the uneven group sizes.

moderate effect size partial η^2 = .16. Pairwise comparison, using Bonferroni Adjustment, showed that those within the emotionally vulnerable subgroup reported more psychopathy than the behaviourally conditioned group (p = .02). Furthermore, those in the antisocial impulsivist subgroup reported more psychopathy than those in the emotionally vulnerable group (p<.001).

There was significant effect of subtype on *dissocial tendencies* (F (2, 564) = 45.5, p<.001, with a moderate effect size partial η^2 = .14), and *disregard for others* (F (2, 565) = 13.1, p<.001, with a small effect size partial η^2 = .08). Those within the antisocial impulsivist subgroup reported more dissocial tendencies and having less regard for others than those in the emotionally vulnerable and behaviourally conditioned groups.

There was also a significant effect of subtype on *emotional detachment*, F (2, 568) = 20.2, p<.001, with a small effect size partial η^2 = .06. Antisocial impulsivist gamblers reported more emotional detachment than behaviourally conditioned gamblers, but not more than the emotionally vulnerable group. Lastly, a significant effect emerged for subgroup on *lack of sensitivity to emotion*, F (2, 568) = 58.1, p<.001, with a moderate effect size partial η^2 = .17. Participants in the antisocial impulsivist and emotionally vulnerable subgroups reporting have a greater lack of sensitivity to emotion than those within the behaviourally conditioned subtype.

Offending behaviour

This section explores offending behaviour within the three gambling pathways. Over 27% of the sample reported having committed an offence. Nearly 10% reported committing a violent offence, over 18% a drug-related offence, 4% an acquisitive offence and just over 16% reported committing any other antisocial behaviour offence. The number and

percentage of criminal offences committed by those within each subtype were computed and are presented in Table 26.

Prediction 14: Those within the antisocial impulsivist subgroup will report committing more acquisitive, drug-related, violent and other antisocial behaviour offences than those within the behaviourally conditioned and emotionally vulnerable subgroups (Blaszczynski & Nower, 2002).

Table 26: Offending behaviour split by subtype

	Behaviourally conditioned N (%)			Emotionally Vulnerable N (%)			Antisocial Impulsivist N (%)		
	Men N = 250	**Women N = 83**	**Total N = 333**	**Men N = 57**	**Women N = 29**	**Total N = 86**	**Men N = 104**	**Women**	**Total N = 154**
Offending									
Acquisitive	13 (5.2)	2 (2.4)	15 (4.2)	1 (1.8)	0	1 (1.2)	8 (7.7)	0	8 (5.2)
Drug related	50 (20.0)	6 (7.2)	56 (16.8)	12 (21.1)	2 (6.9)	14 (16.3)	26 (25.0)	9 (18.0)	35 (22.7)
Violent	20 (8.0)	4 (4.8)	24 (7.2)	6 (10.5)	2 (6.9)	8 (9.3)	19 (18.3)	4 (8.0)	23 (14.9)
Other antisocial	40 (16.0)	6 (7.2)	46 (13.8)	10 (17.5)	2 (6.9)	12 (14.0)	29 (27.9)	6 (12.0)	35 (22.7)
Any offence	74 (29.6)	13 (15.7)	84 (25.2)	15 (26.3)	4 (13.8)	19 (22.1)	41 (39.4)	10 (20.0)	51 (33.1)
PNTS	14 (5.6)	3 (3.6)	17 (5.1)	5 (8.8)	3 (10.3)	8 (9.3)	4 (3.8)	2 (4.0)	6 (3.9)
Linked to gambling[29]	3 (1.2)	1 (1.2)	4 (1.2)	1 (1.8)	0	1 (1.2)	9 (8.7)	0	9 (5.8)

PNTS = Prefer not to say

[29] To remind readers, the participants were asked if any of the offences they have reported committing are directly linked to their gambling involvement.

A series of chi-square tests of independence were performed to examine the associations between the gambling subtypes and self-reported offending behaviour. The association between subtype and acquisitive offending was not significant, X^2 (2, n = 573) = 2.4, ns. Further, the association between subtype and drug-related offending was also not significant, X^2 (2, n = 573) = 2.7, ns. The associations between gambling subtype and violent offending (X^2 (2, n = 573) = 7.3, p = .027) and other antisocial behaviour offending (X^2 (2, n = 573) = 6.5, p = .038) were both significant. Those in the antisocial impulsivist subtype more likely to report having committed violent and other antisocial behaviour offences. However, both emerged with a small effect size (cramers v = .11).

7.14 Exploring for differences between subtypes on protective factors

Prediction 15: Those in the behaviourally conditioned subgroup will report the highest level of protective factors and those in the antisocial impulsivist subgroup will report the least.

A series of one-way ANCOVA's were performed to determine differences between each of the subtypes on levels of satisfaction with life, social support, self-control, and resilience. Sex was included as a covariate in each ANCOVA.

Satisfaction with Life

There was a significant effect of subtype on satisfaction with life, F (2, 569) = 43.36, p<.001, with a moderate effect size (partial η^2 = .13). Pairwise comparison, using Bonferroni Adjustment, showed that those within both the behaviourally conditioned and emotionally vulnerable subtypes reported being more satisfied with life than those within the antisocial impulsivist subtype (p<.001).

Social Support

A significant effect of subtype on social support was found, F (2, 569) = 35.43, p<.001, with a moderate effect size (partial η^2 = .11). Those within the behaviourally conditioned and emotionally vulnerable subtypes reported more social support than those within the antisocial impulsivist subtype (p<.001).

Self-Control

A significant effect of subtype on self-control emerged, F (2, 569) = 58.57, p<.001, with a moderate effect size (partial η^2 = .17). Those within the behaviourally conditioned and emotionally vulnerable subtypes reported more self-control than those within the antisocial impulsivist subtype (p<.001).

Resilience

There was also a significant effect of subtype on resilience levels, F (2, 569) = 53.29, p<.001, with a moderate effect size partial η^2 = .16. Those within the behaviourally conditioned subtype reported more resilience than those within both the emotionally vulnerable and antisocial impulsivist subtypes (p<.001).

7.15 Exploring the link between risk and protective factors for gambling severity: A Moderation Analysis[30]

This Chapter will now move on to examine the relationships between each of the risk and protective factors used in the study. It will explore whether each of the risk and protective factors are predictive of gambling severity and for the moderating effects of the protective

[30] Moderation rather than mediation analysis was used as the study assessed whether the protective factors affect the strength of the relationship between each risk factor and gambling severity. Mediation analysis was not used as the study did not want to assess whether the protective factors account for the relationships between the risk factors and gambling severity.

factors on the risk factors. Prior to performing the regression analysis, the correlations coefficients between the variables were computed. These are presented in Table 27.

Table 27. Descriptive statistics, internal consistency and correlation coefficients for each of the measures.

	PGSI	**BIS**	**PAPA**	**HAD-A**	**HAD-D**	**LS**	**SS**	**SC**	**R**
PGSI	1	.31***	.37***	.20***	.25***	-.31***	-.16***	-.37***	-.16***
BIS		1	.38***	.30***	.24***	-.36***	-.22	-.65	-.24***
PAPA			1	.33***	.41***	-.28***	-.33***	-.50***	-.22***
HAD-A				1	.51***	-.33***	-.28***	-.30***	-.47***
HAD-D					1	-.35***	-.43***	-.26***	-.34***
LS						1	.49***	.41***	.43***
SS							1	.20***	.23***
SC								1	.32***
R									1

Note: PGSI = Problem Gambling Severity Index; BIS = Barratt Impulsivity Scale; PAPA = Psychopathic Processing and Personality Assessment-2; HADS-A = Hospital Anxiety and Depression Scale (anxiety subscale); HADS-D = Hospital Anxiety and Depression Scale (depression subscale); LS = Satisfaction with Life Scale; SS = Multidimensional Scale of Perceived Social Support; SC = Self-Control Scale; R = Resilience Scale. ***p<.001, **p<.01, *p<.05.

Table 27 shows a negative relationship between each of the risk and protective factors used in the study.

Prediction 16: There will be a moderating effect of life satisfaction, social support, satisfaction with life and resilience on levels of impulsivity, psychopathy and psychological distress in predicting gambling severity.

To test for an interaction between the risk and protective factors, a hierarchical regression was performed, with gambling severity as the criterion variable. Sex was entered into the model in the first step. In the second step, the risk factors - impulsivity, psychological distress, and psychopathy were entered into the model. The protective factors – life satisfaction, social support, self-control and resilience were entered into the model in step 3. In the fourth step, 12 interaction terms between the respective risk and protective factors were entered into the model.

To avoid potentially problematic high multicollinearity with the interaction terms, all variables were centred and centred product terms created, as recommended by Aiken and

West (1991). The centred predictor variables and product terms were entered into the regression model. The model coefficients are presented in Table 28.

Table 28: Hierarchical multiple regression assessing the interactions between the risk and protective factors in predicting gambling severity.

	Unstandardized Coefficients		**Standardized Coefficients**	
Model	**B**	**SE B**	**B**	**T**
Step 1				
(Constant)	6.47	.56		11.62
Sex	-1.96	.41	-.20	-4.78***
Step 2				
(Constant)	6.26	.53		11.88
Impulsivity	.14	.03	.21	5.06***
PAPA	.06	.01	.21	4.70***
Psychological Distress	.08	.03	.11	2.63**
Step 3				
(Constant)	5.89	.53		11.03
Life Satisfaction	-.09	.03	-.16	-3.19**
Social Support	.02	.01	.08	1.68
Self-Control	-.06	.03	-.13	-2.3*
Resilience	.03	.04	.03	.69
Step 4				
(Constant)	5.47	.54		0.19
Impulsivity x Life Satisfaction	-.02	.01	-.20	-4.03***
Impulsivity x Social Support	.01	.00	.13	2.84**
Impulsivity x Self-control	.00	.00	.06	1.21
Impulsivity x Resilience	-6.47	.01	-.00	-0.01
PAPA x Life Satisfaction	.00	.00	.04	0.83
PAPA x Social Support	-.00	.00	-.13	-2.81**
PAPA x Self Control	-.00	.00	-.11	-2.3*
PAPA x Resilience	-.00	.00	-.05	-1.08
Psychological Distress x Life Satisfaction	-.00	.01	-.04	-0.87
Psychological Distress x Social Support	-.00	.00	-.02	-0.37
Psychological Distress x Self-control	.00	.00	.02	0.44
Psychological Distress x Resilience	.01	.01	.04	0.91

R^2=.04, Adjusted R^2=.04, R^2 change=.04 (Block 1); R^2= .21, Adjusted R^2=.20, R^2 change= .17 (Block 2); R^2=.23, Adjusted R^2=.22, R^2 change=.03 (Block 3); R^2= .29, Adjusted R^2=.26, R^2 change= .06 (Block 4).
***p<.001, **p<.01, *p<.05.

The results revealed that the regression model was significant on step 1, F(1, 571) = 22.83, MSE = 19.46, p<.001, step 2, F(4, 568) = 36.82, MSE = 16.16, p<.001, step 3, F(8,564) = 21.35, MSE = 15.73, p<.001, and on the final step of the analysis, F(20, 552) = 11.26, MSE = 14.87, p<.001.

In step 1, sex emerged as a significant predictor of gambling severity and accounted for 2.7% of the variance in gambling severity, (F change (1, 571) = 22.83, p<.001). In step 2, impulsivity, psychopathy and psychological distress all emerged as significantly predictive of gambling severity, with impulsivity and psychopathy being the most predictive. These variables explained an additional 16.7% of the variance in gambling severity, F change (3, 568) = 39.9, p<.001. In step 3, life satisfaction, self-control, social support and resilience were entered into the model and explained an additional 2.7% of the variance in gambling severity, F change (4, 564) = 4.87, p = .001. Life Satisfaction and self-control emerged as unique significant predictors of gambling severity after taking into account the other variables within the model.

In the final step of the regression, the 12 interaction terms were entered into the model and explained an additional 5.7% of the variance in gambling severity. The interactions between increased impulsivity and life satisfaction, and increased impulsivity and self-control emerged as significant in predicting gambling severity. Furthermore, the interactions between increased psychopathy and social support, and increased psychopathy and self-control also emerged as significant predictors of increased gambling severity.

7.16 Analysis of significant moderator interactions

To further explore the nature of the relationship between the risk and protective factors for the four significant interactions, scatter plots were computed. Each of the significant moderator protective factors were split into groups of 'low', 'moderate', and 'high'[31].

[31] Values were split into low, moderate and high based on splitting the scores into 3 equal categories along the sequence of scores.

Figures 1 - 4 illustrate the relationships between the risk and protective factors for the significant interactions.

Figure 1: Relationships between gambling severity and impulsivity for those reporting low, moderate and high life satisfaction.

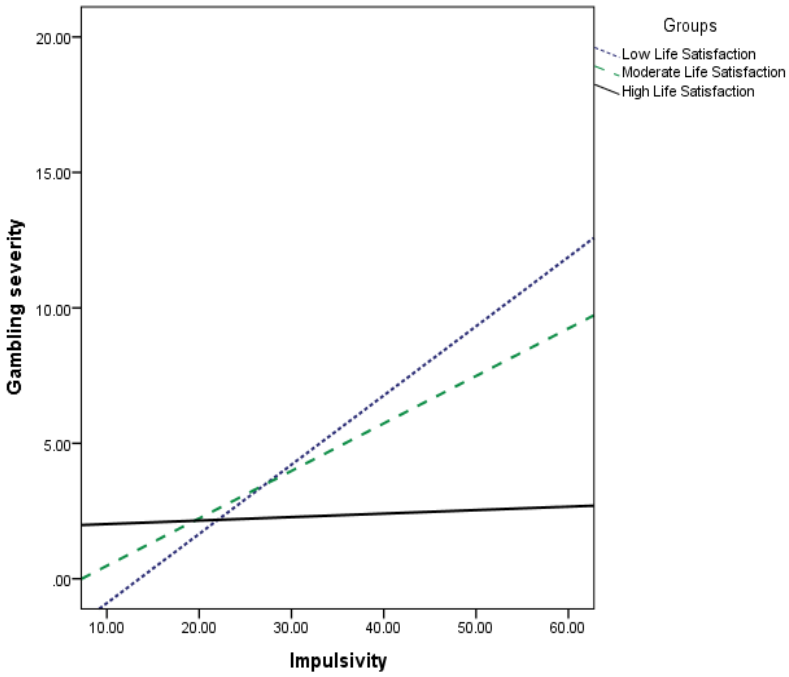


Figure 2: Relationships between gambling severity and impulsivity for those reporting low, moderate and high social support.

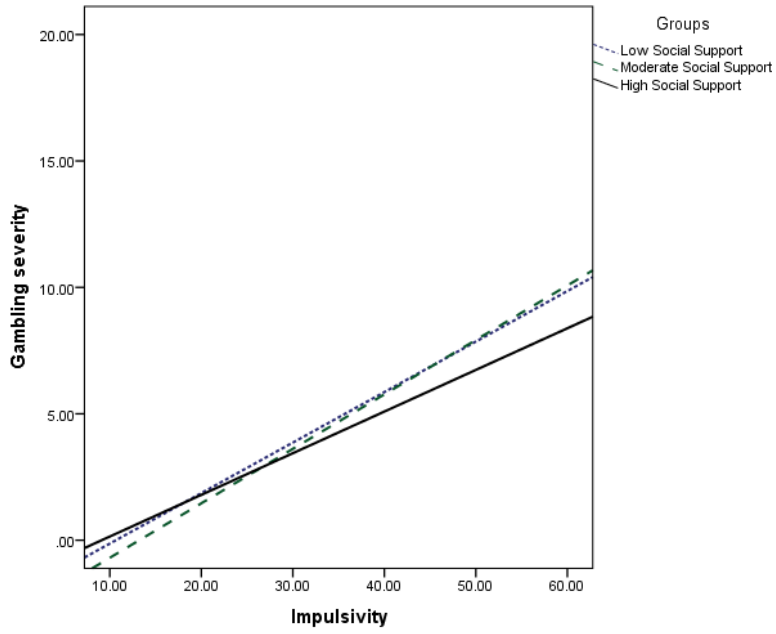


Figure 3: Relationships between gambling severity and psychopathy for those reporting low, moderate and high social support.

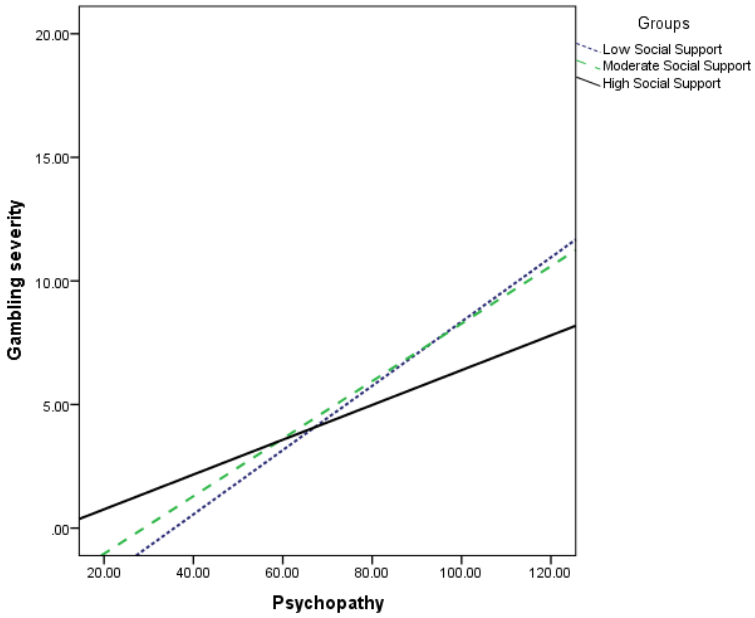
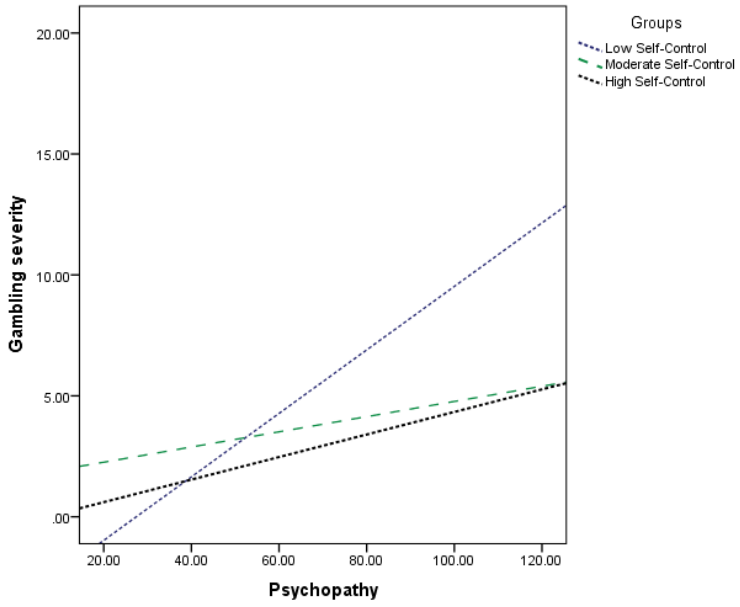


Figure 4: Relationships between gambling severity and psychopathy for those reporting low, moderate and high self-control



Examination of the interaction plots showed that the relationship increased between impulsivity and gambling severity changed as a function of both life satisfaction and social support. The relationships were weaker for those reporting increased life satisfaction and social support. Similarly, the relationship between gambling severity and

increased psychopathy changed as function of both social support and self-control, with the relationships being weaker for those reporting higher levels of social support and self-control.

7.17 Discussion

The current study found that there are three distinct subtypes of gambler. The first of these, behaviourally conditioned, experiences the least severe gambling, psychopathology and antisocial behaviour and report having the most protective factors. The remaining two subgroups of gamblers, emotionally vulnerable and antisocial impulsivist, both experience increased emotional dysfunction. However, antisocial impulsivist gamblers were characterised by being antisocial in nature. This subtype has diverse pathology such as high impulsivity, psychopathy and individuals who commit violent and other antisocial behaviour offences. Furthermore, this subgroup have limited protective resources, such as low levels of social support, self-control, resilience and life satisfaction. This study found increased social support, self-control and life satisfaction moderated the relationships between increased impulsivity and psychopathy and gambling severity.

It was predicted that the antisocial impulsivist subgroup would report more pre-existing anxiety and depression than the emotionally vulnerable subgroup. This prediction was partially supported. Whilst both subgroups were formed based on scores above the threshold for increased pre-existing anxiety and depression, the antisocial impulsivist subgroup reported significantly more premorbid anxiety than emotionally vulnerable gamblers. The antisocial impulsivist subtype did not, however, report more depression. This partially supports Blaszczynski and Nower's (2002) model, which suggests that whilst emotionally vulnerable gamblers display increased premorbid anxiety and

depression, antisocial impulsivist gamblers also display heightened emotional dysfunction, alongside other severe psychopathology and antisocial tendencies.

It was predicted that those within the antisocial impulsivist subgroup would report the most psychopathy. Supporting the prediction, there were differences between the three subtypes in self-reported psychopathy; those within the emotionally vulnerable subtype reported more psychopathy than those in the behaviourally conditioned group, and the antisocial impulsivist group reported the most severe levels of psychopathy. Furthermore, those within the antisocial impulsivist subgroup also reported increased dissocial tendencies, emotional detachment, disregard for others and lack of sensitivity to emotion. This provides support for previous findings (e.g. Rucevic, 2016; Trombly & Zeigler-Hill, 2017) that has shown psychopathic traits (e.g. impulsive-irresponsible behavioural style, grandiose-manipulative interpersonal style) to be associated with problem gambling. This is a pertinent finding given that there is limited research in relation to the link between psychopathy and problem gambling. Yet, the current finding is unsurprising due the antisocial impulsivist subtype being underpinned by impulsivity, a construct associated with psychopathy (e.g. Hart & Dempster, 1997).

This study further supports the assertion that there is group of gamblers who can gamble at increased levels without the presence of current or pre-existing psychopathology. Furthermore, whilst there is an overarching group of gamblers that have histories of significant affective dysfunction and who report increased gambling, a subset of these gamblers represent a separate subgroup due to the presence of other psychopathology, including increased impulsivity, psychopathy and offending behaviour.

Regarding offending behaviour, it was predicted that those within the antisocial impulsivist subtype would report committing the most offending. This study found no

differences between the subgroups in the number of self-reported acquisitive and drug-related offences, which did not support the prediction. Those in the antisocial impulsivist subtype were, however, more likely to report having committed violent and other antisocial behaviour offences, supporting the prediction. This provides some support for previous research that has found problem gambling to be associated with involvement with the criminal justice system (e.g. Abbott & McKenna 2000; Blaszczynski & McConaghy 1994; Emshoff, 2008; Marshall et al., 1999; May-Chahal et al., 2012). Yet, it refutes the literature that suggests that problem gamblers commit offences primarily for financial gain to fund their gambling (e.g. Abbot & McKenna, 2000; Abbott, McKenna, & Giles, 2000; Clark & Walker, 2009; Folino & Abait, 2009; Lesieur, 1994; Potenza et al., 2001; Westphal, Rush & Stevens, 1998; Winters, Stinchfield, & Fulkerson, 1993).

The results found that just over a third of those within the antisocial impulsivist subtype reported having committed an offence, whilst under six percent reported that the offence was related to their gambling. A possible explanation for the lack of consistency with previous literature may relate to differences in the characteristics of the samples studied. For instance, this study recruited students and gambling forum users, whilst the previous literature focused on treatment seeking gamblers and prisoners. Therefore, offending behaviour within gamblers may present differently in different populations. Yet, more research in clinical/forensic samples is needed for further clarity on this assertion. Another plausible explanation could be that being a problem gambler does not necessary increase the likelihood that an individual will commit an illegal act. The DSM-V has indeed removed 'has committed illegal acts such as forgery, fraud, theft or embezzlement' from the gambling disorder diagnostic criteria (DSM-V: American Psychiatric Association, 2013, pg. 586). Therefore, this study suggests that there is a unique subgroup

of gamblers who have increased psychopathology and who are vulnerable to a range of problem behaviours, including increased gambling, violence and antisocial behaviour.

The current results suggest that there is a general antisocial type of gambler and not a group that offends solely for funds to gamble. This provides support to Blaszczynski and Nower's (2002) antisocial impulsivist subtype and supports assertions (e.g. Blaszczynski & Nower, 2002; Blaszczynski, Steel & McConaghy, 1997) that there is a subpopulation of gambler who manifest elevated levels of impulsivity, antisocial behaviour and personality and non-gambling-related criminality. The findings also provide support to Hirschi and Gottfredson's (1994) *Generality of Deviance Theory*, which suggests that those who engage in one form of problematic behaviour are more likely to engage in other forms.

The results of this study provide some support to the prisoner studies (e.g. Abbott, McKenna & Giles, 2000; Westphal, Rush & Stevens, 1998; Winters, Stinchfield, & Fulkerson, 1993) that found a large proportion of the prisoners who were problem gamblers to have committed offences unrelated to gambling. However, the current research did not employ a forensic sample, which limits the direct comparisons that can be made. Nevertheless, the previous research taken together with this study suggests that there is an impulsive-psychopathic subgroup of gambler who engages in criminal behaviour, gambles severely and suffers from increased pre-existing and current psychopathology.

This moves the discussion onto the findings in relation to the effect of the protective factors on the risk factors. Supporting the prediction, those within the behaviourally conditioned subgroup reported that most life satisfaction, social support, self-control and resilience, and those within the antisocial impulsivist subtype reported the least.

It was predicted that each of the protective factors would moderate the relationship between each of the risk factors and gambling severity. This prediction was partly supported, with four significant moderations occurring. Life satisfaction and social support were found to moderate the relationship between impulsivity and gambling severity. In addition, self-control and social support was found to moderate the effects of psychopathy on gambling severity.

Out of the four significant interactions in this study, the negating effects of life satisfaction emerged as the strongest. This provides support to previous literature that has found increased gambling severity to be associated with decreased life satisfaction (e.g. King, 2013; Oei & Goh, 2015). However, the research regarding life satisfaction and gambling remains limited. Whilst some research has been conducted, it has focussed on establishing a ling link between gambling severity and life satisfaction. Thus, whilst the current study provides a contribution towards the literature, the moderating effects of life satisfaction on gambling pathology cannot currently be compared with existing literature. Nevertheless, the current results suggest that those who are more satisfied with their lives are more protected against the risk of developing gambling problems. As research into protective factors for gambling progresses, the factors that promote a satisfied life should also receive attention within the gambling literature.

The moderating effects of social support on the relationships between impulsivity, psychopathy and gambling severity is consistent with research that has found social support to be associated with reduced problem gambling (e.g. Dickson et al., 2008; Hardoon, Gupta & Derevensky, 2004; Thomas et al., 2011; Weinstock & Petry, 2008). Whilst the previous literature has revolved around treatment seeking gamblers, the current study suggests that a quality support network could perhaps prevent an individual from

becoming a problem gambler and, in turn, needing to seek treatment. The finding that self-control moderated the relationship between psychopathy and gambling severity also lends support to previous literature that has found self-control to be associated with gambling less severely (e.g. Bergen, Newby-Clark & Brown, 2012; Cheung, 2014; Gavriel-Fried & Ronen, 2016). Yet, this study extends the literature by finding that those that *have* self-control are less likely to develop gambling problems, despite increased traits of psychopathy.

Contrary to the hypothesis, self-perceived resilience was not found to moderate the relationship between any of the risk factors and gambling severity. This result differs from other findings (e.g. Lussier et al., 2007) that have reported positive effects of resilience on problem gambling. Whilst resilience did not have a moderating effect on any of the risk factors, the problem gamblers in the current study reported less resilience than the non-problem gamblers. This suggests that those who are more resilient are less likely to develop gambling problems. Yet, the specific role resilience plays within those who gamble remains unknown. As discussed previously in this thesis, in contrast to studies regarding other addictions, there is little research examining the association between resilience and gambling. Therefore, as the protective factor research base grows, different findings in relation to any moderating effects that resilience may have could begin to emerge.

None of the protective factors used in the present study were found to moderate the relationship between psychological distress and gambling severity. This is surprising given that social support has been closely linked to a reduction in levels of anxiety and depression (Petry & Weiss, 2009). Given the lack of research into protective factors for gambling, an explanation for this could be that there remain undiscovered factors that

moderate the relationship between psychological distress and gambling severity. Nevertheless, both anxiety and depression were negatively correlated with all the protective factors in the current study. This therefore suggests that those with increased social support, life satisfaction, self-control and resilience are indeed less anxious and depressed.

Notably, whilst the aforementioned protective factors have been found to be associated with gambling less severely within the literature base, the current study extends this by finding moderating effects on gambling related risk factors. Impulsivity and psychopathy are both core elements of the antisocial impulsivist pathway in Blaszczynski and Nower's (2002) model. This suggests that life satisfaction, self-control and social support can play a key protective role within this subgroup and negate the effects of the risk factors on gambling severity. Such knowledge has important implication for the treatment of problem gamblers with different pathology and risk factors.

7.18 Limitations of the study

The current study has several limitations to note. Firstly, it only utilised four protective factors that have emerged within the gambling literature. Whilst the study of protective factors is limited, they are being increasingly studied in the field of psychology due to minimising effects they have on the negative impacts of gambling behaviour (Dickson et al. 2008). Therefore, the inclusion of more protective factors taken from the broader addiction literature would have been beneficial. Another limitation of the current study is that it only explored whether participants had committed four offence types and did not elicit further information about the offences, such as the context it was committed and the function of the behaviour. Ascertaining more information about the offending would have allowed for a greater understanding of the link between offending and gambling.

CHAPTER 8.
GENERAL DISCUSSION

This research suggests that student and gambling forum user gamblers can be placed into three distinct subgroups based on the presence (or absence) of various psychopathology that is both current and that pre-dates gambling behaviour (Blaszczynski & Nower, 2002). This finding is consistent with other studies that have found gamblers can be sub-typed based on typological traits and with The Pathways Model (Blaszczynski & Nower, 2002; Nower et al., 2012; Ledgerwood & Petry, 2010; Valleur et al., 2016). The three subgroups of gamblers were found to present differently with regard to the nature and intensity of the risk and protective factors. A noteworthy contribution of this research is that it sampled gamblers across the spectrum of the disorder and not only those classified as problem or pathological gamblers. Therefore, the current subgroups of gamblers are representative of those who gamble are different severities.

The studies within this research suggest that there is a group of gamblers who present with the least severe gambling and an absence of significant pre-existing or current psychopathology. This finding bears similarities with other studies that have identified a subgroup of gamblers with an apparent absence of severe co-morbid psychopathology. For example, this has been observed in those enrolled in treatment and in community recruited pathological gamblers (Ledgerwood & Petry 2010; Nower et al., 2012; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014; Valleur et al., 2016).

Whilst some studies have recruited community respondents who gamble at varying severities, they have relied on identifying such subgroup by an absence of pathology (e.g. Lobo et al., 2014; Turner et al., 2008; Vachon & Bagby, 2009). The current research extends this literature by exploring factors *present* in this subgroup, including levels of

protective factors and primary motivators for gambling. As such, this research found that this *social gambling* type gamble primarily for social and recreational purposes.

The *social gambler* bears large resemblance to the behaviourally conditioned subtype suggested by Blaszczynski and Nower (2002). This is due to it being a group of gamblers who are largely 'normal' in their functioning, however, can progress to problem gambling through operant and classical conditioning and social learning processes, catalysed by gambling with peers (Abrams & Kushner, 2004; Coventry & Constable, 1999). Longitudinal studies have indeed found that frequent gambling is an important predictor of the onset of problem gambling (el-Glueball et al., 2015; Williams et al., 2015). It is therefore possible that regular social exposure to gambling could explain why such gamblers' behaviour can escalate to the point where they experience gambling related problems.

There are differences and extensions to the pathways model (Blaszczynski & Nower, 2002) provided by the current research. As discussed in Chapter 3, the pathways model was proposed from a review of the literature and does not present any analysis to support the proposed subtypes or indicate whether levels of cognitive distortions vary between the subtypes. The current research found that whilst social gamblers report a level of distorted cognitions, they occurred least frequently within this type in comparison to the other sub-groups. Furthermore, the current research extends previous literature by finding that this subgroup reported the lowest psychopathy and low levels of acquisitive, drug-related, violent and other antisocial behaviour offences.

As documented throughout this thesis, previous literature and theoretical models (e.g. The Pathways Model) are limited with regards to their capacity to account for both risk and protective factors for gambling. In taking steps to address this issue and provide insight

into protective factors, this research explored for protective factors within each of the subgroups. *Social gamblers* were found to report the highest levels of protective factors.

This research also proposes a type of gambler characterised by significant affective instability that is both current and pre-dates their gambling; *affect regulation gamblers*. For this subgroup, the identical ecological determinants and conditioning processes are present as in social gamblers. They have the same gambling related cognitive distortions as *social gamblers*, however, more severe. This type shares similarities with the emotionally vulnerable subtype proposed in Blaszczynski and Nower's (2002) model. For example, this group of gamblers were found to report heightened affective instability, both currently and in relation to prior to their gambling commencing. Furthermore, the current research also supports the assertions of the Pathways Model in that this type report the most negative life events.

Yet, there remain differences between the *affect regulation* gamblers within this research and the emotionally vulnerable subtype proposed by Blaszczynski and Nower (2002). For instance, the pathways model suggests that the emotionally vulnerable subtype includes those who gamble to both decrease negative affect and increase positive affect. However, the current studies suggest that *affect regulation* gamblers primarily gamble to cope with and reduce negative affect and escape from problems. According to the results of this research, those who gamble as a means of enhancing positive affect fall within a different gambler type. Another difference with Blaszczynski and Nower's (2002) pathways model comes from the current research finding that this subgroup of gamblers report more severe cognitive distortions than behaviourally conditioned/social gamblers. Whilst the pathways model (Blaszczynski & Nower, 2002) does not consider protective factors within the subtypes, this research found *affect regulation* gamblers to report fewer

protective factors than *social* gamblers, however, more than *antisocial* gamblers. Thus, this finding with regard to protective factors is unique to the current research.

Taken together with the previous literature it can be suggested that there is a clear type of gamblers who suffer with extreme negative affect and gamble to escape from and cope with psychological distress (Ledgerwood & Petry, 2006, 2010; Lobo et al., 2014; Nower et al., 2012; Stewart & Zack, 2008; Stewart et al., 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009; Valleur et al., 2016). Whilst this type of gambler is represented at increased levels in problem gamblers (Nower et al, 2012; Stewart et al., 2008 Turner et al., 2008; Valleur et al., 2016) and those seeking treatment (Ledgerwood & Petry, 2006, 2010; Suomi, Dowling & Jackson, 2014), this research along with other studies shows that this subgroup is also represented in sub-clinical gamblers (Stewart & Zack, 2008; Lobo et al., 2014; Vachon & Bagby, 2009). In line with the previous literature, women were overrepresented in this type of gambler (Ledgerwood & Petry, 2006, 2010; Stewart & Zack, 2008).

Previous research that has proposed finding a similar subgroup to Blaszczynski and Nower's (2002) emotionally vulnerable subtype have done so by only examining current affective problems within the sample (Ledgerwood & Petry, 2006, 2010; Lobo et al., 2014; Nower et al, 2012; Stewart et al., 2008; Stewart & Zack, 2008; Suomi, Dowling & Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009; Valleur et al., 2016). It is recognised that Valleur et al., (2016) asked a single question regarding emotional states prior to gambling. Yet, in contrast, the current research took a more robust approach by adopting two measures to ascertain pre-existing traumatic experiences and affective states, which is seen as a core strength of the research and a key contribution to the literature.

The final group that emerged within the current studies, *antisocial* gamblers, are characterised by increased levels of impulsivity and antisociality, which manifests in severe multiple maladaptive behaviours. Similar to the prior types of gamblers, the same ecological determinants and conditioning processes are present. They have the same gambling related cognitive distortions as the prior two subgroups, however, more severe. This type of gambler shares some important similarities with the findings from other studies that have investigated subgroups of gamblers. As reviewed, studies have found a factor/cluster distinguished by increased impulsivity (Ledgerwood & Petry, 2006; Suomi, Dowling and Jackson, 2014; Turner et al., 2008; Vachon & Bagby, 2009). It also supports studies that have found those who report increased impulsivity to also display antisocial personality traits (e.g. Ledgerwood & Petry, 2010; Nower et al., 2012).

A noteworthy merit of this research over previous studies includes it being one of the first to comprehensively examine antisociality in the sample. Thus, this provides a large unique contribution. Themes within the previous subtyping studies lie around a tendency to not adopt measures to test factors proposed within Blaszczynski and Nower's (2002) antisocial impulsivist subtype or to rely on proposing such a subtype based on impulsivity alone (e.g. Lobo et al., 2014; Turner et al., 2008; Vachon & Bagby, 2009; Valleur et al., 2016). This research extends previous literature by finding that this type also report the most severe dissocial tendencies, emotional detachment, disregard for others and lack of sensitivity to emotion. As noted previously, within this subgroup, enhancing positive affect emerged as a primary motivator for gambling. This directly contradicts the pathways model, which proposes that such gamblers would be in the same subgroup as those who use gambling as a coping mechanism.

Whilst *antisocial* gamblers reported the highest levels of acquisitive, drug-related, violent and other antisocial behaviour offences, violence and other antisocial behaviour offences emerged to be particularly characteristic of this group of gamblers. This alongside the increased impulsivity and psychopathy suggests that there is a group of gamblers that manifests significant psychopathology and is antisocial in nature, as proposed by Blaszczynski and Nower (2002). Yet, Blaszczynski and Nower's (2002) subtypes were proposed for only problem or pathological gamblers. The current research contributes towards the literature by finding a similar type of gamblers within the spectrum of gambling severity and within students and those who use gambling forums. The *antisocial* gambler emerged to have the least protective factors. This is unsurprising given that this group reported some of the most severe gambling and psychopathology.

In terms of the size of the gambler types, *social* gamblers represented the largest group in each study, *antisocial* the second largest and *affect regulation* gamblers the smallest group. This supports some research and contradicts other studies. For example, Nower et al., (2013) and Valleur et al., (2016) found that their subgroup of gamblers who most resembled Blaszczynski and Nower's behaviourally conditioned gamblers was the largest. This is inconsistent, however, with other findings. Ledgerwood and Petry (2010), for instance, found the group that most resembled antisocial impulsivist gamblers to be the largest and they had very few participants categorised as behaviourally conditioned gamblers. Consequently, there appears to be large variation in terms of subgroup sizes across studies. It is a plausible explanation that the variance comes from the nature of the sample being utilised. For example, Nower et al., (2016) and Valleur et al., (2016) sampled disordered gamblers from the community. Whilst those samples differ from the current research, the present studies recruited gamblers within the spectrum of the disorder, that included a relatively high number of problem gamblers. This could serve to

explain the similarities. However, Ledgerwood and Petry (2010) recruited a small specific sample of gamblers engaged in treatment. As such, it is also possible that gambler subgroups may be populated differently by those seeking treatment, where individuals may be less represented in the *social* gambler group.

This thesis provides further insight into the risk and protective factors within gambler subgroups that requires reflection in a theoretical model. This leads to the proposal of an integrated risk and protective factors model. This proposed model, the Integrated Risk and Protective Factors Model of Gambling Types (IRPF-MGT) is also unique due to its integration of non-problem gamblers to problem gamblers in a single applied framework.

8.1 The current proposed model

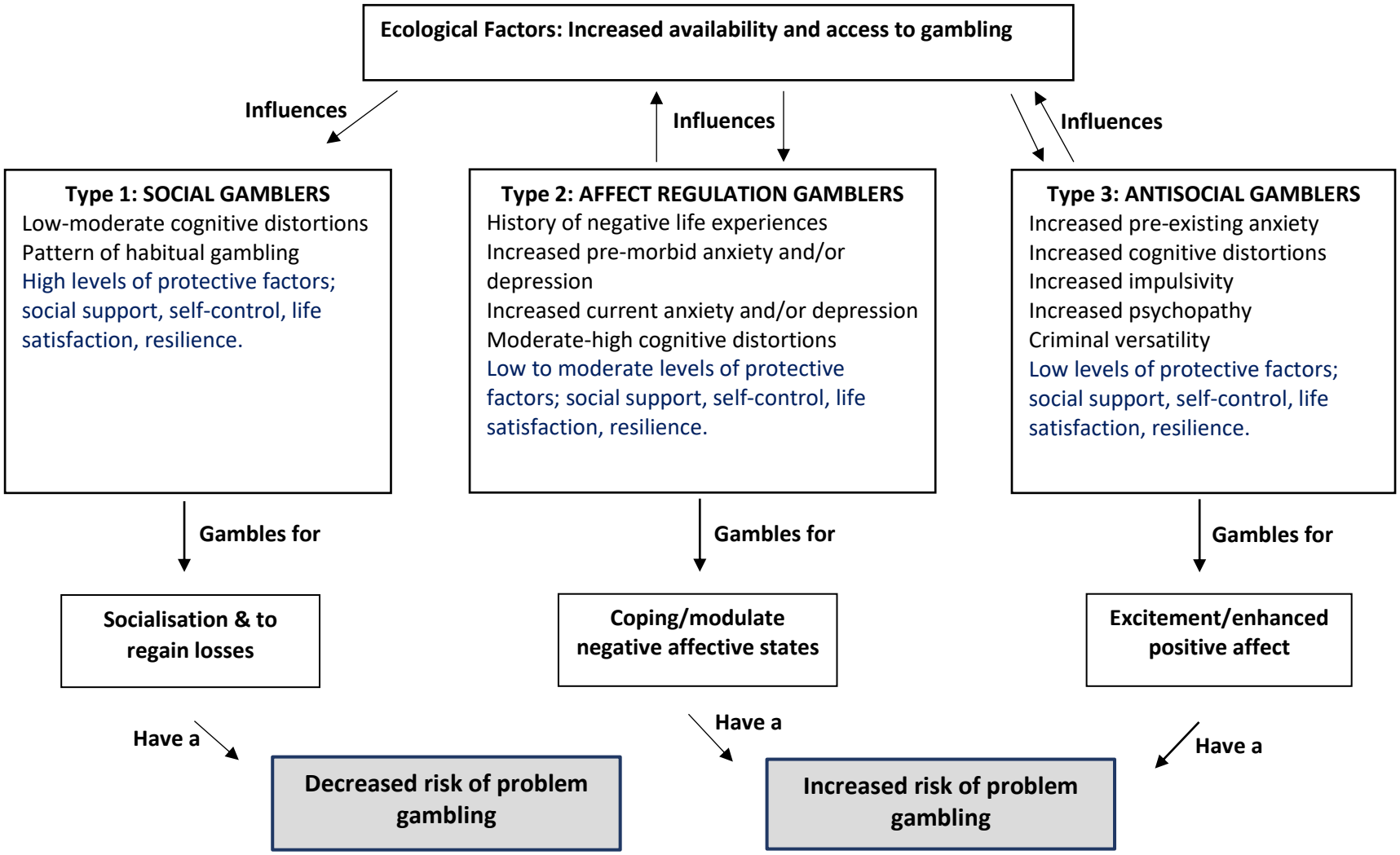
Existing integrated models of gambling (e.g. Blaszczynski & Nower, 2002) outline how multiple factors influence the escalation of gambling behaviour. This principle is apparent in the current model through its inclusion of several important factors drawn from the literature as relevant to gambling namely, social, cognitive, affect and personality. The model was primarily influenced by the Pathways Model (Blaszczynski & Nower, 2002), in highlighting the importance of exploring the heterogeneity of gambling, whilst also proposing several new ideas to the field. For instance, the new types of gamblers proposed by the current research has potential to address the limitations of its predecessors (i.e. Pathways Model), which includes their over-focus on pathological gamblers and their lack of attention to protective factors and gambling motivation. Drawn from motivation theory, another notion in the IRPF-MGT is that gambling can be underpinned by some core motivations (Stewart & Zack, 2008).

The IRPF-MGT suggests that there remain three distinct types of gambler, each associated with specific aetiological processes. All types contain certain common

features, however, are distinguishable by testable factors. The IRPF-MGT is presented diagrammatically in Figure 5. It is represented as a Knowledge Integration Map (KIM). A KIM is a form of concept mapping, which is an analytical tool that depicts the components and articulates the relationship between concepts (Schwendimann, 2014)[32], in this instance gambling severity, motivation, psychopathology and protective factors.

[32] On a KIM, concept maps are a form of node-link diagram for organizing and representing connections between ideas as a semantic network. KIMs consist of concepts and labelled arrows (Schwendimann, 2014).

Figure 5: The Integrated Risk and Protective Factors Model of Gambler Types



8.2 Implications for clinical/forensic practice

As discussed, the current studies propose a model built from gamblers within the spectrum of gambling disorder, incorporating those with sub-clinical gambling behaviours. Sub-clinical gamblers represent a larger proportion of people who gamble regularly (Gainsbury et al., 2016). Furthermore, whilst an individual's gambling may be identified as sub-clinical, it remains of interest as their gambling may have detrimental consequences on themselves and others (Rash, Weinstock & Van Patten, 2016). Therefore, research of this nature has a large societal impact. For those working with individuals reporting problems with gambling, it is important for clinicians to understand both the spectrum and the heterogeneity of the disorder. For example, awareness of the different types of gamblers and risk factors for gambling could help professionals to understand the full pathology of an individuals' problems. This could therefore assist them in exploring for the pathology people may present with alongside their gambling problems. It is likely that professionals will need to treat other vulnerabilities in addition to gambling problems, particularly those that have been found to pre-date gambling, such as premorbid anxiety, depression and traumatic experiences. Therefore, knowledge of such co-occurring disorders is of essence.

Due to the varying gambling severity and symptomology among the subgroups, the prognosis and treatment of them will be likely be different and need to target different treatment needs. An understanding of the essential differences defining subgroups of gamblers will, therefore, be important in dictating the necessary and appropriate form of intervention required. For instance, it is possible that individuals within the *social* gambling group may be able to successfully utilise self-help techniques. In contrast, those within the *affect regulation* type may need an intense intervention. For example, it is likely that these individuals may need to learn coping strategies in a trauma informed

way. Those in the *antisocial* subgroup may also need an intervention as equally intense as *affect regulation* gamblers, however, to target different vulnerabilities. Due to individuals within this group having the least protective factors, support to build protective factors will be of essence to *antisocial* gamblers and *affect regulation* gamblers. Thus, such knowledge will help professionals to target this treatment in a person-centred way.

There are also implications specific to the samples used within this research. The incidence of problem gambling in both samples, and in each study, was considerably higher than rates reported in community prevalence surveys (e.g. BGPS, 2010). This has implications for gambling forums who should be aware of the high number of problem gamblers frequenting their sites. As such, there is a clear need for a diverse range of support information offered on gambling forums, including gambling related help, but also support for substance misuse, emotional problems and offending behaviour. Similarly, it would be beneficial for treatment providers of other vulnerabilities, such as trauma, anxiety and depression, substance misuse and offenders to be aware of the high comorbidity with gambling. This will allow practitioners of various disciplines to screen for gambling problems.

The high problem gambling rate in the student sample has implications for universities. It would be beneficial for higher education institutions to be aware of the prevalence in order to develop strategies to identify students who may be at risk of gambling at problematic levels. In addition, it would be worthwhile for universities to not only be in a position to offer appropriate support services for students to access, but also to implement educational strategies to develop students' knowledge of the risks associated with gambling excessively.

As discussed in this thesis, research on protective factors for gambling remains in its infancy. Therefore, knowledge of the protective factors that have emerged from this research will be of crucial importance to not only gambling treatment services, but also to therapists, self-help websites and universities.

8.3 Limitations of the research

Limitations are unavoidable for research of this nature and this section of the discussion will attempt to summarise some of the core challenges. A limitation of all of the studies is the cross-sectional design utilised. The participants were asked to recall previous negative life experiences and affective states prior to their gambling. This retrospective reporting is subject to recall bias and therefore responses may not accurately reflect levels of adversity and premorbid affective states. A longitudinal design would have been able to answer more questions and would have been preferable. Self-report measures were used to examine the variables of interest in all studies. This form of measurement is subject to respondent bias. For example, the participants may have purposely tried to deceive the researcher or they may have little insight into or memory of their functioning. The possibility that participants' responses were guided by a perceptive, reporting or memory bias must, therefore, be acknowledged. Measures examining socially desirable responding were not included in any of the studies due to the number of measures already adopted. Inclusion of such measures would have ascertained whether participants were providing socially desirable responses.

This research sampled students through an online newsletter and from online student groups. It also sampled those who use gambling forums. Due to participants being recruited online, it is possible that they gamble online. Yet, this research did not ascertain

where participants gamble and as such there could be different types of gamblers for online and in-shop gamblers that were not captured by the current studies.

Another limitation is the level of generalisability that can be assumed from the research. Participants engaged in the research voluntarily, which may have inadvertently contributed to a form of selection bias in the research. For each study, there was a relatively low response rate of those who read the information sheet to those who engaged with the research. As documented in the Method sections, the response rates were 39%, 35% and 35% for studies one, two and three respectively. It is unclear why the response rates were low. However, the questionnaires were lengthy and therefore, the time needed to complete the questionnaires may have played a role in the low response rates. Another possible explanation is that those who participated could reflect a subgroup of the motivated or willing and who differ from the wider student and gambling forum user populations. The research only sampled a small number of students and gambling forum users in contrast to the wider populations. Therefore, the research cannot claim to be generalisable and representative of these populations.

There are also a number of limitations associated with the exploration of key factors related to the development of problem gambling. For instance, the Pathways Model (Blaszczynski & Nower, 2002) and the biological perspective to gambling suggest that individuals can have a biological vulnerability for gambling through neurological or neurochemical dysfunction (Boileau et al., 2012; Jazaeri & Habil, 2012; Linnet et al., 2011). This research failed to assess for biological vulnerabilities and this is a clear area of weakness of this thesis.

Another limitation comes from some of the measures adopted. As highlighted, the second study made adaptions to a measure of current anxiety and depression to assess pre-

existing anxiety and depression. Whilst this measure did emerge as highly reliable, its validity is questionable. Furthermore, the researcher constructed short scales to measure negative life events and the level of gambling that the participant's family and friends engage in. This was due to a lack of other published and validated measures available and to also not make the questionnaire pack too long. Whilst the negative life events measure emerged as reliable, it is unknown whether these short scales measured the underlying construct intended.

In light of the limitations identified here, there are clear directions for future research and these will be discussed in the next section.

8.4 Directions for future research

The findings of this research suggest that student and gambling forum user gamblers fall within three types of gamblers. Further larger scale studies to examine whether these types extend to other populations should be conducted. This is considered necessary to ascertain validity.

Protective factors for problem gambling are continuing to emerge within the literature and future research would benefit from further exploring protective factors for problem gambling. For example, resilience has been found to be paramount in the treatment and recovery from other addictive disorders (Hall & Webster, 2007; Robitschek & Kashubeck, 1999), however, remains in its infancy in relation to problem gambling. Moreover, future research is needed in identifying direct mitigating effects other protective factors may have on problem gambling comorbidities.

As noted previously, there is a need for longitudinal research. This will help to assess an individual's functioning prior to their gambling commencement, as well as

during/following their gambling. This will also assist treatment providers in accurately assessing predisposing factors to an individuals' gambling problems. Furthermore, taking into account the limitations of self-report questionnaire methods, future research will benefit from using alternative methodologies to self-report measures, such as structured interviews and/or functional analyses.

Within the literature there are well established gambling related comorbidities. However, there are other risk factors for gambling that are not as well known. For instance, this research identified a strong link between gambling severity and psychopathy, which is not a clear comorbidity within the literature base. It would also be beneficial for future research to explore the nature and function of offending behaviour and its link with gambling in a range of populations (e.g. custodial settings, community gamblers and treatment seeking gamblers) as this will help to further understand the link between offending and gambling.

8.5 Final conclusion

This thesis suggests a conceptual framework of gambling subgroups that is inclusive of both risk and protective factors. It suggests three clear groups that can assist clinicians in identifying the gambling type of their client and, in turn, their chosen treatment and management strategies. Whilst a wealth of risk factors and some protective factors for gambling have already been identified, there remains much more to learn. Gaining more knowledge of these will help to raise more awareness of an addiction that is relatively unknown and ill-understood in comparison to other illnesses. Furthermore, this awareness will help reduce stigma for those with gambling problems and, in turn, support a range of populations to seek and be provided with quality help and support in their journey towards rehabilitation.

REFERENCES

Abbot, M. W. & McKenna, B. G. (2000). Gambling and Problem Gambling Among Recently Sentenced Women in New Zealand Prisons. *Journal of Gambling Studies, 21,* (4).

Abbot, M. W., McKenna, B. G. & Giles, L. C. (2005). Gambling and Problem Gambling among Recently Sentenced Male Prisoners in Four New Zealand Prisons. *Journal of Gambling Studies, 21,* (4).

Abbott, M. Volberg, R. (1999). Taking the pulse out of problem gambling in New Zealand: A report of phase one of the 1999 Prevalence Study. Wellington, New Zealand: Department of Internal Affairs.

Abidin, Z., Davoren, M., Naughton, L., Gibbons, O., Nulty, A. & Kennedy, H. G. (2013). Susceptibility (risk and protective) factors for in-patient violence and self-harm: prospective study of structured professional judgement instruments START and SAPROF, DUNDRUM-3 and DUNDRUM-4 in forensic mental health services. *BMC Psychiatry, 13,* (197), 1-18.

Abrams, K. & Kushner, M. G. (2004). Behavioral understanding. Cited In Grant, J. E. & Potenza, M. N. *Pathological Gambling. A Clinical Guide to Treatment.* Washington DC: American Psychiatric Publishing, Inc.

Afifi, T. O., Nicholson, R., Martins, S. S. & Sareen, J. (2016). A Longitudinal Study of the Temporal Relation Between Problem Gambling and Mental and Substance Use Disorders Among Young Adults. *The Canadian Journal of Psychiatry, 61,* (2).

Aiken, L. S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Thousand Oaks, CA: Sage.

Alessi, S. M. & Petry, N. M. (2003). Pathological gambling severity is associated with impulsivity in a delay discounting procedure. *Behavioural Processes, 64,* 345-354.

Allcock, C. C. & Grace, D. M. (1988). Pathological gamblers are neither impulsive nor sensation-seekers**.** *Australian Journal of Psychiatry*, 22, 307–311.

American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders, IV-TR Edition*. Arlington, VA: American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM V*. Washington, DC: American Psychiatric Association.

Anderson, G. & Brown, R. I. F. (1984). Real and Laboratory Gambling: Sensation - seeking and arousal. *British Journal of Psychology, 75,* 401-410.

Arnett, J. J. (2004). *Emerging adulthood: The winding road from late teens through the twenties.* New York, New York: Oxford Press.

Arthur, M. W., Hawkins, J. D., Pollard, J. A. & Catalano, R. F. & Baglioni, A. J. (2002). Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors: The Communities That Care Youth Survey. *Evaluation Review*, 26, 575–601.

Atkinson, J., Sharp, C., Schmitz, J. & Yaroslavsky, I. (2012). Behavioral activation and inhibition, negative affect, and gambling severity in a sample of young adult college students. *Journal of Gambling Studies, 28,* (3), 437–449.

Bagby, R. M., Vachon, D. D., Bulmash, E. & Quilty, L. C. (2008). Personality disorders and pathological gambling: a review and re-examination of prevalence rates. *Journal of Personality Disorder, 22,* 191-207.

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., Monteiro, M. G. & World Health Organization. Dept. of Mental Health and Substance Dependence. (2001). AUDIT: the Alcohol Use Disorders Identification Test: guidelines for use in primary health care 2nd ed. Geneva: World Health Organization.

Bandura, A. (1971). *Social Learning Theory*. New York City, New York: General Learning Press

Barnes, G. M., Welte, J. W., Hoffman, J. H. & Dintcheff, B. A. (2005). Shared predictors of youthful gambling, substance use, and delinquency. *Psychology of Addictive Behaviors, 19,* (2), 165–174.

Barrault, S., Bonnaire, C. & Herrmann, F. (2017). Anxiety, Depression and Emotion Regulation among Regular Online Poker Players. *Journal of Gambling Studies*, 1-12.

Barrault S. & Varescon I. (2013). Impulsive sensation seeking and gambling practice among a sample of online poker players: Comparison between non-pathological, problem and pathological gamblers. *Personality and Individual Differences, 55,* (5), 502–507.

Becona, E., Del Carmen Lorenzo, M. & Fuentes, M. J. (1996). Pathological gambling and depression. *Psychological Reports, 78,* (2), 635–640.

Bergen, A. E., Newby-Clark, I. R. & Brown, A. (2012). Low Trait Self-Control in Problem Gamblers: Evidence from Self-Report and Behavioural Measures. *Journal of Gambling Studies, 28,* 637-648.

Bergh, C., Eklund, T., Sodersten, P. & Nordin, C. (1997). Altered dopamine function in pathological gambling. *Psychological Medicine, 27,* 473–475.

Bjelland, I., Dahl, A. A., Haug, T. T. & Neckelmann, D. (2002). The validity of the hospital anxiety and depression scale: an updated literature review. *Journal of Psychosomatic Research, 52,* 69–77.

Black, D. W., Monahan, P. O., Temkit, M. & Shaw, M. (2006). A family study of pathological gambling. *Psychiatry Research, 141,* 295–303.

Black, D. & Shaw, M. (2008). Psychiatric comorbidity associated with pathological gambling. *Psychiatric Times, 25,* (12).

Blain, B., Gill, P. R. & Teese, R. (2015). Predicting Problem Gambling in Australian Adults Using a Multifaceted Model of Impulsivity. *International Gambling Studies, 15,* (2), 239-255.

Blanchard, J. J., Brown, S. A., Horan, W. P. & Sherwood, A. R. (2000). Substance use disorders in schizophrenia: Review, integration, and a proposed model. *Clinical Psychology Review, 20,* 207 – 234.

Blaszczynski, A. & McConaghy, N. (1989). Anxiety and/or Depression in the Pathogenesis of Addictive Gambling. *Substance Use and Misuse, 24,* (4), 337-350.

Blaszczynski, A. & McConaghy, N. (1994). Antisocial Personality Disorder and pathological gambling. *Journal of Gambling Studies, 10*, (2), 129–145.

Blaszczynski, A. P., McConaghy, N. & Frankova, A. (1989). Crime, antisocial personality and gambling. *Journal of Gambling Behaviour, 5*, 137-152.

Blaszczynski, A., & Nower, L. (2002). A pathways model of problem and pathological gambling. *Addiction, 87,* (5), 487-499.

Blaszczynski, A. & Silove, D. (1995). Cognitive and behavioural therapies for pathological gambling. *Journal of Gambling Studies, 11,* 195–220.

Blaszczynski, A. & Steel, Z. (1998). Personality disorders among pathological gamblers. *Journal of Gambling Studies, 14,* 51-71.

Blaszczynski, A., Steel, Z. & McConaghy, N. (1997). Impulsivity in Pathological Gambling: The Antisocial Impulsivist. *Addiction, 92,* (1), 75–87.

Blinn-Pike, L., Worthy, S. & Jonkman, J. (2007). Disordered gambling among college students: A meta-analytic synthesis. *Journal of Gambling Studies, 23,* 175–184.

Boileau, I., Payer, D., Chugani, B., Lobo, D., Behzadi, A. & Rusjan, P. (2013). The $D_{2/3}$ dopamine receptor in pathological gambling: a positron emission tomography study with propyl-hexahydro-naphtho-oxazin and Craclopride. *Addiction, 108,* 953–963.

Bonnaire, C., Bungener, C. & Varescon, I. (2009). Subtypes of French Pathological Gamblers: Comparison of Sensation Seeking, Alexithymia and Depression Scores. *Journal of Gambling Studies, 25,* 455-471.

Bowden-Jones, H. & George, S. (2015). *A clinician's guide to working with problem gamblers*. Routledge: East Sussex.

Breiter, H. C., Aharon, I., Kahneman, D., Dale, A. & Shizgal, P. (2001). Functional imaging of neural responses to expectancy and experience of monetary gains and losses. *Neuron, 30,* 619–639.

Brevers, D., Cleeremans, A., Verbruggen, F., Bechara, A., Kornreich, C., Verbanck, P. & Noel, X. (2012). Impulsive action but not impulsive choice determines problem gambling severity. *PLoS One, 7,* (11).

Callaghan, P. & Morrissey, J. (1993). Social support and health: A review. *Journal of Advanced Nursing, 18,* 203–210.

Canale, N., Vieno, A., Rubaltelli, E. & Santinello, M. (2015). How Do Impulsivity Traits Influence Problem Gambling Through Gambling Motives? The Role of Perceived Gambling Risk/Benefits. *Psychology of Addictive Behaviours, 29,* (3), 813-823.

Caron, C. & Rutter, M. (1991). Comorbidity in child psychopathology: Concepts, issues and research strategies. *Journal of Child Psychology and Psychiatry, 32,* 1063 – 1080.

Chantal, Y. & Vallerand, R. J. (1996). Skill versus luck: A motivational analysis of gambling involvement. *Journal of Gambling Studies, 12,* (4), 407-418.

Chantal, Y., Vallerand, R. J. & Vallieres, E. F. (1995). Motivation and Gambling Involvement. *The Journal of Social Psychology, 135,* (6), 755-763.

Cherry, K. E., Sampson, L., Galea, S., Marks, L. D., Nezat, P. F., Baudoin, K. H. & Lyon, B. A. (2017). Optimism and Hope After Multiple Disasters: Relationships to Health-Related Quality of Life. *Journal of Loss and Trauma, 22,* (1), 61-76.

Cheung, N. (2014). Low Self-Control and Co-occurrence of Gambling with Substance Use and Delinquency Among Chinese Adolescents. *Journal of Gambling Studies, 30,* (1), 105-124.

Chiu, J. & Storm, L. (2010). Personality, perceived luck and gambling attitudes as predictors of gambling involvement. *Journal of Gambling Studies, 26,* 205–227.

Clarke, D. (2006). Impulsivity as a mediator in the relationship between depression and problem gambling. *Personality and Individual Differences, 40,* (1), 5-15.

Clark, C. & Walker, D. M. (2009). Are gamblers more likely to commit crimes? An empirical analysis of a nationally representative survey of US young adults. *International Gambling Studies, 9,* (2), 119-134.

Coman, G. J., Burrows, G. D. & Evans, B. J. (1997). Stress and anxiety as factors in the onset of problem gambling: Implications for treatment. *Stress Medicine, 13,* 235-244.

Conolly, A., Fuller., E., Jones, H., Maplethorpe, N., Sondaal, A. & Wardle, H. (2017). *Gambling behaviour in Great Britain in 2015: Evidence from England, Scotland and Wales*. London (UK): National Centre for Social Research.

Conversano, C., Marazziti, D., Carmassi, C., Baldini, S., Barnabei, G. & Dell'Osso, L. (2012). Pathological gambling: a systematic review of biochemical, neuroimaging, and neuropsychological findings. *Harvard Review of Psychiatry, 20,* 130–148.

Coventry, K. R. & Constable, B. (1999). Physiological arousal and sensation seeking in female fruit machine gamblers. *Addiction, 94, (3),* 425-430.

Cowen, E. L. & Work, W. C. (1988). Resilient children, psychological wellness, and primary prevention. *American Journal of Community Psychology*, 16, **(4),** 591–607.

Crockford, D. N. & el-Guebaly, N. (1998). Psychiatric comorbidity in pathological gambling: A critical review. *The Canadian Journal of Psychiatry, 43,* (1), 43-50.

Cronce, J. M., Bittinger, J. N., Di Lodovico, C. M. & Liu, J. (2016). Independent Versus Co-occurring Substance Use in Relation to Gambling Outcomes in Older Adolescents and Young Adults. *The Journal of Adolescent Health: Official Publication of the Society For Adolescent Medicine*.

Cunningham, J. A., Hodgins, D. C. & Toneatto, T. (2014). Relating severity of gambling to cognitive distortions in a representative sample of problem gamblers. *Journal of Gambling Issues, 29.*

Custer, R. L. (1984). Profile of the pathological gambler. *Journal of Clinical Psychiatry, 45,* (12), 35-38.

Custer, R., & Milt, H. (1985). When luck runs out. Cited in Kassinove, J. I. & Schare, M. L. (2001). Effects of the "Near Miss" and the "Big Win" on Persistence at Slot Machine Gambling. *Psychology of Addictive Behaviours, 15,* (2), 155-158.

Cyders, M. A & Smith, G.T. (2008). Clarifying the role of personality dispositions in risk for increased gambling behavior. *Personality and Individual Differences, 45,* 503–508.

Cyders, M. A., Smith, G. T., Spillane, N. S., Fischer, S., Annus, A. M., & Peterson, C. (2007). Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment, 19,* 107–118.

Dackis, C. & O'Brien, C. (2005). Neurobiology of addiction: treatment and public policy ramifications. *Nature Neuroscience, 8,* 1431-1436.

Dahlem, N. W., Zimet, G. & Walker, R. R. (1991). The Multidimensional Scale of Perceived Social Support: A confirmation study. *Journal of Clinical Psychology, 47,* (6), 756-61.

Davey, J. D., Obst, P. L. & Sheehan, M. C. (2000). Developing a profile of alcohol consumption patterns of police officers in a large scale sample of an Australian Police Service. *European Addiction Research, 6,* 205-212.

Dechant, K. (2014). Show Me the Money: Incorporating Financial Motives into the Gambling Motives Questionnaire. *Journal of Gambling Studies, 30,* (4), 949-965.

Dell, L. J., Ruzicka, M. F. & Palisi, A. T. (1981). Personality and other factors associated with the gambling addiction. *Substance Use & Misuse, 16,* 149–156.

Dellis, A., Sharp, C., Hofmeyr, A., Schwardmann, P. M., Spurrett, D., Rousseau, J. & Ross, D. (2014). Criterion-related and construct validity of the Problem Gambling Severity Index in a sample of South African gamblers. *South African Journal of Psychology 2014, 44,* (2), 243–257.

Delfabbro, P. H. & Winefeld, A. H. (2000). Predictors of irrational thinking in regular slot machine gamblers. *The Journal of psychology, 134,* (2), 117-128

Department for Social Development (Northern Ireland). (2016). *Northern Ireland Gambling Prevalence Survey, 2010*. UK Data Service.

Desai, R. A. & Potenza, M. N. (2008). Gender differences in the associations between past-year gambling problems and psychiatric disorders. *Social Psychiatry and Psychiatric Epidemiology, 43,* 173–183.

Derevensky, J. & Gupta, R. (2007). Internet gambling amongst adolescents: A growing concern. *International Journal of Mental Health and Addictions, 5,* (2), 93-101.

Dickson, L. M., Derevensky, J. L. & Gupta, R. (2008). Youth Gambling Problems: Examining Risk and Protective Factors. *International Gambling Studies, 8,* (1), 25-47.

Dickson, L. M., Derevensky, J. L. & Gupta, R. (2002). The prevention of gambling problems in youth: A conceptual framework. *Journal of Gambling Studies, 18,* (2), 97–159.

Diener, E., Emmons, R. A., Larsen, R. J. & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49,* 71-75.

Dowling, N. A., Merkouris, S. S., Greenwood, C. J., Oldenhof, E., Toumbourou, J. W. & Youssef, G. J. (2017). Early risk and protective factors for problem gambling: A systematic review and meta-analysis of longitudinal studies. *Clinical Psychology Review, 51,* 109 – 124.

Dunne, S., Flynn, C. & Sholdis, J. (2017). 2016 Northern Ireland Gambling Prevalence Survey. Retrieved from file:///C:/Users/Natalie/AppData/Local/Microsoft/Windows/INetCache/IE/TCYXHOPP/2016-ni-gambling-prevalence-survey-main-report.pdf on 01.08.2017.

Eisenberg, D., Gollust, S. E., Golberstein, E. & Hefner, J. L. (2007). Prevalence and Correlates of Depression, Anxiety and Suicidality Among University Students. American Journal of Orthopsychiatry, 77, (4), 534-542.

El-Guebaly, N., Mudry, T., Zohar, J., Tavares, H. & Potenza, M. N. (2012). Compulsive features in behavioural addictions: the case of pathological gambling. *Addiction 107*, 1726–1734.

El-Guebaly, N., Patten, S. B., Currie, S., Williams, J. V. A., Beck, C. A., Maxwell, C. J. & Wang, J. L. (2006). Epidemiological associations between gambling behavior, substance use & mood and anxiety disorders. *Journal of Gambling Studies, 22,* (3), 275–287.

Emshoff, J., Zorland, J., Mooss, A. & Perkins, A. (2008). *Gambling and offending: An examination of the literature.* Georgia State University.

Estevez, A., Herrero-Fernandez, D., Sarabia, I. & Jauregui, P. (2015). The Impulsivity and Sensation-Seeking Mediators of the Psychological Consequences of Pathological Gambling in Adolescence. *Journal of Gambling Studies, 31,* 91-103.

Eysenck, H. J. & Eysenck, S. B. G. (1991). Manual of the Eysenck personality scales. Cited In. Teesson, M., Degenhardt, L., Proudfoot, H., Hall, W. & Lynskey, M. (2005). How common is comorbidity and why does it occur? *Australian Psychologist, 40,* (2), 81 – 87.

Felsher, J., Derevensky, J. & Gupta, R. (2003). Parental influences and social modeling of youth lottery participation. *Journal of Community and Applied Social Psychology, 13,* 361-377.

Ferentzy, P., Skinner, W. J. & Matheson, F. I. (2013). Illicit Drug Use and Problem Gambling. *Addiction, 1.*

Ferland, F., Fournier, P. M., Ladouceur, R., Brochu, P., Bouchard, M. & Paquet, L. (2008). Consequence of pathological gambling on the gambler and his spouse. *Journal of Gambling Issues, 22,* 219–229.

Fernandez-Montalvo, J. & Echeburua, E. (2004). Pathological gambling and personality disorders: an exploratory study with the IPDE. *Journal of Personality Disorders, 18,* 500-505.

Ferris, J. & Wynne, H. (2001). *The Canadian Problem Gambling Index: Final Report.* Ottawa, ON: Canadian Centre on Substance Abuse.

Folino, J. O. & Abait, P. E. (2009). Pathological gambling and criminality. *Current Opinion in Psychiatry, 22,* (5), 477–481.

Fraser, M. W., Richman, J. M. & Galinsky, M. J. (1999). Risk, protection, and resilience: Toward a conceptual framework for social work practice. *Social Work Research, 23,* 131–143.

Gaboury, A. & Ladouceur, R. (1989). Erroneous perceptions and gambling. *Journal of Social Behavior and Personality, 4,* 411-420.

Gainsbury, S. M., Liu, Y., Russell, A. M. T. & Teichert, T. (2016). Is all Internet gambling equally problematic? Considering the relationship between mode of access and gambling problems. *Computers in Human Behavior,* 55, 717–728.

Gambling Commission (2017). Gambling Participation in 2016: behaviour, awareness and attitudes. Retrieve from www.gamblingcommission.gov.uk/PDF/survey-data/Gambling-participation-in-2016-behaviour-awareness-and-attitudes.pdf+&cd=8&hl=en&ct=clnk&gl=uk on 10.03.2017.

Gambling Prevalence in South Australia (2012). Retrieved from www.problemgambling.sa.gov.au/.../release-of-the-2012-gambling-prevalence-study on 05.07.2016.

Gavriel-Fried, B. & Ronen, T. (2016). Positive Emotions as a Moderator of the Associations Between Self-Control and Social Support Among Adolescents with Risk Behaviours. *International Journal of Mental Health and Addictions, 14,* 121-134.

Getty, H., Watson, J. & Frisch, G. (2000). A comparison of depression and styles of coping in male and female GA members and controls. *Journal of Gambling Studies, 16,* (4), 377-391.

Gluck, S. (2008). Phases of a Gambling Addiction: How do you go from being a social gambler to compulsive gambling. Retrieved from http://www.healthyplace.com/addictions/gambling-addiction/phases-of-a-gambling-addiction/ on 28/12/2015.

Graham, J. R. & Lowenfeld, B. H. (1986). Personality dimensions of the pathological gambler. *Journal of Gambling Behavior, 2,* 58–66.

Grant, J. E. & Kim, S. W. (2002). Gender differences in pathological gamblers seeking medication treatment. *Comprehensive Psychiatry, 43,* 56–62.

Griffiths, M. D. (1994). The role of cognitive bias and skill in fruit machine gambling. *British Journal of Psychology, 85,* 351–369.

Goldberg, J., Curran, B., Vitek, M. E., Henderson, W. G. & Boyko, E. J. (2002). The Vietnam Era Twin Registry. *Twin Research, 5,* (5), 468-481.

Gomes, K. & Pascual-Leone, A. (2009). Primed for change: facilitating factors in problem gambling treatment. *Journal of Gambling Studies, 25,* (1), 1-17.

Gonzalez-Ortega, I., Echeburua, E., Corral, P., Polo-Lopez, R. & Alberich, S. (2013). Predictors of pathological gambling severity taking gender differences into account. *European Addiction Research, 19,* (3), 146–54

Goodie, A. S. & Fortune, E. E. (2013). Measuring cognitive distortions in pathological gambling: Review and meta-analyses. *Psychology of Addictive Behaviors, 27,* (3), 730-743.

Grant, J.E., Brewer, J.A. & Potenza, M.N. (2006). The neurobiology of substance and behavioral addictions. *CNS Spectrums, 11,* (12), 924-930.

Grant, J. E. & Kim, S. W. (2001). Demographic and clinical features of 131 adult pathological gamblers. *The Journal of Clinical Psychiatry, 62,* 957–962.

Griffiths, M. D. (1994). The role of cognitive bias and skill in fruit machine gambling. *British Journal of Psychology, 85,* 351-369.

Gupta, R. & Derevensky, J. L. (1997). Familial and social influences on juvenile gambling behavior. *Journal of Gambling Studies, 13,* (3), 179-192.

Gupta, R., & Derevensky, J. L. (1998). An empirical examination of Jacobs' general theory of addictions: Do adolescent gamblers fit the theory? *Journal of Gambling Studies, 14,* (1), 17-49.

Hall, C. W. & Webster, R. E. (2007). Multiple stressors and adjustment among adult children of alcoholics. *Addiction Research and Theory, 15,* 425–434.

Hardoon, K. K., Gupta, R. & Derevensky, J. L. (2004). Psychosocial variables associated with adolescent gambling. *Psychology of Addictive Behaviors, 18,* (2), 170-179.

Hare, R. D. (1980). A research scale for the assessment of psychopathy in criminal populations. *Personality and Individual Differences,* 12, 111–119.

Hariri, A. R., Brown, S. M., Williamson, D. E., Flory, J. D., Wit, H. D. & Manuck, S. B. (2006). Preference for Immediate over Delayed Rewards is Associated with Magnitude of Ventral Striatal Activity. *The Journal of Neuroscience, 26,* (51), 13213-13217.

Hart, S. D. & Dempster, R. J. (1997). Impulsivity and psychopathy. In. Webster, C. D. & Jackson, M. A. (2000). *Impulsivity: Theory, assessment, and treatment*. New York: Guilford Press.

Hayatbakhsh, M., Najman, J., Aird, R., Bor, W., O'Callaghan, M. Williams, G., Shuttlewood, G., Alati, R. & Heron, M. (2006). *Early life course determinants of young adults gambling behaviour: An Australian longitudinal study.* The University of Queensland.

Himelhoch, S. S., Miles-McLean, H., Medoff, D., Kreyenbuhl, J., Rugle, L., Brownley, J., Bailey-Kloch, M., Potts, W. & Welsh, C. (2016). Twelve-Month Prevalence of DSM-5 Gambling Disorder and Associated Gambling Behaviors among Those Receiving Methadone Maintenance. *Journal of Gambling Studies, 32,* 1-10.

Hirschi, T., & Gottfredson, M. R. (1994). *The Generality of deviance*. New Brunswick (USA), Transaction Publishers.

Hodgins, D. C. & Holub, A. (2015). Components of Impulsivity in Gambling Disorder. *International Journal of Mental Health Addiction, 13,* 699–711.

Holden, C. (2001). Behavioral addictions: Do they exist? *Science, 294,* 980-982.

Hounslow, V., Smith, D., Battersby, M. & Morefield, K. (2011). Predictors of Problem Gambling Severity in Treatment Seeking Gamblers. *International Journal of Mental Health and Addiction, 9,* 682-695.

Huang, Y. & Kotov, R. (2009). DSM-IV personality disorders in the WHO World Mental Health Surveys. *The British Journal of Psychiatry, 195,* 46–53.

Ibanez, A., Blanco, C., Donahue, E., Lesieur, H. R., Perez de Castro, I., Fernandez-Piqueras, J. & Saiz-Ruiz, J. (2001). Psychiatric comorbidity in pathological gamblers seeking treatment. *American Journal of Psychiatry, 158,* (10), 1733-1735.

Jacobs, D. F. (2000). Juvenile gambling in North America: An analysis of long-term trends and future prospects. *Journal of Gambling Studies, 6,* 119–152.

Jacobs, D. F. (1986). A general theory of addictions: A new theoretical model. *Journal of Gambling Behavior, 2,* 15-31.

Jazaeri, S. A. & Bin Habil, M. H. (2012). Reviewing Two Types of Addiction – pathological gambling and substance use. *Indian Journal of Psychological Medicine, 34,* (1), 5-11.

Johansson, A., Grant, J.E., Kim, S.W., Odlaug, B.L., & Gotestam, K.G. (2009). Risk factors for problematic gambling: A critical literature review. *Journal of Gambling Studies, 25,* (1), 6792.

Joukhador, J., MacCallum, F., & Blaszczynski, A. (2003). Differences in cognitive distortions between problem and social gamblers. *Psychological Reports, 92,* 1203–1214.

Kalischuk, R. G., Nowatzki, N., Cardwell, K., Klein, K. & Solowoniuk, J. (2006). Problem Gambling and its Impact on Families: A Literature Review. *International Gambling Studies, 6,* (1), 31-60.

Kassinove, J. I. & Schare, M. L. (2001). Effects of the "Near Miss" and the "Big Win" on Persistence at Slot Machine Gambling. *Psychology of Addictive Behaviours, 15,* (2), 155-158.

Kausch, O. (2003). Patterns of substance abuse among treatment-seeking pathological gamblers. *Journal of Substance Abuse Treatment, 25,* (4), 263-270.

Kessler, R. C. (1995). The National Comorbidity Survey: Preliminary results and future directions. *International Journal of Methods in Psychiatric Research*, 5, (2), 139–151.

Kessler, R. C., Hwang, I., Labrie, R., Petukhova, M., Sampson, N. A., Winters, K. C. & Shaffer, H. J. (2008). The prevalence and correlates of DSM-IV Pathological Gambling in the National Comorbidity Survey Replication. *Psychological Medicine, 38,* (9), 1351-1360.

Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry, 142,* 1259 – 1264.

Kingma, S. (2007). Gambling and the risk society: the liberalisation and legitimation crisis of gambling in the Netherlands. *International Gambling Studies, 4,* (1), 47-67.

Knapp, T. J. (1976). The Premack Principle in human experimental and applied settings. *Behaviour Research and Therapy, 14,* (2), 133-147.

Koob, G. F., & Le Moal, M. (2001). Drug addiction, dysregulation of reward, and allostasis. *Neuropsychopharmacology, 24,* 97 – 129.

Kramer-Kuhn, A. M. & Farrell, A. D. (2016). The Promotive and Protective Effects of Family Factors in the Context of Peer and Community Risks for Aggression. *Journal of Youth and Adolescence, 45,* 793-811.

LaBrie, R. A., Shaffer, H. J., LaPlante, D. A. & Wechsler, H. (2003). Correlates of college student gambling in the United States. *Journal of American College Health, 52,* (2), 53–62.

Ladd, G. T. & Petry, N. M. (2002). Gender differences among pathological gamblers seeking treatment. *Experimental and Clinical Psychopharmacology, 10,* 302–309.

Ladouceur, R., Dube, D. & Bujold, A. (1994). Prevalence of Pathological Gambling and Related Problems among College Students in the Quebec Metropolitan Area. *The Canadian Journal of Psychiatry, 39,* (5).

Ladouceur, R., Sylvain, C., Boutin, C., Lachance, S., Doucet, C. & Leblond, J. (2001). Cognitive treatment of pathological gambling. *The Journal of Nervous and Mental Disease, 189,* 774-780.

Ladouceur, R., & Walker, M. (1996). A cognitive perspective on gambling. In: Salkovskis, P. M. *Trends in cognitive-behavioural therapies*. New York City, New York: John Wiley & Sons.

Langenbucher, J. & Merrill, J. (2001). The validity of self-reported cost events by substance abusers - Limits, liabilities, and future directions. *Evaluation Review, 25,* (2), 184–210.

Langewisch, M. W. J. & Frisch, G. R. (1998). Gambling Behavior and Pathology in Relation to Impulsivity, Sensation Seeking, and Risky Behavior in Male College Student. *Journal of Gambling Studies, 14,* (3).

Larm, P., Hodgins, S., Tengstrom, A. & Larsson, A. (2010). Trajectories of resilience over 25 years of individuals who as adolescents consulted for substance misuse and a matched comparison group. *Addiction, 105,* (7), 1216-1226.

Leblond, J., Ladouceur, R. & Blaszczynski, A. (2003). Which pathological gamblers will complete treatment? *British Journal of Clinical Psychology 42,* 205–209.

Ledgerwood, D. M. & Petry, N. M (2006). Psychological experience of gambling and subtypes of pathological gamblers. *Psychiatry Research, 144,* 17-27.

Ledgerwood, D. M. & Petry, N. M. (2010). Subtyping pathological gamblers based on impulsivity, depression and anxiety. *Psychology of Addictive Behaviors, 24,* (4), 680-688.

Lee, H. P., Chae, P. K., Lee, H. S. & Kim, Y. K. (2007). The five-factor gambling motivation model. *Psychiatry Research, 150,* (1), 21-32.

Lee, C. K., Lee, Y. K., Bernhard, B. J. & Yoon, Y. S. (2006). Segmenting casino gamblers by motivation: a cluster analysis of Korean gamblers. *Tourism Management, 27,* (5), 856–866.

Leppink, E. W., Redden, S. A. & Grant, J. E. (2016). Impulsivity and Gambling: A Complex Clinical Association Across Three Measures. *The American Journal on Addictions, 25,* 138-144.

Lesieur, H. R. (1994). Epidemiological surveys of pathological gambling: Critique and suggestions for modification. *Journal of Gambling Studies, 10,* 385–398.

Lesieur, H. R. (2001). Cluster analysis of types of inpatient pathological gamblers. *Dissertation Abstracts International, 62.*

Lesieur, H. R. & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): a new instrument for the identification of pathological gamblers. *The American Journal of Psychiatry, 144,* (9), 1184-1188.

Lesieur, H. R., Cross, J., Frank, M., Welch, M., White, C. M., Rubenstein, G., Moseley, K., & Mark, M. (1991). Gambling and pathological gambling among university students. Cited In. Raylu, N. & Oei, T. P. S. (2002). Pathological Gambling: A comprehensive Review. *Clinical Psychology Review, 22,* 1009-1061.

Lesieur, H. R. & Blume, S. B. (1991). When lady luck loses: Women and compulsive gambling. In Van Den Bergh, N. (1998). Feminist perspectives on addictions. New York City, New York: Springer Publishing Co.

Lesieur, H. R. & Rosenthal, R. J. (1991). Pathological gambling: A review of the literature. *Journal of Gambling Studies 7,* 5-39.

Lewis, M., Ireland, J. L., Abbott, J. & Ireland, C. A. (2017). Initial development of the Psychopathic Processing and Personality Assessment (PAPA) across populations. International *Journal of Law and Psychiatry, 54,* 118-132.

Linnet, J., Moller, A., Peterson, E., Gjedde, A. & Doudet, D. (2011). Dopamine release in ventral striatum during Iowa Gambling Task performance is associated with increased excitement levels in pathological gambling. *Addiction, 106,* 383–390.

Liu, W., Lee, G. P., Goldweber, A., Petras, H., Storr, C. L. & Ialongo N. S. (2013). Impulsivity trajectories and gambling in adolescence among urban male youth. *Addiction* 108 780–788.

Lloyd, C. D., Chadwick, N. & Serin, R. C. (2014). Associations between gambling, substance misuse, and recidivism among Canadian offenders: A multifaceted exploration of poor impulse control traits and behaviors. *International Gambling Studies, 14,* (2), 279-300.

Lloyd, J., Doll, H., Hawton, K., Dutton, W. H., Geddes, J. R., Goodwin, G. M. & Rogers, R. D. (2010). How psychological symptoms relate to different motivations for gambling: An online study of internet gamblers. *Biological Psychiatry.*

Lobo, D. S. S., Quilty, L. C., Martins, S. S., Tavares, H., Vallada, H., Kennedy, J. L. & Bagby, R. M. (2014). Pathological Gambling Subtypes: A comparison and treatment-seeking and non-treatment-seeking samples from Brazil and Canada. *Addictive Behaviors,* 1172-1175.

Loroz, P. S. (2004). Golden-age gambling: psychological benefits and self-concept dynamics in aging consumers' consumption experiences. *Psychology and Marketing, 21,* (5), 323–349.

Lussier, I., Derevensky, J., Gupta, R., Bergevin, T. & Ellenbogen, S. (2007). Youth Gambling Behaviors: An Examination of the Role of Resilience. Psychology of addictive behaviors. *Journal of the Society of Psychologists in Addictive Behaviors*, 21, 165-73.

Lussier, I., Derevensky, J. L., Gupta, R., Bergevin, T. & Ellenbogen, S. (2007). Youth gambling behaviors: An examination of the role of resilience. *Psychology of Addictive Behaviors, 21,* (2), 165–173.

Maas, M. V. D. (2016). The Social Side of the Pathways Model: Examining the Mediation of Social Support on the Relationship between Psychopathology and Problem Gambling. *Journal of Gambling Issues, 32.*

Maccallum, F. & Blaszczynski, A. (2002). Pathological gambling and co-morbid substance use. *Australian and New Zealand Journal of Psychiatry, 36,* 411–415.

Maccallum F, Blaszczynski A, Ladouceur R, (2007). Functional and dysfunctional impulsivity in pathological gambling. *Personality and Individual Differences, 43,* 1829–1838.

MacKillop, J., Amlung, M. T., Few, L. R., Ray, L. A., Sweet, L. H. & Munafo, M. R. (2011). Delayed reward discounting and addictive behavior: A meta-analysis. *Psychopharmacology, 216,* 305–321.

Mackillop, J., Miller, J. D., Fortune, E., Maples, J., Lance, C. E. & Campbell, W. K. (2014). Multidimensional examination of impulsivity in relation to disordered gambling. *Experimental and Clinical Psychopharmacology, 22,* 176–185.

Mackinnon, S. P., Lambe, L. & Stewart, S. (2016). Relations of Five-Factor Personality Domains to Gambling Motives in Emerging Adult Gamblers: A Longitudinal Study. *Journal of Gambling Issues, 34,* 179-200.

MacLaren, V. V., Fugelsang, J. A., Harrigan, K. A. & Dixon, M. J. (2011). The personality of pathological gamblers: A meta-analysis. *Clinical Psychology Review, 31,* 1057–1067.

MacLaren, V. V., Harrigan, K. A. & Dixon, M. (2012). Gambling motives and symptoms of problem gambling in frequent slots players. *Journal of Gambling Issues, 27.*

Malecki, C. K. & Dermaray, M. K. (2002). Measuring perceived social support: development of the child and adolescent social support scale (CASSS). *Psychology in the Schools, 39,* 1-18.

Malouf, E. T., Schaefer, K. E., Witt, E. A., Moore, K. E., Stuewig, J. & Tangey, J. P. (2014). The brief self-control scale predicts jail inmates' recidivism, substance dependence, and post-release adjustment. *Personality and Social Psychology Bulletin, 40,* (3), 334-347.

Marmurek, H. H. C., Switzer, J. & D'Alvise, J. (2015). Impulsivity, Gambling Cognitions, and the Gambler's Fallacy in University Students. *Journal of Gambling Studies, 31,* 197-210.

Marshall, M., Balfour, R., & Kenner, A. (1999). *Pathological gambling: Prevalence, type of offence, comorbid psychopathology, and demographic characteristics in a prison population.* Productivity Commission Inquiry into Australia's Gambling Industries. Retrieved from http://www.pc.gov.au/inquiry/gambling/subs/sub116.pdf on 10.02.2016.

Martin, R., Usdan, S., Cremeens, J. & Vail-Smith, K. (2014). Disordered gambling and co-morbidity of psychiatric disorders among college students: An examination of problem drinking, anxiety and depression. *Journal of Gambling Studies, 30,* (2), 321-333.

May-Chahal, C., Wilson, A., Humphreys, L. & Anderson, J. (2012). Promoting an Evidence-Informed Approach to Addressing Problem Gambling in UK Prison Populations. *The Howard Journal of Criminal Justice, 51,* (4), 372-386.

McConaghy, N. (1980). Behavioural completion mechanisms rather than primary drive maintain behavioural patterns. *Activas Nervosa Superior (Praha), 22,* 138-151.

McCormick, R.A. (1987). Pathological gambling: A parsimonious need state model. *Journal of Gambling Behavior, 3*, 257–263.

McCormick, J., Delfabbro, P. & Denson, L. A. (2012). Psychological Vulnerability and Problem Gambling: An Application of Durand Jacobs' General Theory of Addictions to Electronic Gaming Machine Playing in Australia. *Journal of Gambling Studies, 28,* 665-690.

McGrath, D., Stewart, S., Klein, R. & Barrett, S. (2010). Self-generated motives for gambling in two population-based samples of gamblers. International Gambling Studies, 10, (2), 117–138.

McManus, S., Bebbington, P., Jenkins, R. & Brugha, T. (2016). Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey 2014. Leeds: NHS Digital.

Meisel, M. K., Clifton, A. D., MacKillop, J., Miller, J. D., Campbell, W.K. & Goodie, A. S. (2013). Egocentric social network analysis of pathological gambling. *Addiction, 108,* (3), 584-591.

Meyer, G., Hayer, T. & Griffiths, M. (2009). *Gambling in Europe: Challenges, Prevention and Intervention.* Springer. New York.

Meyer, G., Schwertfeger, J. & Exton, M. S. (2004). Neuroendocrine response to casino gambling in problem gamblers. *Psychoneuroendocrinology, 29,* 1272–1280.

Meyer, G. & Stadler, M. A. (1999). Criminal behavior associated with pathological gambling. *Journal of Gambling Studies, 13,* 29-43.

Milosevic, A. & Ledgerwood, D. M. (2010). The subtyping of pathological gambling: A comprehensive review. *Clinical Psychology Review, 30,* 988-998.

Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry, 158,* 1783–1793.

Molde, H., Pallesen, S., Bartone, P., Hystad, S. & Johnsen, B. H. (2009). Prevalence and correlates of gambling among 16 to 19-year-old adolescents in Norway. *Scandinavian Journal of Psychology, 50,* 55–64.

Monacis, L., Sinatra, M., Tanucci, G., Taurino, A. & de Palo, V. (2014). Toward an understanding of predictive and protective factors in gambling. *Procedia - Social and Behavioral Sciences, 114,* 622-627.

Moran, E. (1970). Varieties of pathological gambling. *British Journal of Psychiatry, 116,* 593–597.

Muellman, R. L., Den Otter, T., Wadman, M. C., Tran, T. P. & Anderson, J. (2002). Problem Gambling in the Partner of the Emergency Department Patient as a Risk Factor for Intimate Partner Violence. *Journal of Emergency Medicine, 23,* 307–312.

Myrseth, H. (2011). *Pathological Gambling: Treatment and Personality Factors.* Dissertation for the degree philosophiae doctor (PhD). University of Bergen, Norway

Myrseth, H., Brunborg, G. S. & Eidem, M. (2010). Differences in Cognitive Distortions Between Pathological and Non-Pathological Gamblers with Preferences for Chance or Skill Games. *Journal of Gambling Studies, 26,* 561-569.

National Coalition Against Legalised Gambling National Coalition Against Legalised Gambling (2003) The Explosive Growth of Gambling in the United States. Cited In Griffiths, M., Parke, A. & Parke, J. (2005). Gambling-related violence: An issue for the police. *The Police Journal, 78,* 223-227.

National Opinion Research Centre. (1999). Gambling Impact and Behavior Study. Cited In. Odlaug, B. L., Schreiber, L. R. N. & Grant, J. E. (2013). Personality dimensions and disorders in pathological gambling. *Current Opinion in Psychiatry, 26,* 107–112.

National Gambling Impact Study Commission (1999). *Pathological Gambling: A Critical Review.* Washington DC: National Academy Press.

Neighbours, C., Lostutter, T. W., Cronce, J. M. & Larimer, M. E. (2002). Exploring college student gambling motivation. *Journal of Gambling Studies, 18,* 361–370.

Nowak, D. E. & Aloe, A. M. (2014). The prevalence of pathological gambling among college students: a meta-analytic synthesis, 2005-2013. *Journal of Gambling Studies, 30,* (4), 819-843.

Nower, L., Derevensky, J. & Gupta, R. (2004). The relationship of impulsivity, sensation seeking, coping and substance use in youth gamblers. *Psychology of Addictive Behaviors, 18,* (1), 49-55.

Nower, L., Martins, S. S., Lin, K. H. & Blanco, C. (2012). Subtypes of disordered gamblers: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Addiction, 108,* 789-798.

Oei, T. P. S. & Goh, Z. (2015). Interactions Between Risk and Protective Factors on Problem Gambling in Asia. *Journal Gambling Studies, 31,* 557–572.

Oei, T. P. S. & Gordon, L. M. (2008). Psychosocial factors related to gambling abstinence and relapse in members of Gamblers Anonymous. *Journal of Gambling Studies 24,* 91-105.

Oei, T., Lin, J. & Raylu, N. (2008). The relationship between gambling cognitions, psychological states and gambling: a cross-cultural study of Chinese and Caucasians in Australia. *Journal of Cross-cultural Psychology, 39,* 147–161.

Oster, S.L., & Knapp, T.J. (2001). Underage and pathological gambling by college students: Emerging problems on campus? *Psychology and Education: An Interdisciplinary Journal, 38,* 15-19.

Park, M. K., Yang, X., Lee, B. K., Jang, H. C. & Stokowski, P. A. (2002). Segmenting casino gamblers by involvement profiles: a Colorado example. *Tourism Management, 23,* (1), 55–65.

Petry, N. M. (2001). Substance abuse, pathological gambling, and impulsiveness. *Drug and Alcohol Dependence, 63,* 29–38.

Petry, N. (2005). *Pathological gambling: Etiology, comorbidity and treatment.* Washington DC: American Psychological Association.

Petry, N. M. & Steinberg, K. L. (2005). Childhood maltreatment in male and female treatment-seeking pathological gamblers. *Psychology of Addictive Behaviors, 19,* (2), 226–229.

Petry, N. M., Stinson, F. S. & Grant, B. F. (2005). Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions, *Journal of Clinical Psychiatry, 66,* (5), 564-574.

Petry, N. M. & Weiss, L. (2009). Social support is associated with gambling treatment outcomes in pathological gamblers. *American Journal on Addictions 18,* 402–408.

Pietrzak, R. H. & Petry, N. M. (2005). Antisocial personality disorder is associated with increased severity of gambling, medical, drug and psychiatric problems among treatment seeking pathological gamblers. *Addiction, 100,* (8), 1183-1193.

Platz, L. & Millar, M. (2001). Gambling in the context of other recreation activity: a quantitative comparison of casual and pathological student gamblers. *Journal of Leisure Research, 33,* (4), 383–395.

Potenza, M.N. (2001). The neurobiology of pathological gambling. *Seminars in Clinical Neuropsychiatry, 6,* 217-226.

Potenza, M. N., Fiellin, D. A., Heninger, G. R., Rounsaville, B. J. & Mazure, C. M. (2002). Gambling: An addictive behaviour with health and primary care implications. *Journal of General Internal Medicine, 17,* (9), 721-732.

Potenza, M. N., Steinberg, M. A., McLaughlin, S. D., Wu, R., Rounsaville, B. J., & O'Malley, S. S. (2001). Gender-related differences in the characteristics of problem gamblers using a gambling helpline. *American Journal of Psychiatry, 158*, 1500-1505.

Powers, M. (2017). How Can Families Develop Resilience Against Patient Relapse Behaviors? *Psychology Today, 50,* (1).

Productivity Commission (1999). Australia's gambling industries (Report No.10). Cited In Lahn, J. (2005). Gambling Among Offenders: Results From an Australian Survey. *International Journal of Offender Therapy and Comparative Criminology, 49,* (3), 343-355.

Public Health England (2013). Problem Gambling. Retrieved from https://www.local.gov.uk/sites/default/files/documents/problem-gambling-frequent-4f2.pdf+&cd=1&hl=en&ct=clnk&gl=uk on 06.07.2016.

Rash, C. J. & Petry, N. M. (2014). Psychological treatments for gambling disorder. *Psychology Research and Behavior Management, 7*, 285-295.

Rash, C. J., Weinstock, J. & Van Patten, R. (2016). A review of gambling disorder and substance use disorders. *Substance Abuse and Rehabilitation, 7,* 3-13.

Raylu, N. & Oei, T. P. (2002). Pathological Gambling: A comprehensive Review. *Clinical Psychology Review, 22,* 1009-1061.

Raylu, N. & Oei, T. P. (2004). Role of culture in gambling and problem gambling. *Clinical Psychology Review, 23,* 1087-1114.

Reid, R. L. (1986). The psychology of the near miss. *Journal of Gambling Studies, 2,* 32–39.

Reilly, C. & Smith, N. (2013). *The Evolving Definition of Pathological Gambling in the DSM-5.* National Centre for Responsible Gaming.

Reith, G. & Dobbie, F. (2012). Lost in the game: Narratives of addiction and identity in recovery from problem gambling. *Addiction Research and Theory,* 1-11.

Rickwood, D., Blaszczynski, A., Delfabbro, P., Dowling. N, and Heading, K. (2010). T he psychology ofgambling: APS review paper, final, November, APS Gambling Working Group: Australia.

Robitschek, C., & Kashubeck, S. A. (1999). Structural model of parental alcoholism, family functioning, and psychological health: The mediating effects of hardiness and personal growth orientation. *Journal of Counselling Psychology*, 46, 159–172.

Roberts, A., Coid, J., King, R., Murphy, R., Turner, J., Bowden-Jones, H., Du Preez, K. & Landon, J. (2016). Gambling and violence in a nationally representative sample of UK men. *Addiction.*

Roberts, A., Landon, J., Sharman, S., Hakes, J., Suomi, A. & Cowlishaw, S. (2018). Gambling and Physical Intimate Partner Violence: Results From the National Epidemiological Survey on Alcohol and Related Conditions (NESARC). *The American Journal on Addictions,* 27, 7-14.

Roberts, A., Sharman, S., Coid, J., Murphy, R., Bowden-Jones, H., Cowlishaw, S. & Landon, J. (2017). Gambling and negative life events in a nationally representative sample of UK men. Addictive Behaviours, 75, 95-102.

Rodriguez, L. M., Neighbors, C., Rinker, D. V. & Tackett, J. L. (2015). Motivational Profiles of Gambling Behavior: Self-determination Theory, Gambling Motives, and Gambling Behavior. *Journal of Gambling Studies, 31,* 1597-1615.

Rogers, P. (1998). The Cognitive Psychology of Lottery Gambling: A Theoretical Review. *Journal of Gambling Studies, 14,* (2), 111-134.

Rosenthal, R. (1992) Pathological gambling. *Psychiatric Annals, 22,* 72–78.

Rucevic, S. (2016). Gambling among Croatian young people: an exploratory study of the relationship between psychopathic traits, risk-taking tendencies and gambling-related problems. *International Gambling Studies, 16,* (2), 231-245.

Rumpold, G., Klingseis, M., Dornauer, K., Kopp, M., Doering, S., Hofer, S., Mumelter, B. & Schubler, G. (2006). Psychotropic Substance Abuse Among Adolescents: A Structural Equation Model on Risk and Protective Factors. *Substance Use & Misuse, 41,* 1155–1169.

Rutter, M. D. (1987). Psychosocial Resilience and Protective Mechanisms. *American Journal of Orthopsychiatry,* 57, 316-331.

Sabina, C. & Banyard, V. (2015). Moving Toward Well-Being: The Role of Protective Factors in Violence Research. *Psychology of Violence, 5,* (4), 337–342.

Sahin-Baltaci, H., & Karatas, Z. (2015). Perceived social support, depression and life satisfaction as the predictor of the resilience of secondary school students: The case of Burdur. *Eurasian Journal of Educational Research, 60,* 111-130.

Schlosser, S., Black, D.W., Perertinger, S., & Freet. D. (1994). Compulsive buying: demography, phenomenology, and comorbidity in 46 subjects. *General Hospital Psychiatry, 55,* 5-11.

Schuckit, M. A., Tipp, J. E., Bucholz, K. K., Nurnberger, J. I., Hesselbrock, V. M., Crowe, R. R., et al. (1997). The life-time rates of three major mood disorders and four major anxiety disorders in alcoholics and controls. *Addiction, 92,* 1289 – 1304.

Schwendimann, B. A. (2014). Making sense of knowledge integration maps. In D. Ifenthaler & R. Hanewald (Eds.). *Digital Knowledge Maps in Education*. New York: Springer.

Shaffer, H. J., Hall, M. N. & Vander-Bilt, J. (1997). *Estimating the Prevalence of Disordered Gambling Behaviour in the United States and Canada: A Meta-analysis.* Harvard Medical School Division on Addictions.

Shaffer, H. J., Hall, M. N. & Vander Bilt, J. (1999). Estimating the prevalence of disordered gambling behaviour in the United States and Canada: A research synthesis. *American Journal of Public Health, 89,* 1369–1376.

Shah, K. R., Eisen, S. A., Xian, H. & Potenza, M. N. (2005). Genetic Studies of Pathological Gambling: A Review of Methodology and Analyses of Data from the Vietnam Era Twin Registry. *Journal of Gambling Studies, 21,* (2), 179-203.

Sharma, L., Markon, K. E. & Clark, L. A. (2014). Toward a theory of distinct types of "Impulsive" Behaviors: a meta-analysis of self-report and behavioral measures. *Psychological Bulletin, 140,* 374–408.

Shead, N. W., Derevensky, J. L. & Gupta, R. (2010). Risk and protective factors associated with youth problem gambling. *International Journal of Adolescent Medicine and Health, 22,* (1), 39-58.

Shead, N. W. & Hodgins, D. C. (2009). Affect-regulation expectancies among gamblers. *Journal of Gambling Studies*, *25,* 357–375.

Shenassa, E. D., Paradis, A. D., Dolan, S. L., Wilhelm, C. S. & Buka, S. L. (2012). Childhood impulsive behavior and problem gambling by adulthood: a 30-year prospective community-based study. *Addiction, 107,* 160–168.

Skinner, B. F. (1969). *Contingencies of Reinforcement: A Theoretical Analysis*. Engelwood Cliffs, NJ, Prenice-Hall.

Skinner, H. A. (1982). The drug abuse screening test. *Addictive Behavior, 7,* 363–371.

Slutske, W. S., True, W. R., Goldberg, J., Eisen, S., Xian, H., Lyns, M. J. & Tsuang, M. (2001). A Twin Study of the Association Between Pathological Gambling and Antisocial Personality Disorder. *Journal of Abnormal Psychology*, *110,* (2), 297-308.

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15,* (3), 194-200.

Sommers, I. (1988). Pathological gambling: Estimating prevalence and group characteristics. *The International Journal of the Addictions, 23,* 477-490.

Spinella, M. (2007). Normative data and a short form of the Barratt Impulsiveness Scale. *International Journal of Neuroscience, 117,* 359-368.

Spunt, B. (2002). Pathological gambling and substance misuse. *Substance Use and Misuse, 37,* (8–10), 1299–1304.

Spunt, B., Dupont, I., Lesieur, H., Liberty, H. J. & Hunt, D. (1998). Pathological gambling and substance misuse: A review of the literature. *Substance Use and Misuse, 33,* (13), 2535-2560.

Steel, Z. & Blaszczynski, A. (1996). The Factorial Structure of Pathological Gambling. *Journal of Gambling Studies, 12,* (1), 3–20.

Steenbergh, T. A., Meyers, A. W., May, R. K., & Whelan, J. P. (2002). Development and validation of the Gamblers' Beliefs Questionnaire. *Psychology of Addictive Behaviors, 16,* 143–149.

Stewart, S. H. & Zack, M. (2008). Development of psychometric evaluation of a three-dimensional Gambling Motives Questionnaire. *Addiction, 103,* 1110-1117.

Stewart, S. H., Zack, M., Collins, P., Klein, R. M. & Fragopoulos, F. (2008). Subtyping Pathological Gamblers on the Basis of Affective Motivations for Gambling: Relations to Gambling Problems, Drinking Problems, and Affective Motivations for Drinking. *Psychology of Addictive Behaviours, 22,* (2), 257-268.

Stinchfield, R. A. (2001). Comparison of gambling among Minnesota public school students in 1992, 1995 and 1998. *Journal of Gambling Studies, 17,* 273–296.

Strickland, L. H. & Grote, F.W. (1967). Temporal presentation of winning symbols and slot-machine playing. *Journal of Experimental Psychology, 74,* 10–13.

Suomi, A., Dowling, N. A. & Jackson, A. C. (2014). Problem gambling subtypes based on psychological distress, alcohol abuse and impulsivity. *Addictive Behaviors, 39,* 1741 – 1745.

Tabachnick, B. G. & Fidell, L. S. (2013). *Using Multivariate Statistics.* 6th Ed. Boston: Pearson.

Tamminga, C. A. & Nestler, E. J. (2006). Pathological gambling: Focusing on the addiction, not the activity. *American Journal of Psychiatry, 163,* 180-181.

Tangney, J. P., Baumeister, R. F. & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades and interpersonal success. *Journal of Personality, 72,* 271-324.

Teesson, M., Degenhardt, L., Proudfoot, H., Hall, W. & Lynskey, M. (2005). How common is comorbidity and why does it occur? *Australian Psychologist, 40,* (2), 81 – 87.

The Gambling Commission (2016). Participation in gambling and rates of problem gambling – Wales. Retrieved from http://www.gamblingcommission.gov.uk/PDF/survey-data/Participation-in-gambling-and-rates-of-problem-gambling-Wales-headline-report.pdf. On 23.01.2017.

Thomas, A., Moore, S., Kale, S., Zlatevska, N., Spence, M. & Staiger, P. (2011). *International student gambling: The role of acculturation, gambling cognitions*

and social circumstances. Full technical report: A mixed-methods investigation of international student gambling. Melbourne: Gambling Research Australia.

Thomsen, K. R., Callesena, M. B., Linnet, J., Kringelbach, M. L. & Moller, A. (2009). Severity of gambling is associated with severity of depressive symptoms in pathological gamblers. *Behavioural Pharmacology, 20,* 527–536.

Trombly, D. R. C. & Zeigler-Hill, V. (2017). The Dark Triad and Disordered Gambling. *Current Psychology, 36,* 740-746.

True, W., Xian, H., Scherrer, J., Madden, P., Bucholz, K., Heath, A. et al. (1999). Common genetic vulnerability for nicotine and alcohol dependence. *Archives of General Psychiatry, 56,* 655 – 661.

Tsuang, M. T., Lyons, M. J., Meyer, J. M., Doyle, T., Eisen, S. A., Goldberg, J., et al. (1998). Co-occurrence of abuse of different drugs in men: The role of drug-specific and shared vulnerabilities. *Archives of General Psychiatry, 55,* 967 – 972.

Turner, N. E., Jain, U., Spence, W., Zangeneh, M. (2008). Pathways to Pathological Gambling: Component Analysis of Variables Related to Pathological Gambling. *International Gambling Studies, 8,* (3), 281, 298.

Turner, N. & Littman-Sharp, N. (2006). *Inventory of gambling situations users guide.* Toronto, ON: Centre for Addictions and Mental Health.

Turner, D., Sebastian, A. & Tuscher, O. (2017). Impulsivity and Cluster B Personality Disorders. *Current Psychiatry Reports, 19,* (3), 1-14.

University of Iowa. (2006, March 16). Study Finds Pathological Gambling Runs in Families. *ScienceDaily*. Retrieved March 15, 2016 from www.sciencedaily.com/releases/2006/03/060316091857.htm

Vachon, D. D. & Bagby, R. M. (2009). Pathological Gambling Subtypes. *Psychological Assessment, 21,* (4), 608-615.

Valleur, M., Codina, I., Venisse, J. L., Romo, L., Magalon, D., Fatseas, M., Chereau-Boudet, I., Gorsane, M. A., Guilleux, A., Grall-Bronnec, M. & Challet-Bouju, G. (2016). Toward a Validation of the Three Pathways Model of Pathological Gambling. *Journal of Gambling Studies, 32,* 757-771.

Verdejo-García, A., Lawrence, A. J. & Clark, L. (2008). Impulsivity as a vulnerability marker for substance-use disorders: review of findings from high-risk research, problem gamblers and genetic association studies. *Neuroscience and Biobehavioral Reviews, 32,* 777-810.

Villalobos-Gallegos, L., Perez-Lopez, A., Mendoza-Hassey, R., Graue, J. & Marin-Navarrete, R. (2015). Psychometric and diagnostic properties of the Drug Abuse Screening Test (DAST): Comparing the DAST-20 vs. the DAST-10. *Salud Mental. 38.* 89-94.

Vitaro, F., Arseneault, L. & Tremblay, R. E. (1999). Impulsivity predicts problem gambling in low SES adolescent males. *Addiction, 94,* (4), 565-75.

Vitaro, F., Brendgen, M., Ladouceur, R., & Tremblay, R. E. (2001). Gambling, delinquency, and drug use during adolescence: mutual influences and common risk factors. *Journal of Gambling Studies, 17,* (3), 171–190.

Volberg R. A., Abbott M. W., Ronnberg S., Munck I. M. (2001). Prevalence and risks of pathological gambling in Sweden. *Acta Psychiatrica Scandinavica, 104,* 250–256.

Wanner, B., Vitaro, F., Carbonneau, R., & Tremblay, R. E. (2009). Cross-lagged links among gambling, substance use, and delinquency from mid-adolescence to young adulthood: additive and moderating effects of common risk factors. *Psychology of Addictive Behaviors, 23,* (1), 91–104.

Wardle, H., Moody, A., Spence, S., Orford, J., Volberg, R., Jotangia, D., Griffiths, M., Hussey, D. & Dobbie, F. (2011). British Gambling Prevalence Survey 2010. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243515/9780108509636.pdf on 02.06.2017.

Weinstock, J. & Petry, N. M. (2008). Pathological gambling college students' perceived social support. Journal of College Student Development, 49, (6), 625-632.

Welte, J., Barnes, G., Wiezorek, W., Tidwell, M., & Parker, J. (2002). Gambling participation in the U.S. Results from a national survey. Journal of Gambling Studies, 18(4), 313–337.

Westphal, J. R. & Johnson, L. J. (2007) Multiple co-occurring behaviours among gamblers in treatment: Implications and assessment. *International Gambling Studies, 7,* 73–99.

Westphal, J. R., Rush, J. A., & Stevens, L. (1998). *Problem and pathological gambling behaviours within specific populations in the State of Indiana*. Indianapolis: Indiana Family & Social Services Administration.

Weatherly, J. N. & Dixon, M. R. (2007). Toward an integrative behavioral model of gambling. *Analysis of Gambling Behavior, 1,* 4–18.

Weatherly, J. N., Sauter, J. M. & King, B. M. (2004). The "big win" and resistance to extinction when gambling. *The Journal of Psychology, 138,* 495–504.

Williams, R. J., Royston, J., & Hagen, B. (2005). Gambling and problem gambling within forensic populations: A review of the literature. *Criminal Justice and Behaviour: An International Journal, 32,* 665-689.

Williams, R. J., Volberg, R. A. & Stevens, R. M. G. (2012). The Population Prevalence of Problem Gambling: Methodological Influences, Standardized Rates, Jurisdictional Differences, and Worldwide Trends. Report prepared for the Ontario Problem Gambling Research Centre and the Ontario Ministry of Health and Long Term Care.

Winters, K. C., & Anderson, N. (2000). Gambling involvement and drug use among adolescents. *Journal of Gambling Studies, 16,* (2-3), 175–198.

Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993). Toward the development of an adolescent gambling problem severity scale. *Journal of Gambling Studies, 9,* 63-84.

Wood, R. T. A., & Griffiths, M. D. (2007). A qualitative investigation of problem gambling as an escape based coping strategy. *Psychology and Psychotherapy: Theory, Research and Practice.*

Zigmond, A. S. & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica, 67,* (6), 361-370.

Zimet, G. D., Dahlem, N. W., Zimet, S. G. & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52,* 30-41.

Zimmerman, M. A., Meeland, T. & Krug, S. E. (1985). Measurement and structure of pathological gambling behaviour. *Journal of Personality Assessment, 49,* (1), 76-81.

APPENDIX 1.

MATERIALS USED IN STUDY ONE

Information Sheet
Understanding gambling: pathways towards and away from gambling

I am a psychology PhD student from the University of Central Lancashire and I am investigating gambling activities and how it may link with a range of factors such as substance use and emotional wellbeing. You will be asked to complete several short questionnaires on these topics.

There are numerous types of gambling activities – it can include online gambling, going into a betting shop, or gambling privately with friends. The present study is not excluding any types of gambling, we are interested in all types e.g. national lottery, scratch-cards, poker games, roulette, bingo, pub slot games, sports betting and horse and dog racing etc. The study is interested in all types of gambling and does not assume that gambling is a problematic activity. We are interested in all forms of gambling, including that primarily engaged in for fun and recreation.

This questionnaire is completely anonymous. All data gathered will be confidential. It is not expected that any of the questionnaires will cause upset but if you feel they do please do not complete them. Only the researcher and the supervisors will have access to the individual questionnaires. Only group results will be reported in any publication, not individual results.

It is important to note that you DO NOT HAVE TO TAKE PART IN THIS STUDY and you have the RIGHT to WITHDRAW from the research at any point up to the completion of the questionnaire. As the questionnaire is anonymous it will be impossible to identify your data after submission and so for this reason I will be unable provide direct feedback.

The questionnaires will take roughly **30 minutes** to complete. By completing and submitting questionnaires the researchers will assume you consent to the research. If you require any information about the study please contact me directly Natalie Hearn (NLHearn@uclan.ac.uk) or my supervisor, Professor Jane L. Ireland (JLIreland1@uclan.ac.uk).

If you feel you would like to speak to a professional about the effects of gambling please see the information below:

National Gambling Helpline: Offer free and confidential support, information and advice on problem gambling via telephone- 0808 8020 133.

GamCare: offer free face to face and online counselling for those affected by a gambling problem. In addition, GamCare provides online advice on self-help strategies, and practical advice to families and friends of people experiencing problems. www.gamcare.org.uk

Gamblers Anonymous: Are a group of men and women who have joined together to tackle their own gambling problem and help others do the same. Tel: 020 7384 3040.

National Debtline: Provide free confidential and independent advice on how to deal with debt. Tel: 0808 808 4000

Demographic Information

It would be helpful if you would complete the following questions so that we can categorise the information. You are reminded that all responses are anonymous and individual responses will not be reported in any write up of the results. The information you provide is also for research purposes only.

Please circle the appropriate response.

Sex (please circle):

Male Female

Age (please circle): 18-25 25-25 35-45 45-55 55+

Are you are student? (please circle):

Yes No

If yes are you (please circle): Undergraduate Postgraduate

GAM-DS

The following questionnaire consists of a number of statement about how gambling may affect your life. Please think carefully about each statement and answer them as honestly as possible by circling YES/NO - which ever best corresponds with your gambling.

In the past 12 months have you:

1. Needed to gamble with increased amounts of money in order to achieve the desired excitement.

   YES NO

2. Become restless or irritable when attempting to cut down or stop gambling.

   YES NO

3. Made repeated unsuccessful efforts to control, cut back or stop gambling.

   YES NO

4. Become preoccupied with gambling? For example, have you had persistent thought of reliving past gambling experiences, planned the next gambling venture or thought of ways to get money to gamble?

   YES NO

5. Gambled often when feeling distressed? (e.g. feeling helpless, guilty, anxious, depressed). After losing money gambling I often return another day to get even (i.e. to chase my losses).

   YES NO

6. Lied to conceal the extent of my involvement in gambling?

   YES NO

7. Jeopardized or lost a significant relationship, job education or career opportunity because of gambling.

   YES NO

8. Relied on others to provide money to relieve desperate financial situations as a result of my gambling.

   YES NO

PGSI:

The following questionnaire will, again, ask you about your engagement in gambling activities. Please think carefully about your answers and respond as honestly as possible by circling the frequency by which the item applies to you.

1. **How often have you bet more than you could really afford to lose?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

2. **How often have you needed to gamble with larger amounts of money to get the same feeling of excitement?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

3. **How often have you gone back another day to try and win back the money you lost?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

4. **How often have you borrowed money or sold anything to get money to gamble?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

5. **How often have you felt that you might have a problem with gambling?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

6. **How often has gambling caused you any health problems, including stress or anxiety?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

7. **Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

8. **Has your gambling caused any financial problems for you or your household?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

9. **Have you felt guilty about the way you gamble or what happens when you gamble?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

GMQ

The following questionnaire will ask you about the reasons why you take part in gambling activities. Please answer as honestly as possible by circling the frequency with which the item best applies to you.

1. As a way to celebrate

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

2. To relax

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

3. Because you like the feeling

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

4. Because it's what most of your friends do when you get together

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

5. To forget your worries

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

6. Because it's exciting

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

7. To be sociable

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

8. Because you feel more self-confident or sure of yourself

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

9. To get a 'high' feeling

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

10. Because it's something I do on special occasions

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

11. Because it helps when you are feeling nervous or depressed

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

12. Because it's fun

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

13. Because it makes a social gathering more enjoyable

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

14. To cheer up when you're in a bad mood

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

15. Because it makes you feel good

1	2	3	4
Never/ Almost Never	Sometimes	Often	Almost Always

HAD Scale

This questionnaire will ask you about how you are feeling. Please read every sentence and put a circle around the answer that best describes how you have been feeling during the LAST COUPLE OF WEEKS. Please do not think too much about your answer and answer the first thing that comes to mind.

1. **I feel tense or 'wound up':**

Most of the time

A lot of the time

From time to time

Not at all

2. **I still enjoy the things I used to enjoy:**

Definitely as much

Not quite as much

Only a little

Hardly at all

3. **I get a sort of frightened feeling as if something awful is about to happen:**

Definitely and quite badly

Yes, but not too badly

A little, but it doesn't worry me

Not at all

4. **I can laugh and see the funny side of things:**

As much as I always could

Not quite as much now

Definitely not so much now

Not at all

5. **Worrying thoughts go through my mind:**

A great deal of the time

A lot of the time

From time to time, but not too often

Only occasionally

6. I feel cheerful:

Not at all

Not often

Sometimes

Most of the time

7. I can sit at ease and feel relaxed:

Definitely

Usually

Not often

Not at all

8. I feel as if I am slowed down:

Nearly all the time

Very often

Sometimes

Not at all

9. I get a sort of frightened feeling like 'butterflies' in the stomach:

Not at all

Occasionally

Quite often

Very often

10. I have lost interest in my appearance:

Definitely

I don't take as much care as I should

I may not take quite as much care

I take just as much care as ever

11. I feel restless as I have to be on the move:

Very much indeed

Quite a lot

Not very much

Not at all

12. I look forward with enjoyment to things:
As much as I ever did

Rather less than I used to

Definitely less than I used to

Hardly at all

13. I get sudden feelings of panic:
Very often indeed

Quite often

Not very often

Not at all

14. I can enjoy a good book or radio or TV program:
Often

Sometimes

Not often

Very Seldom

AUDIT Questionnaire

The following questionnaire will ask you about your alcohol intake **in the past 12 months**. Please answer this questionnaire as honestly as possible by circling the answer which best corresponds with your level of intake.

1. How often do you have a drink containing alcohol?

· Never
· Monthly or less
· 2-4 times a month
· 2-3 times a week
· 4 or more times a week

2. How many standard drinks containing alcohol do you have on a typical day when drinking?

· 1 or 2
· 3 or 4
· 5 or 6
· 7 to 9
· 10 or more

3. How often do you have six or more drinks on one occasion?

· Never
· Less than monthly
· Monthly
· Weekly
· Daily or almost daily

4. How often have you found that you were not able to stop drinking once you had started?

· Never
· Less than monthly
· Monthly
· Weekly
· Daily or almost daily

5. How often have you failed to do what was normally expected of you because of drinking?

· Never
· Less than monthly
· Monthly
· Weekly
· Daily or almost daily

6. How often have you needed a drink in the morning to get yourself going after a heavy drinking session?

· Never
· Less than monthly
· Monthly
· Weekly
· Daily or almost daily

7. How often have you had a feeling of guilt or remorse after drinking?
· Never
· Less than monthly
· Monthly
· Weekly
· Daily or almost daily

8. Have you been unable to remember what happened the night before because you had been drinking?
· Never
· Less than monthly
· Monthly
· Weekly
· Daily or almost daily

9. Have you or someone else been injured as a result of your drinking?
· No
· Yes, but not in the past year
· Yes, during the past year

10. Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?
· No
· Yes, but not in the past year
· Yes, during the past year

DAST-10 Questionnaire

This questionnaire is about your potential involvement with drug use, **excluding alcohol and tobacco, in the past 12 months.** When the words "drug abuse" are used, they mean the use of prescribed or over-the-counter medications/drugs in excess of the directions and any non-medical use of drugs. The various classes of drugs may include: cannabis, solvents, tranquilizers (e.g., Valium), barbiturates, cocaine, stimulants (e.g., speed), hallucinogens (e.g., LSD) or narcotics (e.g., heroin). If you have difficulty with a statement choose the response that is mostly right.

In the past 12 months:

1. Have you used drugs other than those prescribed for medical reasons?

   YES NO

2. Do you abuse more than one drug at a time?

   YES NO

3. Are you always able to stop using drugs when you want to (If never use drugs answer YES)?

   YES NO

4. Have you had 'blackouts' or 'flashbacks' as a result of drug use?

   YES NO

5. Do you ever feel bad or guilty about your drug use (If never use drugs answer NO)?

   YES NO

6. Does your partner (or parents) ever complain about your involvement with drugs?

   YES NO

7. Have you neglected your family because of your use of drugs?

   YES NO

8. Have you engaged in illegal activities in order to obtain drugs?

   YES NO

9. Have you ever experience withdrawal symptoms (e.g., felt sick) when you have stopped using drugs?

   YES NO

10. Have you had medical problems as a result of your drug use (e.g., memory loss, hepatitis, convulsions, bleeding etc)?

    YES NO

Debrief

Thank you very much for participating in this research. Please remember that all the results will be stored securely, and that all the questionnaire responses are anonymous.

This study looked at how the general and student population engage in gambling and the link with factors such as substance misuse and emotional wellbeing. The aim of the research was to investigate potential pathways towards gambling and the maintenance of gambling in community and student gamblers. Specifically, the research was examining whether substance misuse and anxiety and depression play a role in the development and maintenance of gambling activities.

If you require any further information or would like a summary of the findings please feel free to contact me directly; Natalie Hearn (NLHearn@uclan.ac.uk) or my supervisor Professor Jane L. Ireland (JLIreland1@uclan.ac.uk). If you feel upset by any of the issues addressed in this research, you may wish to speak to a professional organisation about the issue, if so, please note the information below.

National Gambling Helpline: Offer free and confidential support, information and advice on problem gambling via telephone- 0808 8020 133.

GamCare: offer free face to face and online counselling for those affected by a gambling problem. In addition, GamCare provides online advice on self-help strategies, and practical advice to families and friends of people experiencing problems. www.gamcare.org.uk

Gamblers Anonymous: Are a group of men and women who have joined together to tackle their own gambling problem and help others do the same. Tel: 020 7384 3040.

National Debtline: Provide free confidential and independent advice on how to deal with debt. Tel: 0808 808 4000

Citizens Advice Bureau: Can help people resolve their legal, money and other problems by providing free information and advice from nearly 3,400 locations in England, Scotland, Wales and Northern Ireland.

Many thanks for your participation.

APPENDIX 2.

MATERIALS USED IN STUDY TWO

Information Sheet

Understanding gambling: pathways towards and away from gambling

I am a psychology PhD student from the University of Central Lancashire and I am investigating gambling activities and what types of gambling activities you engage in and what kinds of things you think about your gambling. It will also be exploring the different reasons why you gamble. It also looks at how you feel in general and the way you felt before you started gambling. Lastly, it explores the way you generally think and act in different situations. You will be asked to complete several short questionnaires on these topics.

There are numerous types of gambling activities – it can include online gambling, going into a betting shop, or gambling privately with friends. The present study is not excluding any types of gambling, we are interested in all types e.g. national lottery, scratch-cards, poker games, roulette, bingo, pub slot games, sports betting and horse and dog racing etc. The study is interested in all types of gambling and does not assume that gambling is a problematic activity. We are interested in all forms of gambling, including that primarily engaged in for fun and recreation.

This questionnaire is completely anonymous. All data gathered will be confidential. It is not expected that any of the questionnaires will cause upset but if you feel they do please do not complete them. Only the researcher and the supervisors will have access to the individual questionnaires. Only group results will be reported in any publication, not individual results.

It is important to note that you DO NOT HAVE TO TAKE PART IN THIS STUDY and you have the RIGHT to WITHDRAW from the research at any point up to the completion of the questionnaire. As the questionnaire is anonymous it will be impossible to identify your data after submission and so for this reason I will be unable provide direct feedback.

The questionnaires will take roughly **25 minutes** to complete. By completing and submitting questionnaires the researchers will assume you consent to the research. If you require any information about the study or would like to speak to me please contact me directly Natalie Hearn (NLHearn@uclan.ac.uk). I would be interested in any feedback you have on the study and I really appreciate you taking part.

If you are unhappy or have concerns about any aspect of the project, you can contact the University Officer for Ethics (OfficerForEthics@UCLan.ac.UK) who is entirely independent of the research and will respond to your concerns. As the questionnaire contains sensitive information, please refresh the website page and delete your history (through Internet Options) after you have submitted the questionnaire. If you are not sure where internet options is search ‘history’ on your computer.

Demographic Information

Please circle the appropriate response.

Sex (please circle): Male Female

Age (please circle): 18-25 26-35 36-45 46-55 Over 55

Are you are student? (please select): Yes No

Marital Status (please select): Single Married Divorced Widowed

How old were you when you started to gamble?

How old were you when you had your first 'big win'?

What type of gambling do you take part in?

If you gamble, what type of gambler are you? (please select):
Professional Recreational

To what extent do the following gamble? Use the following scale:

	0 Never	1 Sometimes	2 Most of the time	3 Always	4 Don't know
Your parents/guardians	0	1	2	3	4
Your friends	0	1	2	3	4
Your family	0	1	2	3	4
Your colleagues	0	1	2	3	4

Answer the following questions using the following scale:

0 Does not apply	1 Applies a bit	2 Applies quite a lot	3 Totally applies

My childhood was positive
0 1 2 3

My childhood was negative
0 1 2 3

I have had many good things happen to me
0 1 2 3

I have had many bad things happen to me
0 1 2 3

I feel my life experiences have been very negative
0 1 2 3

I feel I have had a very positive life so far
0 1 2 3

GAM-DS

The following questionnaire consists of a number of statement about how gambling may affect your life. Please think carefully about each statement and answer them as honestly as possible by selecting the response which best represents you.

In the past 12 months have you:

9. Needed to gamble with increased amounts of money in order to achieve the desired excitement.

YES NO

10. Become restless or irritable when attempting to cut down or stop gambling.

YES NO

11. Made repeated unsuccessful efforts to control, cut back or stop gambling.

YES NO

12. Become preoccupied with gambling? For example, have you had persistent thought of reliving past gambling experiences, planned the next gambling venture or thought of ways to get money to gamble?

YES NO

13. Gambled often when feeling distressed? (e.g. feeling helpless, guilty, anxious, depressed).

YES NO

14. After losing money gambling I often return another day to get even (i.e. to chase my losses).

YES NO

15. Lied to conceal the extent of my involvement in gambling?

YES NO

16. Jeopardized or lost a significant relationship, job education or career opportunity because of gambling.

YES NO

17. Relied on others to provide money to relieve desperate financial situations as a result of my gambling.

YES NO

GBQ

This scale is concerned with how you think about gambling. Please read each of the following statements carefully and select the response to how much you agree/disagree.

1. I think of gambling as a challenge.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

2. My knowledge and skill in gambling contribute to the likelihood that I will make money.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

3. My choices or actions affect the game on which I am betting.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

4. If I am gambling and losing, I should continue because I don't want to miss a win.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

5. I should keep track of previous winning bets so that I can figure out how I should bet in the future.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

6. When I am gambling, "near misses" or times when I almost win remind me that if I keep playing I will win.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

7. Gambling is more than just luck.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

8. My gambling wins are evidence that I have skill and knowledge related to gambling.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

9. I have a "lucky" technique that I use when I gamble.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

10. In the long run, I will win more money than I will lose gambling.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

11. Even though I may be losing with my gambling strategy or plan, I must maintain that strategy or plan because I know it will eventually come through for me.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

12. There are certain things I do when I am betting (for example, tapping a certain number of times, holding a lucky coin in my hand, crossing my fingers etc.) which increase the chances that I will win.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

13. If I lose money gambling, I should try to win it back.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

14. Those who don't gamble much don't understand that gambling success requires dedication and a willingness to invest money.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

15. Where I get money to gamble doesn't matter because I will win and pay it back.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

16.1 am pretty accurate at predicting when a "win" will occur.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

17. Gambling is the best way for me to experience excitement.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

18. If I continue to gamble, it will eventually pay off and I will make money.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

19. 1 have more skills and knowledge related to gambling than most people who gamble.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

20. When I lose at gambling, my losses are not as bad if I don't tell my loved ones.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

21. I should keep the same bet even when it hasn't come up lately because it is bound to win.

1 2 3 4 5 6 7

strongly agree neutral strongly disagree

HAD Scale

This questionnaire will ask you about how you are feeling. **I WOULD LIKE YOU TO THINK BACK TO BEFORE YOU EVER STARTED TO GAMBLE.** Please select the response which best describes how you were feeling **prior to ever starting gambling.**

Please answer the first thing that comes to mind.

15. I felt tense or 'wound up':

Most of the time

A lot of the time

From time to time

Not at all

16. I had many things which I enjoyed doing:

Definitely

Not quite

Only a little

Hardly at all

17. I used to get a sort of frightened feeling as if something awful was about to happen:

Definitely and quite badly

Yes, but not too badly

A little, but it doesn't worry me

Not at all

18. I used to be able to laugh and see the funny side of things:

Always

Quite often

Quite rarely

Not at all

19. Worrying thoughts used to go through my mind:

A great deal of the time

A lot of the time

From time to time, but not too often

Only occasionally

20. I felt cheerful:

Not at all

Not often

Sometimes

Most of the time

21. I could sit at ease and feel relaxed:

Definitely

Usually

Not often

Not at all

22. I felt as if I was slowed down:

Nearly all the time

Very often

Sometimes

Not at all

23. I used to get a sort of frightened feeling like ‘butterflies’ in the stomach:

Not at all

Occasionally

Quite often

Very often

24. I did not take interest in my appearance:

Definitely not

I don’t take as much care as I should

I may not have taken quite as much care as I should

I took lots of care

25. I felt restless as if I had to be on the move:

Very much indeed

Quite a lot

Not very much

Not at all

26. I used to look forward with enjoyment to things:

Very much indeed

Quite a lot

Not very much

Not at all

27. I used to get sudden feelings of panic:

Very often indeed

Quite often

Not very often

Not at all

28. I could enjoy a good book or radio or TV program:

Often

Sometimes

Not often

Very Seldom

BIS-11

People differ in the ways they act and think in different situations. This questionnaire measures some of the ways you act and think. Please read each statement and select the response that best represents you. Please answer this questionnaire to represent you as you are **in general at the present time.**

1. I plan tasks carefully.

1 2 3 5

Rarely/Never Occasionally Often Almost Always

2. I do things without thinking.

1 2 3 5

Rarely/Never Occasionally Often Almost Always

3. I don't "pay attention"

1 2 3 5

Rarely/Never Occasionally Often Almost Always

4. I concentrate easily

1 2 3 5

Rarely/Never Occasionally Often Almost Always

5. I save money on a regular basis

1 2 3 5

Rarely/Never Occasionally Often Almost Always

6. I squirm at plays or lectures.

1 2 3 5

Rarely/Never Occasionally Often Almost Always

7. I am a carful thinker

1 2 3 5

Rarely/Never Occasionally Often Almost Always

8. I plan for job security

1 2 3 5

Rarely/Never Occasionally Often Almost Always

9. I say things without thinking

1 2 3 5

Rarely/Never Occasionally Often Almost Always

10. I act "on impulse"

1	2	3	5
Rarely/Never	Occasionally	Often	Almost Always

11. I get easily bored when solving thought problems

1	2	3	5
Rarely/Never	Occasionally	Often	Almost Always

12. I act on the spur of the moment

1	2	3	5
Rarely/Never	Occasionally	Often	Almost Always

13. I buy things on impulse

1	2	3	5
Rarely/Never	Occasionally	Often	Almost Always

14. I am restless at lectures or talks

1	2	3	5
Rarely/Never	Occasionally	Often	Almost Always

15. I plan for the future

1	2	3	5
Rarely/Never	Occasionally	Often	Almost Always

HAD Scale

I understand you have already completed this short questionnaire. However, please would you complete it again about how you have been feeling during THE LAST COUPLE OF WEEKS. Please do not think too much about your answer and answer the first thing that comes to mind.

1. **I feel tense or 'wound up':**

Most of the time

A lot of the time

From time to time

Not at all

2. **I still enjoy the things I used to enjoy:**

Definitely as much

Not quite as much

Only a little

Hardly at all

3. **I get a sort of frightened feeling as if something awful is about to happen:**

Definitely and quite badly

Yes, but not too badly

A little, but it doesn't worry me

Not at all

4. **I can laugh and see the funny side of things:**

As much as I always could

Not quite as much now

Definitely not so much now

Not at all

5. **Worrying thoughts go through my mind:**

A great deal of the time

A lot of the time

From time to time, but not too often

Only occasionally

6. I feel cheerful:

Not at all

Not often

Sometimes

Most of the time

7. I can sit at ease and feel relaxed:

Definitely

Usually

Not often

Not at all

8. I feel as if I am slowed down:

Nearly all the time

Very often

Sometimes

Not at all

9. I get a sort of frightened feeling like ‘butterflies’ in the stomach:

Not at all

Occasionally

Quite often

Very often

10. I have lost interest in my appearance:

Definitely

I don’t take as much care as I should

I may not take quite as much care

I take just as much care as ever

11. I feel restless as I have to be on the move:

Very much indeed

Quite a lot

Not very much

Not at all

12. I look forward with enjoyment to things:

As much as I ever did

Rather less than I used to

Definitely less than I used to

Hardly at all

13. I get sudden feelings of panic:

Very often indeed

Quite often

Not very often

Not at all

14. I can enjoy a good book or radio or TV program:

Often

Sometimes

Not often

Very Seldom

PGSI:

The following questionnaire will, again, ask you about your engagement in gambling activities. Please think carefully about your answers and respond as honestly as possible by selecting the frequency by which the item applies to you.

1. **How often have you bet more than you could really afford to lose?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

2. **How often have you needed to gamble with larger amounts of money to get the same feeling of excitement?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

3. **How often have you gone back another day to try and win back the money you lost?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

4. **How often have you borrowed money or sold anything to get money to gamble?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

5. **How often have you felt that you might have a problem with gambling?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

6. **How often has gambling caused you any health problems, including stress or anxiety?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

7. **Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

8. **Has your gambling caused any financial problems for you or your household?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

9. **Have you felt guilty about the way you gamble or what happens when you gamble?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

Debrief

Thank you very much for participating in this research. Please remember that all the results will be stored securely, and that all the questionnaire responses are anonymous. This study looked at how often the general population and students engage in gambling, what motivate them to gamble and what beliefs they hold about their gambling. The research also explored a number of other factors, such as the link between gambling, impulsivity, mood and emotions. The aim of the research was to investigate potential pathways towards gambling and the maintenance of gambling in community and student gamblers. Specifically, the research was examining whether impulsivity, anxiety, depression, belief systems, and coping styles play a role in the development and maintenance of gambling activities.

If you are unhappy or have concerns about any aspect of the project, you can contact the University Officer for Ethics (OfficerForEthics@UCLan.ac.UK) who is entirely independent of the research and will respond to your concerns. As the questionnaire contains sensitive information, please refresh the website page and delete your history (through Internet Options) after you have submitted the questionnaire. If you are not sure where internet options is search 'history' on your computer.

If you require any further information or would like a summary of the findings please feel free to contact me directly; Natalie Hearn (NLHearn@uclan.ac.uk) or my supervisor Professor Jane L. Ireland (JLIreland1@uclan.ac.uk). If you feel upset by any of the issues addressed in this research, you may wish to speak to a professional organisation about the issue, if so, please note the information below.

National Gambling Helpline: Offer free and confidential support, information and advice on problem gambling via telephone- 0808 8020 133.

GamCare: offer free face to face and online counselling for those affected by a gambling problem. In addition, GamCare provides online advice on self-help strategies, and practical advice to families and friends of people experiencing problems. www.gamcare.org.uk

Gamblers Anonymous: Are a group of men and women who have joined together to tackle their own gambling problem and help others do the same. Tel: 020 7384 3040.

National Debtline: Provide free confidential and independent advice on how to deal with debt. Tel: 0808 808 4000

Citizens Advice Bureau: Can help people resolve their legal, money and other problems by providing free information and advice from nearly 3,400 locations in England, Scotland, Wales and Northern Ireland.

Many thanks for your participation.

APPENDIX 3.

MATERIALS USED IN STUDY THREE

Information Sheet: Understanding gambling

I am a psychology PhD student from the University of Central Lancashire and I am investigating gambling behaviour. If you have taken part in any kind of gambling, I would like to invite you to complete a questionnaire. The questionnaire aims to explore how often and to what extent you gamble. It also aim to look at how you feel in general and the way you felt before you started gambling. There are also questions about the way you generally think about yourself and other people, and the way you behave in different situations. In addition, there are questions about your life and how you interact with others. There is a question at the end of the questionnaires that asks you whether you have ever been committed a criminal offence. It is important to note that you do not have to answer this question.

You must be 18 years of age or older to complete this research. There are numerous types of gambling activities. The present study is not excluding any types of gambling, we are interested in all types and this research does not assume that gambling is a problematic activity.

All data gathered will be anonymous. No names, addresses, phone numbers or identifying details will be collected and the questionnaire is given a numerical ID. If you choose to email the researcher, then the detail you provide in the email (e.g. your name) will not remain anonymous. It is not expected that any of the questionnaires will cause upset, but if you feel they do please do not complete them and consider contacting one of the sources of support listed at the bottom of this page.

Only the researcher and the supervisors will have access to the individual questionnaires and only group results will be reported in any publication, not individual results. Please note that you do not have to take part in this research. You also have the right to withdraw from the research at any point up to the completion of the questionnaire. As the questionnaire is anonymous it will be impossible to identify your data. Your data cannot therefore be removed after submission. Please note that the data is saved as you progress through the sections and so it will not be possible to discard questions answered up to the point of exiting as your data will not be identifiable. However, the research team will not be considering any surveys that are not at least 50% completed. These will be discarded.

The questionnaires will take roughly 25 minutes to complete. By completing and submitting questionnaires the researchers will assume you consent to the research. If you require any information about the study or would like to speak to me please contact me directly Natalie Hearn (NLHearn@uclan.ac.uk) or my supervisors – Professor Jane L Ireland (JLIreland1@uclan.ac.uk) or Dr Mike Eslea (MJEslea@uclan.ac.uk). I would be interested in any feedback you have on the study and I really appreciate you taking part.

If you are unhappy or have concerns about any aspect of the project, you can contact the University Officer for Ethics (OfficerForEthics@UCLan.ac.uk) who is entirely independent of the research and will respond to your concerns. As the questionnaire contains sensitive information, please refresh the website page and delete your history (through Internet Options) after you have submitted the questionnaire. If you are not sure where internet options is search ‘history’ on your computer.

If you wish to speak to a professional organisation about gambling, please note the information below.

National Gambling Helpline: Offer free and confidential support, information and advice on problem gambling via telephone- 0808 8020 133.

GamCare: offer free face to face and online counselling for those affected by a gambling problem. In addition, GamCare provides online advice on self-help strategies, and practical advice to families and friends of people experiencing problems. www.gamcare.org.uk

National Debtline: Provide free confidential and independent advice on how to deal with debt. Tel: 0808 808 4000.

Citizens Advice Bureau: Can help people resolve their legal, money and other problems by providing free information and advice from nearly 3,400 locations in England, Scotland, Wales and Northern Ireland.

Demographic Information

To gain a general understanding of the people taking part in the research, it would be helpful if you could complete the following:

Please circle the appropriate response.

Sex: Male Female

Age: 18-25 26-35 36-45 46-55 Over 55

Are you are student? Yes No

What is your marital status? Single Married Living with partner

Divorced Widowed

What is your employment status?
In full-time employment In part-time employment I am unemployed

Are you a student? Yes No

What is your ethnic group?
Choose one option that best describes your ethnic group or background

White
1. English / Welsh / Scottish / Northern Irish / British
2. Irish
3. Gypsy or Irish Traveller
4. Any other White background, please describe ……

Mixed / Multiple ethnic groups
5. White and Black Caribbean
6. White and Black African
7. White and Asian
8. Any other Mixed / Multiple ethnic background, please describe ……

Asian / Asian British
9. Indian
10. Pakistani
11. Bangladeshi
12. Chinese
13. Any other Asian background, please describe ……..

Black / African / Caribbean / Black British
14. African
15. Caribbean

16. Any other Black / African / Caribbean background, please describe

Other ethnic group
17. Arab
18. Any other ethnic group, please describe
19. Prefer not to say

How old were you when you started to gamble?

PGSI

The following questionnaire will ask you about your gambling. Please think carefully about your answers and respond as honestly as possible by selecting the frequency by which the item applies to you.

3. **How often have you bet more than you could really afford to lose?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

4. **How often have you needed to gamble with larger amounts of money to get the same feeling of excitement?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

3. **How often have you gone back another day to try and win back the money you lost?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

4. **How often have you borrowed money or sold anything to get money to gamble?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

5. **How often have you felt that you might have a problem with gambling?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

6. **How often has gambling caused you any health problems, including stress or anxiety?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

7. **Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

8. **Has your gambling caused any financial problems for you or your household?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

9. **Have you felt guilty about the way you gamble or what happens when you gamble?**

0	1	2	3
Never/ Almost Never	Sometimes	Most of the time	Almost Always

BIS-11

People differ in the ways they act and think in different situations. This questionnaire measures some of the ways you act and think. Please read each statement and select the response that best represents you. Please answer this questionnaire to represent you as you are **in general at the present time.**

1. I plan tasks carefully.

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

2. I do things without thinking.

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

3. I don't "pay attention"

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

4. I concentrate easily

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

5. I save money on a regular basis

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

6. I squirm at plays or lectures.

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

7. I am a carful thinker

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

8. I plan for job security

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

9. I say things without thinking

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

10. I act "on impulse"

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

11. I get easily bored when solving thought problems

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

12. I act on the spur of the moment

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

13. I buy things on impulse

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

14. I am restless at lectures or talks

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

15. I plan for the future

1	2	3	4
Rarely/Never	Occasionally	Often	Almost Always

PAPA-2

Below are a series of statements that people use to describe themselves. Please read each statement carefully. Using the scale provided decide how well each statement describes how you have generally been throughout your life.

Very unlike me	Not really like me	Neither agree or disagree	Somewhat like me	Very like me
1	2	3	4	5

1. I am only interested in myself.
   1 2 3 4 5

2. I will use people to get what I want.
   1 2 3 4 5

3. I often take chances that could be risky to me or others
   1 2 3 4 5

4. I often don't think of the consequences of my actions
   1 2 3 4 5

5. As a person, I have never changed.
   1 2 3 4 5

6. I have been described as a cruel person who does not worry about hurting others
   1 2 3 4 5

7. Others would describe me as an irritable person with problems controlling my temper
   1 2 3 4 5

8. I see a lot of hostility around me.
   1 2 3 4 5

9. I regularly view others as lazy.
   1 2 3 4 5

10. I find most people are weak and not worth bothering with
    1 2 3 4 5

11. I find it impossible to resist temptation.
    1 2 3 4 5

12. I often get into trouble more than others.
    1 2 3 4 5

13. I find it difficult to comfort others when they are upset.
    1 2 3 4 5

14. I am not that bothered about others.

1 2 3 4 5

15. The world is a threatening place, you have to ‘watch your back’.
1 2 3 4 5

16. I often feel in touch with other people’s feelings.
1 2 3 4 5

17. If I am caught out on a lie I can quickly think of a way out.
1 2 3 4 5

18. I often experience strong positive emotions, such as happiness and joy.
1 2 3 4 5

19. I am able to commit a wide number of behaviours that, if caught, would get me into trouble.
1 2 3 4 5

20. I can often find myself viewing others as nothing more than ‘objects’ or thing to be used.
1 2 3 4 5

21. I am an aggressive person in a number of situations.
1 2 3 4 5

22. I use illegal drugs, or those that are not prescribed to me, more than people I know
1 2 3 4 5

22. I find it difficult to give emotional and personal support to others.
1 2 3 4 5

23. If I do something wrong I will feel bad about it.
1 2 3 4 5

24. I often find myself thinking that I am more important than others.
1 2 3 4 5

25. I always accept responsibility for what I do.
1 2 3 4 5

26. I often find people behave aggressively or in a hostile manner towards me.
1 2 3 4 5

27. Others would describe me as a very intense person who has difficulties getting on with others.
1 2 3 4 5

28. As a child I often got into trouble more than others.
1 2 3 4 5

HAD Scale

This questionnaire will ask you about how you are feeling. **I WANT YOU TO THINK BACK TO BEFORE YOU EVER STARTED TO GAMBLE.** Please select the response which best describes how you were feeling **prior to ever starting gambling.**

Please answer the first thing that comes to mind. Before you ever started to gamble…..

1. **I felt tense or 'wound up':**

Most of the time

A lot of the time

From time to time

Not at all

2. **I had many things which I enjoyed doing:**

Definitely

Not quite

Only a little

Hardly at all

3. **I used to get a sort of frightened feeling as if something awful was about to happen:**

Definitely and quite badly

Yes, but not too badly

A little, but it doesn't worry me

Not at all

4. **I used to be able to laugh and see the funny side of things:**

Always

Quite often

Quite rarely

Not at all

5. **Worrying thoughts used to go through my mind:**

A great deal of the time

A lot of the time

From time to time, but not too often

Only occasionally

6. I felt cheerful:

Not at all

Not often

Sometimes

Most of the time

7. I could sit at ease and feel relaxed:

Definitely

Usually

Not often

Not at all

8. I felt as if I was slowed down:

Nearly all the time

Very often

Sometimes

Not at all

9. I used to get a sort of frightened feeling like ‘butterflies’ in the stomach:

Not at all

Occasionally

Quite often

Very often

10. I did not take interest in my appearance:

Definitely not

I don’t take as much care as I should

I may not have taken quite as much care as I should

I took lots of care

11. I felt restless as if I had to be on the move:

Very much indeed

Quite a lot

Not very much

Not at all

12. I used to look forward with enjoyment to things:

Very much indeed

Quite a lot

Not very much

Not at all

13. I used to get sudden feelings of panic:

Very often indeed

Quite often

Not very often

Not at all

14. I could enjoy a good book or radio or TV program:

Often

Sometimes

Not often

Very Seldom

SLS

Below are five statements with which you may agree or disagree. Using the 1–7 scale below, please indicate your agreement with each item by circling the appropriate number for each item. Please be open and honest in your responding.

1 2 3 4 5 6 7
strongly disagree slightly disagree neither agree nor disagree slightly agree strongly agree

1. In most ways my life is close to my ideal.
   1 2 3 4 5 6 7

2. The conditions of my life are excellent.
   1 2 3 4 5 6 7

3. I am satisfied with my life.
   1 2 3 4 5 6 7

4. So far I have gotten the important things I want in life.
   1 2 3 4 5 6 7

5. If I could live my life over, I would change almost nothing.
   1 2 3 4 5 6 7

MSPS

We are interested in how you feel about the following statements. Please read each statement carefully and indicate how you feel about each statement by circling the response that best corresponds to you.

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Mildly Disagree	Neutral	Mildly Agree	Strongly Agree	Very Strongly Agree

1. There is a special person who is around when I am in need.

1 2 3 4 5 6 7

2. There is a special person with whom I can share my joys and sorrows.

1 2 3 4 5 6 7

3. My family really tries to help me.

1 2 3 4 5 6 7

4. I get the emotional help and support I need from my family.

1 2 3 4 5 6 7

5. I have a special person who is a real source of comfort to me.

1 2 3 4 5 6 7

6. My friends really try to help me.

1 2 3 4 5 6 7

7. I can count on my friends when things go wrong.

1 2 3 4 5 6 7

8. I can talk about my problems with my family.

1 2 3 4 5 6 7

9. I have friends with whom I can share my joys and sorrows.

1 2 3 4 5 6 7

10. There is a special person in my life who cares about my feelings.

1 2 3 4 5 6 7

11. My family is willing to help me make decisions.

1 2 3 4 5 6 7

12. I can talk about my problems with my friends.

1 2 3 4 5 6 7

SCS

Using the 1 to 5 scale below, please indicate how much each of the following statements reflects how you typically are:

1	2	3	4	5
Not at all like me				Very much like me

1. I am good at resisting temptation

   1 2 3 4 5

2. I have a hard time breaking bad habits

   1 2 3 4 5

3. I am lazy

   1 2 3 4 5

4. I say inappropriate things

   1 2 3 4 5

5. I do certain things that are bad for me, if they are fun

   1 2 3 4 5

6. I refuse things that are bad for me

   1 2 3 4 5

7. I wish I had more self-discipline

   1 2 3 4 5

8. People would say that I have iron self-discipline

1 2 3 4 5

9. Pleasure and fun sometimes keep me from getting work done

   1 2 3 4 5

10. I have trouble concentrating

    1 2 3 4 5

11. I am able to work effectively toward long term goals

    1 2 3 4 5

12. Sometimes I can't stop myself from doing something, even if I know it is wrong

    1 2 3 4 5

13. I often act without thinking through all the alternatives

    1 2 3 4 5

T-R Scale

Use the following scale and circle one number for each statement to indicate how much you disagree or agree with each of the statements

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

1. I tend to bounce back quickly after hard times

   1 2 3 4 5

2. I have a hard time making it through stressful events

   1 2 3 4 5

3. It does not take me long to recover from a stressful event

   1 2 3 4 5

4. It is hard for me to snap back when something bad happens

   1 2 3 4 5

5. I usually come through difficult times with little trouble

1 2 3 4 5

6. I tend to take a long time to get over set-backs in my life

1 2 3 4 5

Thank you for taking part in the research so far. The following will ask you questions about any criminal offences you may have committed. As a reminder, **you are not required to answer these questions if you would prefer not to.**

Have you ever committed (whether you have been convicted or not) any of the following offences:

A violent offence
An acquisitive offence
A drug offence
Other antisocial behaviour offence
Other offence, please state……..
I would prefer not to say.
I have not committed any criminal offences

Have any of the offences been linked to gambling?
Yes
No
Not applicable
I would prefer not to say.

Debrief

Thank you very much for participating in this research. Please remember that all the results will be stored securely, and that all the questionnaire responses are anonymous.

This study looked at how often and to what extent gambling forum users and students engage in gambling. The research also explored a number of other factors, such as the link between gambling, impulsivity, emotions and dissocial behaviour. It explored whether there is a subtype of gambler with and without increased levels of these traits.
It also explored protective factors, which could help a person keep their gambling recreational, instead of it becoming problematic for them. It aimed to explore whether those who gamble for recreational purposes have more protective factors, and what types of protective factors these are.

If you are unhappy or have concerns about any aspect of the project, you can contact the University Officer for Ethics (OfficerForEthics@UCLan.ac.uk) who is entirely independent of the research and will respond to your concerns. As the questionnaire contains sensitive information, please refresh the website page and delete your history (through Internet Options) after you have submitted the questionnaire. If you are not sure where internet options is search 'history' on your computer.

If you require any further information or would like a summary of the findings please feel free to contact me directly; Natalie Hearn (NLHearn@uclan.ac.uk) or my supervisor Professor Jane L. Ireland (JLIreland1@uclan.ac.uk). If you feel upset by any of the issues addressed in this research, you may wish to speak to a professional organisation about the issue, if so, please note the information below.

National Gambling Helpline: Offer free and confidential support, information and advice on problem gambling via telephone- 0808 8020 133.

GamCare: offer free face to face and online counselling for those affected by a gambling problem. In addition, GamCare provides online advice on self-help strategies, and practical advice to families and friends of people experiencing problems. www.gamcare.org.uk

National Debtline: Provide free confidential and independent advice on how to deal with debt. Tel: 0808 808 4000

Citizens Advice Bureau: Can help people resolve their legal, money and other problems by providing free information and advice from nearly 3,400 locations in England, Scotland, Wales and Northern Ireland.

Many thanks for your participation.