The Prevalence of Gambling Among University Students: With a Focus on Internet Gambling

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Author’s Declaration

“I, Michele Sammut, confirm that this is my own work and that all material attributed to others (whether published or unpublished) has been clearly identified and fully acknowledged and referred to the original sources. I agree that the University has the right to submit my work for originality checks.”

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Abstract

Problem gambling is a topic that is scarcely studied in the Maltese context. This study provides a snapshot of the gambling habits of university student during the past year and explores the effect of Internet gambling on gambling severity. The Primary research question is; what is the prevalence of gambling and problem gambling among students of the University of Malta and what are the general patterns of gambling activity? Secondly, to what extent Internet gambling practices and problem gambling are related? A secondary research question is: What is the relationship between problem gambling and gender, mental illness, substance abuse, family history, and, attitudes toward gambling? The study was carried out using an online questionnaire sent out all university students via email, yielding 792 respondents. The prevalence of problem gambling in the population was found to be between 0.8 and 0.9%, while Internet gambling was found to be a strong predictor for increased gambling problems. It was found that the male, Internet gambler who uses multiple substances and spends more than 10 Euros a month on gambling is at the greatest risk of gambling problems. This study explores a new area of research as well as providing a platform for future research.
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The Prevalence of Gambling Among University Students: With a Focus on Internet Gambling

Until recently much of the research that has been done on gambling was as a response to governmental regulation of gambling, and such regulations were influenced by political pressures and not by empirical evidence. Around the world, over the past 10 to 15 years, with countries such as the United States of America spending twenty-five million dollars, Canada spending forty-four million dollars and even smaller countries such as New Zealand spending sixteen million dollars annually on services for problem gamblers (Fong, Rosenthal, Rugle, & Volberg, 2004), the research of problem gambling has begun to gain greater support. It must be noted, that this is still only a fraction of the revenue taken in from the taxation of gambling, more precisely, less than 0.1% of the amount of gambling taxation in America (Canadian Partnership for Responsible Gambling, 2010; Gerstein, et al., 1999). Starting in the nineties, reports with large representative samples on 'gambling prevalence', 'problem gambling', and such related behaviours began to be funded by many governments including those of the following countries:

- The United States of America with the National Gambling Impact Study in 1999
- Sweden with “Problem Gambling in Sweden” in 1999
- Australia with the Inquiry into Australia's Gambling Industries in 1999
- Gambling
- Britain with the British Gambling Prevalence Survey in 2000 and 2007
- Canada with “Gambling in Canada” by the Canada West foundation in 2001
- Germany with Gambling Behaviour and Problem Gambling in Germany in 2007

Recently however, many other smaller scale studies have been done throughout Europe and around the world (Griffiths., Meyer, & Hayer, 2009). The focus of this research has been
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principally on the prevalence of gambling and the regulation of gambling industries. Most studies have looked into the incidence of problem gambling, assessing the effectiveness and necessity of treatment.

Looking at the local scenario, there have been four hundred and fifty remote gaming license applications in Malta, up from sixty in 2004 when new regulations were put into effect in the Lotteries and Gaming Authority, which regulates online gambling in Malta. With competitive tax rates and regulations, as well as EU membership and its central location in the Mediterranean, Malta has become one of the largest international gaming jurisdictions, generating a revenue of thirty five million Euros in 2007 (Lotteries and Gaming Authority, 2007). Internet gambling is a fast growing sector of the Maltese economy, becoming responsible for greater proportions of the countries income, despite this however, there has been exceedingly little research done on the topics of gambling or Internet gambling in Malta. While the gambling authorities take considerable measures to promote responsible gambling, such as, providing awareness of problem gambling, effective protection of minors and limiting advertising, virtually nothing is known about problem gambling in Malta (Griffiths, Meyer, & Hayer, 2009). It is my opinion that these authorities should also be ethically responsible for helping to provide ongoing and up-to-date research into the area that provides their income.

Aims of the Study and Research Question

Research has shown that people who gamble on the Internet are significantly more likely to be problem gamblers than people who do not use the Internet to gamble. Also, males are significantly more likely to be Internet problem gamblers than women (Griffiths & Barnes, 2008; Petry & Mallya, Gambling Participation and Problems Among Employees at a University Health Center, 2004; Wood & Williams, 2008). The main aims of this study are two-fold; First this
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study aims to understand patterns of gambling practices and prevalence of gambling within the population of students at the University of Malta. Secondly, it seeks to test the hypotheses that people who gamble on the Internet are more likely to be problem gamblers.

Secondary aims of this study are firstly to examine the correlation between two gambling measures of gambling severity, the Problem Gambling Severity Index (PGSI) and one based on the DSM-IV criteria. Gambling severity can then be tested against some of the other factors that have been found to be related to problem gambling, including, mental illness, increased amounts money spent on gambling, substance abuse, family history and negative attitudes towards gambling (National Centre for Social Research Gambling Commission, 2007).

Stemming from these aims the study sets out to answer the following research question: What is the prevalence of gambling and problem gambling among students of the University of Malta and what are the general patterns of gambling activity?

Secondly, to what extent Internet gambling practices and problem gambling are related?

A secondary research question is: What is the relationship between problem gambling and gender, mental illness, substance abuse, family history, and, attitudes toward gambling?

**Rationale**

The students at the University of Malta were chosen as the population for this study. This choice was motivated by reasons of practicality and also for the fact that students, being younger and having a higher level of education, are therefore predisposed to using a computer and the Internet. Students may also be an “at risk” population as younger age groups are significantly more likely to have higher rates of problem gambling (Shaffer, Hall, & Bilt, 1999). It is therefore of great interest to study this group.
**Definition of Terms**

Gambling: The term gambling can be used to describe a wide range of behaviours, however gambling can be described as betting money or some form of property on the outcome of a game or event that is ultimately based on chance.

Pathological Gambling: A psychiatric impulse control disorder applying to those who fit five or more of the criteria for problem gambling as described in the fourth edition of the Diagnostic and Statistical Manual for Mental Disorders (American Psychiatric Association, 1994) and excluded from the criteria of a manic episode, over the preceding twelve month period, this is assessed through a clinical interview.

Problem Gambling: Can be used to describe any gambling that has caused personal, vocational or educational problems to a person. In this text it will apply to those fitting three or four of the DSM-IV criteria for pathological gambling, unless otherwise specified.

**DSM-IV Criteria for Pathological Gambling:**

A. Persistent and recurrent maladaptive gambling behaviour as indicated by five (or more) of the following:

   A1: Is preoccupied with gambling (e.g. preoccupied with reliving past gambling experiences, handicapping or planning the next venture, or thinking of ways to get money with which to gamble).

   A2: Needs to gamble with increasing amount of money in order to achieve the desired excitement.

   A3: Has repeated unsuccessful efforts to control, cut back, or stop gambling.

   A4: Is restless or irritable when attempting to cut down or stop gambling.
A5: Gambles as a way of escaping from problems or of relieving a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety, depression).

A6: After losing money gambling, often returns another day to get even (“chasing” ones losses).

A7: Lies to family members, therapist, or others to conceal the extent of involvement with gambling.

A8: Has committed illegal acts such as forgery, fraud, theft or embezzlement to finance gambling.

A9: Has jeopardized or lost a significant relationship, job or educational or career opportunity because of gambling.

A10: Relies on others to provide money to relieve a desperate financial situation caused by gambling.

B. The gambling behaviour is not better accounted for by a Manic Episode.

The following chapters will include an overview of the literature topics related to problems gambling, including: the steps through which problem gamblers may pass along with possible motivations for this. Some possible neurobiological factors involved in gambling, and concluding with the addictive potential of different types of gambling. Next the methodology used in the study, showing the population and sampling procedure as well as the material used and the statistical tests used in the analysis will be given. The results chapter will then illustrate the data obtained from the analysis of the data relating to each of the research questions. The findings will be discussed in the next chapter, exploring the prevalence, risk factors and the way attitudes relate to problem gambling. The conclusion will provide the limitations, as well as recommendations gained from of this research, and, recommendations for future research.
2. Literature Review

This chapter will present some of the literature found relevant to the topic. Beginning by exploring why gambling is attractive to humans and how it can cause problems in excess. Following that, a brief overview of the existing literature will be delivered. Next, the different phases in a problem gamblers career and their possible motivations will be documented, going on to illustrate some of the possible neurobiological roots of gambling. Finally, exploring the addictive potential of different types of gambling and introduce the study in light of the literature.

Gambling

The origins of gambling cannot be known for certain as it has been with mankind since prehistoric times. The oldest back-gammon set to have ever been discovered is thought to be five thousand years old, was found in modern day Iran, and is older than the one found in ancient Mesopotamia, considered to be the cradle of civilisation. Gambling seems to be so important to mankind that is has been around longer than civilisation itself and is present in every society, it is postulated that the origin of gambling might have come from the practice of divination, that is the casting of sticks stones and bones as a means of communication with the gods or spirits. I am of the opinion that Man’s nature to question his surroundings and to seek meaning in existence provides the basis for religion as well as science; our fascination with the random can easily be seen to give rise to the charm of gambling.

Most people who do gamble with money (this is approximately 70% of the population, according to the British Gambling Prevalence Survey in 2007), can be said to do so responsibly and in moderation. However, for a small minority gambling causes problems, which arise when it is done to excess. Gambling, like most games, can be seen as a representation or reproduction of
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life and these can be interesting to explore and learn from, however if one becomes too preoccupied with games their real life may suffer. What makes gambling so attractive to individuals is the element of risk; this means that by its very nature excessive gambling will ultimately cause one to lose their stake. Unfortunately they might end up losing more than money, as their relationships with their family and friends as well as their work life are directly impacted by the money and time spent. What causes people to gamble excessively in the first place, and how this affects them and their family in turn, is a difficult question to answer due to the multitude of facets to human nature. However, by studying the psychology, biology and environment of these persons we can gain insight not only into the possibility of helping them, but insight into the nature of what it is to be human.

**The Current State of the Literature**

Problem gambling is a topic that has only recently been studied extensively and does not have much empirical research in its name, especially when one considers the fact that gambling has been with mankind throughout history. In a study that examines the number of journal articles that researched gambling in America over a hundred year period between 1903 and 2003 found that there have been two thousand articles during this time, however, seven hundred and fifty of these were published in the five years preceding 2003. It is suggested that the greater availability of gambling over time has led to greater research into the topic (Shaffer, Stanton, & Nelson, 2006).

Within the last decade there have been increasing amounts of studies on the aetiological factors leading to problem gambling (Petry N. M., Pathological Gambling: Etiology, Comorbidity, and Treatment, 2005; Moore & Jadlos, 2002). While the prevalence of problem gambling is relatively low, ranging between 0.5-2.5% for lifetime prevalence and between 0.2
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and 1% for past year gamblers (Productivity Commission, 1999; National Centre for Social Research Gambling Commission, 2007; Canadian Partnership for Responsible Gambling, 2010; Griffiths., Meyer, & Hayer, 2009; Bonke & Borregaard, 2009) in the general population, it has been found that there is a higher chance of mental illness, substance abuse, traumatic events such as abuse or neglect, a family history of mental illness, and a family history of problem gambling in the group that qualify as problem gamblers (Petry N. M., Pathological Gambling: Etiology, Comorbidity, and Treatment, 2005).

The Course and Motivation of Problem Gambling

In Dr. Robert Custer’s seminal book (Custer R. M., 1985), he identifies six types of gamblers these are professional gamblers; antisocial or personality gamblers, casual social gamblers, serious social gamblers, escape gamblers, compulsive gamblers.

For professional gamblers, gambling is a job and therefore to be successful they must be skilled at the type of gambling they choose. They carefully calculate what they can afford to bet against their bankroll and are always in control, able to stop gambling when it becomes unprofitable for them. Professional gamblers are not said to be addicted to gambling.

Antisocial gamblers are similar to professional gamblers as they also use gambling to make money, however they tend to cheat or scam people or casinos to do this.

Causal social gamblers generally gamble for relaxation, fun or as a social event. Casual social gamblers may play occasional poker games with friends; play the lottery if there is a large jackpot or bet some money on large infrequent sporting events, such as the world cup.

Serious social gamblers are similar to casual social gamblers, however gambling to them is their hobby using this as their main form of recreation. This can be compared to spending as
much time and money playing a sport, such as golf. Serious social gamblers always put their family and job before gambling and are always in control of their betting.

Escape gamblers tend to prefer types of gambling that involve no real skill, such as machine gambling or bingo. They become engrossed in these games and by doing so get relief from feelings of anxiety, depression, boredom and loneliness. Gambling does not give much excitement for escape gamblers; rather it provides a numbing effect allowing an escape from their problems.

For compulsive gamblers, gambling interferes with every aspect of their life as it progresses. They are not in control of their gambling and they view it as most important thing in their life, putting it before their family and work, which naturally suffer as a consequence. If they do not have any money to gamble they will go against their morals and lie, cheat and steal to get it. Compulsive gamblers cannot stop gambling, no matter how much they want to, or how hard they try.

From the time this work was published until the 1990’s most of the research into problem gambling had mainly focused on males. Since then more research has been done into females’ problem gambling habits. It has been found that female problem gamblers tend to fit Custer’s profile for escape gamblers (Schull, 2002), which contrasts with the classical view of problem gamblers as action seekers, where action is described as “activities that are consequential, problematic, and undertaken for what is felt to be their own sake” (Goffman, 1969). Some researchers adopted this as a new classification of problem gamblers into action gamblers and escape gamblers, (Lesieur & Rosenthal, 1991) most literature has focused on action gamblers as most research has been done on males, who are more likely to be action gamblers. Although males are linked with action gamblers and females with escape gamblers, members of any sex
can belong to either group (Wenzel & Dahl, 2008). There are several critical differences between the groups besides the gender difference; these can be clearly illustrated by pointing out the differences in the progression of the gambling career of action and escape gamblers.

There are three phases in the development of problem gambling (Custer & Lesieur, 1984). These are the winning or adventurous phase, the losing phase and the desperation phase.

When the gambler begins their career they naturally feel a lot of excitement when they win and experiment with gambling types. The gambler has now entered the winning phase, at this stage they are typically said to have a ‘Big-Win’ which makes them feel superior to other gamblers and think that they have a greater chance of winning. This leads them to tolerance, increasing the size and frequency of their bets, which ultimately leads them to begin to lose more and more money and so thereby entering the losing phase. For the escape gambler the real win is not the money gained but rather the time spent gambling. This is a possible explanation for findings on gambling type preference showing that men prefer table games, such as blackjack, poker or craps while women prefer machines. Women also tend to play the machines to maximise play-time rather than possible winnings (Hing & Breen, 2001; Coventry & Constable, 1999), such as opting to play one coin at a time rather than three.

In the losing phase problem gamblers will think that they are simply on a losing streak, and will take more risks to win back all their losses at once, they will still bet when they know the odds are heavily against them, hoping for a big win. Escape gamblers are less concerned with the need for a big win but still need more money to fund their time spent gambling. The gamblers preoccupation with gambling increases as they reminisce about past wins and begin to chase their losses. Their relationships at home and at work begin to suffer as gambling debts and lies about the extent of their gambling cause pressure; they may rely on others to be bailed out of
their desperate situation at this point. They might make several attempts to stop or control their gambling and will become irritable and restless in this withdrawal phase, putting further pressure on relationships. Both action and escape gamblers will spend more time gambling alone at this time.

In the desperation phase gamblers preoccupation with gambling consumes their everyday life and there is an increase in the time spent gambling. Relationships might be lost at this point and there is no attempt to stop the gambling, they play to escape from their problems. Feelings of guilt and remorse towards other may cause anxiety or depression, tempting them to gamble further to relieve their negative affect. The gambler may have to resort to committing crimes to fund their gambling and they may abuse alcohol or other drugs, this might cause the gambler to have run-ins with the law. Experiences of hopelessness and helplessness may lead to suicidal thinking and acts.

The progression through the phases is varied, it may take decades or it may take as little as three to five years. A classification into escape and action gambling can give us more information as to why such a disparity occurs, as female problem gamblers who tend to gamble to escape have a much faster onset to problem gambler status than males who are mainly action gamblers (Wenzel & Dahl, 2008). Female problem gamblers also have a notably later age of onset than males, at approximately forty four compared to approximately thirty three (Breen & Zimmerman, 2004).

This trend seems to imply that the severity of a persons problem gambling is dictated by their need to escape. While a host of biological, psychological, ecological and sociological factors need to be intricately combined to produce the need for escape, and also provide the means, through gambling, it is this need that may drive a person to problem gambling. Although
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Gambling is currently classified as an impulse control disorder in the DSM; it is clear that problematic gambling is closely related to disorders of substance abuse and addiction. A popular definition of addiction describes it as a process in which a behaviour that can generate pleasure, as well as a means of escaping internal discomfort, is used in a pattern that demonstrates failures to control their behaviour and the continuation of such behaviour despite its negative consequences (Goodman, 2006). This definition has many elements in common with the diagnostic criteria of pathological gambling, indeed, these criteria were originally based on the DSM criteria for substance dependence. Recently, some researchers in the field propose redefining the classification of substance abuse disorders to include behavioural addictions including pathological gambling (Petry N. M., 2006).

The Neurobiology of Gambling

The role of our brain chemistry in our psychology and behaviour must also be taken into account when investigating any psychiatric condition. In the case of problem gambling there is evidence to suggest that the neurotransmitter dopamine plays an especially active role. It has been found that in some patients with Parkinson’s disease who were treated with dopamine agonists (as the degeneration of the brain cells of the substantia nigra that produce dopamine is the cause of the disease), developed pathological gambling as a complication. Other impulse control disorders such as compulsive sexual behaviour, buying, and, eating were also associated with higher doses of dopamine agonists (Weintraub, et al., 2006). Parkinson’s patients with higher novelty seeking traits (a measure of impulsivity), previous impulse control disorders and a younger age of onset predict the presence of impulse control disorders with dopamine agonists, with the impulse control symptoms subsiding after the medication was discontinued (Voon, Thomsen, & Miyasaki, 2007). Dopamine is associated with the pleasure-reward pathway in the
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limbic system, as well as motivation and problem solving in the frontal lobes. Substances such as cocaine, nicotine and amphetamine mimic the action of dopamine producing pleasure but also the effects of addiction afterwards.

This might be evidence for strong links between substance addiction and pathological gambling behaviour that might otherwise be difficult to explain, such as the chasing behaviour, where drug users increase the dosage the chase the feeling of their first high, as they become more physically tolerant to the drug, and similar chasing behaviour in gamblers where they return again and again to win back their losses. Recent research into such chasing behaviour, using fMRI studies, has shown that decisions to continue betting after losses rather than quit, are associated with increased activity in the ventromedial prefrontal cortex, while decisions to stop chasing were associated with decreased activation in this area, and an increase in activation in the anterior cingulate cortex, ventral striatum and insular cortex (Campbell-Meiklejohn, Woolrich, Passingham, & Rogers, 2009). This is interesting as the ventromedial prefrontal cortex is associated with the regulation of emotion, in particular the triggering of emotional experiences in ones past (Koenigs, et al., 2007), lesions to this area are thought to result in impaired decision-making abilities, especially when it comes to the possible future consequences of the decision, rather than deciding because of an immediate reward or punishment (Bechara, Damasio, & Trane, 2000). Conversely the Cingulate cortex is strongly associated with the brains ability to perform executive functions such as planning, attention, the control of detrimental behaviour and the initiation of beneficial behaviour. The combination of these areas are involved in the regulation of emotional states; anxiety, risk and, reward and are all highly interconnected, it is possible that in the brain of a problem gambler the balance between the separate but connected systems of emotion and executive function is shifted away from the latter,
resulting in making decisions based on their emotional state rather than their cognitive functioning. This might help explain why problem gamblers are able to repeatedly make the same erroneous decisions even if they recognise the error and feel the need to correct it.

**Possible Addictive Potential of Gambling Types**

There has been interest from researchers in determining whether some forms of gambling are more addictive than others. This topic had originally come into focus with the popularisation of gambling machines, such as the slots and video poker machines. These machines are responsible for greater and greater percentages of casinos profits, and there is concern that these machines may be more addictive to gamblers for a number of reasons, and therefore, public health might be at risk. Breen and Zimmerman in 2002 investigated this hypothesis and confirmed that machine problem gamblers may have a faster onset than non-machine problem gamblers. This might help explain why escape gamblers seem to progress through the phases of gambling faster than action gamblers. The study however, had some inherent methodological limitations, such as describing machine gamblers as the group that preferred machine gambling at the time of the study and not at the initial on-set of the problem gambling. Despite this, the results still bear some consideration, as a number of the reasons which are presumed to make machine gambling more addictive, such as the vivid visual stimuli, the possibility of playing continuously with little time in between bets, instantaneous reinforcement and machines being easier, less intimidating, and, more predictable than dealing with humans.

These are also features that are shared with Internet gambling. Internet gambling is in a position to become increasingly important in all areas of gambling, such as gambling addiction research or in industry, it is likely to produce a similar revolution as did the popularisation of gaming and virtual gaming machines.
The advent of the Internet has permanently changed the way that many in Malta, and the world, conduct their lives. The Internet has revolutionised commerce, education, technology, communication and entertainment. This is because it is cheap and easy to use and accessible any time of the day, making it extremely convenient. It provides access to a wide variety of visual stimulation, like television, but allows us our own autonomy and along with this gives us anonymity (Greenfield, D.N., 2000). While some of these factors can be extremely useful for doing business, socialising or learning, in excess they may also become harmful to our mental health. With such a convenient and powerful new technology it is not surprising that the public has quickly become reliant on it. It is therefore, easy to see how the Internet may be abused by some and its potential to become addictive, and thus become harmful socially, academically or occupationally. This was studied by Kimberly Young in 1996 by using a modified version of the DSM-IV (APA, 1994) criteria for pathological gambling, the results were significant and it was posited that Internet addiction could be a clinical disorder. It has not been included in the DSM IV-TR (APA, 2000) although it is being considered for inclusion in the DSM-V in 2013. The Internet has also revolutionised the way people gamble, all of the factors mentioned above seem to have to potential to combine to make online gambling extremely attractive. Since the Internet became widely available gambling sites and online casinos have emerged, their number since then has increased, leading to a large and lucrative international industry, with an online poker site being the most popular in the gaming category of the international web information and traffic website www.alexa.com, more popular than the Yahoo games, Playstation and Xbox360 websites (Alexa Internet, Inc, 2010).
The Study of Gambling Habits in Malta

Unfortunately literature regarding gambling habits and Internet use in Malta is extremely scarce. It is remarkable there has been so little interest in this topic in Malta, especially considering that local statistics on other dependencies or addictions such as alcohol, illicit drugs, and, tobacco are abundant. This study may begin to fill this gap in the literature and compare the gambling habits of Maltese university students against what is known about gambling abroad. The results can then be compared and to see if this method is a successful way of studying gambling behaviour in Malta or if other techniques are needed.
3. Methodology

In this chapter, the aims and hypotheses of this research will be restated, followed by the details on the population and sampling procedure to carry out the survey. The DSM-IV and PGSI scales used to measure gambling severity will then be described along with a measure for attitudes towards gambling, and concluding with details on the analysis of the data.

The first aim of the study is to measure the patterns of gambling practices and prevalence of gambling within the population of students at the University of Malta.

Secondary aims of this study are firstly to examine the correlation between two gambling measures of gambling severity, the Problem Gambling Severity Index (PGSI) and one based on the DSM-IV criteria. Gambling severity can then be tested against some of the other factors that have been found to be related to problem gambling, including, mental illness, substance abuse, family history and negative attitudes towards gambling.

The study sets out to answer the following research question:
What is the prevalence of gambling and problem gambling among students of the University of Malta and what are the general patterns of gambling activity?
Secondly, to what extent Internet gambling practices and problem gambling are related?
A secondary research question is:
What is the relationship between problem gambling and gender, mental illness, increased amounts of money spent on gambling, substance abuse, family history, and, attitudes toward gambling?

This study seeks to find the prevalence of problem gambling among university students, and explore the following hypotheses that have been derived from the literature. Firstly, that the
scores for DSM-IV criteria for problem gambling and the PGSI are positively correlated.

Secondly, the following groups will show a greater tendency towards problem gambling:

- Males.
- Internet gamblers.
- Users of alcohol, tobacco and illicit drugs.
- Substance users, who use while gambling.
- Substance users who use two or all three types.
- Student who spend increased amounts of money on gambling.
- Students who have a negative view of gambling.
- Unemployed students versus part and full time employed students. With the unemployed having higher scores than the part timers and the part timers having a higher score than the full timers.
- Students with problem gamblers in their nuclear family and students with problem gamblers among their extended family and friends. With the closer relations showing high scores.
- Students who have been diagnosed with mental disorders.

**Population and Sampling Procedure**

The student population at the University of Malta were chosen as the subjects of this study. The sample consists of 792 respondents, 62.8% of which are female and 32.2% male; this is consistent with the ratio of female to male students in the total university population at 57.3% and 42.7% respectively (Cefai & Camilleri, 2009). The bulk of the respondents are aged between 18 and 24 totalling to almost 80%, 8% are aged between 25 and 29, and the remaining 12% are over 30. The vast majority of respondents (96.1%) are Maltese.

The study was carried out using a fourteen item questionnaire sent out via university email by the office of the registrar. All students enrolled at the University of Malta are required to sign up for a university email address and the email was sent to all students, the sampling can therefore be considered to be random. Carrying out the survey electronically helped ensure that the sample was truly random and allowed for the possibility for many more respondents, as this is cheaper and less time consuming than administering the questionnaires by hand, while also
making statistical analysis easier and removing any bias that may be introduced by interacting with an experimenter.

**Materials**

The questionnaire used can be found in appendix A and consists of fourteen items eight of which concern the hypotheses stated above, including the types of gambling and attitudes towards gambling. Four items covered data on age, nationality, amount of money spent on gambling and reasons for using the Internet to gamble. The remaining two items are two gambling screens used to assess the degree of problem gambling.

Two gambling screens were used to ensure validity; these are the Problem Gambling Severity Index (Ferris & Wynne, 2001) and questions based on the DSM-IV criteria for pathological gambling (American Psychiatric Association, 1994). These screens were chosen as they are widely used and the results can therefore be compared against other studies. The DSM-IV criteria questions and PGSI were chosen over the most commonly used screen, the South Oaks Gambling Screen (Lesieur & Blume, 1987) as there is evidence that this screen may overestimate the amount of problem gamblers (Jonsson, 2006; Stinchfield, 2002).

**The DSM-IV.** This scale of problem gambling consists of ten questions based on the diagnostic criteria for pathological gambling for example, the criterion for lying to others ‘Lies to family members, therapist, or others to conceal the extent of involvement with gambling’, is asked in the questionnaire as ‘Have you lied to family, or others, to hide the extent of your gambling? These questions were replicated from the British Gambling Prevalence Survey of 2007 (National Centre for Social Research Gambling Commission, 2007). It is advantageous to use the DSM-IV criteria to screen for problem gambling as this is best way to help ensure
validity. Other screens that do not use or only use a few of the diagnostic criteria may not be truly measuring pathological gambling.

**The PGSI.** The PGSI consists of the nine, scored items in the problem gambling assessment section of the longer Canadian Problem Gambling Index. Scores range from zero to three for each item and respondents are classified into three categories based on the sum of their score, Low risk gamblers score between one and three, Moderate risk gamblers score between 3 and, Problem gamblers score between 8 and 27. The PGSI is useful as it gives more importance to social and environmental factors than other screens such as the DSM-IV criteria; as such measures were created using clinical samples of problem gamblers. This group is different in many ways to the general population, consisting mostly of men for example, this might lead to women being underrepresented when screening (Ferris & Wynne, 2001).

Using both the DSM-IV criteria and the PGSI measures might give a clearer picture of the gambling habits of the University population. The correlation between the classification into problem and non-problem gambler of the two scores suggests greater validity in this study.

**Attitude towards gambling.** Attitudes of gambling was measured using a 13 items scale, these items were part of a study used to determine attitudes in the British Gambling Prevalence Survey in 2007. Six of these items denoted more positive attitudes while the other seven items were worded more negatively, participants were requested to select from a five point Likert scale the statement that applied to them the most, from strongly disagree through neutral to strongly agree.
Analysis

**Pearson correlation used to measure the relationship between two numerical variables.** In this study the Pearson correlation used to study the correlation between DSM score and PGSI score; and also between DSM score and a score for negative attitude.

A correlation close to 1 indicates a very strong positive relationship. A correlation close to -1 indicates a strong negative relationship, and a correlation close to 0 indicates no relationship.

The null hypothesis specifies that there is no relationship between the two variables’ scores and is accepted if the p-value exceeds the 0.05 level of significance. The alternative hypothesis specifies that there is a significant relationship between the two scores that attributed to chance and is accepted if the positive value is less than to the 0.05 criterion.

**The 1-way Anova test used to compare gambling tendency between several categorical variables.** In this study this test was used to check the significance of the hypotheses mentioned above, against the measure of problem gambling. This will establish whether the trends observed can be generalised to the student population.

The null hypothesis specifies that the mean gambling severity scores for the categorical variables elicited differ significantly and is accepted if the p-value is less than the 0.05 criterion. If the p-value is less than the 0.05 level of significance it can be said that the difference in the mean gambling severity scores is significant and not attributed to chance.

The 95% confidence interval provides a range of values where the critical mean DSM score would lie if the whole student population where to be included in the study.
The Chi square ($\chi^2$) test used to determine whether an association exists between two or more categorical variables. The $\chi^2$ test to determine if a significant relationship exists between the different gambling types selected by the respondents.

The null hypothesis specifies that there is no association between the categorical variables and is accepted if the positive value exceeds the 0.05 level of significance. The alternative hypothesis specifies that there is a significant association between the two categorical variables and is accepted if the p-value is less than 0.05 level of significance.

Ethical Considerations

All the data was collected anonymously, the email and IP addresses from which the questionnaire was filled out was unknown even to the author. The respondents were informed of this before beginning the questionnaire.

In summary the student population was sampled using a 14 item online questionnaire distributed via the university email system. This was done as this is the cheapest, easiest and least time consuming way to distribute; this helped to ensure the maximum amount of respondents as well as making the data analysis quicker and less prone to error. Two gambling screens were used to ensure validity between them, the DSM-IV criteria and the PGSI were chosen as they are both much used and are less likely to over-represent problem gamblers.
4. Results

In this chapter, to begin with, the choice of gambling types preferred by the participants will be illustrated along with the prevalence of problem gambling among the sample. Each of the hypotheses listed above will then be analysed. The hypothesis of a positive correlation between the two measures of problem gambling, the DSM-IV criteria and the PGSI, will be illustrated and a measure for the degree of problem gambling established. The remaining hypotheses will then be tested against this measure, in the order listed above.

Gambling Types

A $\chi^2$ test was used to determine the correlation between the types of gambling preferred by the participants and a cluster bar graph was produced (Figure 1.). It is evident from the crosstab and cluster bar graph that a large proportion of the participants stated that they never participate in many of the games with the exception of playing lotteries or scratch cards. In fact, approximately 67% of the respondents have stipulated that they played the numbers in their life time. Since the p-value (0.000) is less than 0.05 level of significance we can deduce that some games are played by a significantly larger proportion of participants.

Following playing the numbers, machine gambling and gambling on card games are the most popular types of gambling with about 30% of the participants having tried them. Very few of the participants bet on animals or play the stock market and only about 10% of the participants have used the Internet to gamble.
Figure 1. Preference of gambling types
The Prevalence of problem gambling

The prevalence of problem gambling was 0.875% using the DSM-IV measure, problem gamblers are defined as those scoring four or more on the ten point scale, with one point being given for every answer of ‘Very Often’ or ‘Often’, and no points for ‘Never’ and ‘Sometimes’. Using the PGSI criteria for problem gamblers, those having a score of 8 and over on the 27 point scale 0.887% of the sample population were classified as problem gamblers.

The Correlation between the DSM-IV Criteria and PGSI

To be made comparable to each other a score was computed for each measure. This was done by giving a value of one, two, and three to every selection of sometimes, often, and very often, respectively, on each gambling screen. The sum of these values was then divided by the number of items on each screen to give the mean score.

The Pearson correlation coefficient (0.819), relating DSM and PGSI scores, is very close to 1 indicating a very strong positive relationship (see figure 2). This implies that a participant getting a high score in one measure tends to get a high score in the other and vice versa. This relationship is significant as the p-value is less than the 0.05 level of significance, therefore we can deduce that these two measures complement each other.

For ease of use and understanding the mean DSM score will be used as the measure for gambling severity in this study. The results taken against mean DSM score are more reliable and likely to generalise to the population.
The DSM score ranges from zero to three where zero corresponds to non-problem gambling and three to extreme problem gambling. This is not a direct representation of meeting the diagnostic criteria for pathological gambling however, but a scale for the amount and the degree of problems reported. For example a score of 0.6 might signify mild gambling problems in six areas of the DSM-IV criteria, moderate problems in three areas or severe problems in two areas. A pathological gambler cannot have a score of less than one.
The hypothesis stating that males would have higher rate of gambling problems than females was confirmed. Using the 1-Way Anova test it can be seen that the mean DSM score for males is significantly higher than that of the female group (p-value= 0.000), with males having a mean DSM score of 0.1 and females having a mean score of 0.025 (Table 1).

**Table 1**

*Gambling severity by Gender*

<table>
<thead>
<tr>
<th>DSMscore</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Male</td>
<td>290</td>
<td>.1034</td>
<td>.23276</td>
<td>.0765</td>
</tr>
<tr>
<td>Female</td>
<td>489</td>
<td>.0252</td>
<td>.09646</td>
<td>.0166</td>
</tr>
<tr>
<td>Total</td>
<td>779</td>
<td>.0543</td>
<td>.16551</td>
<td>.0427</td>
</tr>
</tbody>
</table>

*Note: p-value= 0.000*
The Gambling Severity of Internet Gamblers

The hypothesis stating that Internet gamblers would have a higher DSM score was confirmed. The mean DSM score for those who use Internet gambling is considerably higher than the mean DSM score of participants who never use Internet gambling. Since the p-value (0.00) is less than the 0.05 level of significance we can generalise that the difference in the mean DSM score is significant and not attributed to chance. This implies that students who use Internet gambling frequently are more likely to have gambling problems than respondents who never gamble on the Internet.

We are 95% confident that the mean DSM score for participants engaging in Internet gambling once a week lies between 0.27 and 0.62 and we are 95% confident that the mean DSM score for participants who never engage in Internet gambling lies between 0.2 and 0.4 the fact that the two confidence intervals do not overlap explains why the one way Anova test yield a significant result with a p-value of less than 0.05(Figure 3)

When Internet gamblers were asked for the reasons why they used the Internet to gamble, the most popular answers were, ease of access at 20%, convenience at 19%, 24 hour availability at 16% and comfort at 15%. Less popular answers were greater availability of gambling types, greater event frequency, and, anonymity with approximately 8% of respondents choosing these, the least popular reason for gambling online was a dislike of traditional gambling venues at 2%.
The hypothesis that substance users would have a higher DSM score than non-users was confirmed for all the substances, alcohol, tobacco and, illicit drugs. By far the most common substance being used was alcohol. Alcohol users had a mean DSM score of 0.082 versus alcohol non-users who had a score of 0.25. A 1-way Anova revealed that this difference is significant and not due to chance with a p-value less than the 0.05 threshold (p-value=0.000). This result can be generalised to the student population, we can be 95% confident that the mean DSM score for alcohol users will be between 0.06 and 0.1 while the score for non users will be between 0.01 and 0.04.
Similarly tobacco users have a higher mean DSM score than tobacco non-users. This difference is significant and not due to chance as a 1-way Anova gave a p-value of 0.000.

Illicit drug users were by far the least numerous of the substance users. They also showed a tendency to have a higher DSM score than illicit drug non-users the p-value of 0.001 is less than the 0.05 threshold and is therefore not due to chance.

Alcohol users have a lower average DSM score than tobacco users, and tobacco users have a lower mean DSM score than illicit drug users. This trend may not be generalised to the population however as the difference in upper and lower bound limits of the scores is too great to be able to generalise with any confidence (Table 2).

<table>
<thead>
<tr>
<th>DSMscore</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
<th>p-value</th>
<th>Lower bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol user</td>
<td>412</td>
<td>.0823</td>
<td>.19964</td>
<td>.0629 .1016</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol non-user</td>
<td>380</td>
<td>.0245</td>
<td>.11512</td>
<td>.0129 .0361</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco user</td>
<td>157</td>
<td>.1146</td>
<td>.25741</td>
<td>.0741 .1552</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco non-user</td>
<td>635</td>
<td>.0397</td>
<td>.13184</td>
<td>.0294 .0500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illicit drugs user</td>
<td>32</td>
<td>.1531</td>
<td>.27823</td>
<td>.0528 .2534</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Illicit drugs user</td>
<td>760</td>
<td>.0504</td>
<td>.15963</td>
<td>.0390 .0618</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Substance users who use while gambling.** The hypothesis that the DSM score for substance users, who use while gambling, is greater than for those who do not use substances while gambling, was proven for alcohol and tobacco users but not for illicit drug users. Approximately 30% of alcohol users also use alcohol while gambling. The alcohol users who drink while gambling have a substantially higher mean DSM score than alcohol users who do not drink while gambling, since the p-value (0.000) is less that the 0.05 limit we can generalise this trend to the population as this difference is not attributed to chance.

Similarly 37% of smokers also smoke while gambling. The smokers who smoke while gambling have a higher DSM score than smokers who do not smoke while gambling. As the p-value is 0.08 we can say that the difference is not due to chance.

Illicit drug users who use while gambling also tend to have a notably higher DSM score than those who do not use while gambling. The p-value (0.33) is greater than the 0.05 criterion however, and therefore, this tendency cannot be generalised to the population as this difference may be due to chance. Since illicit substance users are such a small group, numbering only 20, it is unsurprising that the p-value within this group does not meet the 0.05 level of significance (Table 3).
Multiple Substance Users. The hypothesis that multiple substance users have a higher DSM score than single or non-users was proven. The trend shows that the more habits the students have the greater the amount or degree of gambling problems that they are likely to have. A 1-way Anova revealed the p-value to be 0.038 as this is less than the 0.05 level of significance we can state that the difference in the mean DSM score is significant and not attributed to chance. It can be said with 95% confidence that students with two or three habit have significantly higher DSM score than students with no habits, with p-values of 0.038 and 0.021 respectively. There is no significant relationship between those students with one habit and any other group; the trend can be clearly seen however.
Students who have a Negative View of Gambling

The hypothesis that students who have a negative view on gambling would also have a higher DSM score was disproven. The scores of the all items on the scale were coded to indicate a higher score for a more negative attitude. That is five points for strongly agreeing with a negative statement or 5 points for strongly disagreeing with a positive statement. These scores were summed and divided by the number of items to give an average score that could be compared against the DSM score.

The negative attitude score ranges from 1 – 5. A score close to 5 indicates a very strong negative attitude; conversely a score close to 1 indicates a very strong positive attitude towards gambling. Scores of about 2 and 4 indicate mildly positive or mildly negative attitudes respectively, while a score of 3 indicates a neutral attitude. The Pearson correlation co-efficient relating the DSM score and negative attitudes score is -0.350, and this implies that the more negative the attitude towards gambling the lower the DSM score. Conversely the more positive the attitude, the higher the DSM score. This relationship can be generalised because it is not attributed to chance as the p-value is less than 0.05.

The students showed a predominantly negative view of gambling overall, with 55% of respondents having a mildly negative view of gambling, and 11% having a very negative view of gambling. 30% of the sample had a neutral attitude towards gambling while only 4% of respondents had a more positive attitude towards gambling (Table 4).
Table 4

Students who have a Negative View of Gambling

<table>
<thead>
<tr>
<th>Attitude toward gambling</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Positive</td>
<td>1</td>
<td>.2</td>
</tr>
<tr>
<td>Somewhat Positive</td>
<td>12</td>
<td>2.3</td>
</tr>
<tr>
<td>Neutral</td>
<td>163</td>
<td>30.6</td>
</tr>
<tr>
<td>Somewhat Negative</td>
<td>295</td>
<td>55.3</td>
</tr>
<tr>
<td>Very Negative</td>
<td>62</td>
<td>11.6</td>
</tr>
</tbody>
</table>

Money Spent on Gambling

Most of the respondents spend very little on gambling every month; almost 90% spend less than five Euros a week, about 5% spend five to ten Euros a month and the remaining 5% spend more than this. A trend can be seen where students who spend more on gambling per month tend to have a higher DSM score, this trend is significant with p-value of 0.00.

Employment Status

Employment status cannot be said to have an effect on DSM score. An inclination exists where full timers have a lower DSM score than part timers, and part times have lower score than not otherwise employed students, this tendency cannot be proven significantly as the p-value is greater than the 0.05 criterion, this may therefore be due to chance.

Relatives with Gambling Problems

Being related to a person reported to be a problem gambler does not seem to have an effect on DSM score. Students who knew or were distantly related to problem gamblers reported a marginally higher DSM score than those directly related to problem gambler and those who did not report knowing any gamblers. This trend may well be due to chance as the p-value exceeds the 0.05 threshold.
Mental Disorders

The hypothesis that students that have been diagnosed with mental health disorders have higher DSM scored could not be supported. Students with mental health disorders did show moderately higher DSM scores than students with no mental health problems; however, this difference is not significant as the p-value of 0.11 exceeds the 0.05 level of significance. These results cannot therefore be generalised to the population with any certainty.

In conclusion, it can be seen that prevalence of problem gambling among the university population is between 0.8 and 0.9% and the scores of DSM-IV criteria and the PGSI are very strongly correlated.

Internet gamblers have substantially higher gambling severity scores than any of the other groups tested. Males, substance users, and, students those that spend more money on gambling are also at greater risk for problem gambling.

Students have a very negative view of gambling on the whole, with students having more negative views having lower levels of gambling problems. While employment status, mental illness, or being acquainted with problem gamblers cannot be conclusively said to have an effect on gambling severity.
5. Discussion

This exploratory research gives a snapshot of the gambling habits of students at the University of Malta during the year of 2009-2010. The prevalence of problem gambling behaviour was found by using an online questionnaire distributed to all students via the university email. Two scales were used to measure the prevalence, the types of gambling preferred and the attitudes towards gambling were also assessed. Possible risk factors for problematic gambling, including the use of the Internet to gamble, were also explored. In this chapter the results will be interpreted in the light of past literature. For the sake of brevity only the most salient results will be discussed in depth, beginning the prevalence of problem gambling in the population. Going on to explore four possible risk factors for problem gambling, Internet gambling, increased amount of money spent on gambling, male gender and, substance use. The effects of students’ attitudes about gambling on problem gambling are then discussed.

Prevalence

The results from the PGSI and DSM-IV screens proved to be strongly correlated. Using the agreement of these two measures, the prevalence of problematic gamblers can be estimated at between 0.8 and 0.9% of the University population which is of roughly 10000 students; this indicates (at 95% confidence) that up to 85 students may have severe gambling problems.

It is important to bear in mind that the threshold for problem gambling when using the DSM-IV scale was set at four, while many researchers prefer to use a threshold of 3 to assess this. Using a threshold of three in this study would indicate that 1.75% of the population has problems gambling. However, bearing in mind the correlation with the PGSI scale and in an effort not to over-represent the problematic behaviour, the author prefers to employ the threshold of four when using the DSM-IV criteria in this study.
The minimum prevalence of 0.8% is comparatively high, for past year gamblers. The general population of some other European countries show a considerably lower prevalence for past year gamblers. This indicates that students at the University of Malta may have a greater risk for gambling problems, than people in the general population of Europe. While differing methodological styles may be responsible for some of the variance in the findings, in this study the methodology was specifically chosen to demonstrate the minimum possible prevalence rate, as it seems particularly important to have the minimum amount of ambiguity in the results of an exploratory study. This can then provide a starting point that future studies can compare against.

Possible Risk Factors for Problematic Gambling

**Internet gambling.** The strongest predictor for gambling problems was the use of the Internet to gamble. While Internet gambling was expected to be a predictor for problem gambling it was not expected to be the best predictor, following the past literature, mental illness and increased substance use were expected to be better predictors. The highest mean DSM scores found among the hypotheses tested were those of gamblers who used the Internet to gamble more than once a week. This group had a mean DSM score of 0.45 (more than double that of the next best predictor), while this does not indicate that the group has more problem gamblers, it does suggest that weekly Internet gamblers may suffer from mild to moderate gambling problems in several areas.

Whereas only 9.2% on the sample have ever used the Internet to gamble over a third of these use the Internet to gamble more than once a week, while the average percentage of weekly gamblers of the other groups was approximately 5%. With the next highest being, playing cards for money, where 11% play weekly. This suggests that Internet gamblers are far more loyal to
This medium of gambling than those with a preference for any other type of gambling.

Something about Internet gambling clearly keeps this group coming back frequently.

The reasons this group state that they chose the Internet to gamble reflect this. The most popular choices were; ease of access, convenience, 24 hour availability, and, comfort. This trend is interesting as it suggests the fact that gambling is always easily accessible, is far more important to Internet gamblers than other possible reasons for Internet gambling such as the anonymity, quantity of gambling types or the decreased time in between consecutive games. It can also be safely be said that it is not the dislike of other gambling venues or other, unspecified, reasons that draws this group to Internet gambling. This has the implication that the preoccupation as well as chasing behaviour would be a great deal more difficult to resist or control for Internet gamblers, as the temptation and means to go back and win back their losses is, essentially, always present and convenient. Internet gambling may be easier to conceal than other forms of gambling; however, on the other hand anonymity does not seem to be of great importance to the majority of Internet gamblers.

These may also be reasons that people, who gamble to escape problems, might prefer the use of the Internet. This supports the similarity between Internet gambling and other types of machine gambling. However, the increased frequency in between gambling events (as it is possible to play multiple games simultaneously if desired) is only a secondarily desirable factor for Internet gamblers. This suggests that there may be a subtle distinction between Internet gambling and other forms of machine gambling.

These results also have implications on the growing economy based around Internet gambling in Malta. It can be said that younger more educated persons who use the Internet to gamble might have more severe gambling problems than more traditional gamblers. If this
group is studied further appropriate steps can be found that might help Internet problem gamblers adjust their or prevent their problematic behaviour.

**Money Spent.** The spending of greater amounts of money on gambling activities is also a risk factor for problematic gambling. While this observation has great face validity it is important to note, as the vast majority of students spend remarkably little on gambling every month, while a noteworthy minority spend greater amounts 1% spend up to 50 Euros while 0.6% spend up to 100 Euros. With the difference in their DSM scores being significantly greater; this is the second most powerful determinant for problem gambling.

Larger amounts of money spent on gambling may be a roundabout way of measuring tolerance, the need to spend more and more amounts of money to get enjoyment from gambling. While in wider populations this trend may not hold true in the relatively economically homogenous group of university students the persons who spent more on gambling show a higher degree of related problems.

**Gender.** As expected males had a significantly higher degree of gambling problems than females, the predisposition for males to be more likely to be problem gamblers holds true in the case of the students at the University of Malta. This is encouraging as this indicates that the foreign literature is reasonably applicable to the situation of university students in Malta. The reasons for this are likely similar to those in the literature, being that gambling is more socially acceptable for males, while women tend to gamble on types of gambling that are less potentially problematic, such as playing the numbers.

**Substance Use.** The use of alcohol, tobacco and illicit drugs are all possible risk factors for problem gambling. The results show a clear increase in DSM score with the use of each of the substances, moreover students using the substances while gambling demonstrated a further
increase in DSM score. While the majority of substance users only use alcohol, while tobacco users and illicit drug users tend to have more severe gambling problems. This trend is similar to those of the substance addictions – the commonest used and abused mind altering substances are alcohol and tobacco. The Illicit drugs come after these widely and legally available substances. This may be an indication that users of substances may have similar psychological traits with gamblers, as the same feelings of excitement and escape found while gambling can be found through the use of substances. Alcohol and especially illicit drugs can directly evoke these sensations when taken in, while the nicotine in tobacco closely resembles dopamine in its chemical structure and action, this might mimic the action that gambling might provide. This strongly suggests that the psychological and biochemical roots for substance use and gambling behaviours are similar or linked. It can therefore be easily seen how persons with a similar biopsychological makeup will be much more likely to engage in the same behaviours, and also why the severity of these possibly problem causing behaviours increases when they are combined. This is exemplified by the results showing a substantial increase in gambling severity, with the amount of substance using habits of the sample. This is evidence for a strong link between the substance related problems and behavioural addictions such as gambling.

**Attitudes towards Gambling**

The vast majority of students sampled express negative attitudes about gambling. This seems to conflict with the finding of a relatively large proportion of problem gamblers in this study. This implies that the students who have neutral attitudes towards gambling have higher DSM score than those of students with negative views. This result does not agree with the past literature where persons with a negative attitude tended to have higher gambling problems. This could signify that while a negative view of gambling might deter people from gambling, a more
rounded awareness of the possible positive as well as negative effects of gambling might be of
greater protective benefit. As so few of the students view gambling as positive it cannot be said
that a positive attitude towards gambling is a risk factor for problem gambling among the
population studied. However having a negative view of gambling may have protective effects.
It must be considered that the respondents’ expectancy that gambling should be seen as wrong,
introduced a social desirability bias, skewing the results and producing the overwhelmingly
negative views.

Findings

The prevalence of past year problem gamblers among students at the University of Malta
was found to be between 0.8 and 0.9% in this study. This figure is relatively high when
compared against the average amount of past year problem gamblers in the general population in
other European countries. Four possible risk factors for problem gambling were identified.
Internet gambling has been strongly linking to an increase in the severity of gambling problems
experienced by the students. The amount of money spent on gambling, being male and, a
substance user have also been linked to an increase in problem gambling behaviour.

The effects of mental disorders, having friends or relatives who have gambling problems
and, employment status cannot be definitively said to have an effect on the severity of gambling
problems in this population. However trends show that students who are diagnosed with a
mental disorder and closely acquainted with persons with a gambling problem may have slightly
more severe gambling problems. While students having a full or part time job may have a slight
protection from gambling problems. Students’ attitudes towards gambling are remarkably
negative on the whole. Possessing a negative attitude towards gambling may provide significant
protective effects from gambling problems.
6. Conclusion

From the results of this study it can be said that the prevalence of problem gambling in the University population is somewhat high and Internet gamblers are at a greater risk of developing gambling problems. It can be said that the male, Internet gambler who uses multiple substances and spends more than 10 Euros a month on gambling is at the greatest risk of gambling problems, while having a negative attitude towards gambling may protect against gambling problems.

While this study is merely an exploratory study it gives us vital information about this scarcely researched topic. This information can be used to give a deeper understanding of the phenomenon of problem gambling among university students and can be used to help identify and treat the sufferers. Moreover this study provides a strong starting point for future studies into this topic, where more in-depth research can be done into specific areas associated with problem gambling.

Limitations of the Study

The main limitation of this study is that the target population, problem gamblers, composes such a small proportion of the population. Therefore only a relative increase in severity of gambling problems can accurately be measured and significantly generalised, rather than the actual differences between problem gamblers and non problem gamblers.

Methodological limitations of the study involve the use of an Internet based questionnaire for its distribution. While this method is the only one available that can conveniently get the required number of respondents, many of the students did not respond to a few of the items on the questionnaire. This may leave us with an incomplete picture of the situation as well as introduce problems in the analysis of the data. Additionally the use of the Internet may introduce
bias into questions regarding the use of the Internet, the exact nature of this bias is difficult to determine however.

**Recommendations**

The results of this study show that there is a real need to address problem gambling as a possible hazard to student life, as gambling problems may seriously hamper students’ success. The University Counselling Unit can benefit from the data from this study for the treatment of gambling problems. It is evident that students would benefit if there is greater awareness about the problems gambling can cause and where help can be found, students should be made aware of both the possible positive and negative effects of gambling, this would give a rounder view of the situation, a more informed public might have protective benefits against gambling problems.

These finding can also be use by Maltese government agencies such as the LGA to get more empirical data to guide healthy policy making. Maltese addictions agencies, such as sedqa, could be further informed about this reality.

**Future Research**

This study can open up the way to a great deal of future research into the topic, as this was one of the aims of this research. From this study only the prevalence of problem gambling can be found, that is the amount of problem gamblers at this point in time. With future studies similar to this, the incidence, or the rate at which new cases of problem gambling arise, can be found. This might provide more information and allow for more powerful inferences to be made, such as finding out if there is a faster onset of problem gambling among Internet gamblers.

It would be beneficial if more in-depth research is done on the trends in this research that did not produce significant results, specifically mental disorders, relation to problem gamblers, and, employment status.
This study explores a new area of research within the student population and also within the general population. This study could be used as a platform for future research into the growing fields of problem gambling and Internet use in Malta, as well as to further research into the mental health of students at the University of Malta.
References

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### Appendix A

**How often have you spent money on any of the following forms of gambling?**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Every Day</th>
<th>Once a Week</th>
<th>Once a Month</th>
<th>Every 6 Months</th>
<th>In the Last 12 Months</th>
<th>Few times in your Lifetime</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Played cards for money</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bet on horses, dogs, or other animals</td>
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<td>Bet on sport (Football pools)</td>
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<tr>
<td>Played dice games, including craps, over and under or other dice games</td>
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<tr>
<td>Went to casinos (legal or otherwise)</td>
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<tr>
<td>Played the numbers, bet on lotteries or scratch cards</td>
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<tr>
<td>Played the stock and/or commodities market</td>
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<tr>
<td>Played slot machines, poker machines, or other gambling machines</td>
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<tr>
<td>Bowled, shot pool, played golf, or some other game of skill for money</td>
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<tr>
<td>Have you used the Internet to gamble in any way</td>
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<tr>
<td>Some form of gambling not listed above</td>
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</tbody>
</table>

*Figure 1. Questionnaire item 1. Gambling types.*
Approximately how much money do you think you spend on gambling each month?

- Less than 5 Euros
- 5-10 Euros
- 11-15 Euros
- 16-20 Euros
- 21-50 Euros
- 51-100 Euros
- 101-250 Euros
- 251-500 Euros
- Over 500 Euros

Why do you use the internet to gamble?

- Easy to access
- Convenient
- More comfortable
- New gambling events frequently available (such as poker tournaments or new tables opening up)
- Dislike the atmosphere of normal gambling venues
- Greater availability of gambling types
- Anonymous
- 24 hour access
- Other

Figure 2. Questionnaire items 2 and 3. Money spent on gambling and Reasons for using the Internet to gamble.
Please answer each of the following questions by indicating how much it applied to you in the past twelve months.

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>When you gamble, how often do you go back another day to win the money you lost?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>How often have you found yourself thinking about gambling (reliving past gambling experiences, planning the next time you will play, or thinking of ways to get money to gamble)?</td>
<td></td>
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<tr>
<td>Have you needed to gamble with larger amounts of money to get the same feeling of excitement?</td>
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<tr>
<td>Have you felt restless or irritable when trying to cut down gambling?</td>
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<tr>
<td>Have you gambled to escape from problems or when you are feeling depressed, anxious or bad about yourself?</td>
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<tr>
<td>Have you lied to family, or others, to hide the extent of your gambling?</td>
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<tr>
<td>Have you made unsuccessful attempts to control or stop gambling?</td>
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<tr>
<td>Have you committed a crime in order to finance gambling or to pay gambling debts?</td>
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<tr>
<td>Have you risked or lost an important relationship, job, educational or work opportunity because of gambling?</td>
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<tr>
<td>Have you asked others to provide money to help with a desperate financial situation caused by gambling?</td>
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</tbody>
</table>

Figure 3. Questionnaire item 4. The DSM-IV criteria.
<table>
<thead>
<tr>
<th>Question</th>
<th>Very Often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you bet more than you really could afford to lose?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Have you needed to gamble with larger amounts of money to get the same feeling of excitement?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Did you go back another day to try and win back the money you lost?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Have you borrowed money or sold anything to get money to gamble?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Have you felt that you might have a problem with gambling?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Has gambling caused you any health problems, including stress or anxiety?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Have you felt your gambling caused any financial problems for you or your household?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
<tr>
<td>Have you ever felt guilty about the way you gamble, or what happens when you gamble?</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
<td>⬜</td>
</tr>
</tbody>
</table>

*Figure 4. Questionnaire item 5. The PGSI*
In the past month have you used any of the following substances? (Please tick any that you might have used).
- Alcohol
- Tobacco
- Illicit drugs
- None

In the past month have you used any of the following substances while gambling? (Please tick any that you might have used).
- Alcohol
- Tobacco
- Illicit drugs
- None

Figure 5. Questionnaire items 6 and 7. Questions on substance use
The following question is about attitudes toward gambling. Please read each statement carefully and select the answer which most applies to you.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are too many opportunities for gambling nowadays</td>
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<tr>
<td>People should have the right to gamble whenever they want</td>
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<tr>
<td>Gambling should be discouraged</td>
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<tr>
<td>Most people who gamble do so sensibly</td>
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<tr>
<td>Gambling is a fool's game</td>
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<td>Gambling is dangerous for family life</td>
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<tr>
<td>Gambling is an important part of cultural life</td>
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<tr>
<td>Gambling is a harmless form of entertainment</td>
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<tr>
<td>Gambling is a waste of time</td>
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<tr>
<td>In moderation gambling is good for society</td>
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<tr>
<td>Gambling liven up life</td>
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<tr>
<td>It would be better if gambling was banned altogether</td>
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<tr>
<td>Gambling is like a drug</td>
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</tbody>
</table>

*Figure 5. Questionnaire item 8. Attitudes towards gambling.*
What is your gender?
- Male
- Female

How old are you?
- under 18
- 18-24
- 25-29
- 30+

What is your nationality?
- Maltese
- Other

Do you also have a job while attending university?
- Part-time
- Full-time
- None

Check which of the following people in your life has (or has had) a gambling problem.
- Mother
- Father
- Brother/Sister
- Spouse/Partner
- Child/ren
- Another Relative
- A friend or someone important in my life
- None

Have you ever been diagnosed with any mental health problems or disorders such as anxiety, depression or obsessive compulsive disorder?
- Yes
- No

*Figure 5. Questionnaire items 9 through 14. Demographic data, relatives with gambling problems and mental illness.*