Conceptual Framework of Harmful Gambling: An International Collaboration

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Conceptual Framework Of Harmful Gambling

An International Collaboration Sponsored By The Ontario Problem Gaming Research Centre (OPGRC),
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CONCEPTUAL FRAMEWORK OF HARMFUL GAMBLING

ABSTRACT

While seen by many as a form of leisure and recreation, gambling can have serious repercussions for individuals, families, and society as a whole. The harmful effects of gambling have been studied for decades to attempt to understand individual differences in gambling engagement and the life-course of gambling-related problems. In this publication, we present a comprehensive, internationally relevant conceptual framework of “harmful gambling” that moves beyond a symptoms-based view of harm and addresses a broad set of factors related to population risk, community and societal effects. Interactive factors represented in the framework represent major themes in gambling that range from specific (gambling environment, exposure, types, and resources) to general (cultural, social, psychological, and biological). This framework has been created by international and interdisciplinary experts from a variety of stakeholder perspectives – including researchers, treatment providers, operators, policy makers, and individuals and their families – to facilitate an understanding of harmful gambling. It not only reflects the state of knowledge as it relates to factors influencing harmful gambling, but also acts to guide the development of future research programs and educate policy makers on issues related to harmful gambling. The Ontario Problem Gambling Research Centre (Guelph, Ontario, Canada) has facilitated the development of the Conceptual Framework of Harmful Gambling and is committed to updating it over time.
1. Executive Summary

Gambling is one of human kind’s most ancient activities. The opportunity to wager something for uncertain reward is enticing to even the most risk-aversive amongst us. Today, gambling takes a number of forms including land-based table games and electronic games, Internet-based games, lottery games, and horse racing. While seen by many as a form of leisure and recreation, gambling can have serious repercussions for individuals, their families and society as a whole. Because of the far reaching influences of gambling, in this project we have chosen to take a broad view of the harm caused by gambling.

The harmful effects of gambling have been studied for decades across various types of gambling, countries, cultures and scientific disciplines (e.g., psychology, economics). Various models have been developed in an attempt to understand the individual differences in gambling engagement and the life-course of gambling-related problems. While these models have substantially advanced our understanding of gambling related problems, no model has been able to provide a comprehensive view of gambling related harm – one that spans countries, cultures and scientific disciplines.

1.1 Key Objectives of the Framework

The recognized need for a comprehensive model of harmful gambling by the scientific community was the impetus for this project. In autumn 2011, the Ontario Problem Gambling Research Centre (OPGRC) in Canada initiated a project to close this conceptual gap. OPGRC brought together eleven global and interdisciplinary experts to develop a clear, comprehensive, internationally relevant conceptual framework for harmful gambling that addresses a broad set of factors related to population risk, community and societal effects. A summary of some of the key models we considered while developing this publication can be found in Appendix B.

As the project sponsor, OPGRC collaborated with this expert panel to facilitate the development of a Conceptual Framework of Harmful Gambling (the Framework), and intends to continue to support the Framework by updating it as needed in response to feedback and to new knowledge as it becomes available. Author biographies and acknowledgements can be found in an Appendix A.

In spring 2013, the Framework was made available on the OPGRC website with an option to comment on the document via an online survey. The Framework describes how factors within it are associated with harmful gambling and is expected to facilitate three key objectives:

1. To reflect for all readers the current state of knowledge (across disciplines and existing models) as it relates to factors impacting harmful gambling and the relationships among those factors.

2. To assist service providers, policy makers, regulators, and the public to better understand the complex dynamics involved in harmful gambling to enable better informed decision making.

3. To act as a strategic map that can guide the development of future research programs and identify areas where future research is most needed.

Ongoing Development of the Framework

OPGRC is committed to continually improving the Framework so it remains relevant and accessible to stakeholders and makes a contribution to furthering the understanding and awareness of harmful gambling. To achieve this objective, OPGRC has committed to continue to work with the expert panel and stakeholders in the gambling field to expand and refine the framework based on new knowledge and feedback. Emerging research evidence will be incorporated into subsequent iterations of the document. Through this sustained active engagement from the scientific community and other stakeholders, the Framework is expected to evolve towards meeting our stated objectives. While similar exercises have been attempted in the past no evolving comprehensive framework currently exists in the field.

One-page summaries of referred work will become available to readers through the integration of the Conceptual Framework Project with OPGRC’s Synopsis Project – a resource for plain language summaries of peer-reviewed gambling research publications. Each one-page synopsis describes the research objectives, methodologies, key results, limitations, and conclusions of the referred work in this publication, as well as other research. Readers can search for synopses in a variety of ways including keywords, year, journal name, and search category via the OPGRC website. It is our goal to link references within this publication with its synopsis.

Intended Audience and Writing Style

The Framework is intended to be intelligible and informative for a broad audience including international
researchers, treatment providers, decision-makers and the lay public. This publication is not a research paper, nor does it outline any one model, theory or pathway from past research. This publication aims to highlight the major factors that contribute to harmful gambling and major inter-relationships between those factors to illustrate the complexity of harmful gambling.

**Stakeholder Feedback to Date**
In September of 2012, key stakeholders were asked to provide detailed comments on the publication. Feedback was also gathered when the Framework was presented at a number of forums including the annual Alberta Gambling Research Institute conference in 2012 and 2013; Think Tank 2012 and 2013; and Ontario Federation of Community Mental Health and Addiction Programs conference in 2012. Stakeholder feedback was both positive and constructive and the importance of work was recognized.

**Strength of Evidence**
We recognize that the strength of evidence varies markedly across the publication due, in part, to our panel’s range of expertise as well as the range in the existence of research evidence. While this publication provides an understanding of the strength of evidence related to particular factors, we have not provided an exhaustive review of evidence. Such an assessment is neither within the scope of this project nor does it align with the intended objectives of this publication. Within each section of the publication, references to original research studies and reviews are provided.

### 1.2 Defining Harmful Gambling

**Gambling**
In general, gambling includes any practice that requires an irreversible investment (money or a material good that is of value) in the hope of gain based on chance or an uncertain outcome (which is the case of games that require an element of skill). The definition of gambling is likely to continue to evolve with societies and cultures, as norms around gambling continue to change over time in different countries. Once seen as illegal, immoral or disreputable, today many societies view gambling as a form of recreation and even a source of income.

Commercial gambling is a more formal, regulated style of gambling which includes a variety of gambling types such as casinos, video lottery terminals, lottery tickets, horse racing, formal sports betting, and even stock market speculation. Commercial gambling is characterized by an asymmetric relationship between the gambling provider and the gamblers. As a group, the gamblers always lose money to the provider. Monetary loss is the most distinctive characteristic of harmful gambling. We refer to commercial gambling throughout the bulk of this document. In contrast, within non-commercial private gambling, money is redistributed within the group and individual losses and wins depend on chance or skill. Private gambling can include betting on card games such as poker amongst friends, or betting on sports results with colleagues at the office.

**Harmful gambling**
We define harmful gambling as any type of repetitive gambling that an individual engages in that leads to (or aggravates) recurring negative consequences such as significant financial problems, addiction, as well as physical and mental health issues. Negative consequences may also be experienced by the gambler’s family, social network, and community. The degree of harm can range from inconsequential, to transient, to significant, and finally to chronic. For the purposes of this project, we treat harmful gambling as a term that encompasses all of these degrees of severity and frequency. Harmful gambling has also been referred to as problem gambling, compulsive gambling, irresponsible gambling, gambling disorder or pathological gambling. The differences between these terms are in-part a matter of severity as well as frequency of gambling. Pathological gambling is the most extreme form of harmful gambling as currently outlined in the Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV).

**Non-Harmful Gambling**
We refer to non-harmful gambling as gambling for recreation or entertainment purposes and in low-risk and/or controlled situations. Non-harmful gambling sustains, enhances or has little to no impact on a gambler’s state of well-being (but note the term is not intended to imply that gambling promotes personal growth and/or health). A discussion on non-harmful gambling and some of the positive aspects of gambling can be found in a recent publication titled ‘Why people gamble: A model with five motivational dimensions’ (Binde, 2012b). Non-harmful gambling has also been referred to as responsible, healthy, social, recreational, low-risk, leisure, or private gambling.
1.3 Value of the Framework

As stated above, no evolving comprehensive framework currently exists in the gambling field. Therefore this Framework adds value to the field in some specific ways including:

**Using Harm as the Organizing Principle**

The Framework moves beyond a symptoms-based view of harm which focuses on the individual and considers harm to families and society as a whole thus offering a broader perspective of gambling related problems and consequences. Harmful gambling behaviour is independent of an individual's gambling status as well as the severity, frequency, or intensity of gambling.

**Demonstrating Areas of Robust Evidence**

The Framework highlights areas where knowledge is robust and, in doing so, necessarily reveals points on which to focus or direct future research. Unlike any specific model, the Framework does not describe specific pathways to harmful gambling (causal or otherwise).

**Promoting Theory Driven Research**

The most comprehensive models of harmful gambling integrate genetic, biological, psychological, economic, social, societal, and cultural factors. Typically, models depict a selective number of (inter)connected factors and a dynamic process by which a change in one or several factors has the potential to affect an individual's gambling status (e.g., paths). In contrast, the Framework does not commit to any particular theory or analytical perspective. Rather, it provides a comprehensive view of factors with recognized links to harmful gambling with no defined paths. This approach urges researchers, decision-makers and others to grasp the complexity of the phenomenon and inspire new theory-driven research.

**Enabling an Examination of Harm Reduction**

It is our goal that the Framework inspires the audience to consider a harm reduction approach to gambling. Harm reduction goes beyond an abstinence-based approach and generally refers to reducing the harm or increasing the safety related to gambling. In a harm-reduction perspective, the central concept is empowering individuals affected by gambling. This perspective has implications both in terms of clinical goals and public policy.

**Allows for Consideration of a Cost-Benefit Analysis of Gambling**

A harm-based view considers the costs and benefits to the gambler, the family, community and society. Estimates of the relative extent of harm or relative cost to society have been made and therefore given some attention herein.

The value of positioning gambling harm as the organizing principle has important implications - both for gambling researchers and for other stakeholders in the gambling community. First, a framework focused on harm can be readily integrated into mental health promotion, community development, as well as healthy corporate and public policy initiatives that reduce the potential for gambling related harms. Second, such a framework positions gambling harm within the relevant academic disciplines of both public health and addictions. Third, the Framework appropriately frames harm reduction and minimization by embracing moderation and abstinence clinical goals. Consequently, it is attractive to vulnerable or high risk populations where commitment to abstinence may not be an appealing goal. These groups might include youth, marginalized groups and the elderly. Lastly, examining harm facilitates discussions of non-harmful gambling, which is particularly important for decision-makers whose goal is to optimize profit while reducing harm.

1.4 Overview of the Framework

The Framework was developed through a number of working sessions over a one-year period from September 2011 through September 2012. Between working sessions, the OPGRC team collaborated with the expert panel and stakeholders using various electronic tools including teleconferences, webinars, an online collaborative portal and electronic mail.

The Framework is a result of the combined knowledge, expertise and effort of the expert panel, whose members were asked to brainstorm numerous approaches to and illustrations of a comprehensive conceptual framework of harmful gambling. The brainstorming sessions resulted in a variety of interesting and at times diverging viewpoints on a framework. Diverse perspectives from different countries, disciplines and conceptual styles led to fruitful debates that informed the development of the Framework. The visual illustration and publication continued to change in their level of sophistication and degree of content, through numerous iterations of the Framework.

Four sets of **Gambling Specific Factors** are represented in the top half of the Framework: gambling environment, gambling exposure, gambling types, and gambling resources. These represent major themes in gambling studies and groupings of factors that are relevant across all other, general factors represented in the bottom half of the Framework. Four sets of **General**
Factors are represented across the bottom half of the Framework: cultural, social, psychological, and biological. Each set of general factors is directly or indirectly related to the life-course of harmful gambling and may or may not interact with one another. The general factors represent major areas of scientific study.

All factors are discussed in greater detail in subsequent sections, with the discussion moving from broad concepts that affect society (e.g., gambling environment, gambling exposure) to those that more specifically affect individuals (e.g., psychology, biology). Each grouping of factors is defined and discussed in stand-alone sections. A summary of the major inter-connections between various factors is provided thereafter.

Gambling Specific Factors
Gambling environment (i.e., the environment in which an individual lives) can impact on the nature and frequency of gambling activity, and the degree of resulting gambling related harm. Gambling exposure is a prerequisite for harmful gambling as no gambling would occur without opportunity. Gambling types refers to various forms of gaming, which may have different potential to cause harm. Gambling resources refer to sources (internal or external) to the individual that can influence harm-reduction.

General Factors
Cultural factors refer to shared systems of thought, meaning and morality of a people or ethnic group. Culture is manifested in norms, customs, collective knowledge, symbols, myths and rituals. Through its fundamental influence on meanings and values, culture has a multitude of impacts on the prevalence of gambling, the popularity of various forms of gambling, thoughts about and attitudes towards gambling, the practices of gambling, and the extent of harmful gambling. Social factors encompass both interactions among individuals and their collective co-existence. Social factors are important in shaping how commercial gambling is made available and how individuals who develop difficulties are perceived by others, in shaping attitudes and beliefs about different types of gambling, and in shaping best practices. Psychological factors include individual differences in personality and temperament, self-perceptions, social learning, lifespan development, co-morbid disorders, subjective well-being, coping styles, judgment and decision-making. Biological factors consider genetically inherited and/or biological propensities toward harmful gambling such as sex differences, brain structure and function, and the process by which a genetic propensity for harmful gambling gets expressed (epigenetics).

Below is one example of how the Framework might be applied to identify future research directions by examining the nature of the links between gambling accessibility and the prevalence of harmful gambling.

• Most, if not all, of the factors under gambling exposure relate to the accessibility of gambling.
• Under biological factors, genetic predispositions can be risk factors that influence psychological factors.
• Under psychological factors, changes in accessibility can have different impacts depending on individual lifespan and experiences with comorbid disorders. Personality and temperament, and coping styles also interact with gambling accessibility.
• Under social factors, physical proximity of gambling venues within neighbourhoods is related to higher rates of harmful gambling. However, there is little research on why gambling venues tend to be located in low socio-economic areas. Social settings where gambling is accessible also play an important role as does social learning.
• Under cultural factors, ethnicity and traditions can directly affect availability (e.g., gambling is strictly forbidden in some cultures) and sociocultural perceptions can also affect accessibility.

This application of the Framework to the concept of accessibility highlights several possible new directions for research. It underscores the importance of considering sex, age and ethnicity in relation to the availability of specific forms of gambling as well as the role of social learning in relation to legal and illegal forms of gambling.

1.5 Future Research Directions
The OPGRC recently undertook a stakeholder consultation process to develop its research program in future years. This process also involved revising the Conceptual Framework of Harmful Gambling (Figure 1). As part of that consultation process, which was based on the Conceptual Framework of Harmful Gambling, 29 stakeholders were given the opportunity to comment on areas related to harmful gambling that required more research attention. The collective feedback of these stakeholders – which included national and international researchers as well as treatment providers
- is summarized below. We expect similar consultations in the future to continue to yield rich input on future research directions.

**Non-Harmful Gambling**

Stakeholders felt that research in the gambling field appears to be mostly focused on harmful gambling. However, the large majority of gamblers are not harmful gamblers. More research needs to be focused on establishing a better understanding about non-gambling, non-harmful gambling and associated resiliency factors.

**Interconnections**

Researchers noted that understanding the complexity of harmful gambling requires multi-disciplinary research efforts and very large sample sizes – something single research groups usually cannot do because of financial and time constraints. Stakeholders advised OPGRC to invest in research that analyzes complex interconnections (e.g., modelling large-scale U.S. addiction initiatives) and to continue to create partnerships among Canadian researchers, policy makers, and citizens to produce research that is informed by and relevant to a variety of perspectives. There is some epidemiological research related to gambling but much more is required. Stakeholders also identified a need to understand the extent to which mental health issues related to harmful gambling are a cause versus an effect.

**Longitudinal Research**

Many researchers and treatment providers are interested in understanding more about causality between factors, but this requires funding of a larger number of longitudinal studies; such studies could also shed more light on individual impacts and consequences associated with harmful gambling, as well as on individual predispositions to harmful gambling.

**Harmful Gambling in the Context of Other Addictions**

Stakeholders felt that harmful gambling research is decades behind that of other addictions (e.g., alcoholism). Additional research could further the understanding of the relationship between harmful gambling and other addictions, the shift that some individuals make from one addiction to another (e.g., some harmful gamblers cease to gamble, but turn to another addiction), the comorbidity of harmful gambling and other addictions while considering cause versus effect versus the un-relatedness of co-occurring addictions. Stakeholders felt that the connection between harmful gambling and other addictions in youth is also not well understood.

**Harmful Gambling in the Context of Incarceration**

Stakeholders noted that more research is required to understand how harmful gambling behaviour changes upon incarceration, particularly with youth, which can involve onset, increase or decrease in gambling in prisons and similar settings.

**Evidence-Based Policy Making**

Some stakeholders highlighted the need for integrating harmful gambling research into the development of public policies related to gambling. Such integration would allow the development of evidence-based policies that can have an impact on both gambling establishments and individual gamblers. Policy making in other areas such as alcohol and smoking is much more evidence-based in comparison to harmful gambling. Research on what particular changes in public policy would reduce the harmful effects of gambling would also be informative.

**Venue Location**

More research needs to be conducted related to the location of gambling facilities, and the impact of these facilities on the local economy, property values, harmful gambling, crime, and other factors.

**Venue Design**

More studies need to focus on understanding cultural differences in venue design, and how elements of venue design induce specific behaviours in individual gamblers.

**Gambling Machine Design**

Additional research is required regarding the design of gaming machines and the impact of machine designs on gamblers, especially on individuals experiencing problems with gambling.

**Modernization of Gambling**

The impact of gaming modernization and the impact of using new technologies on exacerbating or helping with harmful gambling issues needs to be better understood. The examination of the impact of the Internet and social media on gambling also needs greater attention.

**Loss of Opportunities**

More research needs to be conducted on the impact of gambling problems on lost educational, vocational and relationship opportunities. Even in situations where young people are able to overcome gambling problems,
Figure 1: Conceptual Framework of Harmful Gambling
they may not be able to recover from the loss of academic achievements and vocational opportunities. This can have a long term impact on other areas of their lives. The negative impact on personal relationships, including severed ties with friends and family, can also have a life-long effect on those who are trapped in the vicious cycle of crime or other deviant behaviours.

**Education and Prevention Strategies for Youth**
Treatment providers noted that they do not have a good understanding of which education and prevention strategies are most effective with youth. Further research in this area could help treatment providers develop better strategies that resonate with young people.

**Work Cycles and Leisure Time**
More research attention could be given to the impact of work-cycles on harmful gambling behaviour. In the example of oil patch workers, the work cycle can be a full week of work followed by a full week of time off. This type of work schedule, and limited access to other leisure options in areas surrounding the oil patch, gives individuals ample time and opportunity to engage in gambling activities.

**Treatment Availability and Hours**
More research is needed related to the impact of treatment availability for harmful gamblers (i.e. hours of operation, location). This type of research would be related to the ‘accessibility’ factor in the Framework.

**Normalization of Gambling**
Some stakeholders felt that more research should be focused on the impact of gambling operators’ media portrayal of and communication of gambling to the public. The depiction of gambling as a routine activity serves to normalize gambling in the eyes of the public. The effect of this normalization on harmful gambling behaviour requires further study.

**Impact of Incentives/Disincentives of Harmful Gambling**
Stakeholders felt that more research is required regarding how the financial cost of gambling (i.e., the consumer price) is related to promoting and/or reducing gambling and harmful gambling. For example, the availability of free or inexpensive bus transportation to casinos for senior citizens is likely to make gambling more accessible to this demographic group. Additionally, there is currently no admission cost for entering most gambling venues; increasing entry costs might deter some gamblers. Loyalty programs and high-stakes rooms at casinos which might provide gamblers incentives for gambling – including friendly or lavish treatment, and complementary dinners – need further study as well to understand whether they increase feelings of confidence and self-worth or prolong gamblers’ stay.

**Research on Older Adults**
Treatment providers highlighted a significant issue amongst the senior population (55+ years of age). One stakeholder pointed out that the overwhelming majority of their treatment centre's hotline calls is from seniors. This is considerably higher than support lines for other addictions. Treatment providers would like to see more financial support for research into the severity of harmful gambling among seniors.

**Physical Ailments Related to Gambling**
Treatment providers in our consultation sessions highlighted the lack of research into physical ailments that they see in the people they treat for harmful gambling issues. Ailments include irritable bowel syndrome, hypertension, ulcers, migraines and poor quality of life. The physical effects from drinking or smoking while gambling are also a concern. Physical ailments might also lead to harmful gambling (e.g., gambling to alleviate pain through game immersion).

**Financial Instability and Homelessness**
Treatment providers highlighted the need for research into the financial instability and homelessness that can result from destructive gambling habits, and how such extreme situations can be prevented through early intervention and treatment.

**Illegal Gambling**
Some stakeholders suggested that it would be instructive to study the resulting rise in illegal gambling, given current regulations and restrictions on gambling.

**Research on “High Rollers”**
Stakeholders were interested in understanding the prevalence and nature of gambling among those who place large value bets during gambling.

**Research on the Impact of Advocacy Efforts**
Stakeholders noted the impact of grassroots advocacy groups related to other addictions (such as Mothers Against Drunk Driving – MADD). Stakeholders were interested in researching the extent to which similar advocacy groups might arise with respect to harmful gambling and its associated effects.
Other Factors for Future Inclusion in the Framework

Some researchers pointed out that Asperger’s Syndrome and Attention Deficit Hyperactivity Disorder (ADHD) might be associated with an increased risk for developing gambling problems.

1.6 RELEVANCE OF FRAMEWORK TO STAKEHOLDERS

Based on our stakeholder consultation process, the relevance and utility of the Framework to three stakeholder groups is summarized below.

Researchers

The Framework allows researchers to have a flexible but comprehensive visual tool that can use to quickly identify the array of factors that contribute to harmful gambling. It is a useful tool in prioritizing research activities and guiding the development of research programs, indicating which areas of research are well supported by evidence, and which areas require more investment of research resources, time and funding.

Treatment Providers

The Framework was also judged to be useful and user friendly for treatment providers and the agencies they work with. The Framework provides an illustration of the breadth and complexity of harmful gambling, thereby highlighting its gravity. The Framework also provides an opportunity to inform treatment providers' thinking regarding non-harmful gambling habits. Some stakeholders suggested that they would use the Framework for presentations to other agencies, funders, and perhaps even to their clients. Other stakeholders felt that they could apply the Framework in triaging activities prior to treatment, or for clinical use during treatment. Stakeholders suggested that there may be opportunities for connecting the social determinants of health, and more specifically mental health (as identified by Health Canada, etc.) with the Framework. Stakeholders felt that harmful gambling is currently a health concern that is being addressed almost exclusively within the healthcare system; there may be opportunities to incorporate the 'social determinants of health' perspective into the Framework.

Government

The Framework further serves as a useful tool for OPGRC and other stakeholders in communicating with government bodies. Once again, the breadth of factors captured in the Framework can highlight to government the complexity of harmful gambling and all of its negative effects. Understanding the gravity of harmful gambling and its impact on individuals, family members and society could allow governments to make more informed and effective decisions related to under-served and/or under-funded areas of harmful gambling research. The Framework can also highlight for government the challenges that treatment providers face in addressing the multi-dimensional issue of harmful gambling and the need for a variety of harmful gambling prevention and treatment strategies and resources.

2. DISCUSSION OF GAMBLING SPECIFIC FACTORS CONTRIBUTING TO HARMFUL GAMBLING

This section provides a thorough discussion of four categories of Gambling Specific Factors (gambling environment, gambling exposure, gambling types, and gambling resources) depicted in the Framework. The factors represent major concepts or themes in gambling studies and are relevant across the four categories of General Factors in the Framework. We provide a definition and description of each category of factors in separate subsections below.

2.1 GAMBLING ENVIRONMENT

The environment in which an individual lives can have an impact on the nature and frequency of gambling activity, which also impacts the degree of resulting gambling related harm. In this section we discuss the gambling environment which covers a broad set of factors ranging from economics, to politics to public policy including macroeconomics, microeconomics, socio-political environment, corporate environment, culture of social responsibility, availability of leisure options, and public policy.

The question of links between factors related to the gambling environment and levels of harmful gambling has not received sustained research attention. This arises, at least in part, from the fact that government and industry resources dedicated to reducing harm from gambling have largely been focused at the individual level rather than at the community or societal level. A recent systematic review of socioeconomic impact studies of gambling identified 492 studies – only 60% of these were empirical investigations which primarily examined government revenue, employment,
harmful gambling and non-gambling business revenue (Williams, Rehm & Stevens, 2011). Fewer than 10% of the studies examined impacts in the areas of regulatory costs, infrastructure, quality of life, inequality, property values or business starts and failures. As the following sections suggest, empirical investigations of the macroeconomic, microeconomic and socio-political forces that shape gambling provision are sorely needed.

Gambling is a commercial activity that is largely controlled and regulated by governments but also driven to some extent by complex market forces that determine supply and demand, and ultimately, the nature, availability and accessibility of various forms of gambling within a specific jurisdiction. However, the practices and procedures adopted by the industry in developing, configuring, advertising and marketing gambling products are often at variance with responsible gambling objectives. State-owned gambling companies have to meet the challenge of balancing between responsible provision of gambling, which in the European Community (EC) legislative framework is one of the acceptable reasons for national restrictions of the gambling market, and commercialism that make them able to compete with foreign-based privately owned Internet gambling companies. Economic tensions exist between the commercial reality of intra- and inter-gambling sector competition and community pressures to reduce gambling-related harms on individuals, families and the wider society.

The extent to which individuals are exposed to various forms of gambling within a community will dictate the proportion of the population at-risk of, and manifesting, gambling-related harms. Exposure is dependent upon a number of factors that include the geographic distribution and density of gambling outlets, the physical characteristics of venues including ancillary recreational facilities co-located within the context of gambling activities, attractiveness, safety and social acceptability of surroundings, and types of gambling products offered. These concepts have been discussed in detail in section 2.3 Gambling Types. There is evidence indicating that a higher density of gambling-related harm exists in close proximity to available gambling land-based venues. In addition, data reveals an almost linear functional relationship between density of gaming machines and disadvantaged socio-economic regions. Changes that may contribute to reduced harms include reducing per capita density of gaming machines and gambling outlets, restricting distribution of gambling opportunities to a limited number of venues, restricting trading hours, limiting the provision of alcohol to gambling patrons, and imposing limits on per capita densities of gaming machines in low socio-economic communities.

2.1.1 MACROECONOMICS

At the macro-economic level, governments often see gambling as an important tool to stimulate economic growth and regional regeneration; increase indirect taxation; and reverse loss of revenue to off-shore or out-of-jurisdiction operators (Richard, 2010). Although the overall cost-benefits remain debatable, it is argued that gambling increases employment opportunities through new jobs and co-located hospitality businesses; increases the tourist trade; and leads to the economic regeneration of socially deprived and disadvantaged local communities.

Most importantly, gambling represents an important source of indirect taxes that contributes significantly to overall taxation revenue in many jurisdictions. As long as governments use gambling as a means to meet budgetary deficits and stimulate economic growth, the potential for continued liberalization and legislation exists.

A further threat to government revenue arises from competitive pressures generated by international jurisdictions offering destination and other forms of gambling. The proliferation of gambling has emerged in response to losses of revenue to offshore sites resulting in governments attempting to restrict access or to introduce competing markets. Exemplars include the introduction of legislation banning Internet gambling in Australia and the United States; and the construction of casinos in Singapore to counter the effects of cruise ship gambling and that of Macau casinos.

Finally, there also appears to be a link between the state of the economy and gambling consumption. For example, lotteries are considered recession proof (Dense, 2009), while resort casino revenues can decline during recessionary periods, as was the case during the time of the ‘Great Recession’ beginning in 2008 (Eadington, 2011). For other gambling types, research evidence about this connection between economic conditions and gambling consumption is mixed (Horvath & Paap, 2012).

2.1.2 MICROECONOMICS

It is important to understand what factors influence individual decision making and how resulting consumer
behaviours influence patterns of market behaviour, particularly supply and demand. Economic theory holds that individuals are rational beings and act to maximize the cost-benefit return made on decisions regarding consumption. Economic decisions are made by accounting for financial and opportunity costs associated with the purchase of a product. Individuals must weigh the cost of gambling with the benefits gained from its consumption, while considering alternative products that could be consumed in its place. The resulting intangible benefits may be both cognitive and emotional in nature.

Gambling represents a rational behaviour if the benefits outweigh the costs; for example, the opportunity for a large prize at a small affordable cost. The discord lies in the phenomenon of repeated temporal discounting, where decisions are frequently made to forgo later large rewards in preference to immediate lesser rewards resulting in negative outcomes. Thus although rational at one level, consumer behaviour becomes irrational when faulty cognitions and repeated poor decisions lead to sub-optimal outcomes – that is when costs exceed benefits. Consumer demands play a decisive role in determining the supply of gambling products. Given limited opportunities for alternative leisure pursuits coupled with the allure of life-style changes, individuals from low-income brackets will gravitate toward venues offering affordable entertainment and hospitality. In response, market forces re-distribute gambling products to the more profitable areas, that is, socio-economically disadvantaged regions, thus maintaining the regressive effects of gambling. In this context, regressive means that low income earners spend a larger proportion of their income on gambling than high income earners, such that gambling functions as a regressive tax.

2.1.3 Socio-political Environment

Although consumers often readily embrace gambling when given the opportunity, the demand for introducing gambling into a community originates in commercial interests. There is little convincing evidence that community members lobby for the introduction of gambling outside the sphere of industry interests. Consistent with microeconomic processes, industry operators determine which products are supplied, and through effective marketing create a demand. Consumer behaviours sustain the supply through consumption of such products.

As Chambers (2011) argues, the adoption of gambling in a jurisdiction is the end result of socio-cultural and socio-political forces. Socio-cultural factors dictate the extent to which gambling is considered a legitimate product; the extent to which gambling is liberalized and made available; and the degree to which communities express opposition to its introduction on the grounds of moral turpitude or harm. These concepts are discussed in more detail in section 3.1.2 Socio-Cultural Attitudes.

Politics plays a crucial role in shaping the gambling environment. Political decisions are also subject to economic pressures in response to international competing interests and retention of on-shore revenue arising from online gambling facilities. Currently, increasing numbers of licensed Internet operators are attracting cross-border participants resulting in a metastatic global expansion of Internet gambling. Political and economic systems are also extremely important in determining where and how commercial gambling will be made available to people as well as which groups are most likely to be labeled problem gamblers. Unlike other consumer products, legal gambling has largely been shaped by government decisions rather than economic imperatives. Since the 1980s, governments’ reluctance to raise taxes has led to the rapid expansion of some forms of gambling to generate revenues. Within the broader context of contemporary forms of wealth redistribution, the upward diffusion of wealth through commercial gambling has been accompanied by a downward diffusion of responsibility and victimization as individuals in society with fewer financial resources to buffer the adverse effects of gambling losses are more likely to be labeled as problem gamblers (Volberg & Wray, 2007).

When new forms of gambling are legalized, they reach into society in ways that further contribute to their legitimacy and acceptance. This is not merely a matter of the de-stigmatization of a formerly “deviant” activity or a new acceptance of gambling by individuals and communities. Changes in availability are accompanied by major institutional shifts. Gambling operations and oversight become part of the routine processes of government. Commissions are established, revenues distributed, and industry, worker and customer constituencies develop. National, state and local governments become increasingly dependent on gambling revenues to fund essential services. So too, to varying degrees, do other sectors of society including voluntary organizations, churches, the mass media and, more recently, universities and specialist harmful gambling agencies. Non-gambling occupations and businesses – accountants, lawyers, architects, public relations and advertising, security services – expand their activities to provide for the gambling industry.
Retail operators of various kinds, such as restaurants, hotels and social clubs, come to depend on revenue from gambling to operate profitably. Finally, gambling industry executives and political action committees became key sources of funding for political parties, elections, and ballot initiatives (Volberg & Wray, 2007; Abbott & Volberg, 1999).

### 2.1.4 Public Policy

Another key area which has not been well researched to date is public policy surrounding gambling. Some politicians and regulators believe that state controlled gambling companies with a monopoly are more effective in minimizing harmful gambling than private companies on a competitive market. This belief rests upon the assumption that a state-owned company can give priority to responsible gambling measures, since it does not need to maximize profit. Others, however, believe that gambling problems could be reduced equally effectively through appropriate regulation of private gambling companies on a competitive market. There is currently no research that gives support to any of these positions (Planzer & Wardle, 2011).

In the European Community (EC) there is no unified and harmonized regulation of gambling. Member states therefore have a certain freedom to restrict their gambling markets in ways that they find appropriate. However, if national restrictions violate EC articles 49 and 56 (Freedom of establishment and Freedom to provide services, exArticleTEC and 49 TEC respectively) they must be made for acceptable reasons. Among the overriding reasons that the case law of the European Court of Justice have identified are those relating to the public order, such as prevention of fraud and illegal gambling, consumer protection and prevention of excessive gambling. Membership in the EC has therefore put harmful gambling on the political agenda in many countries with monopolistic state-owned gambling companies (Binde, 2007; Binde 2013; Cisneros Örnberg & Tammi 2011). State-owned and foreign based Internet gambling companies compete for being the most responsible in the aspiration to support their claims about the legal basis for various regulatory systems (i.e., monopoly versus free competition in a licensing system).

Globally, the area of gambling policy is both important and underdeveloped. Stakeholders in the gambling field frequently allude to gambling policy without a rigorous attention to definition, scope, and evaluation. A definition of public policy on gambling would reflect a broad statement of purpose or intent on gambling direction within the public domain. Its origins would be initiated or endorsed by elected officials, governmental bodies, and/or regulatory structures. It would aim to address such matters as the scope of gambling activities, types of games, limits on availability and jurisdictional authority whether it is provincial, national or international. Healthy public policy would reflect and be responsive to public opinion, promote interest in the gambling issue, foster public discourse, and shape a socially responsible direction. Public policy is often expressed in legislation, regulation, or through governmental reports and commissions. It can be expressed nationally, regionally, and at the local municipal and community level. At the end of the day, any public policy on gambling must articulate the broad goals, methods for monitoring implementation and success, as well as a structure and commitment for formal evaluation.

In many countries, the goals of public health policy on gambling can be conceptualized as revenue generation, responsiveness, and responsibility. Revenue generation is intended to optimize both governmental revenue, as well as private sector investments. Research examining per capita expenditure of gamblers (in a number of jurisdictions) demonstrates that a disproportionately high percentage of overall gambling revenue comes from people with moderate and severe gambling problems (Williams & Wood, 2007b). Another dimension to revenue is the challenge to recruit new gamblers, either within or evolving age cohorts, local community members, or tourists. Public policy needs to be receptive and responsive to the populations they serve. Gambling, usually called gaming by the revenue stakeholders, becomes a focus for advertising and marketing gambling activities, whether for casinos, lotteries, Internet, horse racing, or other gambling types. Often times the messaging becomes positioned as a form of recreation and entertainment, and can be government or self-regulated. Responsibility is the other key component of public policy. Language such as healthy public policy, social responsibility (personal, corporate, and governmental), and casino accreditation, are often the themes identified for active preventative and protective programming and public messaging.

Healthy public policy is a related lens to understand, implement, and evaluate the impact of gambling initiatives. The themes are to promote healthy and low-risk gambling behaviour, to prevent harms and associated problems, and to protect youth and other vulnerable populations from potential harmful consequences of gambling.
To date, significant public policy issues arise around casino expansion, Internet gambling, youth and vulnerable population protection, gambling advertising and marketing, the distribution of revenues and social costs, the impact on local communities, and the help resource applications of both prevention and treatment. With respect to research, on a global level to date, public policy has not received the high level attention that is warranted by academics and policy evaluators. To date, academically-linked researchers have been slow to address the public policy issues in the gambling domain. As we look to the future, a challenge for all citizens would be the development of a global charter on gambling, similar to high level initiatives in the alcohol, drugs, and tobacco fields.

2.1.5 CORPORATE ENVIRONMENT

Corporations that are involved in the supply and marketing of gambling products with the potential to create harm have a responsibility to maintain standards of ethical practice. This necessitates adopting a corporate philosophy that balances economic expansion and profits, with socially responsible practices that reduce harm. This ranges from manufacturers of products such as gaming machines and Internet-based gambling to operators of venues and marketing companies. Manufacturers are confronted with the dilemma of designing and constructing devices that are popular but do not lead to addictive propensities. Evidence demonstrates that sounds, lights, near misses, and losses disguised as wins are features of gaming products that serve to generate excitement and contribute to continued gambling. Some elements incorporated into machines such as free-spin features are particularly conducive to persistent play. In Internet gambling, free-to-play sites contained elevated probabilities of winning compared to pay-to-play sites that result in false impressions of personal skill and over-inflated beliefs of winning. Venue operators have a corporate responsibility to ensure that individuals are not offered inducements or incentives to gamble, or provided with alcohol that impairs judgment. They also are imbued with the responsibility of actively identifying signs indicative of excessive/harmful gambling and intervening in a timely manner to minimize losses. Although not established by law, there is a moral obligation for corporate entities and operators to maintain a duty of care not to exploit vulnerable individuals.

2.1.6 CULTURE OF SOCIAL RESPONSIBILITY

Attitudes toward social responsibility heavily depend on prevailing economic frameworks and political structures. More capitalist economies emphasizing free-market competition and individual responsibilities are generally less likely to be responsive to regulatory policies that restrict economic expansion. Such governments tend to accept the legitimacy of the industry and intervene in order to manage unintended consequences by influencing demand rather than supply (Chambers 2011). They often promote responsible gambling and consumer protection through regulatory means and funding of counselling services. They focus on a culture of responsibility that promotes self-regulation and personal responsibility for decision making. A broader focus would include personal, corporate and social responsibility.

2.1.7 AVAILABILITY OF LEISURE OPTIONS

Gambling offers unique incentives in terms of potential financial gains and meeting other psychological needs such as the allure of significant life-style changes. In many jurisdictions gambling is readily available and accessible, particularly with the option of Internet gambling (as discussed in section 2.2.1, Accessibility). This feature, coupled with limited access to affordable alternative leisure activities by low-income individuals, increases the attractiveness and utilization of gambling. Further, gambling outlets can be located in socio-economically disadvantaged areas in venues that offer cheap food, beverage and entertainment. In these areas, limited income can restrict an individual’s capacity to travel to other parts of their community that might offer other leisure options. Therefore, such individuals tend to access facilities close to home where gambling is available.

The local geography plays a significant role in the availability of and accessibility to gambling. The types, number and concentration of venues where gambling is located; opening hours; conditions of entry; availability of transport; available affordable alternative recreational facilities; and the physical visibility/prominence of venues are factors that govern the proximity of gambling opportunities within a defined geographical region (Productivity Commission 1999). Destination gambling venues densely located and promoted to tourists in a local geographical area plays an instrumental part in attracting large numbers of individuals motivated to gamble. Las Vegas, Macau, and Singapore are good exemplars of such destinations.
Given the mobility of the participants, gambling-related harms may be less evident at the local level as harms are transported on return to their place of origin.

2.2 Gambling Exposure

Gambling exposure can be defined as the extent to which populations or population sectors come into contact with gambling activities (Abbott, 2007). Exposure is strongly influenced by availability: that is, the type, number, distribution and accessibility of gambling activities. Gambling participation is measured by involvement in specific gambling activities and includes assessments of frequency, duration and expenditure. Participation can become problematic when the gambling participant and/or other people experience harm as a consequence of his or her participation.

Gambling types vary in their potency and ability to lead to harm. Some types of gambling such as lotteries and raffles are relatively benign. Other types (e.g. Electronic Gaming Machines; (EGMs), casino table games, horse track and sports betting) can more easily lead to harm especially through regular, prolonged participation because they are continuous in nature and involve an element of skill or perceived skill (Binde, 2011; Abbott et al., 2004; Raylu & Oei, 2002; Walker, 1992).

There are also indications that problems develop more rapidly in association with some types of gambling (for example EGMs) than others (Evans, 2003), but that these problems may be more transient (Abbott, Williams & Volberg, 2004). Therefore, it is important to take into account exposure levels for different types of gambling. It is also important to develop more refined ways to assess the risk potential and harm associated with different gambling types and closely analyze the settings within which they are provided (Peren, 2011). The risk potential of various forms of gambling is discussed in section 2.3 Gambling Types.

In this section, we discuss the following factors related to gambling exposure (accessibility, context, gambling setting, and adaptation) in greater detail. There is a large body of research on gambling participation and harmful gambling, their associations with the availability of particular gambling forms, and changes in participation and problems over time. These studies are predominantly cross-sectional and do not establish the direction of relationships or causality. Further work is required to develop more refined measures of gambling exposure and the contextual and environmental factors that influence participation and problems. Until recently there has been a dearth of high quality prospective studies that enable the incidence (onset) of at-risk and harmful gambling to be assessed and identify the factors implicated in harmful gambling development including recovery, remission and relapse. Studies of this type and natural experiments enable stronger causal inferences to be made. Recent meta-analyses and reviews have provided corroboration for both exposure and adaptation hypotheses (see below); however, research examining factors responsible for adaptation, including the possible impacts of policy and regulatory measures, is in its infancy.

2.2.1 Accessibility

Historically, some societies had little or no exposure to gambling (Binde, 2005). Others experienced long-term alternating cycles of liberalization and restriction – with the latter typically linked to rising official and public concern about gambling eroding morals and public order (Rose, 2003; Miers, 2004). During the past two to three decades, gambling availability, participation and expenditure have markedly increased around the world. This expansionary phase is quantitatively and qualitatively unprecedented and is affected by interrelated forces that continue to drive the global evolution of commercial gambling (Abbott & Volberg, 1999). In addition, there is the rapid expansion of Internet gambling sites which allow access from home, work and portable devices. However, in a number of populations during the past decade, participation has declined considerably despite further increases in availability. In some of these cases expenditure has continued to rise, in others to level out, or decline. These changes may be aspects of adaptation, which is discussed further later in this section.

Accessibility of gambling activities is a necessary condition for gambling participation and in turn, participation is necessary for the development of harmful gambling. It is widely believed that greater availability of gambling and associated changes in attitudes towards gambling have led to both increased participation and an increase in gambling-related harms. Orford (2005) has stated that although causation is complex and multifactorial “the more the product is supplied in an accessible form, the greater the consumption and the greater the incidence and prevalence of harm.” Major reviews of relevant literature and official inquiries have generally agreed, with varying degrees of qualification. Recent research (Williams, Volberg & Stevens, 2012) has found that Orford’s argument may hold in the early phases of expansion of the gambling market, but potentially...
not during the past two decades in most jurisdictions. Many aspects of accessibility or exposure have been identified but only a few have been studied. Overall the conceptualization and measurement of exposure is not well developed. Some work has been done to create measures of exposure but these tend to be specific to single gambling activities or jurisdictions.

Numerous surveys have examined differences in self-reported gambling participation between regions and population sectors. Others have assessed participation changes over time. Some have considered associations between availability and participation, including participation changes following the introduction of new gambling forms or a significant change in provision (Abbott et al., 2004). The findings from most studies are consistent with the view that increased availability of gambling opportunities is associated with an increase in the percentage of the exposed population that participates. In a number of instances, the introduction and expansion of some forms of gambling and/or gambling settings has been followed by marked changes in the demographic mix of people who take part in gambling activities. However, in a number of jurisdictions, initial increases in participation have been followed by significant decreases, even when availability continued to increase.

Many studies using official data sources demonstrate strong relationships between gambling availability and per capita gambling expenditure. Casinos and EGMs have typically dominated markets within a few years after their introduction. Where EGMs are widely distributed outside casinos, strong co-variation is typically found between EGM numbers and EGM expenditure. Strong relationships have also been found between EGM venue densities and expenditure at local and regional levels (Marshall, 2005). However, there are instances where expenditure continued to rise for a number of years after machine numbers had been capped. In some cases this appears to have been a consequence of machines being relocated to communities where financial returns can be maximized (Productivity Commission, 1999).

It is important to note that there are many different types of gambling undertaken in diverse settings, appealing to different sorts of people and perceived in various ways by participants and observers (Abbott, 2007). These differences, among others, influence whether or not people take part and whether or not participation becomes frequent or problematic. Research has shown that under certain circumstances the relationship between increased exposure and increased problems will break down. Relationships between availability, participation and problems are complex and consideration needs to be given to the duration of exposure, as well as to individual and environmental factors that moderate exposure effects (Williams, Volberg & Stevens, 2012; Abbott & Volberg, 1999; Abbott et al., 2004; Shaffer et al., 2004). Gambling exposure is also significantly influenced by political decision making. Most gambling activities are heavily proscribed with legal and regulatory controls determining many aspects of provision and accessibility. Access to gambling activities, as with other products, services or facilities, is determined by a multitude of factors. In addition to legal considerations, spatial distribution and a variety of economic, social and cultural factors are implicated.

### 2.2.2 Context

The context of gambling is of great importance to gambling exposure and to social factors discussed in section 3.2 Social Factors. Apart from jurisdictions, communities and localities, there are additional, more local contexts within which gambling exposures can vary. These contexts include families and workplaces, as well as reference, cultural and religious groups. Typically, most people report being introduced to gambling within their family of origin. Commencing gambling at an early age is a risk factor for harmful gambling. People who commence gambling in late adolescence or adulthood more often report being introduced to gambling by external socializing agents including friends, advertising, work colleagues and partners/spouses (Abbott, 2001a).

In the past, increases in gambling have most often been explained by availability of money; availability of gambling options (especially in the case of problem gamblers); and advertising (Abbott, 2001b). One study found that while adults who reported gambling before the age of 13 years were more likely to be current problem gamblers the same was true of people who reported starting gambling aged 25 years or older (Abbott & Volberg, 2000). Those introduced to gambling in their late teens and early adult years had a very low prevalence of harmful gambling, raising the possibility that initial participation might lead to lower long term risk of harmful gambling. In a 2006 study, Turner et al. found a non-linear (quadratic) relationship between age of gambling onset and problems (Turner, Zangeneh & Littman-Sharp, 2006). Most non-problem gamblers began to gamble between the ages of 18 and 23, while pathological gamblers began to gamble
either before 18 or after 23. In both studies, it is possible that the elevated risk for later onset gamblers might have been a consequence of the relatively recent introduction of EGMs and casinos.

Spouses or partners and other family members are also most often mentioned as gambling companions, although this varies across venues, gambling forms and population sectors (Abbott, 2001b). Adolescents and adults, who gamble frequently, particularly problem gamblers, report much higher levels of gambling participation in both current families and households, and in their family of origin.

Substantial variation in gambling participation has been found across occupational and religious groups. Walker (1992) among others has cited sociological studies dating back to the 1950s that suggest ways in which work and other reference groups can encourage and discourage gambling. People working in the gambling industries may have an elevated risk for harmful gambling. Shaffer and Hall (2002) found high rates of harmful gambling among casino employees, especially younger and more recent employees. Longer-term employees had lower rates. They interpreted this as indicating elevated risk during early exposure, followed by adaptation.

### 2.2.3 Gambling Setting

Gambling takes place in many different locations. Commercial forms of gambling, including casinos and gaming machines at social clubs and hotels, occur in locations where some vulnerable groups in the population feel safe compared with venues where less legitimate forms of gambling occur. There is some research to suggest that women, older adults and some migrant groups prefer to gamble in venues where they feel physically safe and comfortable. These feelings of safety and comfort may lead some people to gamble more than they can afford.

In addition to the number and distribution of particular gambling types and venues, a variety of more proximal, situational or contextual factors have an impact on gambling exposure, gambling participation, and harmful gambling (Abbott, 2007; Thomas, Bates, Moore, Kyrios, Meryedth & Jessop, 2011). Venue entry requirements and the legality, nature and perceived safety of gambling settings have an influence on who will participate and what their gambling behaviour will be like. The purpose of the activity, association with other attractions, alcohol availability, venue layout, as well as light, colour, sound effects and background odours, have also been shown to influence the time and money spent gambling (Abbott et al., 2004; Finlay et al., 2010).

It appears likely that the co-location of ATMs and credit facilities with certain gambling types contributes to at-risk and harmful gambling. This likely extends to proximity and access to loan sharks as well. A number of gambling activities are only accessible in venues licensed to serve alcohol. While this helps to restrict access by minors, there are indications that consuming alcohol while gambling reduces inhibition and leads to more intensive and more risky gambling behaviour. Smoking bans, at least in the short to medium term, have led to significant reductions in gambling participation and harmful gambling as evidenced by the number of help-seekers.

A number of measures have been proposed or introduced intentionally to promote moderation in gambling behaviour and reduce harmful gambling. Some measures include preventing intoxicated people from gambling; prohibiting credit or cash advances for gambling; training staff in responsible gambling practices; pre-commitment to specified loss and/or time limits; controls on advertising and promotions; cheques not cashed for large sums; self-exclusion programmes; facilities shut down for a least a few hours each day; as well as clocks and natural lighting in gambling areas. Research evaluating these and other prevention measures is not well developed and it remains uncertain what effect they have on gambling participation including at-risk and harmful gambling (Ladouceur, Blaszczynski & Lalande, 2012; Williams, West & Simpson, 2008).

Since 1995, gambling on the Internet has grown rapidly - a trend that is likely to continue as access on mobile devices such as smart phones and tablets takes different gambling activities directly into homes and workplaces throughout the world. While base rates are low, Internet and remote gambling has increased significantly despite efforts of governments to control or manage access (Williams, Wood & Parke, 2012; Wood & Williams, 2009). On the other hand, Internet gambling has increased in Sweden and some other European countries because it is supported by state-owned gambling companies. Online gambling will continue to evolve with ongoing changes and competition among Internet gambling sites, with new demographic groups such as women and older adults entering the market, and with a growing number of jurisdictions legalizing and regulating these activities.
The nature of online gambling makes it inherently more problematic than most other forms of gambling. Greater convenience, easier access, the solitary nature of play, the ability to play when intoxicated, the lack of realistic cash markers, and the ability to play multiple sites and/or games simultaneously are all features that contribute to a diminution in players’ ability to control their involvement. Another challenge is that Internet problem gamblers have a much more difficult time avoiding gambling venues which are available at the click of a mouse (Schull, 2005; Wood, Williams & Lawton, 2007). Internet gambling allows possibilities for the player to limit the amount of money staked and the hours of play. Gambling companies may also implement player tracking systems that warn players if their gambling behaviour appears to become risky. The internet allows for more sophisticated responsible gambling measures than any other way of providing gambling.

2.2.4 Adaptation

The area of adaptation is under debate and there are currently different perspectives on it. There is a school of thought which suggests that over time the phenomenon of adaptation generally occurs due to ‘host’ immunity, protective environmental changes, as well as regulatory and public health measures. As a result problem levels reduce, even in the face of increasing exposure. Adaptation may be accelerated by regulatory and public health measures. Abbott (2006) has proposed that exposure to new gambling forms, particularly EGMs and other continuous activities, puts previously unexposed individuals, population sectors and societies at high risk for the development of gambling problems. As discussed in section 2.2.1 Accessibility, increased availability of gambling activities has been shown to be associated with increased participation and harmful gambling in some studies. However other studies, particularly those that have assessed change over moderate to long time periods in the same population, have failed to demonstrate sustained increased in participation and problems during periods of rising availability and expenditure. In a number of cases, participation and problem levels have apparently fallen during these periods.

Meta-analyses of relevant bodies of research have been conducted to assess relationships between exposure, availability, time and harmful gambling. Most recently Williams, Volberg & Stevens (2012) conducted analyses using 68 national prevalence studies world-wide, 27 Australian state/territory studies, 40 Canadian provincial studies and 67 US state studies. They first produced ‘standardized’ prevalence estimates to take account of major methodological differences between the various studies (harmful gambling measure; time-frame; administration format; survey description; and response rates). These differences have been known to influence prevalence estimates. In the Storer, Abbott & Stubbs (2009) study only one difference, the harmful gambling measure used, was adjusted to facilitate comparison. Like Shaffer et al. (1997), Williams, Volberg & Stevens confined their consideration to time. They did not include measures of gambling availability or consumption. They concluded that in most jurisdictions harmful gambling prevalence decreased relative to earlier rates; that this decline was more evident in some jurisdictions and started at different times; and that prevalence had also increased prior to a decline. Given that gambling availability and expenditure had continued to increase during the past 30 years, they concluded that the results provide support for the view that increased availability is related to increased harmful gambling, as well as for the view that populations tend to adapt over time.

2.3 Gambling Types

Research has shown that most individuals do not tend to be drawn to all gambling types, but will instead be focused on one primary type (Stevens & Young, 2010; e.g., lottery versus slot machines). The factors behind a preference for a primary gambling product are the wish to win money; the need for arousal; a need for escape; seeking challenges; sociability; or as a means to relax through games such as bingo or EGM games. In this section we focus on the following risk factors related to gambling types: event frequency and arousal, skill and perceived skill, and sociability. Risk assessment instruments will be discussed and will further illuminate the risk potential of various gambling types.

In general, much research has been conducted on arousal, and the strength of evidence is fairly strong. The strength of evidence for understanding the psychology of lottery products is less strong. Although not directly proven, more recent studies on EGM from the non-harmful gambling perspective, Blaszczynski and Griffiths separately have indicated that EGMs are being programmed to be more ‘spectacular’ in order to appeal to those that need this arousal — which is not a contradiction from those who show less emotion or reaction at older EGMs. Rogers (ibid.) highlighted that modelling a coherent theory of lottery
play is particularly difficult. Consequently, much of the research done was indirect (Rogers, 1998). The strength of evidence for skill and perceived skill is again mostly by inference, as most researchers were focusing on other variables (such as arousal or cognitive function) rather than skill by itself. Yet, gamblers tended to distinguish between skill (or “control”) based games, as opposed to games of chance. In the case of sociability, although there are very few studies on this aspect of gambling behaviour, the evidence is fairly strong. The audience that is observers or other players, who are surrounding the gambler, has been shown in the few studies done on this to significantly affect gambling behaviour although evidence for this is currently limited.

### 2.3.1 Event Frequency and Arousal

While evidence is limited, the frequency of a particular type of gambling and the associated outcome appears to be important to individuals who tend to gamble in order to satisfy their need for arousal, almost as much as those seeking monetary rewards. Those individuals who gravitate towards high frequency types of gambling such as EGMs are gambling to escape boredom or to experience excitement at quick intervals (Brown, Rodda & Phillips, 2004). In high frequency gambling, there are often enough “near misses” to keep individuals entertained, if excitement is what they are seeking.

However on some modern gaming machines, players have so many near misses so as not to notice them, and have little impact on the excitement level of the individual. A few studies have suggested that the harmful potential of such high frequency games is that if an individual is repeatedly seeking a feeling of arousal (a “high”) from wins or near misses, the bets made may be frequent and substantial (Breen & Zimmerman, 2002; Holtgraves, 2009). Unfortunately, there have not been enough studies on arousal and gambling; hence, the overall weight of evidence is not strong and more studies are required to further explore the relationship.

On the other hand, some individuals who gravitate towards lottery type products may tend to demonstrate more patience and seem to have the ability to wait for the monthly or weekly drawing of the prize (Rogers, 1998). At the same time, others may choose to gamble on both lotteries and EGMs. Such low frequency gambling types are usually cheap to play and often do not require any particular skill level. However, the size of the reward itself can be an attractive component of this gambling type, which in turn can create an urge to engage in potentially harmful gambling behaviour. Many EGM and bingo gamblers seek relaxation through these games, but risk shutting out their relationships and environment – a maladaptive coping strategy for stress and personal problems. More specifically, rather than betting frequently and quickly as in the case of high frequency gamblers, individuals who enjoy lottery products may not bet frequently but will bet ‘heavily’ - that is they may buy many lottery tickets and be willing to wait until the end of the week or month to find out if they have won. It is important to note that lottery products are typically not a challenging or highly social gambling type (Rogers, 1998). Therefore, individuals who seek company while gambling will be drawn to other gambling types.

### 2.3.2 Skill and Perceived Skill

Some individuals are drawn to gambling products such as poker and blackjack that involve an element of skill because they believe they are ‘challenging’ themselves in addition to competing against other players or the house (i.e. the gambling facility; Cotte & Latour, 2008). For these individuals, while monetary rewards remain important, the event frequency is not so important. Of greatest importance is how they derive intrinsic satisfaction from their perception that it was their personal skill and/or experience, among other factors, that allows them to win (Bjerg, 2010). In this sense, individuals might erroneously believe that they can “improve” their gambling skill through learning and experience, which in turn could involve a period of regular (financial) losses.

Other partially skill-based gambling types are sports betting, which would include horse racing, and speculation on the stock market. Individuals drawn to such gambling types tend to find pleasure in researching the event and testing their own “expertise” in the field while making their bets. Furthermore, these individuals are seeking to enhance the entertainment value of the event or sport itself by betting on its outcome. In other words, not only do they hope their team (or horse) will win but also that they will enjoy a windfall from that event (Bonnaire, Bungener & Varescon, 2006).
2.3.3 Sociability

It is clear that different people have different predispositions towards sociability; each of us can be classified as introverts or extroverts or as landing somewhere along this spectrum of sociability. In the context of gambling, one could speculate that those who seek sociability might tend to gravitate towards gambling types within a casino setting or to other games such as bingo; sports and horse betting with friends who have similar interests; or gambling in local ‘betting shops’ where people gather to play and socialize. Such individuals might participate in certain games such as roulette or dice games, where there are many other players or spectators present to heighten the arousal of wins or near misses. Individuals who simply want the challenge of the game and the winnings but seek to avoid sociability will be drawn to Internet-based games, where they need not socialize with others (Shaffer et al., 2010). This does not suggest that casinos are necessarily sociable locations; even within populated settings such as casinos individual gamblers are at risk of becoming isolated, spending long periods of time at EGMs for example. Isolation is certainly possible with other gambling types such as EGMs, where the technology, special effects and other features are designed to enhance an individual’s sense of arousal from wins or near misses, thereby encouraging long periods of individual, isolated play (Rockloff & Greer, 2010; Parke & Griffiths, 2006). However, while some people are attracted to online gambling because they are not required to socialize, others are drawn to online gambling because of the opportunity to compete against many other players.

2.4 Gambling Resources

Problem solving is a systematic process involving the identification of a problem; analyzing its components; developing and evaluating potential solutions; and overcoming obstacles before settling on a course of action. In the context of gambling, the main problem for a proportion of the population can be identified as significant negative consequences resulting from recreational and legally available gambling activities. This leads to an important point about the optimal characteristics that a gambling environment should possess in order to minimize the incidence and prevalence of harmful gambling and reduce harm to individuals. In this section, we discuss the notion of harm reduction as we outline the following factors relevant to gambling resources in the context of problem solving, treatment and help: general perceptions of problem solving, harm reduction, prevention and protection, mutual and self-directed help, and treatment.

The strength of the evidence for these risk factors varies considerably. The strongest evidence comes from evaluation of mutual and self-directed help and treatment studies. Although gaps remain, a number of reviews reveal strong support for effectiveness (e.g., Stea & Hodgins, 2011). In contrast, the literature on the influence of general perceptions of problem-solving and harm reduction is smaller and less cohesive. Similarly, there is a small body of literature on specific harm reduction strategies and prevention programming.

2.4.1 General Perceptions of Problem Solving

Individuals’ environments vary in terms of how prevention of problem development and resolution of problems are conceptualized, supported and facilitated. This is true both in a general sense for a variety of personal struggles, and specifically in relation to gambling harms. These environmental features include public attitudes that support individual self-determination, self-care and healthy living. The landscape may or may not include structures that provide support for individuals at risk, or those already struggling with a variety of individual, family or social issues. For example, the role of physicians, teachers, clergy and financial institution employees might include the expectation that they will support individuals who are struggling with a variety of problems, one of which might include gambling-related harm.

Similar expectations may exist about the role of family members in supporting or caring for those within the family that are dealing with gambling related problems. Finally, an important question -- whose answer can vary based on the society and its intrinsic cultural values -- is to what extent is an individual expected to solve problems on his or her own without support.

2.4.2 Harm Reduction, Protection and Prevention

The legal and social landscape may also support the existence of harm reduction policies that limit individual exposure to the risks of gambling. Some jurisdictions have fully articulated public health models that include gambling within their purview. School-based prevention programs have been developed and evaluated and are offered in some jurisdictions. Public awareness campaigns promoting responsible gambling behaviours are less well researched in
terms of effectiveness. As outlined in section 2.2.1 Accessibility, a variety of harm reduction approaches have been proposed and implemented in different jurisdictions including offering self-exclusion programs within gambling venues, limiting the number and location of gambling outlets in a region, restricting trading hours, banning smoking in venues, preventing credit betting, enforcing age restrictions, offering voluntary or mandatory pre-commitment, reducing maximum bet limits, removal of Automated Teller Machines (ATMs), and lowering prize levels. However, the evidence base for the effectiveness of such harm reduction approaches is often inconsistent or non-existent due to the absence of prospective/longitudinal studies, or counteractive measures introduced by gambling operators.

In contrast to reducing harm, the landscape may promote increased exposure to gambling. Direct advertising and marketing by industry operators and indirect promotion through media representations (films, television) are key factors that contribute to the attractiveness and glamorization of gambling as a recreational product. In some countries, such as Australia, the telecast of sporting events includes commentators reporting the odds offered by online and telephone sports betting operators, coupled with gambling-oriented commercials. Online betting company logos and advertisements are placed in prominent positions on the sporting field and players’ apparel provides additional advertising linking prominent sporting figures with gambling.

2.4.3 Mutual and Self-directed Help

Different environments may also include more specific types of support relevant to harmful gambling. Some countries have well established mutual support groups such as Gamblers Anonymous and Gam-Anon (Binde, 2012). In addition, local libraries and websites may provide culturally and linguistically relevant support materials for self-guidance for individuals who are over involved with gambling. However, little is known about the effectiveness of these problem-solving options.

2.4.4 Treatment

Although not all problem gamblers require formal treatment services, depending upon the general perception of problem solving and other support, it is clear that many affected individuals benefit from treatment involvement. Availability of treatment varies dramatically across jurisdictions. A comprehensive treatment system would include evidence-based treatment of varying intensity and modality. These treatments would include both face-to-face and distance individual counseling, group treatment, day programs and residential services. In some jurisdictions, some or all of these services are available as part of mental health treatment systems, and in others, they are positioned within addiction treatment or are free standing services. These features have implications for who accesses treatment and at what level of distress and harm.

Many of these differences in environment have not been well-researched to date. However, a growing body of research has focused on the efficacy of specific intervention strategies, including individual, group, and self-directed treatment interventions. Results generally support the efficacy of cognitive-behavioural treatment models, with more limited but positive results for pharmacological and family approaches (Stea & Hodgins, 2011). Investigations of prevention programs (Williams et al., 2008) and more comprehensive public health strategies are sparse (Hodgins et al., 2011).

2.4.5 Risk assessment

Almost all researchers agree that some forms of gambling are more closely associated with harmful gambling than others. Lotteries, for example, are generally regarded to be relatively harmless while EGMs often are closely associated with harmful gambling. Indications of the riskiness of various forms of gambling can be obtained from the analysis of data from prevalence studies (Binde, 2011), from statistics about the games played by people who seek help for harmful gambling, and from risk assessment instruments. It is important to keep in mind that the riskiness of a particular form of gambling is relative and depends on what other games are available in a gambling market at a given point in time (Binde, 2011).

Risk assessment instruments rate forms of gambling from relatively harmless to relatively harmful on the basis of a selection of factors that in research have been found to contribute to harmful gambling. The factors are given different weights depending on how important they are for the overall risk potential. Each factor in a form of gambling is rated on a scale and the sum of the weighted ratings is calculated. If a form of gambling is found to be unacceptably risky, some important factor can be modified so as to lower the risk potential. Risk assessment instruments are
currently being used mainly by gambling companies, but also regulatory authorities are beginning to use them in order to focus regulatory measures on the most harmful types of gambling.

There are currently three risk assessment instruments: GAM-GaRD (Wood, Griffiths & Parke, 2008); Tools for Responsible Games (TRG - Airas, 2011); and “Tool to evaluate the risk potential of different gambling types” (also known as AsTERiG - Meyer, Fiebig, Häfeli & Mörsen, 2011). The first two of these have been developed by a British firm and Finnish researchers, respectively. The third has been constructed by a group of German researchers and is freely available. It includes ten factors: event frequency, multigame / stake opportunities, prize-back ratio, light and sound effects, variable stake size, availability, jackpot, cash out interval, near miss, and continuity of the game. GAM-GaRD also includes ten factors while the TRG includes no less than 50 indicators across nine dimensions.

3. Discussion of General Factors Contributing to Harmful Gambling

3.1 Cultural Factors

Culture is the shared system of thought, meaning and morality of a people or ethnic group. It is manifested in norms, customs, collective knowledge, symbols, myth and ritual. Attitudes and traditions may differ between groups within a culture, but the contrasts are shaped by the overall cultural system. A subculture is a variation within a culture, comparable to a dialect of a language. Through its fundamental influence on meanings and values, culture has a multitude of impacts on the prevalence of gambling, the popularity of various forms of gambling, thoughts about and attitudes towards gambling, the practices of gambling, and the extent of harmful gambling (Forrest & Wardle, 2011; Lin, 2011; GAMECS Project, 1999; Loo, Raylu & Oei, 2008; Parish, 2005; Raylu & Oei, 2004; Scull & Woolcock, 2005; Tepperman & Korn, 2002; Wynne & McCready, 2004).

The functions and meanings of gambling vary significantly between cultural groups. Cultural views of gambling can vary within and across cultures with gambling being regarded as individual entertainment, a social activity, escapism from daily life, a hobby requiring skill, a way to test one’s luck, a quick way to make money, or something shameful. While some cultural meanings and values are likely to increase the risk for individuals to engage in harmful gambling, others are likely to decrease the risk. In this section we outline Cultural Factors that contribute to harmful gambling: ethnicity and traditions, socio-cultural attitudes, gambling subcultures, religion and other belief systems, representations and symbolism, and gender.

Strong evidence from many prevalence studies suggests that gambling behaviour and the rate of harmful gambling varies across ethnic groups in a particular jurisdiction (Williams, Volberg & Stevens, 2012). More research is required to better understand the cause of this variation, but some studies within particular ethnic groups suggest that religion, attitudes, beliefs, acculturation processes and other cultural factors contribute to the differences (e.g., Forrest & Wardle, 2011; Kim, 2012). Prevalence studies also typically show that gambling and harmful gambling varies with gender, class and age. This suggests that cultural factors are involved and there are some studies that explore these (e.g., Clarke & Clarkson, 2009; Corney & Davis, 2010). Studies of the cultural meanings and symbolism of gambling are relatively few and mostly consist of qualitative investigations using ethnographic, historical or interpretative approaches (for a review of the literature, see Binde, 2009 p. 44-57 which includes additional research references such as: Casey, 2003; Fisher 1993; Malaby, 2003; McMillen, 1996; Neal, 1998).

3.1.1 Ethnicity and Traditions

We have already acknowledged that views on gambling vary between peoples and cultural traditions. These views can range from gambling being a fully acceptable activity or even the norm on certain social occasions, to inappropriate and suspect in other cases. Population surveys often show that the demographic category of foreign born individuals has elevated rates of harmful gambling. However, neither minority ethnic groups nor migrant groups are a homogeneous, single group. The cultures and traditions of their countries of origin, and different processes of acculturation, must be considered. While harmful gambling prevalence may be relatively high in some ethnic groups, among other groups – especially among women in these groups – gambling and harmful gambling may be less common than in the host society due to gambling being viewed negatively; little involvement in commercial forms of gambling; and lack of money to spend on gambling. Many groups exhibit bimodal patterns of gambling.
whereby the group as a whole gambles relatively little, but those members who do gamble do so heavily and experience high rates of gambling problems (Abbott & Volberg, 2000; Kim, 2012; Volberg & Wray, 2007). These are likely sectors of populations in the early stages of introduction to commercial gambling.

In the case of immigrant groups, elevated rates of harmful gambling may have several causes. One category of causes is related to the culture and traditions of the country of origin. The immigrant groups may belong to a culture where views on luck, fortune and destiny increase the risk for harmful gambling or where the level of probabilistic thinking is generally lower. In their culture, gambling may be common and accepted, with heavy gambling less likely to be seen as a problem by the gambler or people around the gambler. In some migrant cultures great value is placed on the possession and display of wealth, which attracts individuals to the world of gambling where great amounts of money rapidly change hands.

By contrast, some cultures consider gambling to be so shameful that individuals might hesitate to talk about or seek help for gambling problems. Finally, in certain cultures there may not be much gambling but if immigrants then move to a host society with plenty of gambling, they may develop unrealistic expectations of making money, which in turn could lead to excessive gambling.

Another category of causes for elevated rates of harmful gambling relates to the experience of migration and of life in the host country. Certain individuals may feel discomfort because of perceptions of being uprooted, loss of social status, altered family roles in the new country and perceptions of being excluded and discriminated against. Such psychological strains may cause them to rely on gambling to relax, dissociate or spend time in a gambling subculture, which increases the risk for harmful gambling. Migrant groups also often include refugees who have suffered physical and emotional trauma and are often characterized by high rates of gambling problems. However, little is known about the precise link between trauma and harmful gambling. Further, in the host society, immigrants or refugees may have a socioeconomically disadvantaged position which in itself constitutes a risk factor for harmful gambling as discussed in section 3.2 Social Factors. Newcomers to the host country may also experience high unemployment rates and gambling becomes a way to fill up time and reach levels of excitement that cannot be found in daily life. To immigrants, casinos may become a place to meet with compatriots, as they are perceived to be welcoming, safe, multi-cultural settings not based on alcohol consumption and courting between men and women.

In summary, gambling problems of immigrants arise in the interaction between having roots in another culture, the experience of migration, and the process of integration in the host society. Thus, immigrants themselves do not constitute a problem in relation to gambling. In the case of indigenous minority ethnic groups, the main reason for elevated rates of harmful gambling has been argued by some to be a result of the often marginalized and disadvantaged socioeconomic position of such groups (Breen, & Gainsbury, 2013; Volberg & Abbott, 1997). Factors such as unemployment and low education are known to co-vary with harmful gambling as discussed in section 3.2 Social Factors.

### 3.1.2 Socio-Cultural Attitudes

The general attitude in societies towards gambling, which may fluctuate between permissive and disapproving, varies over decades and centuries. One cause for the variation is that modes of gambling and attitudes towards gambling tend to reflect the morals and values sustaining socioeconomic systems. As these systems change, attitudes towards gambling also change. One example is the shift from industrial society to consumer society. In the European industrializing societies of the nineteenth and early twentieth centuries, gambling was negatively portrayed as detrimental to work motivation (Bourgeois critique). It was also seen as harmful for the working class movement, bringing irrational and individualistic hopes of becoming rich to those who instead should fight for social and economic justice, as well as having detrimental consequences to workers in terms of money and time wasted (socialist critique; Dixon, 1991; Husz, 2002; McKibbin, 1979). With the emergence of the consumer society in the mid-twentieth century, these negative views gradually gave way to a more positive view of gambling as an acceptable consumption of leisure products.

Another possible cause for the variation in societal attitudes towards gambling is a cyclical process of excess and disapproval. “A period of liberalization and increased gambling among the population reaches a climax of excess, causing a backlash of disapproval and restrictions of gambling opportunities. People gamble less, but then the passion for gambling intensifies
again, the cycle is completed, and the process repeats itself” (Binde, 2009b, p. 55). Such a cyclical pattern has been observed in the USA and in Europe (Barnhart, 1992; Rose, 2003).

The general attitude towards gambling in society can be assumed to have an impact on harmful gambling in several ways. A permissive and accepting attitude will go hand in hand with an increase in the prevalence and intensity of gambling; according to the total consumption model (Lund, 2008), this will lead to an increase in the prevalence of harmful gambling. A more specific mechanism might be that the normalization of intense gambling in society makes it less likely that the gambling excesses of individuals are criticized by people around them, which reduces the social pressure to gamble responsibly.

The perception of gambling varies across a number of sociocultural divisions in society: social classes, political orientations, and age groups which are discussed further below. These varying perceptions can be assumed to have an impact on harmful gambling by making it more or less likely that individuals engage in intense gambling and/or in forms of gambling that are particularly likely to produce harm.

- Political orientations are rooted in moral values that influence the perception of gambling. For example, a liberal political view often accepts gambling as the choice of the individual and favors a liberal regulation of the gambling market. A socialist or conservative political view might disapprove of gambling as such views are based on beliefs in absolute moral values that often conflict with gambling.

- Social classes are characterized by specific configurations of sociocultural values that can shape the perception of gambling. For example, among American working class men in the 1960s, gambling was perceived as a masculine activity that enabled expressions of courage and comradeship (Zola, 1967). The aristocracies of 18th century France and Russia were much involved in high stakes gambling, often of a competitive nature (Kavanagh, 1993; Helfant, 2002). At the same time they often disapproved of gambling among the “lower” classes. The cultural elite of contemporary European societies, however, tend to despise gambling as an irrational and vulgar form of entertainment for those considered by them to be less educated (see also section 3.2.1 Social Demographics). Some forms of gambling are associated with specific social classes. For example, bingo is in Western societies associated with low income earners while roulette and other casino games, at least traditionally in Europe, is associated with the upper classes.

- Demographics: Age groups tend to hold distinct cultural values. Age cohorts carry throughout life some of the values that were imbibed in them in their formative childhood and teenage years. Age groups also tend to have relatively stable values. For example, over the last half century, “teenage culture” has been characterized by challenging accepted values, risk taking, and going to the extremes in lifestyle. The “golden years” of retirement are on the other hand characterized by a slow pace of life and plenty of leisure. Age groups therefore tend to differ as to perceptions of gambling and preferences for various forms of gambling.

3.1.3 Gambling Subcultures

A specific local gambling culture may evolve at some gambling venues. Most notably racetracks and casinos: some gamblers spend many hours a week at a single venue, get to know other gamblers and employees, and, over time, create specific modes of interaction, special vocabularies, behavioural norms, as well as a local lore of events and people (Fisher, 1993; Hayano, 1982; Rosecrance, 1985). Involvement in such gambling subcultures can be very rewarding for the individual but implies that these individuals spend a substantial amount of money on gambling. If an individual’s social life in the world outside the gambling venue is unrewarding and frustrating, he or she may be drawn towards a more satisfying social life in the gambling venue (Ocean & Smith, 1993).

3.1.4 Religion and Other Belief Systems

Religions have varying views on gambling. Local and polytheistic religions may have a positive view – including gambling in ritual and myth, and gambling having a spiritual dimension – but the large monotheistic religions tend to disapprove of gambling. Islam forbids gambling and Lutheran churches have traditionally condemned gambling (Binde, 2007a), which is the case also for Mormonism and Jehovah’s Witnesses. Roman Catholicism does not disapprove of gambling as such but provides warning about its excesses.

Formal religion has, for a century or more, been on the decline in Western secularizing societies. However, sentiments and beliefs of a religious nature tend to take new forms as people still wish to connect with and
probe the realm of the transcendental, spiritual and mystical; Through an analysis of cultural symbolism, Binde (2007a) suggested that gambling, to some extent, provides such a connection.

To the individual, gambling in contemporary societies may have a spiritual and existential dimension that contributes to excessive gambling (Currie, 2007; Kusyszyn, 1984; Wong, Leung & Lau, 2009). Gambling may fill an existential void and become important for situating oneself in society’s value system, embodying hopes of social acceptance, success and living a meaningful life.

Spirituality and faith may also help people to overcome gambling problems; spirituality is a cornerstone of the mutual support organization Gamblers Anonymous and twelve-step treatment programs (Ferentzy, Skinner & Antze, 2009). Some therapists and scholars maintain that treatment of excessive gambling should include spirituality and the gambler’s broader and deeper life concerns (Hänninen & Koski-Jännes, 1999; Lee, 2009; Nixon, Solowoniuk & McGowan, 2006).

More generally, adhering to a religious faith that disapproves of gambling is a factor that protects against harmful gambling, since it makes it less likely that an individual will gamble. If the individual nevertheless does gamble, the intensity is likely to be low. Participation in religious activities is one of the few identified protective factors against the development of gambling problems (Hayatbakhsh et al., 2006; Hodgins et al., in press). Magical thinking (i.e., ideas about the occult connection between entities which is often based on principles of contagion or resemblance) may be part of religious beliefs or held separately. In the latter case they may take the form of “half-beliefs”, ideas that influence thinking and behaviour even though people may admit that the ideas are irrational (Campbell, 1996). Numerous ideas and practices of a magical character have been documented in relation to gambling (e.g., Henslin, 1967; Teed, Finlay, Marmurek, Colwell, & Newby-Clark, 2012). It is not clear whether such beliefs inspire people to gamble or are a product of gambling, enhancing the experience of play by conferring to it a mystical dimension. In any case, magical beliefs may sustain an exaggerated involvement in gambling. For example the gambler may believe that it is his or her lucky day and a big win is likely to come. Ideas of fate may contribute to harmful gambling in a similar way. Some research suggests that such beliefs exist together with a lower level of probabilistic thinking in some cultures (e.g., Chinese cultures; Lau & Ranyard, 2005).

3.1.5 Representations and Symbolism

As already discussed, views on gambling are quite positive in some societies. Such positive views typically make their way into mass media (e.g., coverage of gambling news, stories about jackpot winners, televised poker tournaments, and suggestions on how to bet and gamble). Gambling also becomes a common topic in popular culture, such as movies, television series, novels and “urban legends” about remarkable stories of good or bad luck that gamblers are supposed to have experienced. Such representations portray gambling in a positive light, and through largely implicit symbolic and mythological messages they root gambling in culture and society (Binde, 2007b; Binde 2012b). Gambling games, which in themselves may be quite trivial, are imbued with positive qualities – such as having fun, excitement, and companionship – through which gambling acquires a moral and spiritual dimension. This can make gambling appear like a more interesting and worthwhile activity to pursue. To the extent that the total consumption model is valid for gambling, the ensuing elevated prevalence and intensity of gambling will contribute to harmful gambling.

The marketing messages of commercial gambling, the design of gambling equipment (e.g., Video Lottery Terminals (VLTs) and lottery tickets), and the architectural exterior and interior design of gambling venues, often make use of cultural symbols to communicate a message that gambling is fun, exciting and can make people rich. Different gambling games may be represented as having qualities that make them especially attractive for specific sociocultural groups (e.g., luxurious casinos for the rich and unpretentious bingo parlors for low income earners). The interior design of venues, in particular casinos, may contain symbolic and psychological cues that may modify the mood and behaviour of patrons and influence spending behaviour. Thus, marketing and gambling equipment and venue design may contribute to harmful gambling by increasing the prevalence and intensity of gambling; research is required to assess these potential relationships.

The long term impact of gambling advertising on attitudes towards gambling is difficult to assess. Some argue that advertising in general has a substantial impact on consumer preferences and attitudes towards the products promoted. Others argue, however, that advertising merely catches on to emerging trends in popular culture and changes in values. Advertising might boost these trends and value changes, but not create them or maintain them. On the individual
level there is some empirical evidence that gambling advertising influences how gambling is perceived. However, there is little research in this area of gambling studies (Planzer & Wardle, 2011).

Assessing the impact of gambling advertising on the extent of harmful gambling is even more difficult as there is no empirical research on the population level. On the basis of the available knowledge about how advertising works and the prevalence of harmful gambling, it has been suggested that the impact of gambling advertising, compared to other factors contributing to harmful gambling, is generally small (Binde, 2007c; Planzer & Wardle, 2011). However, in certain circumstances, such as when a risky form of gambling is introduced into an immature market and heavily promoted, advertising is likely to contribute more prominently to harmful gambling. For people who already have a gambling problem, the repeated cues to gamble may aggravate the harmfulness of their gambling (Binde 2009a).

3.1.6 Gender

Gender refers to cultural and social conceptualizations of femininity and masculinity, in contrast to the biological concept of sex (see Section 3.4.3). In many cultures, gambling is, or has been, perceived to be an activity more acceptable for men than for women. Specific types of games may also be perceived to be more suitable for men than for women, and vice versa. This reflects traditional gender roles. The cultural value of machismo may manifest itself directly in high-stakes risky gambling (Thompson, 1991) while the domestic and caring feminine role may connect with entering the lotteries (Casey, 2003). A pattern often found in Western societies is that females prefer chance games, such as bingo and lotteries, while men tend to play more than women on sports betting and other games where skill is assumed to be an advantage (Gausset & Jansbøl, 2009; Potenza, Maciejewski & Mazure, 2006). The frequency of gambling participation and the sums spent on gambling is almost always higher for men than for females. However, many countries and jurisdictions have witnessed a “feminization” of gambling in recent decades. For example, women more frequently engage in gambling in general and often in particular types of games, such as EGMs and online slots and bingo (Holdworth, Hing & Breen, 2012; Potenza, Maciejewski & Mazure, 2006; Svensson, Romild, Nordenmark & Månsdotter, 2011; Volberg, 2003).

Female harmful gambling may reflect the cultural and socially shaped differences in gambling participation between the genders. Females with gambling problems are more likely than men to be characterized as “escape gamblers”, using gambling as a maladaptive coping with stress and troubles in their everyday lives (Boughton & Brewster, 2002; Dow Schüll, 2002; Thomas & More, 2003). Another typical finding is that females in general begin to gamble harmfully later in life than men, but when the problems have started they progress more rapidly (Tang, Wu & Tang, 2007; Wenzel & Dahl, 2009). This however, could be an effect of repetitive forms of gambling, such as VLTs and bingo, which seem to be especially popular among females (Breen, 2004).

3.2 Social Factors

Social factors encompass both interactions among individuals and their collective co-existence. All spheres of human activity are shaped by interactions between social structure and individual agency. Social factors span from interpersonal relationships at the ‘micro’ level of social relationships into the environmental and cultural groups of factors at the ‘macro’ level of social structures and institutions. Social factors are important in shaping how commercial gambling is made available to individuals in different societies, and how individuals who develop difficulties with their gambling are viewed and treated by others. Social factors are also important in shaping attitudes and beliefs about different types of gambling and about harmful gambling and the best ways to prevent or reduce harm.

The interpersonal aspects of social factors encompass the relatively stable relationships that people form with each other in social contexts such as a family, peer group, workplace or a neighbourhood. In such contexts, individuals are aware of and affected by each other’s actions. Over time, relatively stable patterns of interaction evolve, and are perceived by those involved to be guided by explicit norms and values. Social and interpersonal relationships have an ongoing influence on people of all ages, but are particularly important in the socialization of children and youth.

Features of social and interpersonal relations constitute risk factors for harmful gambling in many ways. Close relationships with others who gamble regularly can lead people to gamble more than they might otherwise on an individual basis. These close ties can also interfere with an individual’s efforts to reduce or end gambling activity. Conversely, close relationships with others who gamble very little can positively influence people and protect them from developing gambling-related problems. However, for people who enjoy gambling, close relationships with others who gamble very little
CONCEPTUAL FRAMEWORK OF HARMFUL GAMBLING

Humans are social beings but maintaining interpersonal relations requires mental and emotional energy. Much gambling takes place in the company of others but social interaction in these settings may be quite restricted and formalized. For example, slot machine and bingo players may sit next to each other while playing but only interact occasionally. If players do interact it is typically only in relation to the game rather than more wide-ranging social discussion. This kind of limited interpersonal contact is appreciated by individuals who wish for some company but do not want to engage intellectually or emotionally with other players. They may already have problems handling interpersonal relations in the family, with friends, or at the workplace; gambling is thus a form of escape that can be exaggerated. Alternatively, individuals may long for genuine interpersonal closeness but lack the social skills to achieve it. This may create a “… vulnerability to seeking solace in addictive quasi-social behaviours such as gambling” (Porter et al., 2004, p. 3).

In this section, we will focus on social factors: social demographics, education systems, neighbourhood, family and peer gambling involvement, stigmatization, and deviance. Generally speaking, the strength of evidence of the links between social factors and levels of harmful gambling is not extremely high. The strongest evidence relates to social demographics and the role of family and peers in influencing gambling involvement. Evidence related to the role of the education system, as well as to neighbourhoods, stigmatization and deviance is much less robust.

3.2.1 Social Demographics

In numerous studies, harmful gambling has been associated with male gender under 30 years of age, low income and single marital status. Low occupational status, less formal education and non-Caucasian ethnicity are additional risk factors, as is residence in large cities (Abbott et al., 2004). Some studies have found that harmful gambling is associated with certain occupations; for example, salespeople who work on commission with flexible hours, little physical supervision and substantial amounts of cash tend to have higher rates of harmful gambling compared with other occupational groups. While job stress has been proposed as a possible contributor to the development of harmful gambling, little is known about this relationship. Finally, little is known about the relationship between harmful gambling and unemployment. This is also true of the relationship between harmful gambling and wealth since most studies only investigate annual household income and do not examine the full spectrum of people’s assets in relation to their gambling involvement.

3.2.2 Family and Peer Gambling Involvement

Peers and family members are important influences, particularly on the gambling of adolescents and young adults. In contrast to most other adolescent risk behaviours, parents, siblings and other family members often approve of and are involved in the informal gambling of children and adolescents. There is extensive empirical research linking parental and adolescent gambling. Parental gambling is associated with higher rates of gambling participation and higher rates of gambling problems among adolescents. Involvement with antisocial peers who may model and reinforce risky gambling may also contribute to youth gambling problems (Hardoon, Gupta & Derevensky, 2004).

Families play a large role in contributing to or preventing the development of harmful gambling through exposure to gambling activities as well as social learning. Problem gamblers in many studies report high levels of gambling and harmful gambling among members of their families. Another feature of upbringing related to the development of gambling problems is parenting style, with authoritative parenting generally acting to direct adolescents away from pathways to youth harmful gambling. As with youth risk behaviours more generally, parental monitoring (engagement) has been identified as an effective protective factor in relation to the development of youth harmful gambling (Dane et al., 2008).

Along with the setting in which one gambles, the people that one gambles with can have a significant impact on the extent of potentially addictive gambling behaviour. Some people have ‘gambling friends’, who are friends solely because gambling is a common interest. For these individuals, a significant disruption in their non-gambling social lives, such as a divorce, loss of a job or the death of a loved one, can leave them with only ‘gambling friends’ as a support system. The exclusivity of their interactions with this group in turn increases the intensity of their gambling. Gambling on one’s own is commonly regarded as a risk factor for harmful gambling. When other people are not present, there is no one to express concern about or criticism of heavy, reckless and harmful gambling. Gambling...
together with other people may lead individuals to gamble more than if they gambled alone, due to social expectations from others to accompany them in gambling. In theory, this may eventually cause people to gamble over their limits.

Most people with a gambling problem do not seek professional help (Suurvali, Hodgins & Cunningham, 2010). Therefore the help provided to gamblers through support systems — such as family members and friends — is of great value. The ways in which families cope with a member who has a gambling problem can vary. The attitudes and approaches of supporters can serve to create barriers to seeking treatment or can actually facilitate entering treatment. Interpersonal relations with fellow problem gamblers in a mutual support society may contribute to the resolution of harmful gambling (Binde, 2012a). The individual gets support to abstain from gambling, finds new non-gambling friends and feels valuable and needed when helping others with a gambling problem.

3.2.3 Education System

There is good evidence that adolescents and young adults often engage in informal gambling and, as they become of legal age, transition to commercial forms of gambling. This makes the education system an important institution for informing young people about the benefits and risks of gambling and for fostering appropriate gambling-related knowledge and beliefs. While teaching youth about the risks and consequences of gambling can be effective, the long-term effects of such educational strategies remain unclear (Williams, West & Simpson, 2008). Also, educators and educational institutions do not always view gambling as an important concern and are often reluctant to adopt measures to prevent and/or mitigate harm associated with adolescent gambling.

3.2.4 Neighbourhood

It is widely assumed that increases in the availability of gambling will lead to increases in the prevalence of harmful gambling. Researchers have investigated this relationship at the population level and found somewhat conflicting evidence. At the neighbourhood level, there is some evidence that easy access to gambling opportunities is associated with higher rates of gambling participation and gambling-related problems although the causal direction of these links has not been established. It is possible that this relationship holds true for some groups in the population but not for others.

There is evidence that the location of gambling venues is influenced by levels of social capital in different communities, although the reasons for this are unclear (Griswold & Nichols, 2006). Social capital refers to the role of cooperation and confidence in producing collective results. Neighbourhoods with high social capital are characterized by complex social networks that support high levels of generalized trust and confidence. Neighbourhoods with low social capital are characterized by high levels of distrust among residents as well as low levels of trust in social institutions and low levels of civic participation. Gambling operators often find it easier to locate venues in neighbourhoods with low social capital because these communities are less likely to mobilize to prevent their introduction. Research conducted in New Zealand has demonstrated links between EGM and TAB densities/location and both gambling participation and harmful gambling (Ministry of Health, 2009).

In Australia, Marshall and colleagues (Marshall, 2009; Marshall & Baker, 2001a, 2001b) have noted that regions of lower socioeconomic status in many large cities have experienced the greatest allocations of electronic gaming machines (EGMs). They argue that, unlike other public health issues, gambling-related problems are determined almost entirely by the local circumstances of the communities in which the gambling activity occurs and that, as a result, preventive strategies should not just focus on gamblers but should target the local contextual environment. Finally, in the United States, Welte and colleagues (2004) found that neighbourhood disadvantage was positively related to frequency of gambling as well as to the prevalence of problem and pathological gambling. The researchers argued that the ecology of disadvantaged neighbourhoods and the availability of gambling opportunities promote both gambling participation and pathology. In Australia, Livingstone (2001) cites evidence that poker machines are strongly marketed and located close to disadvantaged areas.

3.2.5 Stigmatization

Stigmatization is the experience of having a characteristic that is viewed as shameful or discrediting and, as a result, being avoided or shunned. Stigmatization is a powerful tool of social control that can be used to marginalize, exclude and exercise power over individuals. Harmful gambling has been found to be
more stigmatizing than some other health conditions, although this may be influenced by context or by the social characteristics of observers (Horch & Hodgins, 2009). Members of specific cultural groups may be relatively more stigmatized than others (Dhillon et al., 2011). Stigma, in the form of shame or embarrassment about one's over-involvement in gambling, has been identified as a significant obstacle to seeking help for a gambling problem (Clarke et al., 2007).

Another aspect of stigma relates to the financial nature of gambling harm. Research from New Zealand suggests that individuals contacting a national gambling helpline as well as individuals who have not sought help for a gambling problem are reluctant to seek help for reasons of pride, shame or denial (Pulford et al., 2009).

3.2.6 Deviance

Activities and individuals once perceived as deviant or immoral sometimes come to be perceived as ‘sick’ and hence under the domain of medical science and treatment. This ‘medicalization’ of deviance characterized gambling and harmful gambling in the 1970s and 1980s (Castellani, 2000; Rosecrance, 1985). However, the ‘medicalization’ of harmful gambling continues to the current time; research continues to explore links between biology and harmful gambling (see section 3.4 Biological) and individuals are increasingly expected to govern themselves in an era of decline in external forms of social regulation (Reith, 2007).

While research on gambling as deviance (that views of gambling as criminal or marginal) is relatively scarce, research on the links between gambling and individual behaviours often regarded as deviant is abundant. Research in psychology and psychiatry has identified associations between harmful gambling and conditions such as attention deficit disorder, anxiety and depression, as well as certain personality traits, such as impulsivity. Other studies have identified associations between high rates of gambling and substance use among male adolescents, on the one hand, and impulsivity and friends’ delinquency, on the other. Some researchers have concluded that a general problem behavioural syndrome underlies many deviant behaviours, including gambling. While some gambling activities, particularly informal gambling among friends, tend to be associated with higher rates of deviant behaviour (Turner, Ialomiteanu, Paglia-Boak & Adlaf, 2011), other gambling activities do not have such associations.

Relatively little research has been carried out on links between commercial gambling and criminal activities, although there do appear to be links between harmful gambling and some monetary crimes (Ferentzy & Turner, 2009). Research conducted with over 300 male and nearly 100 female prisoners in New Zealand found that about a quarter of male and a third of female prisoners from a nationally representative sample serving the first year of their sentence were problem gamblers immediately prior to imprisonment. A relatively small number appear to have committed an offence as a consequence of a gambling problem. Most were involved in criminal activity first and happened to be both criminals and problem gamblers. Prisoners reported that gambling led both to increases and decreases in offending (Abbott & McKenna, 2005; Abbott, McKenna & Giles, 2005).

An important distinction can be made between people who commit crimes because of their gambling involvement and those whose gambling-related crimes are just one of several risky behaviours in which they engage. The former could be due simply to exposure to gambling while the latter would be related to selection for criminal behaviour generally.

3.3 Psychological Factors

The psychological basis for harmful gambling is rooted in a number of different factors and is influenced by an individual’s biology and broader environment. Depending on the personality and values that an individual holds, he or she is more or less likely to be susceptible to developing harmful gambling habits. This susceptibility could be exacerbated by other psychological disorders or addictions. Indeed, an individual may gamble ostensibly for entertainment purposes without realizing that underlying psychological issues could lead to a chronic gambling habit. In this section we discuss psychological factors that contribute to harmful gambling: personality and temperament, self-perceptions, social learning, lifespan development, co-morbid disorders, subjective well-being, coping styles, and judgment and decision making. There is generally a great deal of research that supports the existence of correlations between these risk factors and gambling problems although the strength of the evidence varies from factor to factor as outlined below. It is important to note that research on the psychological factors influencing gambling-related harm has, until recently, been almost entirely cross-sectional. Longitudinal research is currently in progress in a number of countries that will provide further validation and insight into these factors.
3.3.1 Personality and Temperament

Personality disorders are often comorbid with harmful gambling. Rates of antisocial personality disorder, antisocial traits and delinquency are elevated and may underlie one subtype of harmful gambling (Blaszczynski & Nower, 2002). Impulsivity has been shown to be associated with gambling and harmful gambling in both cross-sectional and longitudinal research (Slutske et al., 2005; Toneatto & Nguyen, 2007). Other personality and temperament traits that have been linked to harmful gambling include sensation-seeking (Johansson et al., 2009); dissociation (Diskin & Hodgins, 2001); novelty-seeking (McCormick et al., 2012); and low trait self-control or willpower (Bergen et al., 2012).

Personality and coping styles as well as mental health comorbidity may be related to different motivations to gamble. A variety of models have been proposed that broadly characterize motives for gambling as hedonistic (i.e., seeking stimulation, winning money) or escape-seeking (i.e., emotional regulation; Milosevic & Ledgerwood, 2010). These coping styles are also frequently connected with childhood trauma, neglect and abuse, which are also linked to severity of harmful gambling (Felsher et al., 2010; Hodgins et al., 2009) and influence both self-concept and values.

3.3.2 Self-perceptions

The perception of self is created as the individual monitors his or her behaviour, emotions and mental states in relation to others. In some cases, low self-esteem is associated with heavy gambling (Volberg, Reitzes & Boles, 1997). As if to compensate for the esteem issue, the individual has a strong wish to feel the pleasure of winning, which includes perceptions of being rewarded, having luck and in some games, and the satisfaction of defeating other players.

Gambling in and among a group of people — such as at the table games of a casino — allows individuals to demonstrate a number of characteristics about themselves with the ultimate aim of gaining prestige (Goffman, 1969). These include the ability to play the game with skill, the willingness to take risks, the means to spend money on such games, and the seeming capacity to maintain composure despite suffering losses or winning. Such group-based gambling games provide an arena for ostentatious self-display intended to impress fellow players and onlookers; individuals who gamble for these reasons are likely to spend relatively large amounts of money, again for the perception of prestige. With high financial stakes, gamblers risk getting into a harmful, addictive game playing cycle either because they are on a winning streak or in a desperate attempt to win back large losses.

3.3.3 Social Learning

This factor highlights the importance of the social setting(s) in which an individual functions and the influence of such settings on gambling behaviour. The result of these influences are, at their extremes, either a higher propensity towards addictive gambling behaviour, or a rejection of gambling altogether, having witnessed the harmful effects of gambling addiction on other family members. If gambling is common in the family, at a workplace or amongst school peers, an individual’s involvement in gambling is likely to be higher than if it is uncommon. Families that gamble a great deal may serve as an example for children and youth in the family. There is evidence that children of problem gamblers are far more likely to gamble themselves; although at least one study suggests that fathers’ gambling is a greater risk factor than mothers’ gambling (Shead, Derevensky & Meerkamper, 2011). Currently there is limited research on gender differences in the socialization to gambling.

While it is logical to assume that greater involvement in gambling leads to greater problems, there is little research to suggest this. This is a difficult methodological question. What comes first: greater involvement or propensity for harmful gambling? In contrast to those individuals who gamble because of social learning from family members, there are individuals whose negative experiences with the psychological, physical and financial toll of gambling addiction among family members or friends can lead to less gambling or no gambling at all. However, even in households where one or both parents do not gamble, substantial proportions of children will nevertheless engage in one or more gambling activities (Volberg, Hedberg & Moore, 2008).

3.3.4 Lifespan Development

An individual’s age is often found to correlate with gambling and harmful gambling. In most but not all jurisdictions, younger individuals are more likely to gamble and have gambling-related problems. Younger age of first gambling is also correlated with a higher probability of harmful gambling (Johansson et al., 2009). Turner et al. (2006) suggest that there might be a curvilinear relationship with age of gambling onset and severity of problems (Statens Folkhälsoinstitut, 2010). As commercial gambling has evolved, new
vulnerable groups of gamblers are exposed to these activities with possible increases in participation and gambling-related problems. This was the case in Australia and New Zealand with the introduction of large numbers of EGMs in pubs and clubs and the increasing parity in harmful gambling rates between men and women (Abbott, 2006). This finding also applies in the case of online and remote gambling, particularly with social media and growing numbers of older women “gamers”.

The relationship between lifespan developmental factors and gambling is complex, as different age cohorts have been exposed to different gambling opportunities and attitudes as legalized gambling has expanded. Availability of leisure time and disposable income also vary across the lifespan and can impact the propensity to gamble and the risk of engaging in harmful gambling.

### 3.3.5 Co-morbid Disorders

Comorbid mental health disorders have been linked to problem and pathological gambling in both community and clinical samples. In particular, strong links have been found with mood disorders such as major depression, anxiety disorders and substance use disorders (Lorains et al., 2011). Harmful gambling and nicotine use are also highly associated (McGrath & Barrett, 2009). Links with lower base rate disorders such as eating disorders (Black & Moyer, 2008) and attention deficit disorder (Carlton & Manowicz, 1994) have also been made. It is possible that a shared vulnerability underlies these high rates of comorbidity although evidence is lacking to date. There is also limited research assessing the order of onset of mental disorders relative to harmful gambling, but it appears that substance use disorders are more likely to develop earlier than gambling difficulties whereas mood disorders are equally likely to predate or follow harmful gambling (Hodgins at al., 2005).

### 3.3.6 Subjective Well-Being

Mental health disorders typically involve significant subjective distress for individuals. Studies that have not assessed clinical disorders per se have found correlations between harmful gambling and self-reported mental health symptoms such as anxiety (Ibanez et al., 2001), depression (Getty et al., 2000) and obsessionality (Frost et al., 2001). Perhaps related, poorer subjective well-being is also linked with harmful gambling and greater subjective well-being is related to social, responsible gambling involvements.

### 3.3.7 Coping Styles

Individuals with gambling problems have a tendency to use avoidance and emotional coping in reaction to adversity, as opposed to using a problem-solving approach (Borsoi & Toneatto, 2003). These problem-solving deficits may be caused by deficits in aspects of working memory, planning, cognitive flexibility, and time management/estimation, all of which have been reported in individuals with gambling problems compared to healthy volunteers (Hodgins, Stea & Grant, 2011).

### 3.3.8 Judgement and Decision Making

A great deal of research attention has been devoted to specific gambling-related cognitive errors that characterize how individuals with gambling problems approach and react to gambling experiences. Two broad categories of cognitive errors are biased evaluations of gambling outcomes (e.g., attributing wins to skill and losses to bad luck) and illusion of control over gambling outcomes (e.g., superstitions; behavioural rituals that are designed to increase wins; and gamblers’ fallacy; Toneatto & Nguyen, 2007). As outlined in the Summary of Existing Research that Informed Our Work, these factors can be catalyzed by different gaming types and features. There is also a growing body of research that measures impairment of decision making in gambling and other addictive disorders that have identified associations between problem gambling behaviours and difficulties in executive functioning (e.g., Roca et al., 2008). Section 3.4.2 Neurobiology in this report contains more information about how brain imaging studies have been used to study gambling behaviour.

### 3.4 Biological Factors

There appears to be a common understanding within most societies that gambling, although recreational for most people, can lead to significant harm in a minority. What is less common is an understanding of the biological substrate underlying the propensity toward harmful gambling as well as the degree to which genetically inherited biological propensities play a role in the development of this tendency. Both past and recent research suggests that biological differences in brain structure and chemistry, as well
as inherited physical or psychological conditions, can impact gambling behaviour. In this section we discuss biological factors that contribute to harmful gambling: genetic inheritance, neurobiology, and sex.

In general, the evidence is very strong that genetics and neurobiology have a very important influence over gambling and harmful gambling. What is less certain, and where more research is needed, concerns the specific genes and neurotransmitters involved, and the mechanisms by which a genetic propensity for harmful gambling is expressed (epigenetics).

3.4.1 Genetic Inheritance

Harmful gambling is significantly more common in the relatives of problem gamblers. However, there is considerable variability in the extent to which this occurs, with rates ranging from 8% to 50% (Black et al., 2006; Lobo & Kennedy, 2006; Slutske et al., 2010; Walters, 2001). The variability between studies is partly a function of differences in how harmful gambling is defined or assessed and whether first, second, or third degree relatives are being examined. Regardless of the true percentages, family studies do not answer the more important question concerning whether these higher rates are due to genetic inheritance versus shared environmental influences. Adoptee and twin studies disentangle this genetic versus environmental contribution to harmful gambling. These studies suggest that:

- 40-50% of the propensity for developing or resisting a gambling problem (often referred to as heritability) can be predicted by genetic factors;
- 0-18% of this propensity can be predicted by shared environmental influences (e.g., upbringing);
- 40-50% can be predicted by unique environmental influences (Eisen et al., 1998; Lobo & Kennedy, 2006; Shah et al., 2005; Slutske et al., 2010).

Many readers will find these figures to be surprisingly high. However, they are very consistent with findings in other fields. For example, the heritability estimates of substance dependence range from 30% to 70%, depending on the substance (Agrawal & Lysnekey, 2008; Goldman et al., 2005). Similarly, the heritability estimates of the major psychiatric disorders are known to range from 30%-85% (Shih et al., 2004).

Many readers will also be surprised with the very small influence of parental upbringing. However, this is also consistent with the general finding that shared environmental effects have relatively little long-term influence in the development of psychopathology or other behavioural traits (Hill et al., 2008; Plomin et al., 2001; McGue & Bouchard, 1998; McGuffin et al., 2001). Shared environmental influences do explain a higher percentage of the variance among childhood and adolescent twins (Baker et al., 2011; Hicks et al., 2007; Kendler et al., 2008).

Some genetic studies (mostly family studies) have found genetic influences to be stronger in men than in women; however, other studies have not found this (Black et al., 2006; Slutske et al., 2010). The high degree of comorbidity between harmful gambling and other addictions, antisocial personality, depression, and some other conditions (e.g., ADHD) is partly due to a common genetic vulnerability (Comings, 2006; Goodman, 2008; Grant et al., 2006; Ibanez et al., 2002; Lobo et al., 2010; Slutske et al., 2010). Harmful gambling is polygenetic. That said, dopamine receptor genes (particularly the Taq A1 variant of the DRD2 gene) have received the most consistent evidence for involvement (Comings et al., 1996; Grant et al., 2006; Ibanez et al., 2002; Lobo et al., 2010; cf Lim et al., 2012). D1 receptors are expressed both in the limbic and cortical areas, D2 and D3 receptors are expressed specifically in the ventral tegmental area, nucleus accumbens (D2), and in the Islands of Calleja (D3) which have been known to play an important role in addictive processes. Serotonin receptor and transporter genes (related to impulsivity) may also be involved (Ibanez et al., 2002; Lobo & Kennedy, 2006), as may variants in MAO, TPH, ADRA2C, NMDA2, and PS1 genes (Ibanez et al., 2002; Lobo & Kennedy, 2006).

3.4.2 Neurobiology

Behaviourally, there is consistent evidence of altered reward sensitivity related to harmful gambling. More specifically, there is a stronger preference for immediate over delayed rewards among problem gamblers, as well as higher arousal in personally relevant reward situations (such as gambling-related feedback; Goudriaan et al., 2004; Oberg et al., 2011; Petry & Madden, 2010; van Holst et al., 2010). There is also good evidence for a general decreased sensitivity to reward (Grant et al., 2006; Oberg et al., 2011; Reuter et al., 2005). behaviourally there is also some evidence of compulsivity, but there is much stronger evidence for impulsivity — which is also related to the preference for immediate rewards (Goodman, 2008; Potenza et al., 2003; van Holst et al., 2010).
With regards to the nervous system, the following regions have been implicated in determining the propensity to develop or resist harmful gambling behaviour:

- The ventral striatum/mesolimbic pathway, also known as the “reward” pathway (Buchel, 2006; Goodman, 2008). It begins in the ventral tegmental area of the midbrain and connects to the limbic system via the nucleus accumbens, the amygdala, and the hippocampus as well as to the medial prefrontal cortex;

- The prefrontal cortex (PFC), particularly the ventromedial and dorsolateral regions, which are involved in executive functions and inhibition, among other things (Dannon et al., 2011; Goudriaan et al., 2004; Potenza et al., 2010; van Holst et al., 2010);

- Dopamine and serotonin neurotransmitters, whereby dopamine has been related to reward and serotonin to inhibition (Chambers & Potenza, 2003; Goodman, 2008; Grant et al., 2004; Slutske et al., 2010);

- Peripheral nervous system arousal (heart rate, skin conductivity, respiration, blood pressure) although there are mixed results on the impact of this type of activation on gambling behaviour (Diskin & Hodgins, 2003; Goudriaan et al., 2004; Grant et al., 2006; Potenza, 2008; Yucha et al., 2007).

### 3.4.3 Sex

Male sex was deemed to be the strongest correlate of harmful gambling in the 202 worldwide jurisdictional studies of gambling and harmful gambling. No known studies have found female problem gamblers to outnumber male problem gamblers in any particular jurisdiction (Williams, Volberg & Stevens, 2012). The ratio of male to female problem gamblers varies as a function of jurisdiction but averages 2 to 1 (Williams et al., 2012; Blanco et al., 2006). There are likely both biological and environmental bases for this difference as a function of sex.
**Author Biographies**

The contributors to this project included the international expert panel and a team of OPGRC staff and advisors. The roles and responsibilities of each are outlined below. Each member of the expert panel played a key role in the development of the Framework and its publication. Author responsibilities included:

- Actively participating in working sessions by contributing ideas, insights and expertise during the development of the framework and publication content;
- Authoring different sections of the publication;
- Providing timely feedback on Framework and publication drafts;
- Working with OPGRC to communicate the Framework to a broad set of stakeholders to solicit feedback.

Profiles for each member of the expert panel are provided below in alphabetical order. This publication reflects the combined work of all the authors on the expert panel. External stakeholders as well as members of the OPGRC team also served as reviewers. Any conflicts of interest that might affect joint authorship of this publication are noted here for each author.

**Max Abbott, Ph.D.:** Dr. Abbott is Pro Vice-Chancellor and Dean, Faculty of Health and Environmental Sciences, at Auckland University of Technology, New Zealand, where he is also Professor of Psychology and Public Health, Co-director of the National Institute for Public Health and Mental Health Research and Director of the Gambling and Addictions Research Centre. Previous positions include National Director of the Mental Health Foundation of New Zealand and President of the World Federation for Mental Health. He is currently Deputy Chair of Waitemata District Health Board and a Board member of Health Workforce New Zealand. He has over 250 publications in the fields of mental health and public health. He has researched gambling extensively, leading the first national problem gambling prevalence study worldwide. Recent major areas of research include gambling and problem gambling, migrant health and Pacific Islander child and family health and development. He chairs the International Think Tank on Gambling Research, Policy and Practice which provides a regular forum for researchers and other key stakeholders to discuss major and emergent issues. He is currently involved in large, ongoing gambling research programmes in New Zealand, Sweden and Australia. Dr. Abbott has no significant conflicts of interest. The large majority of funding that he and his Gambling and Addictions Research Centre colleagues receive comes from government departments and research funding agencies. The Centre occasionally receives industry funding for research with the proviso that the findings of such studies will undergo peer review and be placed in the public domain.

**Per Binde, Ph.D.:** Dr. Binde is an Associate Professor of Social Anthropology at the University of Gothenburg, Sweden. Dr. Binde’s interest in gambling is broad, including regulation issues and problem gambling, with a focus on the cultural roots of gambling and its social contexts. He spent one year conducting fieldwork in gambling environments in Sweden. With ethnographic and historical sources as a base, he has analyzed the distribution of gambling in the pre-colonial world, the relationships between gambling and socio-economic exchange systems, and between gambling and religion. Over a recent six-month period, he studied a mutual support society for problem gamblers and has also conducted an interview study assessing how problem gamblers perceive gambling advertising. He is a member of the board of directors of the Gaming Board for Sweden, which is a state authority with overall responsibility for licensing and supervision within the field of gambling. He is also a member of the advisory board of the Swedish Longitudinal Gambling Study (SWELOGS), coordinated by the Swedish National Institute of Public Health. His writings on gambling have appeared in journals such as *International Gambling Studies, Journal of Gambling Studies, Gaming Law Review* and *Journal of Gambling Issues*, as well as in reports, book chapters and books. His latest book is an in-depth study of a mutual support group for young problem gamblers. Dr. Binde has no conflicts of interest as his research is not supported by the gambling industry.

**David Hodgins, Ph.D.:** Dr. Hodgins is a Professor of Psychology and Department Head at the University of Calgary located in Calgary, Alberta. He is also a coordinator of the Alberta Gaming Research Institute. His research interests focus on relapse and recovery from substance abuse and gambling disorders. He has a particular interest in concurrent mental health disorders and brief motivational treatment. He has developed a brief treatment for gambling problems that uses a motivational enhancement model which is recognized as an evidence-based treatment by the United States Substance Abuse and Mental Health Administration. In 2010, he received the Scientific Achievement Award from the US National Center for Responsible Gaming. Dr. Hodgins teaches in the clinical psychology program and has an active cadre of graduate students. He maintains a private practice.
in addition to providing consultation to a number of organizations internationally. He is senior editor of the journal Addiction and is on the editorial board of the *Journal of Gambling Studies, International Journal of Gambling Studies* and the *Journal of Gambling Issues*. Dr. Hodgins has no conflicts of interest and no affiliation with the industry. All of his research funding has come from peer-reviewed submissions to government-funded research agencies.

**David Korn, M.D., D.T.P. & H., C.A.S.:** Dr. Korn is a Public Health Physician at the University of Toronto, Toronto, Ontario. Dr. Korn has been involved in public health at the University of Toronto for 30 years. Currently, he carries out an active gambling research program, with a specific interest in youth gambling and technology, gambling and public health policy, as well as the impact of gambling advertising on gambling behaviour. As a clinician, he has a psychotherapy practice that specializes in addictions and behavioural health. Earlier in his career, David served as Ontario’s first Chief Medical Officer of Health from 1983 to 1987. In the field of addictions, he was CEO of The Donwood Institute for 10 years prior to its integration into the Centre for Addiction and Mental Health as well as a Visiting Professor at Harvard Medical School, Division on Addictions. He is a medical school graduate of the University of Western Ontario in London, Ontario, Canada. Early in his career he pursued graduate studies in international health at the London School of Hygiene and Tropical Medicine graduating cum laude. Among his international experience was work as a medical clinician in rural Zambia and an epidemiologist for the World Health Organization Global Smallpox Eradication Program in Ethiopia. He is an elected Fellow of the Royal Society of Tropical Medicine. As a community volunteer, he chaired the Health Advisory Committee of the YMCA of Greater Toronto for 10 years. He is a member of the Board of Directors of the Canadian Mental Health Association (Ontario). Dr. Korn’s associations with the field are: Ontario: horse racing industry substance abuse policy; provincial government gambling trend analysis; Fort Erie municipal bingo policy; Massachusetts: evidence-based gambling treatment guidelines publication; Nova Scotia Gaming Corporation: VLT project; Past Board Member National Center For Responsible Gaming (no remuneration); Research grant recipient: Ontario Problem Gambling Research Centre; Responsible Gambling Council of Ontario: Casino Accreditation Panel; and an expert on gambling litigation cases and presenter in various settings.

**Alexius A. Pereira, Ph.D.:** Dr. Pereira is currently Senior Assistant Director of the Ministry of Community Development, Youth and Sports (Gambling Safeguards Division), Singapore. At the Ministry, Dr. Pereira oversees problem gambling research, the training of problem gambling counsellors and the coordination of problem gambling intervention services and treatment provision in Singapore. Previously, Dr. Pereira was an Assistant Professor, Department of Sociology, National University of Singapore. Dr. Pereira has no conflict of interest, and no affiliation with the industry. He is a civil servant of the Government of Singapore.

**Rachel A. Volberg, Ph.D.:** Dr. Volberg is President of Gemini Research, Northampton, MA, USA. Dr. Volberg is a sociologist who has been involved in epidemiological research on gambling and problem gambling since 1985. Dr. Volberg has directed or consulted on numerous gambling studies around the world, including national prevalence surveys in the United States, Australia, New Zealand, Great Britain, Norway and Sweden. She is presently engaged in projects funded by governments in Australia, Britain, Canada, Singapore and Sweden to identify best practices and improve methods for measuring problem and pathological gambling in clinical and community studies. Dr. Volberg is also involved in longitudinal studies of gambling presently underway in Australia, New Zealand and Sweden. In addition to her consulting business, Dr. Volberg holds appointments at the University of Massachusetts, Amherst, NORC at the University of Chicago and the Auckland University of Technology in New Zealand. Dr. Volberg has served as a consultant and advisor to governments and private sector organizations on issues relating to gambling legalization, the epidemiology of problem and pathological gambling and public policy approaches to developing and refining services for problem gamblers and their families. She sits on the Editorial Boards of the *Journal of Gambling Studies, International Gambling Studies* and the *Journal of Gambling Issues* and she is a long-time member of the American Sociological Association and the U.S. National Council on Problem Gambling. Dr. Volberg has no current affiliations with industry although she has worked as a consultant to individual operators in the past. All sources of funding for Dr. Volberg’s research are government agencies with responsibilities for regulating gambling or providing services to problem gamblers.

**Robert Williams, Ph.D.:** Dr. Williams is a Professor in the Faculty of Health Sciences and Coordinator of the Alberta Gambling Research Institute, University of Lethbridge, Lethbridge, Alberta. A clinical psychologist...
by training, Dr. Williams spent the first 15 years of his career as the regional psychologist for northern Manitoba and then as a clinician in the Addiction Centre in Calgary, Alberta. Since 2001 he has been an academic at the University of Lethbridge in Alberta, where he is currently a full professor in the Faculty of Health Sciences, as well as one of the coordinators and researchers with the Alberta Gambling Research Institute. Dr. Williams has published in the areas of addictive behaviour, psychophysiology, seasonal affective disorder, evolutionary theory, fetal alcohol syndrome, health care practice, public policy, and gambling. For the past 10 years most of his work has focused on gambling, where he is an internationally recognized expert. Dr. Williams teaches courses on gambling; provides frequent consultation to government, industry, the media, the courts, and public interest groups; and is a co-editor of International Gambling Studies.

Dr. Williams is one of the world’s best funded gambling researchers and a leading authority in the areas of prevention of problem gambling, Internet gambling, the socioeconomic impacts of gambling, the proportion of gambling revenue derived from problem gamblers, the prevalence and nature of gambling in Aboriginal communities, the etiology of problem gambling, and best practices in the population assessment of problem gambling. Dr. Williams has no conflicts of Interest and no affiliation with the industry. All of his research funding has either come from government-funded research agencies or directly from government contracts.
We would like to thank the following individuals for their input to the Framework during its development:

**Alex Blaszczynski, Ph.D.** Dr. Blaszczynski is a Professor of Clinical Psychology at the University of Sydney and Co-Director of the University of Sydney’s Gambling Research Unit, and Director of the Gambling Treatment Centre, Sydney, Australia. He is a researcher and clinical psychologist with a long history of treatment and research in pathological gambling.

**Charlotte Beck:** Charlotte Beck is the Divisional Director of the Ministry of Community Development, Youth and Sports (Gambling Safeguards Division), Singapore. Charlotte has been handling the gambling safeguards portfolio since 2004.

**David Chan, Ph.D.:** Dr. Chan is currently a Professor of Psychology and Director of the Behavioural Sciences Institute at Singapore Management University, Singapore. His research areas include longitudinal modeling, multilevel issues, personnel selection, and adaptation to changes.

**Wendy Slutske, Ph.D.:** Dr. Slutske is a Professor in the Department of Psychological Sciences at the University of Missouri, MO, USA. Dr. Slutske obtained graduate training in clinical psychology and behavioural genetics, and post-graduate training in psychiatric epidemiology and biostatistics.

We would like to thank the following individuals for their helpful review of the Framework:

**Paul Delfabbro, Ph.D.:** Dr. Delfabbro is an Associate Professor from the School of Psychology at the University of Adelaide, Australia. He has over 190 publications in various areas of social policy, including gambling and child protection and is a frequent advisor to State and Federal Government Departments. His current research areas relate to the relationship between co-morbidity and decision-making, behavioural profiling of problem gamblers in venues and the effects of variations in EGM parameters on gambling behaviour.

**Jim Orford, Ph.D.:** Dr. Orford is an Emeritus Professor of Clinical & Community Psychology at the University of Birmingham, U.K. Jim has achieved a national and international reputation in the fields of addiction and community psychology. He has published many articles and 13 books, the latest of which are *An Unsafe Bet? The Dangerous Rise of Gambling and the Debate We Should Be Having* (Wiley-Blackwell, 2011) and *Addiction Dilemmas: Family Experiences in Literature and Research and their Lessons for Practice* (Wiley-Blackwell, 2012).

**Gerda Reith, Ph.D.:** Gerda Reith is Professor of Social Science and Director of the Gambling Research Group at the University of Glasgow, U.K. Her research focuses on the role of social, cultural and environmental factors in the development of different types of risky or addictive consumption, with a particular focus on gambling behaviour. She has written extensively on these areas from both U.K. and international perspectives, and her book, *The Age of Chance: Gambling in Western Culture*, was awarded the Philip Abrams Prize for 2000. She is a member of the Responsible Gambling Strategy Board, which advises the British government on policy and research directives for gambling-related issues.
OPGRC Team

The OPGRC’s purpose is to use credible, research-based evidence to reduce harm from gambling. The primary beneficiaries of our work include the citizens of Ontario, the government, service-providers, educators, policy makers, researchers, regulators, and operators. While OPGRC is a critical research resource for the province of Ontario, it is also a national and international leader and collaborator in gambling and problem gambling research, knowledge translation, and research capacity building. It is valued for its integrity, independence, expertise, and productivity.

In 2011 OPGRC developed a new three-year strategic plan. The Conceptual Framework of Harmful Gambling project is a key component of that strategic plan and supports an important outcome for the centre: the consolidation of theoretical understanding and to further develop testable theories on the causes and factors influencing harmful gambling and resilience to gambling.

The OPGRC Conceptual Framework team included the following key members:

**Gary O’Connor, CEO:** As CEO of OPGRC Gary took over from Judith Glynn and Karen Choi as project lead for the Conceptual Framework of Harmful Gambling in addition to his responsibilities for strategic oversight and operational management of the research centre. In the project lead role Gary worked with the project consultant, Kalindi Jog, and with the expert panel to ensure completion and launch of the Conceptual Framework.

**Judith Glynn, Acting CEO:** As Acting CEO of OPGRC Judith led both the strategic planning and operational management of the Centre. Her role on the project was to provide oversight and project management; manage project risks and issues; manage relationships and facilitate collaboration with the expert panel; and provide insight into the Framework and publication development.

**Diane Santesso, Ph.D., Research Officer:** Diane coordinates and contributes to a number of research projects at OPGRC including the Synopsis Project. Her role on the Framework document was to consolidate writing from the expert panel and support the development of deliverables and presentation development. She is currently contributing her expertise in gambling related research in preparing the Conceptual Framework Research Program and contributing to stakeholder consultations.

**Karen Choi, Ph.D., Former Research Officer:** Karen coordinated and contributed to a number of research projects at OPGRC while on staff. Her role on this project was to facilitate collaboration with the expert panel, support the development of deliverables and, most importantly contributed her expertise in gambling related research.

**Karen Friday-Field, Professional Facilitator:** Karen is a seasoned professional facilitator and coach. She has a long-standing relationship with OPGRC including her work with its Board of Directors and executives in the development of a three-year strategic plan. Karen’s role on this project was to facilitate a series of working sessions.

**Kalindi Jog, Management Consultant and Business Writer:** Kalindi is a seasoned management consultant with over 15 years of experience in strategic planning, operational assessments, business case analysis, facilitation, business writing and business education. Her role on this project was to lead deliverable development and to work closely with the OPGRC team as well as the expert panel to coordinate project progress; facilitate working sessions; consolidate writing from the expert panel and develop original written content as the publication evolved; and prepare presentations and other materials over the course of the project.
SUMMARY OF EXISTING RESEARCH THAT INFORMED OUR WORK

The Conceptual Framework draws upon knowledge and insights gained from past models and theories that have contributed to gambling research. Here we summarize the salient points of several key models and theories to elucidate their contributions to the field. Most of the summaries below are of analytical models of behaviour, as well as policy frameworks such as the Public Health Framework and other responsible gambling frameworks that have become well recognized.

Pathway model of problem and pathological gambling (Blaszczynski & Nower, 2002). This is likely the most well-known, comprehensive model for problem gambling. The model identifies three distinct subgroups of problem gamblers: behaviourally conditioned; emotionally vulnerable; and antisocial impulsivists. These subgroups of gamblers develop problems in different ways, which are outlined in specific sub-models as well as in an integrated model. The integrated model contains approximately 25 factors, most of which are psychological and biological – such as impulsivity, depression, subjective excitement, substance abuse, and irrational beliefs. There are also two ecological factors – increased availability and increased accessibility – which at a basic level causally influence the other factors.

Impulsivity and pathological gambling: A descriptive model (Nower & Blaszczynski, 2006). This model predicts that dysfunctional impulsivity is the cause of some individuals’ gambling problems. It assumes the presence of a number of predisposing psychobiological factors and a cyclical process involving: impulsivity; gambling behaviour; subjective and behavioural reinforcement; affective interpretation; and cognitions. The reinforcing factors include social rewards gained in gambling environments.

Cognitive-behavioural model of problem gambling: A bio-psychosocial perspective (Sharpe & Tarrier, 1993; Sharpe, 2002). This model is based on a review of major research findings in the gambling field. It is a bio-psychosocial model that brings together these distinct research areas. It examines approximately 25 biological, psychological and social factors that contribute to gambling problems. It is an empirically derived model that is intended to encourage research into both individual factors as well as the interactions between different variables.

Bio-psychosocial model of pathological gambling (Ajdaei & Wolgast, 2008). The model outlines causal and mediating relationships. It is composed of eight steering components, each of which have sub-factors. The steering components are: potentiating variables; antecedents; beliefs; alternative behaviours; capability; consequences; as well as cultural components such as identity, spirituality and values. While most of the factors in this model are psychological, it does examine social factors such as availability of gambling and reinforcement of gambling behaviour through various interpersonal relationships.

Psycho-structural cybernetic model, feedback and problem gambling: A new theoretical approach (Zangeneh & Haydon, 2004). This model is based on approximately 10 biological and psychological factors that lead to gambling problems. It proposes that problem gambling behaviour is generated by the interaction between two mechanisms. The first is located within the agent, comprising psychology and biology. The second is external and structural, including: culture; economic disparity; community structure; political/public health policy and broadcast agents. The interaction between the two mechanisms is assumed to be a complex feedback process in which social knowledge is created and incorporated in the individual’s behaviour.

Bio-psycho-social-sociological model (Bernhard, 2007). This model includes biological, psychological and social factors that influence involvement in gambling. These factors are tied together by an overarching concept referred to as sociological imagination. The model is constructed for the purpose of improving the treatment of problem gamblers. The concept of sociological imagination is suggested as a key to better treatment. In this model excessive gamblers are made aware of the sociological dimension of their gambling problems — rather than having them believe that their problems result from individual pathology or weak character. Awareness of the commercial principles of the gaming market and the politics of gambling regulation is assumed to aid treatment. Consequently, this increases an individual’s chances of recovery or of altering his or her gambling behaviour towards less harmful patterns.

Alberta Longitudinal Project (Bernhard, 2007). This model includes biological, psychological and social factors that influence involvement in gambling. These factors are tied together by an overarching concept referred to as sociological imagination. The model is constructed for the purpose of improving the treatment of problem gamblers. The concept of
sociological imagination is suggested as a key to better treatment. In this model excessive gamblers are made aware of the sociological dimension of their gambling problems — rather than having them believe that their problems result from individual pathology or weak character. Awareness of the commercial principles of the gaming market and the politics of gambling regulation is assumed to aid treatment. Consequently, this increases an individual’s chances of recovery or of altering his or her gambling behaviour towards less harmful patterns.

The model includes many of the factors identified in the present document. It includes family history factors, biological, cognitive, personality influences, family and social environment, and life stressors. The model acknowledges the influence of the broader social and cultural context (e.g., laws, public attitudes) and the relationship between gambling and other addictive and mental health disorders.

Williams, West & Simpson Etiological Framework for Problem Gambling (2008). There are various ways to dimensionalize and organize the factors involved in the development of problem gambling. While the Williams et al. (2008) framework contains all the same factors as the conceptual framework, it organizes them in different ways. In recognition that fifty percent of the propensity for developing problem gambling can be predicted by genetic factors, the Williams framework has two areas of focus: biological and environmental. Within these areas, factors that both increase and decrease the risk of problem gambling are identified.

Public Health Framework
(Korn & Reynolds, 1999; Abbott, Volberg, Bellringer & Reith, 2004). This approach broadly addresses healthy public policy, comprehensive notions of prevention and broad community engagement. It utilizes a range of scientific modalities, diverse perspectives and social determinants, including: epidemiology, social marketing, economics, and community development; education, family functioning, socio-economic status and ethno-cultural diversities. This framework aims to guide public policy by preventing or reducing harm; promoting balanced and responsible choices; and protecting vulnerable and at-risk populations. It also recognizes that there are both costs and benefits associated with gambling (Korn & Shaffer, 1999). A public health framework was used by Abbott et al. (2004) to conceptualize and integrate research on problem gambling development and related harms. It distinguishes between the agent (availability and exposure to gambling activities); the host (individual attributes and experiences that increase susceptibility and resistance to problem development); and the environment (the wider physical, social and cultural setting within which gambling occurs). It also considers interactions between the three domains with regard to problem/ harm development, resistance/adaptation and policy and other measures to ameliorate harm.

**Endnote**
1 Twin studies compare concordance in monozygotic (MZ) and dyzygotic (DZ) twin pairs (i.e., # concordant pairs divided by # concordant + discordant pairs) using the ACE model, where $A$=additive genetics; $C$=common environment; $E$=unique environment. The correlation (not the concordance) between MZ twins ($r_{MZ}$) = $A + C$, whereas the correlation between DZ twins ($r_{DZ}$) = $0.5A + C$. Therefore $A = 2(r_{MZ} - r_{DZ}); \ E = 1 - r_{MZ}; C = r_{MZ} - A$. Note that a heritability of 50% does not necessarily mean that 50% of PG is directly caused by genetic inheritance. Rather, it means that 50% of the likelihood of developing PG can be predicted by knowing the person’s genetic heritage (i.e., can have high correlation but low concordance when the presence of problem gambling reliably predicts the absence of problem gambling in the other twin). The concordance in the Eisen et al. (1998) study was 14% for MZ versus 9% for DZ.


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