



CONCEPTUAL FRAMEWORK OF HARMFUL GAMBLING

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Abstract

Although it is 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 in an 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 depicted 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). The framework has been created by international interdisciplinary experts and stakeholders—including researchers, treatment providers, operators, policy makers, as well as individuals and their families—in order to facilitate an understanding of harmful gambling. It reflects the state of knowledge related to factors influencing harmful gambling; and serves a secondary purpose as a guide for the development of future research programs and education of policy makers on issues related to harmful gambling. Gambling Research Exchange Ontario (GREO) (formerly the Ontario Problem Gambling Research Centre (OPGRC) located in Guelph, Ontario, Canada) has facilitated the development of the Conceptual Framework of Harmful Gambling and will retain responsibility for keeping it up-to-date.

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1. Executive Summary

Gambling is a human activity with a long history. Even now, the opportunity to wager something for uncertain reward is enticing to many people. Today, gambling takes a number of forms including land-based table games and electronic games, Internet-based games, lottery games, and horse racing. While many see it as a form of leisure and recreation, gambling can have serious repercussions for individuals, their families and society as a whole. In this publication we have chosen to take a broad view of the harm caused by gambling in order to explore its far-reaching influences.

The harmful effects of gambling have been studied for decades across different types of gambling and various models have been developed internationally in an attempt to understand the individual differences in gambling engagement and 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 impetus for this project was the recognition of a need for a comprehensive framework of harmful gambling. In autumn 2011, Gambling Research Exchange Ontario (GREO) – known as the Ontario Problem Gambling Research Centre (OPGRC) at the time—initiated an effort that brought together eleven global interdisciplinary experts to develop a clear, comprehensive, internationally relevant conceptual framework that addresses a broad set of factors related to population risk, community and societal effects. In 2014 four new members were invited to join the expert panel to assist in developing the revised edition of the Conceptual Framework with updated information and references. Biographies of both the original and new contributors are included in Appendix A, along with acknowledgements. A summary of some of the key models considered while developing this publication can be found in Appendix B.

The Conceptual Framework of Harmful Gambling (the “Framework”) is designed to achieve three key objectives, namely to:

1. Reflect the current state of knowledge (across disciplines and existing models) as it relates to factors impacting harmful gambling. While there is some discussion of linkages among factors, this publication does not provide an in-depth review of the such dependencies or interactions;
2. Assist treatment providers, policy makers, regulators, and the public to better understand the complex dynamics involved in harmful gambling in order to enable better informed decision-making; and
3. Guide the development of future research programs and identify areas where research is most needed.

Ongoing Development of the Framework: In Spring 2013, the Framework was published on the GREO website with an option to comment on the document via an online survey. This subsequent revision includes further information and updates to the 2013 edition based on survey results, stakeholder comments and new research information.

GREO is committed to improve the Framework continually so that it remains relevant and accessible to stakeholders and contributes to understanding and awareness of harmful gambling. To achieve this objective, GREO will work with the expert panel of contributors and other stakeholders in the gambling field to expand and refine the Framework based on feedback, new knowledge, and emerging research evidence. While similar exercises have been attempted in the past, we believe no complete and comprehensive framework existed before this one was developed.

One-page summaries of referred work are available to readers through the integration of the Conceptual Framework Project with GREO's Synopses Project – a resource for plain language summaries of peer-reviewed gambling research publications. Each synopsis describes the research objectives, methodologies, key results, limitations, and conclusions of the referred work in this publication, as well as of other research. Readers can search for synopses in a variety of ways on the GREO website, including by keywords, year, journal name, and search category. References within this publication will ultimately be hyperlinked to the associated synopses.

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

Strength of Evidence: We recognize that the strength of evidence varies markedly across the different areas discussed in the Framework. This is due, at least in part, to our panel's range of expertise, as well as to the availability of research. While we do discuss the strength of evidence related to particular factors, we have not provided an exhaustive review, which was outside the scope of this project and does not align with its intended objectives. However, each section of the publication does cite original research studies and reviews, where these were identified at the time of publication.

1.2 Defining Harmful Gambling

In general, gambling includes any practice that requires an irreversible stake (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 for 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 gambling is often seen as a form of recreation and, at times, even as a source of income.

Recreational gambling is gambling for leisure, recreation or entertainment purposes and in low-risk and/or controlled situations. Recreational 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 of recreational 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). Recreational gambling has also been referred to as responsible, healthy, social, low-risk, leisure, or private gambling.

Commercial gambling, which is the focus of this publication, is a formal, regulated style of gambling which includes a variety of gambling types such as casinos, video lottery terminals, lottery tickets, horse racing and legal sports betting, among others. 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.

In contrast to commercial gambling, money is redistributed within the group in non-commercial private gambling, and individual losses and wins depend on chance or skill. Private gambling includes betting on card games such as poker amongst friends, or betting on sports results with colleagues at the office. Private gambling usually takes place in informal social settings and provides opportunities for participants to engage competitively with others, demonstrate skills, and gain prestige among friends.

Illegal gambling represents yet another group of gambling activities. It includes bookmaking on sports and horse races, underground casinos and "numbers running." Like commercial gambling, illegal gambling is characterized by an asymmetric relationship between providers and players. Unlike commercial gambling, illegal gambling providers are not constrained by law or regulation to make payments to winners or to collect debts through legitimate avenues. One important argument in favor of legalizing gambling in many jurisdictions has been that legalization will force illegal providers of these activities out of business. However, almost no research has been done to assess whether this claim is true or not and there is some evidence to suggest that illegal operators can sometimes benefit from the establishment of legal versions of the games they provide (Kaplan & Blount, 1990).

In this publication, 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, or physical and mental health issues. Additionally, the gambler's family, social network, and community may also experience negative consequences.

The degree of harm can range from inconsequential, to transient, to significant, and finally to chronic. For the purposes of this publication, we treat harmful gambling as a term that encompasses the full spectrum 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 among these terms are, in part, a matter of severity as well as frequency of gambling. Gambling disorder is the most extreme form of harmful gambling as currently outlined in the Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition (DSM-5).

1.3 Value of the Framework

As discussed above, there is presently no comprehensive framework in the gambling field. Consequently, this particular Framework adds value 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 on gambling-related problems and consequences.

Demonstrating Areas of Robust Evidence: The Framework highlights areas where knowledge is robust and where it is not, and in doing so reveals areas for future research.

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 pursue new, theory-driven research.

Enabling an Examination of Harm Reduction: Our goal is to promote consideration of a harm-reduction approach to gambling. Harm reduction goes beyond abstinence and generally refers to reducing the harm or increasing the safety related to gambling. In a harm-reduction approach, the central concepts are empowerment of individuals who are negatively affected by gambling, protecting people (e.g., through regulation, environment, product) and ensuring the well-being of the community as a whole. These have implications for both clinical goals and public policy. In addition to individual empowerment, harm-reduction approaches also need to work towards the well-being of the community and the protection of people through regulation, type of gambling environment and types of gambling products made available in the community.

Enabling Analysis of Gambling Impact: 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 and community development, as well as providing impetus for healthy corporate, regulatory 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 clinical goals such as moderation and abstinence. Doing so makes it useful for addressing vulnerable or high-risk populations (e.g., youth, marginalized groups and the elderly) where commitment to abstinence may not be an appealing goal. Lastly, examining harm facilitates discussions of ways to support non-harmful gambling, which is particularly important for decision-makers whose goal is to optimize profit while reducing harm.

Conceptualizing Harm: The value of conceptualizing harm and identifying factors that influence harm has been recognized in other fields. Such harm-based frameworks also provide value in understanding harmful gambling.

For example, in relation to substance abuse, the negative effects of narcotic drugs in the UK have been systematically outlined with respect to “harms to users, and harms to others, and clustered physical, psychological, and social effects” in a model with sixteen areas of harm (Nutt, King, & Phillips, 2010). Further, the U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, has compiled a comprehensive overview titled “Risk and Protective Factors for Mental, Emotional, and Behavioral Disorders Across the Life Cycle” (SAMHSA, 2010), which includes numerous factors relating to substance abuse. These and other frameworks provide insights into and inspiration for how this conceptual framework may be applied and further developed.

1.4 Overview of the Framework

The Framework was initially developed through a number of working sessions among an expert panel of international gambling researchers, which were conducted over a one-year period, from September 2011 through September 2012. Since that time the GREO team has collaborated with the original group of researchers, new contributors and stakeholders using in-person meetings and various electronic tools including teleconferences, webinars, an online collaborative portal and e-mail.

Four sets of Gambling Specific Factors are depicted 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 depicted in the bottom half of the Framework. Four sets of General Factors are shown in 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 other factors. 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.

Gambling Specific Factors: *Gambling environment* (i.e., the environment in which an individual lives) can impact 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 mitigate harm.

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 brain structure and function, and the process by which genetic propensity for harmful gambling gets expressed (epigenetics).

Below is one example of how the Framework may 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 and with comorbid disorders. Personality, 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 Relevance of Framework to Stakeholders

Based on our stakeholder consultation, below is a summary of the Framework's relevance and utility to three stakeholder groups, although there may be other stakeholders who may also benefit from the publication.

Researchers: The Framework provides researchers with a flexible but comprehensive visual tool that can be used to quickly identify the array of factors that contribute to harmful gambling. It is useful 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 research resources, time and funding.

Treatment Providers: For treatment providers and the agencies they work with, the Framework illustrates the breadth and complexity of harmful gambling, thereby highlighting its

gravity. 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 use it to triage activities prior to treatment, or in clinic, during treatment. There may also be opportunities for connecting the social determinants of health, and more specifically mental health (as identified by Health Canada, etc.) to the Framework. Stakeholders felt that harmful gambling is currently being addressed almost exclusively within the healthcare system, without much consideration of related social determinants.

Government: GREO and other stakeholders can use the Framework to facilitate their communication to government about the complexity, impact and gravity of harmful gambling. By understanding the overall cost to society, governments can make more informed and effective decisions about under-served and/or under-funded areas of harmful gambling research. It can also highlight particular environments, products or characteristics of products that are most closely associated with gambling harm, and are therefore most appropriate for gambling observation and intervention. Finally, the Framework can also call out 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.

1.6 Conceptual Framework Diagram

Gambling-specific Factors			
Gambling Environment	Gambling Exposure	Gambling Types	Gambling Resources
Economics	Context	Structural Characteristics	Service Utilization
Socio-Political Environment	Gambling Setting	Motivations for Gambling	Protection, Prevention and Harm Reduction
Public Policy	Adaptation	Risk Assessment	Interventions
Culture of Social Responsibility	Accessibility		
	Marketing and Messaging		
General Factors			
Cultural	Social	Psychological	Biological
Ethnicity and Traditions	Social Demographics	Personality and Temperament	Genetic Inheritance
Indigenous Groups	Family and Peer Gambling Involvement	Self-perceptions	Neurobiology
Socio-Cultural Attitudes	Education System	Social Learning	
Religion and Other Belief Systems	Neighbourhood	Lifespan Development	
Gender	Stigmatization	Co-morbid Disorders	
	Deviance	Subjective Well-Being	
		Coping Styles	
		Judgement and Decision Making	

2. Discussion of Gambling-specific Factors Contributing to Harmful Gambling

This section discusses 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, socio-political environment, public policy, socio-political environment, and culture of social responsibility..

To-date there has not been sustained research attention to links among factors related to the gambling environment and levels of harmful gambling. 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 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. Consequently, more empirical investigations are needed on the macroeconomic, microeconomic and socio-political forces that shape gambling provision.

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 too often at odds with responsible gambling objectives. State-owned gambling companies have to meet the challenge of balancing 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, which enables competition 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 attractiveness, safety and social acceptability of venue surroundings); the types of gambling products offered at venues; and the kinds of ancillary recreational facilities co-located with gambling venues. These concepts are discussed in detail in Section 2.2 Gambling Exposure.

There is evidence indicating that gambling harm is more common in proximity to available land-based gambling venues. Further, research reveals an almost linear 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; and limiting smoking or the provision of alcohol to gambling patrons.

2.1.1 Economics

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, the typical argument is that gambling—particularly within large-scale venues and casinos—increases employment opportunities through new jobs and co-located hospitality businesses; promotes tourism; 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. The potential for liberalization continues to exist as long as governments use gambling as a means to meet budgetary deficits and stimulate economic growth.

A further threat to government revenue arises from competitive pressure from jurisdictions offering destination and other forms of gambling. The proliferation of gambling has emerged in response to losses of revenue to offshore sites. This in turn leads governments to restrict access or to introduce competing markets. Examples include the introduction of legislation banning Internet gambling in Australia and the United States; and the construction of casinos in Singapore to compete with cruise ship gambling and casinos in Macau.

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, there is mixed research evidence about the connection between economic conditions and gambling consumption (Horvath & Paap, 2012).

It is important to understand what factors influence individual decision-making and how the resulting consumer behaviours influence patterns in the gambling market, particularly supply and demand. Economic theory holds that individuals are rational beings and act to maximize the cost-benefit return on consumption decisions. 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 against the benefits gained from its consumption,

while considering alternative products. The resulting intangible benefits may be both cognitive and emotional in nature.

Gambling may be considered 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 for immediate but lesser rewards, resulting in negative outcomes. Thus, although rational at one level, consumer behaviour becomes irrational when faulty logic 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 lifestyle changes, individuals from low-income brackets may gravitate toward venues offering affordable entertainment and hospitality. In response, market forces redistribute gambling products to the more profitable areas—that is, to 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.

2.1.2 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, stimulate a demand. Consumer behaviours sustain the supply through consumption of such products. Historically, even if state-owned companies did not promote gambling (as in Sweden from 1930-1980), demand for gambling remained strong. This is the case even when some forms of gambling are outlawed (Downs, 2015).

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 3.1.3 Socio-Cultural Attitudes.

Politics plays a crucial role in shaping the gambling environment. Political decisions are also subject to economic pressures, such as the need to respond to international competition or the desire to retain on-shore revenue from online gambling facilities. This is especially the case in a time when increasing numbers of licensed Internet operators are attracting cross-border participants, fueling a 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 as 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 serve as an alternative revenue stream. 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 destigmatization 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.

As such, 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 other agencies. Non-gambling occupations and businesses – accountants, lawyers, architects, public relations and advertising, security services – also expand their activities to provide for the gambling industry.

Retail operators of various kinds, such as restaurants, hotels and social clubs, too, come to depend on revenue from gambling to operate profitably. Finally, in some countries gambling industry executives and political action committees became key sources of funding for political parties, elections, and ballot initiatives (Abbott & Volberg, 1999; Volberg & Wray, 2007).

2.1.3 Public Policy

Some governments around the world have adopted a broad public health approach for developing gambling policy and regulation, building on the success of harm-reduction efforts for products such as alcohol and tobacco. However, in many cases the emphasis continues to be on individuals experiencing problems – the need to identify and treat 'problem gamblers'—rather than on the community or environment. In order to be effective, healthy public policy needs to be centered on promoting the health and well-being of the community as a whole, and be based primarily on prevention and reduction of harm. It should also be grounded in evidence, be reflective and responsive to public opinion, and foster public discourse to help improve the community's health and well-being.

Elected officials, governmental bodies, and/or regulatory structures should all play a part in the promotion of public policy related to gambling harm. Such policies should have a number of important characteristics, including: a broad statement of purpose or intent about the role of gambling within the public domain and clear goals to prevent and reduce harm and to support and treat those harmed by gambling. They should also include methods for monitoring implementation and a structure for and commitment to formal evaluation. Finally, good public policies should aim to address such matters as the scope of gambling activities, types of games, limits on availability and jurisdictional authority (Babor et al., 2010; Productivity Commission, 2010).

There are considerable challenges to the development of healthy public policy, including the key issue of gambling revenue. However, a focus on optimizing returns for both government and the private sector can impede good policy development in some countries. The EU, for instance, has recognized this conflict and has enacted legislation, which forbids monopolies that are explicitly intended to generate revenues for the state. Monopolies are only accepted for public health reasons, minimizing economic crime, etc.

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 to severe gambling problems (Productivity Commission, 2010; Rintoul, Livingstone, Mellor, & Jolley, 2013; Williams & Wood, 2007b). One way to address this challenge is to ensure there is sufficient separation of gambling policy development and regulation from political, tax and commercial influences. In practice this could mean policy development and regulation being handled at a different level of government than gambling revenue management.

Another key issue relates to the funding of gambling research and whether it is influenced by the fact that most funding comes from the same sources that rely on and/or benefit from gambling revenue. Making gambling research and evaluation funding independent from gambling revenue generation and collection would enable development of a comprehensive, policy-oriented research agenda. A good example of such separation is the Australian Gambling Research Centre (AGRC) within the Australian Institute of Family Studies (an independent statutory body). The AGRC is funded by the Australian Commonwealth Government, which receives no direct revenue from gambling.

Beyond funding, the level of control of gambling operations also varies across jurisdictions. In some regions state-controlled gambling companies have a monopoly or near monopoly over the supply of some types of gambling products (e.g., Canada, Norway, Sweden). Some politicians and regulators believe that state-controlled gambling companies with a monopoly are more effective in minimizing harmful gambling than private companies in a competitive market. This belief rests upon the assumption that a state-owned company will prioritize responsible gambling measures, since it does not need to maximize profit. There are also

some important lessons from the alcohol field, where the evidence suggests that monopolistic and/or government involvement in alcohol provision is associated with less harm to the public (e.g., Miller, Snowden, Birckmayer, & Hendrie, 2006; Popova et al., 2011; Wagenaar & Holder, 1996).

However, if the government receives a substantial amount of revenue from gambling, this could potentially constrain public policy that aims to reduce harm, especially if other tax revenue is limited. Contrastingly, there are also arguments for effective harm reduction through appropriate regulation of private gambling companies in a competitive market. While both positions may have merit, there is currently no research that supports either of them (Planzer & Wardle, 2011).

Policies are likely to be more effective if they are based on credible evidence, and there are examples from around the world to support this view (Banks, 2011; Livingstone, Rintoul, & Francis, 2014; Productivity Commission, 2010). Good policies would be based on comprehensive, rigorous, research evidence and evaluation to ensure that (a) measures introduced are effective, (b) benefits outweigh the costs, and (c) unintended consequences are minimized.

The evidence-base itself would ideally be constructed from multiple sources of data, including a mix of self-reported surveys; machine and user records; prevalence data and/or linked administrative data; systematic observations; qualitative investigations; examination of related data; and consultations with relevant experts. The use of multiple data sources and methods of analysis enhances the validity and transferability of findings (Cresswell, 2009).

However, it is important to acknowledge that this type of rigorous evidence can be quite difficult to construct and it is unlikely that any single piece of evidence will be sufficient. Further, even if such evidence existed, policy decisions may still be made with imperfect evidence (Banks, 2011).

The Australian Productivity Commission (APC) – an independent research agency that provides advice to governments on social, economic and environmental issues – suggests that the level of evidence required to support a policy initiative should be more akin to the balance of probability, such as required in civil law, rather than the criminal standard of proof ‘beyond all reasonable doubt’ (Productivity Commission, 2010). The Commission has also argued that gambling harm-reduction policy focus on two broad areas (a) enhancing self-responsibility by strengthening individual capacity for informed choice, and (b) reducing the risk by moderating features of the gambling environment, which have been shown to be hazardous (Productivity Commission, 2010). Further, the commission emphasizes harm prevention/reduction and consumer protection for all gamblers: those currently experiencing problems with their gambling; those at risk of harm; and vulnerable populations.

Overall the APC observes that policy-makers need to balance the risk of introducing ineffective measures with the risk of failing to introduce effective measures. Thus, in addition to direct empirical evidence, support for the introduction (or otherwise) of measures can include theoretical understanding, advice from experts, and evidence from allied areas or ‘natural’ experiments. Good options for trials or pilots that can then be more fully evaluated include: measures which are anticipated to be relatively low cost; those which can be fairly easily reversed; and those that are anticipated to have a relatively large effect on highrisk gamblers, but a relatively low impact on recreational gamblers and the community (Productivity Commission, 2010).

There are numerous areas of research that can usefully inform development of public policy and researchers should articulate potential policy implications of their research (Thomas, Vasiliadis, & Deblaquiere, 2015). Recent issues that warrant a policy response include: online or interactive gambling; youth and vulnerable population protection; gambling advertising and marketing; the distribution of revenues and social costs; and the impact on local communities.

Research focused on variables, characteristics or forms of gambling that are known to be closely associated with risk and harm will also provide information relevant to policy development. This could include research related to increasing informed decision-making (e.g., pre-commitment technology, accurate expenditure data) or research investigations designed to inform on ways policy or regulation could be used to reduce the risk of this form of gambling (e.g., machine/system architecture, specific game characteristics, operating hours, availability of opportunity).

Finally, much can be learned from allied fields such as tobacco, drugs and alcohol where development of public health policy is further advanced. For example, research conducted in the alcohol field has suggested policy responses in relation to alcohol taxes, restrictions on availability (e.g., hours/days of sale, regulations on maximum density and strength of alcohol), and regulation of advertising and marketing (Babor et al., 2010). Examination of the research and its relationship to policy recommendations in these allied fields may help to identify gambling harm-reduction research topics.

2.1.4 Culture of Social Responsibility

Attitudes toward social responsibility depend heavily on prevailing economic frameworks and political structures. More capitalist economies that emphasize 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.

Corporations involved in marketing and selling 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 includes manufacturers of products such as gaming machines and Internet-based gambling, 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 addiction. 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. Features such as free-spin are particularly conducive to persistent play. In Internet gambling, free-to-play sites offer a greater probability of winning compared to pay-to-play sites, which creates a false-sense that the win was the result of personal skill.

Similarly, 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 should also be responsible for actively identifying signs of excessive/harmful gambling and for intervening in a timely manner to minimize losses. Although not established by law in some countries, there is a moral obligation for corporate entities and operators to maintain a duty of care to not exploit vulnerable individuals.

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 (Abbott, Volberg, Bellringer, et al., 2004; Binde, 2011; 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 2.3.3 Risk Assessment.

In this section, we discuss the following factors related to gambling exposure in greater detail: gambling setting, accessibility, adaptation, and marketing and messaging. 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 which 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. A number of longitudinal studies are currently underway that will improve evidence in this area e.g., The Victorian Gambling Study (Victoria Department of Justice, 2011), Swedish Longitudinal Gambling Study (SWELOGS) (Romild, U., Volberg, R., & Abbott, M., 2014; Statensfolkhälsoinstitut, 2010), Massachusetts Gambling Impact Cohort (MAGIC), Leisure, Lifestyle, Lifecycle Project, Canada (LLLLP) and the Quinte Longitudinal Study (QLS), Canada.

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. Starting to gamble 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, 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 at age 25 or older (Abbott & Volberg, 2000).

Those introduced to gambling in their late teens and early adulthood had a very low prevalence of harmful gambling, raising the possibility that initial participation in adulthood may lead to greater 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 could 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, as well as 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. For instance, 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; however, longer-term employees had lower rates. They interpreted this as indicating elevated risk during early exposure, followed by adaptation.

2.2.1 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 people 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 et al., 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, M., Volberg, R., Bellringer, M., and Reith, G., 2004; Finlay, Marmurek, Kanetkar, & Londerville, 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 (Thomas et al., 2013). 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.

A number of measures have been proposed or intentionally introduced to promote moderation in gambling behaviour and to 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; not cashing cheques for large sums; self-exclusion programmes; shutting down facilities for a least a few hours each day; as well as providing clocks and natural lighting in gambling areas. Research evaluating these and other prevention measures is not well-developed and it remains uncertain what effect such measures 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 an inherently more problematic medium of gambling. Greater convenience; easier access; the solitary nature of play; the ability to play when intoxicated; the lack of realistic cash markers; ability to play with credit; lack of age verification; 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 (Schüll, 2005; Wood, Williams, & Lawton, 2007). On the other hand, Internet gambling allows players to limit the amount of money staked and the hours of play, although only on a given website. 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.

2.2.2 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 increased significantly around the world. This expansionary phase is quantitatively and qualitatively unprecedented and is affected by inter-related forces that continue to drive the global evolution of commercial gambling (Abbott & Volberg, 1999).

At the same time, there has been a 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 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. Greater availability of gambling and associated changes in attitudes towards gambling are widely believed to 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 on this point, with varying degrees of qualification. 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 among 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, Volberg & Bellringer, 2004).

Regardless of the specific considerations, 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. Although, as noted earlier, 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.

Relationships among 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, M., Volberg, R., Bellringer, M., and Reith, G., 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.

Gambling offers unique incentives, such as the potential for financial gains and also meets other psychological needs, such as that for significant life-style changes. In many jurisdictions gambling is readily available and accessible, particularly in the form of Internet gambling. This feature 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, which may offer alternative leisure options. Therefore, such individuals tend to access gambling facilities close to home.

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; availability of 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 play an instrumental role 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, once participants leave and return to their place of origin.

2.2.3 Adaptation

The concept of adaptation continues to be a source of debate. There is a school of thought, which suggests that 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 also 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 2.2.2 Accessibility, increased availability of gambling activities has been shown, in some studies, to be associated with increased participation and harmful gambling. However other studies, particularly those that have assessed change over moderate to long time periods in the same population, have failed to demonstrate sustained increase 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 among 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 produced 'standardized' prevalence estimates to account for major methodological differences among the various studies (harmful gambling measure; time-frame; administration format; survey description; and response rates), which have been known to influence prevalence estimates.

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 previous 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.

However, Williams, Volberg & Stevens confined their consideration to time (like Shaffer et al. (1997)) and did not include measures of gambling availability or consumption. In this, their approach was also similar to that used by the Storer, Abbott & Stubbs (2009) study, wherein only one difference—the harmful gambling measure used—was adjusted to facilitate comparison.

2.2.4 Marketing and Messaging

As already discussed, views on gambling are quite positive in some societies. Such positive views make their way into mass media. For example, in the form of coverage of gambling news, stories about jackpot winners, televised poker tournaments, and advice 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 have supposedly experienced.

Such representations portray gambling in a positive light, and through explicit or implicit symbolic and mythological messages, they root gambling in culture and society (Binde, 2007b; Binde, 2012b; Currie, 2007). Gambling games, which in and of themselves may be quite trivial, are imbued with positive qualities—such as having fun, excitement, and companionship—through which gambling may acquire moral, social and spiritual dimensions. 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 resulting elevated prevalence and intensity of gambling may contribute to harmful gambling.

The marketing messages of commercial gambling and the design of gambling equipment (e.g., EGMs and lottery tickets) may have a similar influence, as they often make use of images and symbols to communicate a message that gambling is fun, exciting and can make people rich (McMullan & Miller, 2009; Nicki, Gallagher, & Cormier, 2007; Sklar & Derevensky, 2010). Some 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 design of venues, in particular casinos, may contain symbolic and psychological cues intended to increase gambling involvement by influencing the mood and behaviour of patrons (Kranes, 1995).

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, and mostly affects the market shares of various products. At the individual level there is empirical evidence that gambling advertising influences how gambling is perceived (e.g., Derevensky, Sklar, Gupta, & Messerlian, 2010). However, on a societal scale, there are examples of cultures (such as Sweden), where public attitudes towards gambling have become more critical despite huge increases in the volume of gambling advertising. This

suggests ‘advertising fatigue’ among consumers as well as a growing perception that gambling in society has become excessive. There is, however, little research in this area of gambling studies (for a review, see Binde, 2014).

Assessing the impact of gambling advertising on the extent of harmful gambling is difficult—more so than its impact on attitudes and on consumption. There is no empirical research on the extent of advertising impact at a population level (with the exception of one cross-sectional panel study with numerous methodological limitations: Planzer, Gray, & Shaffer, 2014). On the basis of the available knowledge about how advertising works and the prevalence of harmful gambling, the impact of gambling advertising is seen as being generally small (Binde, 2007c; Planzer & Wardle, 2011) compared to other factors that contribute to harmful gambling. 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.

Although it may be impossible to estimate exactly how much advertising contributes to the prevalence of problem gambling, it is possible to study the relative impact of different kinds of advertising on various groups of people (Binde, 2014). For example, studies have shown that the repeated cues to gamble from gambling advertising are especially problematic for people who already have a gambling problem or are recovering from one (e.g., Binde, 2009a; Grant & Kim, 2001; Hing, Cherney, Blaszczynski, Gainsbury, & Lubman, 2014).

Youth who scored high on a “vulnerability index” reported that they sometimes or often gambled after having seen an advertisement, more so than those who scored low (Derevensky et al., 2010). Perceptions of gambling advertising vary across ethnic groups and problem gamblers report that some advertising messages influence them more than others (Clarke et al., 2006b, 2007; Schottler Consulting, 2012). Results from such studies are valuable in identifying forms of advertising and messages that may be especially likely to contribute to harmful gambling.

Traditional forms of advertising are increasingly being replaced or complemented by sponsorship (e.g., Hing, Lamont et al., 2014; Milner, Hing, Vitartas, & Lamont, 2013) and new promotional approaches, such as marketing in social media on the Internet, viral marketing and consumer-generated advertising (Gainsbury et al., 2015). Little is yet known about the impact and possible harms of these novel ways of marketing gambling.

2.3 Gambling Types

Gambling comes in many different forms. Commercial gambling includes: lotteries; instant lotteries; number games (such as Lotto and Keno); sports betting; horse betting; poker and other card games; casino table games (such as roulette and craps); bingo; and electronic gaming machines (EGMs). All these forms of gambling, which are offered in many varieties, are available either in physical venues or via the Internet.

A distinction is sometimes made between games of chance and games of skill. The distinction is based upon whether practice or variation in strategy will impact the outcome or profitability of the game. This distinction does not take away a substantial chance component to the skill-based forms of gambling (Reber, 2012). Studies also refer to this distinction as strategic (games of skills) and non-strategic (games of chance) forms of gambling (e.g., Grant, Odlaug, Chamberlain, & Schreiber, 2012), and there is evidence from Western countries that males tend to prefer the former type while females tend to prefer the latter (e.g., Gausset & Jansbøl, 2009; Stark, Zahlan, Albanese, & Tepperman, 2012; Svensson, Romild, Nordenmark, & Månsdotter, 2011). Notably, many regular and problem gamblers engage in both types of games, which can necessitate a third group of 'mixed' gamblers in research designs (e.g., Myrseth, Brunborg, Eidem, & Pallesen, 2013).

The various forms of commercial gambling have evolved through a process of technological innovation and product development (supply, structural characteristics) with the aim of making people spend money on gambling (demand, motivations of gamblers). As indicated in Section 2.3.3 Risk Assessment, this process has resulted in some forms of gambling being more closely associated with harm than others.

Specifically, forms of gambling differ with respect to their structural characteristics (Griffiths, 1993). Although many specific characteristics have been identified there is presently no agreed upon taxonomy. However, they can be organized into some basic categories such as: timing parameters (including event frequency); reward parameters (including jackpot size, sensory features, return to player); near-miss characteristics; and opportunities for illusory skill or control. Gambling forms—being commercial services or products offered on the leisure market—also differ with respect to consumer appeal, as each form fulfills different needs or provides different kinds of stimulation across individuals. As such, people have different motivations for participating in gambling.

The potential for harmful gambling arises from the interaction between the structural characteristics of the games on the one hand, and players' motivations on the other hand (cf. Balodis, Thomas, & Moore, 2014; Clarke, 2005; Dow Schüll, 2013; Husain, Wardle, Kenny, Balarajan, & Collins, 2013).

The strength of the evidence for the influence of structural characteristics on harmful gambling is mixed. On the one hand, there is good evidence from experimental research that the major structural characteristics modify gambling behavior (e.g., persistence, bet size), and this research builds upon classic work from psychological learning theory. However, few studies have tested whether problem gamblers are disproportionately sensitive to these features, and thus the relevance to gambling harms is not clear.

With respect to motivations, there is good evidence that most, if not all, of the motivations of recreational gamblers may be intensified or transformed so that they result in harmful gambling

(Binde, 2013). Many surveys of the general population that included questions on why people gamble have revealed a range of motives (e.g., Wardle et al., 2011). Some studies also show how different motives and personality characteristics relate to harmful involvement in specific forms of gambling (Balodis et al., 2014; Bonnaire, Bungener, & Varescon, 2006; Francis, Dowling, Jackson, Christensen, & Wardle, 2014; Holtgraves, 2009).

2.3.1 Structural Characteristics

Gambling games differ from one another along a number of psychological dimensions termed 'structural characteristics' (Griffiths, 1993). The better studied characteristics have their origins in psychological learning theory and models of conditioning. In terms of timing parameters, one feature is the delay between the gamble and the outcome. In a lottery, there is a long delay (often on the order of days) between ticket purchase and outcome, and it is rarely possible to bet again immediately (Rogers, 1998). In other forms of gambling, like scratchcards or EGMs, this delay is on the order of a few seconds, and a subsequent gamble can be initiated immediately.

In a study that equated other structural characteristics by using a simulated slot machine, pathological gamblers played a game with a 2 second spin delay for significantly more trials than a machine with a 10 second spin delay (Chóliz, 2010). Pathological gamblers reported less enjoyment and excitement at playing a slot machine where the game speed had been slowed down, and the sounds also removed (Loba, Stewart, Klein, & Blackburn, 2001).

A number of reward parameters have been identified as shaping gambling behaviour. Increasing jackpot size (or prize level) increased subjective excitement and physiological arousal during a horse-racing game (Wulfert, Franco, Williams, Roland, & Maxson, 2008). Using vignettes, higher jackpot size was also linked to greater bets, and this effect further scaled with debt size (Crewe-Brown, Blaszczyński, & Russell, 2013). The sensory accompaniment to winning (in terms of both light and sound) is also important—that is, removal of sound accompaniment to wins attenuated psychophysiological responses (Dixon, Harrigan, et al., 2014), and had a stronger effect on game preferences in pathological gamblers (Loba et al., 2001). Perhaps surprisingly, the overall profitability of the game ('return to player' or pay-back percentage) has received relatively little attention, and it remains unclear to what extent gamblers can distinguish subtle differences in the pay-back percentage between machines (Haw, 2008; Woolley, Livingstone, Harrigan, & Rintoul, 2013).

Within chance-based games, certain game features can promote an inappropriate belief that skill is involved (termed the 'illusion of control'). Examples include: a choice of lottery numbers (Langer, 1975); an instrumental action in the form of a dice throw (Ladouceur & Mayrand, 1987) or stop buttons on gaming equipment (Ladouceur & Sevigny, 2005); or the use of familiar stimuli associated with sports or other skilful games (Burger, 1986).

Experiments where these features are manipulated show effects on gambling persistence (Ladouceur & Sevigny, 2005) and risk-taking (Ladouceur & Mayrand, 1987; Dixon, 1998). Control beliefs can also be induced by early clusters of wins within a gambling session (Burger, 1986, Langer & Roth, 1975). Problem gambling has been associated with higher scores on self-report scales measuring the illusion of control (Moore & Ohtsuka, 1999), and pathological gamblers have also shown over-estimation of control in a laboratory task (Orgaz, Estevez, & Matute, 2013).

'Near-miss' events (more appropriately considered 'near-wins') also merit consideration here. Studies that have varied the frequencies of near-misses in slot machine games describe higher levels of persistence at a moderate rate of near-misses around 30% (Cote, Caron, Aubert, Desrochers, & Ladouceur, 2003; Kassinove & Schare, 2001). In laboratory work, near-misses are rated subjectively as increasing motivation to continue with play (Clark, Lawrence, Astley-Jones, & Gray, 2009), and generate psychophysiological arousal (Clark, Crooks, Clarke, Aitken, & Dunn, 2012; Dixon et al., 2011). By imaging brain responses to near-misses, some studies have reported heightened sensitivity to near-misses in problem gamblers (Chase & Clark, 2010; Dymond et al., 2014).

Within modern multi-line slot machines, the opportunities to perceive near-misses are boundless, and a distinct phenomenon occurs: the 'loss disguised as a win' (LDW). On an LDW, a payout is awarded that does not cover the initial wager; nevertheless, these payouts are accompanied by the sensory feedback of winning. LDWs increase physiological arousal and distort a player's memory for the number of true wins in a session (Dixon, Harrigan, Sandhu, Collins, & Fugelsang, 2010; Jensen et al., 2013). Problem gamblers describe multi-line slot machines as being more immersive and requiring more skills than an equivalent single line game, apparently because of the presence of LDWs (Dixon, Graydon, et al., 2014).

There is no consensus on a taxonomy of structural characteristics or the exact number of dimensions that exist (Griffiths, 1993; Meyer, Fiebig, Häfeli, & Mörsen, 2011); these differences are reflected in the different Risk Assessment tools described in 2.3.3. Indeed, technological developments may require the introduction of new variables into these schemes.

2.3.2 Motivations for Gamblers

It is important to note that the reasons that people give for taking part in gambling varies enormously from one form of gambling to another and there is also individual variation with respect to particular forms of gambling. Although forms of gambling differ in many ways they have one thing in common: the potential to win money. The desire to win money may therefore appear to be the most fundamental motivation of gamblers. However, several studies indicate that this motive is of differing importance to recreational versus problem gamblers (Back, Lee, & Stinchfield, 2011; Flack & Morris, 2014; Lee, Chung, & Bernhard, 2013; Marmurek, Switzer, & D'Alvise, 2014). Recreational gamblers principally seek experiences and stimulation of various kinds, whereas problem gamblers place greater importance on and are more motivated

by money. Many problem gamblers try to win back money that they have lost or have erroneous ideas that in the long run they will make money by gambling.

However, to win at gambling is an experience that transcends its pure monetary value (Binde, 2013). Culturally and symbolically, winning is associated with success and happiness. Psychobiologically, winning, as well as the anticipation of winning, stimulates the brain's reward system. Concepts relating to how cultural and psycho-biological factors contribute to harmful gambling are discussed further in Sections 3.1 and 3.4.

In some forms of gambling, such as lotteries, it is possible to win an enormous sum of money for a small stake, although the probability of doing so is infinitesimal. An important motivation for entering the lotteries is to indulge in pleasant fantasies of winning big and living a much better life. While lotteries in most parts of the world are a comparatively less harmful form of gambling, people who are discontent with their lives or in a desperate economic situation may spend large sums of money on lotteries in the unrealistic hope of 'winning big' (Beckert & Lutter, 2013; Hicks, 2009). On the other hand, some individuals may be driven by charitable motivations and engage in raffles and other types of charity based gambling. In general motivations for gambling can vary based on the individual and the type of gambling involved.

All forms of gambling can take place in a social context. For example, people buy lottery tickets together, play bingo with their friends or spend an evening at the casino with their partner. Some forms of gambling require others to be present, such as live poker, while other forms are attractive because they gather large groups of people in a physical venue, such as casinos, race tracks and bingo halls.

The intensity of social interaction may range between gambling with close friends to gambling alone among strangers (e.g., Cotte & Latour, 2009; Guillén, Garvía, & Santana, 2012; Krauss, 2010). Sociologists have stressed the importance of gambling as a 'character contest', allowing people to show courage, 'gameness', integrity, gallantry and composure in front of others – at the gambling tables in casinos or in other venues where behavior and manners are easy to observe (Goffman, 1969).

Gambling may thus have a social motive but evidence is mixed on how it may relate to harmful gambling (Quinlan, Goldstein, & Stewart, 2014). On the one hand, people who feel socially marginalized or have a need for social recognition may be attracted by the social contexts of gambling and therefore spend more money and time gambling. On the other hand, gambling with or among other people may provide social control (Mishra, Morgan, Lalumière, & Williams, 2010; Rockloff & Greer, 2011). Specifically, harmful excesses may be prevented because the individual wishes to avoid disapproval from others.

Demonstrating skill and competing with others are two closely related motivations for gambling. Some forms of gambling – for example roulette and EGMs – are essentially governed by chance but players may nevertheless believe that skill is involved and that there are strategies,

which make it possible to earn money (see Section 2.3.1 Structural Characteristics). If such beliefs are put into practice, the player will certainly lose money and be at risk of gambling harmfully. In other forms of gambling – for example horse and sports betting – there is, in theory, a possibility for a skilled player to make money, but in practice very few will do so.

Gambling may become harmful when players overestimate their skill relative to others; interpret winnings as a result of skill and losses as a result of bad luck; and persist in gambling with the belief that they will become more skillful and eventually make money gambling (Browne, Rockloff, Blaszczynski, Allcock, & Windross, 2013; Cantinotti, Ladouceur, & Jacques, 2004; Gilovich, 1983). Whenever gambling is believed to involve skill, it may also be attractive to people who like to compete with others, for example at the poker table or by being more knowledgeable in betting than others. Thus, people who like competing may run the risk, if they start to gamble, to gamble excessively (Harris, Newby, & Klein, 2013; Parke, Griffiths, & Irwing, 2004).

Because gambling can provide a thrill, sensation seeking – the desire to take risks in order to derive stimulation and excitement – may be a further motive for gambling. The association between harmful gambling and such enhancement motives is well known (e.g., Balodis et al., 2014; Bonnaire et al., 2006; Mishra, Lalumière, & Williams, 2010).

Gambling may also have a tranquilizing effect, providing a means of escape or distraction from troubles in the gambler's life, including anxiety, depression or boredom (Cartmill, Slatter, & Willie, 2014; Porter, Ungar, Frisch, & Chopra, 2004). Specifically, gambling games may engender a dissociative state of mind also termed 'immersion' (Dixon, Graydon, et al., 2014) or the 'machine zone' (Dow Schüll, 2013). This state may be most common in continuous, repetitive forms of gambling, such as bingo and EGMs, and players who prefer these forms may be motivated to seek this state (e.g., Balodis et al., 2014; Husain et al., 2013; Thomas et al, 2009).

The mood altering effects of gambling – providing a thrill or an opportunity to escape and dissociate – are motivations for harmful participation that are explained by classic psychological theories of positive and negative reinforcement. These motivations are central components in several models of problem gambling, (e.g., Blaszczynski & Nower, 2002; Stewart & Zack, 2008). From this perspective, comorbidity between harmful gambling and other psychological disorders is explained by the latter disorders being an underlying cause of excessive involvement in gambling.

A specific gambling culture may also evolve at some gambling venues. Most notably this may take place at racetracks, casinos and sports betting facilities, where some gamblers spend many hours a week at a single venue. They get to know other gamblers and employees, and, over time, collectively create specific modes of interaction, special vocabularies and norms of

conduct, as well as local lore of events and people, that is, a subculture or a ‘social world’ (Fox, 2005; Hayano, 1982; Krauss, 2010; Puri, 2014; Rosecrance, 1985b, 1986).

Subcultures of varying specificity and complexity may also develop in other types of venues and contexts, including in slot machine and arcade halls (Fisher, 1993), bingo halls (Dixey, 1982), and online poker (O’Leary & Carroll, 2013). Involvement in gambling subcultures can be very rewarding to people but typically implies that they spend a substantial amount of time and 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 world in the gambling venue (Ocean & Smith, 1993). This may explain results from longitudinal studies, which show that problem gamblers who participate in on-track horse betting seem to have particularly persistent problems (e.g., Abbott, M. W., Volberg, R. A., & Rönnerberg, S., 2004). Not only do they have to stop betting to become free of gambling problems, but they also need to leave the social world of the race track.

2.3.3 Risk Assessment

Almost all researchers agree that some forms of gambling are more closely associated with harmful gambling than others. As already discussed, lotteries are generally regarded to be relatively harmless while EGMs are often 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 those 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 perceptions of risk can vary depending on what other games are available in a gambling market at a given point in time (Binde, 2011).

Risk assessment instruments rate various forms of gambling on a scale from relatively harmless to relatively harmful. These ratings are based on factors identified through research on contributors to harmful gambling. The factors are given different weights depending on how important they are for the overall risk potential. Each factor in any given form of gambling is rated on this scale and the sum of the weighted ratings is calculated. If a particular form of gambling is found to be unacceptably risky, some of the rated factor(s) can be modified so as to lower the risk potential. Although gambling companies are currently the primary users of these risk assessment instruments, regulatory authorities are also beginning to use them to identify the most harmful types of gambling.

There are currently three principal risk assessment instruments: GAM-GaRD (Griffiths, Wood, & 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 et al., 2011). GAM-GaRD and TRG were developed by a British firm and Finnish researchers, respectively.

AsTERiG was created 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 50 indicators across nine dimensions.

2.4 Gambling Resources

Significant negative consequences can result from involvement in gambling activities. In the following sections, we discuss the gambling resources available to mitigate the risk of developing gambling-related harm and to ameliorate such harms after they occur, as well as the factors relevant to their successful implementation: service utilization, protection, prevention and harm reduction, and interventions.

The strength of the evidence for the benefits of gambling resources varies considerably. The majority of evidence to-date consists of evaluations of mutual support, self-help, and treatment. Although gaps remain, a number of reviews support the effectiveness of some of these resources (e.g., Stea & Hodgins, 2011). In contrast, there is less evidence for the impact of harm-reduction and prevention programming; it is also less cohesive.

2.4.1 Service Utilization

Prevention and resolution of problems are conceptualized, supported and facilitated differently in different environments. This is generally true for a variety of personal struggles, and specifically true in relation to gambling harms. Environments may differ in the degree to which public attitudes encourage individual self-determination, self-care and healthy living. Environments may also vary in their available support for those at risk or currently experiencing harms associated with gambling.

For example, the role definitions of physicians, teachers, clergy and financial institution employees may include the expectation that they will support individuals who are struggling with a variety of problems—including 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—the answer to which can vary based on the specific society and its intrinsic cultural values—is the extent to which an individual is expected to solve problems on his or her own without support.

Thus, a variety of psychological and environmental factors influence the degree to which gambling resources are accessed. Researchers have long observed that although beneficial gambling resources have been developed, they are underused. For example, early estimates suggest that only approximately 10% of problem gamblers seek treatment for their difficulties (Ladouceur, Gosselin, Laberge, & Blaszczynski, 2001).

Numerous barriers to service utilization have been identified, including practical (e.g., geographical, financial, and time constraints) and psychological (e.g., shame, guilt, concerns

regarding stigma or privacy) concerns. Culturally and linguistically appropriate support may be particularly difficult to locate. Web-based forms of psychoeducation, self-help, mutual support, and treatment (Gainsbury & Blaszczynski, 2011) may address some of these concerns and increase the accessibility of gambling resources, as described further below.

Most recent research suggests that those who gamble have low awareness of the resources available to them, and that insight, cost of services, and cultural relevance are factors of particular import to service utilization (Gainsbury, Hing, & Suhonen, 2014).

2.4.2 Protection, Prevention, and Harm Reduction

As outlined in Section 2.2.2 Accessibility, a variety of harm reduction approaches have been proposed and implemented in different jurisdictions. The legal and social landscape may support harm reduction policies that limit individual exposure to gambling risks. Yet, the effectiveness of other programs and policies, such as public awareness campaigns, in promoting responsible gambling behaviours is less well-researched.

Some jurisdictions have well-developed public health models that address gambling as well as school-based prevention programs. Others use a variety of approaches including 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; removing Automated Teller Machines (ATMs); and lowering prize levels.

However, jurisdictions may also promote increased exposure to gambling even as they attempt to reduce harm. 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 places, such as parts of 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 often includes additional advertising linking prominent sporting figures with gambling.

Overall, investigations of prevention programs are limited. Two comprehensive reviews have suggested that the most common prevention initiatives are the least effective, whereas more promising efforts have not been implemented sufficiently (Williams, West, & Simpson, 2008, 2012).

Public awareness and information campaigns have yet to incorporate specific safe gambling guidelines (Currie et al., 2006; Currie, Miller, Hodgins, & Wang, 2009; Quilty, Avila Murati, & Bagby, 2014). Although a recent review suggested that harm reduction and responsible gambling initiatives appear to be comparable in their effectiveness (Ariyabuddhiphongs, 2013), empirical evidence suggests otherwise. For example, responsible gambling centres have been

associated with increased knowledge but not behavioural change (Boutin, Tremblay, & Ladouceur, 2009), whereas self-exclusion, although under-utilized, does result in decreased gambling and improved well-being (Gainsbury, 2014).

2.4.3 Interventions

Although not all those experiencing gambling-related harms require formal treatment services, affected individuals do often benefit from treatment and intervention. And while the availability of treatment varies dramatically across jurisdictions, a comprehensive treatment system should include evidence-based treatments of varying intensity and modality. These treatments may include individual, group, telephone, or web-based psychotherapy, outpatient day programs, or 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 they access it.

A growing body of research has focused on the value of specific intervention strategies, primarily psychotherapy or pharmacotherapy. Results generally support the efficacy of cognitive behavioural treatment approaches and motivational interviewing, with more limited therapeutic benefits for pharmacological and other approaches (Leung & Cottler, 2009; Stea & Hodgins, 2011).

Although relatively few studies have compared different types of gambling resources (e.g., psychotherapy versus pharmacotherapy, self-help versus mutual support), research has suggested that mutual support and self-help are beneficial for those who participate fully, but that attendance and/or adherence is limited for these forms of support (e.g., Brewer, Grant, & Potenza, 2008; Pallesen, Mitsem, Kvale, Johnsen, & Molde, 2005). Individual cognitive behavioural therapy was superior to self-directed completion of cognitive behavioural exercises or mutual support in one investigation. However, the degree of improvement increased with the number of exercises completed and sessions attended across both psychotherapy and mutual support. These findings, once again, highlight the importance of engagement in treatment (Petry et al., 2006) in addition to the nature of that treatment.

Psychotherapy: Research supports the value of psychotherapy in the treatment of problem gambling (Pallesen et al., 2005). Cognitive behavioural approaches in particular are supported, regardless of the type of gambling in question (Gooding & Tarrrier, 2009; Toneatto & Ladouceur, 2003). While cognitive behavioural treatments may be delivered in an individual or group format (Jiménez-Murcia et al., 2007), there is limited evidence for differential effectiveness across different cognitive behavioural approaches.

One meta-analysis supported a modest advantage of cognitive therapy over motivational interviewing and imaginal desensitization (Gooding & Tarrrier, 2009). However, subsequent research did not detect different outcomes for cognitive behavioural treatment versus

motivational interviewing (Carlbring, Jonsson, Josephson, & Forsberg, 2010), and indeed, the efficacy of motivational interviewing is supported by subsequent reviews (Yakovenko, Quigley, Hemmelgarn, Hodgins, & Ronksley, 2015). Further, component analyses have suggested that the inclusion of exposure and response prevention techniques in cognitive behavioural therapy does not improve outcomes, and in fact negatively impacts treatment attrition and adherence (Jiménez-Murcia et al., 2012).

Cost-effective variants of motivational and cognitive behavioural treatments appear comparable, supporting the value of brief treatments to traditional treatments delivered face-to-face over a number of weeks (e.g., Hodgins, Currie, Currie, & Fick, 2009; Leung & Cottler, 2009). Indeed, research suggests that both telephone- and web-based interventions are associated with improvements in problem gambling and associated harms (Myrseth et al., 2013; Tse et al., 2012). Most recently, web-based cognitive behavioural programs including limited (e.g., four hours) therapist contact via telephone and email resulted in improved gambling, mood, and functional outcomes, which were sustained over three years (Carlbring & Smit, 2008; Carlbring, Degerman, Jonsson, & Andersson, 2012).

Psychotherapy research for problem gambling continues to grow, with an increasing focus on identifying novel treatment approaches or augmentations that may be efficacious in problem gambling. For example, early evidence supports the therapeutic benefit of mindfulness-enhanced cognitive behavioural approaches and interventions targeting emotional regulation in the treatment of problem gambling (e.g., Christensen et al., 2013; Toneatto, Pillai, & Courtice, 2014). Yet, the effectiveness of these interventions in real-world settings and the maintenance of therapeutic effects over the long-term have yet to be established.

Pharmacotherapy: There is currently no medication approved for the treatment of problem gambling. The results of an early meta-analysis suggest that medications are more effective than placebo controls or no treatment, but that three classes of medication (opiate antagonists, antidepressants, and mood stabilizers) do not differ in their impact on gambling difficulties (Pallesen et al., 2007).

Yet, the emerging consensus is that opioid antagonists such as naltrexone demonstrate the greatest evidence for efficacy and tolerability (Bullock & Potenza, 2012, 2013), and that co-occurring psychopathology is important to consider in making treatment selections. Opioid antagonists may be particularly well-suited to those with concurrent substance use disorders, whereas antidepressant medications or mood stabilizers may be more appropriate for those with co-occurring depressive/anxious or bipolar disorders, respectively. Problem gambling frequently co-occurs with substance use, mood, and attention deficit/hyperactivity disorders, and these concurrent conditions consistently influence clinical outcomes (Yip & Potenza, 2014).

Mutual Support: In mutual support groups, recovering problem gamblers help each other to stop gambling harmfully or abstain from gambling. The main activity of such groups is regular meetings in which the participants talk about how their gambling problems started and progressed, and about their current recovery, while other participants provide advice. The group's collective knowledge and experience is used to help individuals in a wide variety of ways, including: social and emotional support; sustaining the motivation to abstain; gaining insight into the nature of gambling problems; and getting practical advice on how to stay away from gambling (Binde, 2012a).

The most well-known mutual support society of problem gamblers is Gamblers Anonymous (GA), which originated in the United States and has spread to many other countries. GA is modelled after Alcoholics Anonymous (AA) and shares many of its features— such as the medical model of addiction and the dogma of total abstinence— but differs in some ways, such as having a broader view on spirituality (Browne, 1991; Ferentzy & Skinner, 2003; Ferentzy, Skinner, & Antze, 2006). The “Twelve Step” ideology of AA and GA (Ferentzy, Skinner, & Antze, 2009)— for example, that there is a higher power that gives strength in recovery and that one has to learn to live a new life— has been adopted by numerous treatment providers.

In some countries, such as Sweden, the Netherlands and Spain, there are mutual support societies that are not part of GA, which have their own ideologies and practices (Binde, 2012a; Ferentzy & Skinner, 2006). These groups range from formal groups facilitated by a therapist or less formal groups formed in an ad hoc manner on the initiative of institutions that provide therapy to problem gamblers (e.g., Piquette-Tomei, Norman, Corbin Dwyer, & McCaslin, 2008).

Mutual support may be the only available local form of help or the form that individuals prefer. It may also be a complement to conventional therapy or a way of maintaining abstinence from harmful gambling after the end of therapy. Evidence for the efficacy of mutual support is limited and, where it does exist, is based almost entirely on GA. There seems to be no recent study of the efficacy of only attending GA but a combination of conventional therapy and GA attendance has been found to be fairly effective (Hodgins & el-Guebaly, 2010; Marceaux & Melville, 2011; Petry, 2005).

Self-help: Self-help may take various forms, including: workbooks and manuals; audio and video recordings; and telephone, computer, or web-based programs. The effectiveness of these self-directed programs has received limited empirical attention (Raylu, Oei, & Loo, 2008). Research has increasingly highlighted the value of web-based self-help in delivering protocolized psychotherapy such as cognitive behavioural therapy, as well as providing accessible psychoeducation, in a convenient, confidential, and cost-effective way. Existing reviews support the value of these interventions (Gainsbury & Blaszczynski, 2011).

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 among 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; GAMECS Project, 1999; Lin, Caswell, Huckle, You, & Asiasiga, 2011; Loo, Raylu, & Oei, 2008; Parish, 2005; Raylu & Oei, 2004; Scull & Woolcock, 2005; Tepperman & Korn, 2002; Wynne & McCready, 2004).

The functions and meanings of gambling differ significantly among 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 of individuals engaging in harmful gambling, others are likely to decrease the risk. In this section we outline Cultural Factors that contribute to harmful gambling, including: ethnicity and traditions, indigenous groups, socio-cultural attitudes, religion and other belief systems, 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, et al., 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).

Nevertheless, 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, 2009a 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 among 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 foreign-born individuals have 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, it may nevertheless be less common than in the host society among parts of the group due to gambling being viewed negatively, especially by the women therein.

Other factors that lead to reduced prevalence include less 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 of harmful gambling or where the level of probabilistic thinking is generally lower. In these cultures, gambling may be common and accepted, with heavy gambling less likely to be seen as a problem by the gambler or people around them. 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.

In contrast, some cultures consider gambling to be so shameful that individuals may 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. Previously mentioned theories of exposure and adaptation may also be relevant for these individuals.

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, all of which increase the risk of 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, immigrants or refugees may have a socioeconomically disadvantaged position in the host society, 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. For 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, immigrants' gambling problems arise in the interaction among having roots in another culture, the experience of migration, and the process of integration into the host society. Thus, immigrants themselves do not constitute a problem in relation to gambling. In the case of indigenous minority ethnic groups (see Section 3.1.2 Indigenous Groups), the main reason for elevated rates of harmful gambling is sometimes believed to be the result of the often marginalized and disadvantaged socioeconomic position of such groups (Breen & Gainsbury, 2013; Volberg & Abbott, 1997).

3.1.2 Indigenous Groups

Gambling availability and participation are commonplace around the world. This is substantially due to colonization—predominantly by Western countries with long gambling histories—and more recently by accelerating globalization. Prior to colonization, a significant number of societies had little or no experience with gambling while some had traditional forms of gambling that Binde (2005) refers to as 'indigenous gambling.'

Those parts of the world that had very little or no gambling prior to 1500 AD included most of South America, southern and eastern Africa and Oceania. In other parts of the world, gambling was either widespread or practiced by some societies or groups but not others. 'Indigenous gambling' is also used to refer to the contemporary gambling of indigenous populations, irrespective of the origins of the activities involved (Breen & Gainsbury, 2013). In most instances historical indigenous gambling has been largely or completely replaced by more recently introduced forms, particularly where indigenous peoples have been subsumed by colonization into first-world nation-states.

Historical and ethnographic research suggests that societies where gambling was present often had certain attributes— they used money; had larger concentrations of people; were complex and socially unequal; had more leisure time; did not have religious prohibitions against gambling; and had certain kinds of inter-tribal or inter-community relationships (Binde,

2005). The extent to which traditional indigenous gambling forms spread through cultural contact or developed independently is uncertain.

Whatever their origins, it is clear that gambling activities are interconnected with other aspects of culture and society in complex ways and have different meaning and purpose in different societies. Among other things indigenous gambling provided ways for individuals and groups to achieve and challenge prestige. It also provided a means of recreation, promoting social interaction and redistributing wealth within egalitarian communities. Often, gambling played ceremonial, ritualistic and spiritual roles, for example to help divine the future, determine future actions and engage supernatural forces (Williams, Stevens, & Nixon, 2011).

Indigenous peoples are extremely diverse and live in similarly diverse social contexts. This diversity is such that the United Nations Permanent Forum on Indigenous Issues (UNPFII) declines to adopt an official definition of indigenous. However, the organization notes that there are widely shared characteristics including “self-identification as indigenous at the individual-level and acceptance by the community as their member; historical continuity with pre-colonial and/or pre-settler societies; strong links to territories and surrounding natural resources; distinct social, economic or political systems; distinct language, culture and beliefs; and a resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities” (UNPFII, undated).

Additionally, most indigenous populations share histories of oppression and exploitation including loss of sovereignty and territory, and experience socioeconomic disadvantage, cultural alienation and social exclusion. Most constitute small minorities within nation states, contributing to their political powerlessness. They also experience a wide range of economic, social and health disparities including mental health disorders and addictions (Abbott, M. W., Volberg, R. A., Bellringer, M., & Reith, G., 2004; Adelson, 2005; Snodgrass, 2013; Volberg & Abbott, 1997; Wardman, el-Guebaly, & Hodgins, 2001; Williams, Stevens, et al., 2011; Zitzow, 1996).

It is unclear to what extent traditional indigenous gambling was associated with harm to individuals and communities. From their review of relevant research Williams, Stevens, et al. (2011) concluded that this traditional indigenous gambling— typically engaged in for ritualistic and spiritual reasons, as well as for recreation and social interaction— seldom led to adverse outcomes of the type associated with more contemporary gambling.

One reason for this may be the strong communal focus of traditional societies. It appears that gambling served as a means of resource redistribution in some situations and that individuals and groups who lost probably also received support from families and their wider communities more often than is the case in more individualist societies.

Other studies and reviews appear to be consistent with the view that traditional aboriginal gambling was generally more benign than engagement in some more recent forms that have

largely replaced it (Breen & Gainsbury, 2013; Breen, Hing, Gordon, & Bultjens, 2012; Hing et al., 2014a, 2014b). However, adverse outcomes have been identified in some situations and Williams, Stevens, et al. (2011) refer to North American indigenous oral traditions cautioning that gambling outside its ritualistic and ceremonial context was inappropriate and could lead to excess and harm.

A number of studies of gambling and problem gambling prevalence have been conducted with indigenous groups including Native Americans, Canadian Aboriginals (Métis, Inuit and Indian people), Greenland Inuit, Australian Aboriginals and New Zealand Māori (Abbott, Bellringer, Garrett, & Mundy-McPherson, 2014a, 2014b; Breen & Gainsbury, 2013; McMillen & Donnelly, 2008; Snodgrass, 2013; Volberg & Abbott, 1997; Walker, Abbott, & Gray, 2012; Wardman et al., 2001; Williams, Stevens, et al., 2011; Yanicki, Gregory, & Lee, 2011; Young, Barnes, Stevens, Paterson, & Morris, 2007; Zitzow, 1996). In some of these studies overall participation rates were similar to rates for the general population; in others they were higher. In both situations there are typically differences in frequency of participation, preferred gambling activities and expenditure.

A New Zealand study (NGS) (Abbott et al., 2014a, 2014b) included a large nationally representative Maori sample. Overall, past year participation was similar for Maori and European/Other. However Maori participated more often in specific activities, including card games, Keno, bingo, instant lottery tickets and EGMs. They also participated more often in continual forms of gambling (weekly or more frequently); engaged in multiple gambling activities; and lost large amounts of money when gambling.

Higher participation in card games and bingo, as well as higher weekly participation and gambling expenditure has been found in previous New Zealand surveys of Maori populations (Abbott & Volberg, 1991, 2000). A number of studies involving a variety of other indigenous populations have similar findings (Breen & Gainsbury, 2013; Williams, Stevens, et al., 2011; Volberg & Abbott, 1997).

Indigenous societies with a history of indigenous gambling are sometimes thought to be more inclined to participate in recently introduced forms of gambling than those without prior gambling experience. This, however, does not appear to be the case, at least in the longer term. Whereas indigenous gambling was widespread in North America prior to colonization, Maori and most Australian Aboriginal societies did not have prior histories of gambling participation.

Groups with and without pre-colonial gambling histories now generally have high rates of participation, including high engagement with gambling activities associated with the development of problem gambling. Nevertheless, prior experience of indigenous gambling may influence attitudes towards contemporary gambling and have implications for problem

development (Williams, Stevens, et al., 2011). According to the adaptation hypothesis, lack of prior exposure to gambling may also contribute to problem gambling vulnerability.

Consistent with the participation findings, numerous studies have found that indigenous minority populations experience very high levels of gambling-related harm. Problem gambling rates are typically two to three times higher than in the general population and some studies have found substantially larger differences (Abbott et al., 2014b; Breen & Gainsbury, 2013; Larsen, Curtis, & Bjerregaard, 2013; Raylu & Oei, 2004; Wardman et al., 2001; Williams, Stevens, et al., 2011). While many of these studies involve small samples and have a variety of methodological shortcomings, their findings are consistent across diverse jurisdictions.

A number of reasons have been proposed and some relevant research undertaken (Breen & Gainsbury, 2013; Williams, Stevens, et al., 2011) in regard to high rates of problem gambling and related harm. However, given the scarcity of relevant longitudinal research, explanations for problem development have to be considered with caution. Possible reasons for higher rates of harm include increased availability of and participation in high risk forms of gambling; lack of prior exposure; conducive cultural beliefs; social marginalization and disadvantage; psychological state and stress; and demographic profile.

As discussed previously, the NGS (Abbott et al., 2014a, 2014b), found that the Maori had a high rate of frequent EGM involvement as well as involvement with continual gambling activities in general. The prevalence of problem gambling among Maori, after adjustment for age, was four times the European/Other rate.

In New Zealand EGM venues are heavily concentrated in neighbourhoods lower socioeconomic status and, as already discussed, proximity to venues has been found to be significantly related to both EGM participation and problem gambling. Proportionately more Maori reside in these neighbourhoods and it is likely that high availability contributes to elevated EGM participation and problem gambling prevalence. In the NGS, EGM preference and regular participation were major predictors of problem gambling.

In addition to ethnicity, a number of social and demographic factors were associated with problem gambling including male gender; younger age; lack of formal qualifications; being unemployed; religious group membership; household size; low income; and residence in deprived neighbourhoods. Membership in these high risk groups overlaps considerably, with Maori significantly over-represented in a number of them.

When all of these factors were considered together in multivariate analyses, Maori (and Pacific Island) ethnicity emerged as the major risk factor, followed by younger age. Some of the other factors reflecting social and economic inequality were also retained as independent predictors. These findings suggest that while demographic differences, gambling exposure/availability and disadvantage play a significant part in explaining high problem gambling prevalence rates among Maori, ethnicity per se is also important.

Relative to the general population, problem gamblers in the NGS experienced many more major negative life events, greater social deprivation and more health problems, psychological distress and substance use and misuse. Many studies have found similarly high rates of comorbidity among problem gamblers (Lorains, Cowlshaw, & Thomas, 2011).

Consistent with their histories of colonization, oppression and persistent social disadvantage, Maori and other indigenous minorities experience high exposure to a variety of stressful situations and have high rates of physical and mental health problems. It is unclear how these factors link to gambling participation and the extent to which they contribute to and result from changes in gambling participation and problems.

Much research to date has been cross-sectional and descriptive. Further research, especially longitudinal and qualitative studies, is required to advance understanding of particular factors associated with indigenous gambling and gambling-related harm. While research with other populations including migrant and non-indigenous ethnic minority groups will have relevance, there are probably unique factors that can only be identified by research within indigenous groups and communities. This research is more likely to be valid and contribute to positive social change if it is conducted by, or in collaboration with, indigenous scholars and communities (Wynne, 2011; Yanicki et al., 2011).

3.1.3 Socio-cultural Attitudes

Societies' general attitude 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 to 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 for 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). Such a cyclical

pattern has been observed in North America, Europe and elsewhere (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 may 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 groupings in society including social classes, political orientations, and age groups, which are further discussed 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 more involved in high stakes gambling, often of a competitive nature (Helfant, 2002; Kavanagh, 1993). 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 they consider to be less educated (see Section 3.2.1 Social Demographics). Some forms of gambling are associated with specific social classes. For example, in Western societies bingo is associated with low income earners while traditionally in Europe roulette and other casino games are associated with the upper classes.

Demographics: Age groups tend to hold distinct cultural values. Throughout their life, age cohorts carry some of the values that were imbued 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 in terms of both perceptions of and preferences for various forms of gambling.

3.1.4 Religion and Other Belief Systems

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

For a century or more, formal religion has been on the decline in secularizing Western 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, existential and mystical. Gambling to some extent provides such a connection (Binde, 2007a). For the individual, gambling may thus have a spiritual and existential dimension that contributes to excessive gambling (Currie, 2007; Kusyszyn, 1984; Wong, Leung, & Lau, 2009). Gambling may also fill an existential void and become important for situating oneself in society’s value

system, embodying hopes of social acceptance, success and living a better life (Clarke et al., 2006a).

Spirituality and faith may also help people to overcome gambling problems. For instance, spirituality is a cornerstone of the mutual support organization Gamblers Anonymous and twelve-step treatment programs (Ferentzy, Skinner, & Antze, 2010). Some therapists and scholars maintain that treatment of excessive gambling should include spirituality and the gambler's broader and deeper life concerns (Clarke et al., 2006a; Hagen, Kalishuk, Currie, Solowoniuk, & Nixon, 2013; Lee, 2009; Nixon, Solowoniuk, & McGowan, 2006).

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 (Casey et al., 2011; Eitle, 2011). If the individual nevertheless does gamble, the intensity is likely to be lower. Participation in activities pertaining to such religions is one of the few identified protective factors against the development of gambling problems (Ghandour & El Sayed, 2013; Hayatbakhsh et al., 2006). However, at the population level some groups may show a bimodal pattern of relatively low overall participation in gambling but higher than average prevalence of problem gambling, this is especially true among some ethnic minority groups where factors other than religiosity influence attitudes towards gambling (Abbott et al., 2014a, 2014b, cf. Section 3.1.1 Ethnicity and Traditions).

Magical thinking, that is, ideas about the occult connection between entities which is often based on principles of contagion or resemblance may also 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; D'Agati, M., 2014). It is not clear whether such beliefs inspire people to gamble or are a product of gambling, enhancing the experience of play by conferring a mystical dimension to it. Regardless of their origin, magical beliefs may sustain a harmful 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. Some research suggests that in certain societies such beliefs exist together with a lower level of probabilistic thinking (e.g., Lau & Ranyard, 2005).

3.1.5 Gender

Gender refers to cultural and social conceptualizations of femininity and masculinity, in contrast to the biological concept of sex. 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 engage in 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 women. 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 (Holdsworth, Hing, & Breen, 2012; Potenza et al., 2006; Svensson et al., 2011; Volberg, 2003).

Female harmful gambling may reflect the cultural and socially shaped differences in gambling participation between the genders. Women 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 & Moore, 2003). Another typical finding is that women in general begin to gamble harmfully later in life than men, but when problems start 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 women (Breen, 2004).

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, et al., 2012). The ratio of male to female problem gamblers varies as a function of jurisdiction but averages 2 to 1 (Williams, Volberg, et al., 2012; Blanco, Hasin, Petry, Stinson, & Grant, 2006). There are likely both biological and environmental bases for this difference as a function of sex.

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 interpersonal relationships at the ‘micro’ level of social relationships and 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, as well as 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 do 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 can be a source of conflict and stress.

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 engage, it is typically only in relation to the game rather than in 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).

In this section, we will focus on social factors: social demographics, family and peer gambling involvement, education systems, neighbourhood, stigmatization, and deviance. Generally speaking, the strength of evidence for the links between social factors and levels of harmful gambling is not very 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, M. W., Volberg, R. A., Bellringer, M., & Reith, G., 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 behaviours 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 through social learning. Problem gamblers in many studies report high levels of gambling and harmful gambling among members of their families. Parenting style is another feature of upbringing related to the development of gambling problems, with authoritative parenting generally directing 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, Lawrance, Derevensky, McPhee, & Panetta, 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 and is associated with high stakes betting (Bernhard, 2007). Although gambling alone is a risk factor, the presence and actions of confederate gamblers can also facilitate gambling (McDoughall, Terrance, & Weatherly, 2011; Park & Manchanda, 2015). Playing with others who gamble for long periods of time and for high stakes, may lead an individual to play over their limits (McDoughall et al., 2011). There may be risks in both social and solitary situations; early gambling behaviour is associated with social contexts, whereas problem gambling can serve as a coping strategy and be used to enhance positive affective states (Quinlan et al., 2014).

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— may be of great value (Hodgins, Toneatto, Makarchuk, Skinner, & Vincent, 2007). 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 (Dickson, Derevensky, & Gupta, 2004), although awareness of the extent of gambling problems among teachers and administrators appears low (Shaffer, Forman, Scanlan, & Smith, 2000).

A limited amount of research has focused on describing knowledge and beliefs about gambling among students (Delfabbro, Lambos, King, & Puglies, 2009) and evaluating curricula aimed at changing beliefs and behaviours as well as preventing problems (Turner et al., 2008; Walther, Hanewinkel, & Morgenstern, 2013). Both universal and targeted programs have been described and curricula have included teaching both information (e.g., knowledge of odds) and skills (e.g., coping, problem-solving) and using lecture and video formats (see reviews by Ladouceur, Goulet, & Vitaro, 2013; Williams et al., 2008).

Evaluation studies have generally focused on youth aged 12 to 18 years and have evaluated changes immediately after the education program (Williams et al., 2008). The only study with a longer-term follow-up (i.e., 12 months) reported that the immediate gains post-intervention

were generally maintained (Lupu, I. R., & Lupu, 2013). There is no data on whether these programs reduced the incidence of new cases of gambling problems (Ladouceur et al., 2013).

The goal of such research is to develop effective programs that can be implemented widely. However, dissemination will likely be a challenge as educators and educational institutions do not always view gambling as an important concern (Ladouceur, Ferland, Côté, & Vitaro, 2004). They are therefore often reluctant to adopt measures to prevent and/or mitigate harm associated with adolescent gambling.

3.2.4 Neighbourhood

Increases in the availability of gambling are widely assumed to lead to increases in the prevalence of harmful gambling. Researchers have investigated this relationship at the population level and found somewhat conflicting evidence (see Section 2.2 Gambling Exposure). 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 (Pearce, Mason, Hiscock, & Day, 2008; Welte, Wieczorek, Barnes, Tidwell, & Hoffman, 2004; Wilson, Gilliland, Ross, & Derevensky, 2006; Young, Markham, & Doran, 2012). It is likely that this relationship holds true for some groups in the population but not for others. It is also clear that the distribution of gambling opportunities is not random across neighbourhoods (Chalmers & Willoughby, 2006; Gilliland & Ross, 2005; Pearce et al., 2008; Planinac et al., 2011; Welte et al., 2004).

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 (Uphoff, Pickett, Cabieses, Small, & Wright, 2013). Gambling outlets are more likely to be located in areas with lower socioeconomic status (Pearce, et al., 2007; Wardle, Keily, Astbury, & Reith, 2014), which generally have less social capital (Uphoff et al., 2013). Evidence shows a significant connection between increased gambling availability and higher levels of gambling problems within the community (Marshall & Baker, 2002; Pearce et al., 2007). One hypothesis that needs to be examined further is that 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.

In the United States, research with adolescents found that males living in neighbourhoods with lower social control were more likely to gamble than those who live in areas with higher social

control (Chaumeton, Ramowski, & Nystrom, 2011); and neighbourhoods with generally lower socioeconomic status are associated with greater gambling and problems (Gilliland & Ross, 2005; Lussier, Derevensky, Gupta, & Vitaro, 2014; Welte, Wieczorek, Barnes, & Tidwell, 2006).

In Australia, Marshall and colleagues (Marshall, 2009; Marshall & Baker, 2001a, 2001b) have noted that areas with 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. A systematic review of the literature on stigma in gambling was published by Hing, Holdsworth, Tiyce, & Breen (2013).

Although the overall amount of research specific to gambling is limited, it is growing. Harmful gambling has been found to be more stigmatizing than some other health conditions, but similar to alcohol disorder and schizophrenia—although this may be influenced by context or by the social characteristics of observers (Horch & Hodgins, 2008). Members of specific cultural groups may be relatively more stigmatized than others (Breen, Hing, Gordon, & Holdsworth, 2013; Dhillon, Horch, & Hodgins, 2011) and women may be more stigmatized than men (Holdsworth et al., 2012; Piquette-Tomei et al., 2008).

Stereotypes of “gamblers” and “problem gamblers” are similar and include adjectives such as compulsive, impulsive, desperate, irresponsible, risk-taking, depressed, greedy, irrational, antisocial, and aggressive (Horch & Hodgins, 2013). On the other hand, the general population tends to medicalize gambling problems as an addiction rather than seeing it as being related to poor character (Cunningham, Cordingley, Hodgins, & Toneatto, 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 across a

number of studies in a variety of countries (Gainsbury et al., 2014; Hing, Tolchard, Nuske, Holdsworth, & Tiyce, 2013; Pulford et al., 2009; Suurvali, Cordingley, Hodgins, & Cunningham, 2009). Fear of discrimination may also discourage individuals from disclosing their gambling struggles when seeking help for other social problems such as homelessness (Holdsworth & Tiyce, 2012). To-date, no research has investigated stigma reduction strategies in the problem gambling area (Hing, Holdsworth, et al., 2013).

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, 1985a). 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 Factors) and individuals are increasingly expected to govern themselves in an era when external forms of social regulation are declining (Reith, 2007).

While research on gambling as deviance (that views gambling as criminal or marginal) is relatively scarce, 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, Lalomiteanu, Paglia-Boak, & Adlaf, 2011), other gambling activities do not have such associations.

Research that has been carried out on links between commercial gambling and criminal activities appears to indicate a connection between harmful gambling and some monetary crimes (e.g., Ferentzy & Turner, 2009; Granero et al., 2014; Laursen et al., 2015; Turner & McAvoy, 2011; Wheeler, Round, & Wilson, 2011; Williams, Royston, & Hagen, 2005). 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 their high involvement in 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, including: 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 until recently research on the psychological factors influencing gambling-related harm has been almost entirely cross-sectional. Longitudinal research is currently in progress in a number of countries and 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, Caspi, Moffitt, & Poulton, 2005; Toneatto & Nguyen, 2007). Other personality and temperament traits that have been linked to harmful gambling include sensation-seeking (Johansson, Grant, Kim, Odlaug, & Gotestam, 2009); dissociation (Diskin & Hodgins, 2001); novelty-seeking (McCormick, Delfabbro, & Denson, 2012); and low trait self-control or willpower (Bergen, Newby-Clark, & Brown, 2012) and emotional vulnerability, among others (Bagby, R. M., Vachon, D. D., Bulmash, E., & Quilty, L. C., 2008 and Bagby, R. M., Vachon, D. D., Bulmash, E., Toneatto, T., Quilty, L. C., & Costa, P. T., 2007).

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, Derevensky, & Gupta, 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, 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 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 is, at the 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.

An individual's involvement in gambling is likely to be higher if gambling is common in the family, at a workplace or amongst school peers. 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.

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 often correlates with gambling and harmful gambling. In most, but not all, jurisdictions, younger individuals are more likely to gamble and have gambling-related problems, although this appears to be changing. 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 may be a curvilinear relationship with age of gambling onset and severity of problems.

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 (see Section 3.1.3 Socio-cultural Attitudes). 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, 1998) and attention deficit disorder (Carlton & Manowitz, 1994) have also been observed. It is possible that a shared vulnerability underlies these high rates of comorbidity although to-date evidence is lacking. 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 pre-date or follow harmful gambling (Hodgins et al., 2005; Quilty et al., 2011).

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 (Ibáñez et al., 2001), depression (Getty, Watson, & Frisch, 2000) and obsessionality (Frost, Meagher, & Riskind, 2001). Poorer subjective well-being is also linked with harmful gambling and greater subjective well-being is related to social, responsible gambling involvements (Lee, C.K et al., 2014).

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 decision-making impairment 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 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 many 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, including: genetic inheritance and neurobiology.

In general, the evidence is very strong that genetics and neurobiology have a very important influence on gambling and harmful gambling. What is less certain, and where more research is needed, is 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, Monahan, Temkit, & Shaw, 2006; Lobo & Kennedy, 2006; Slutske, Zhu, Meier, &

Martin, 2010; Walters, 2001). The variability among 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. However, adoptee and twin studies help to 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 the 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, 2009; Shah, Eisen, Xian, & Potenza, 2005; Slutske et al., 2010).¹

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

Many readers will also be surprised at 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, Goddard, & Visscher, 2008; McGue & Bouchard, 1998; McGuffin, Riley, & Plomin, 2001; Plomin, DeFries, McLearn, & McGuffin, 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 among 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, Brewer, & Potenza, 2006; Ibáñez et al., 2001; Lobo et al., 2010; Slutske et al., 2010).

¹ Twin studies compare concordance in monozygotic (MZ) and dizygotic (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}) = $.5A + C$. 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 problem gambling is directly caused by genetic inheritance. Rather, it means that 50% of the likelihood of developing problem gambling 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.

Even though harmful gambling is polygenetic, the evidence consistently points to dopamine receptor genes (particularly the Taq A1 variant of the DRD2 gene) as being key contributors (Comings et al., 1996; Grant et al., 2006; Ibáñez et al., 2001; cf. Lim, Ha, Choi, Kang, & Shin, 2012; Lobo et al., 2010). 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 (Ibáñez et al., 2001; Lobo & Kennedy, 2006), as variants in MAO, TPH, ADRA2C, NMDA2, and PS1 genes (Ibáñez et al., 2001; Lobo & Kennedy, 2006).

3.4.2 Neurobiology

Studies comparing groups of problem gamblers and healthy participants have begun to investigate a range of neurocognitive and biological markers of harmful gambling. These studies indicate altered function in a brain system responsible for reward processing, reinforcement learning, and risk-based decision-making (Clark et al., 2013; Leeman & Potenza, 2012; van Holst, van den Brink, Veltman, & Goudriaan, 2010a, 2010b).

The strength of the evidence from neuropsychological studies is strong: a large number of studies have indicated behavioural markers of impulsivity and impaired decision-making (see below). These studies are in increasingly large groups of pathological gamblers where sources of heterogeneity and relationships with clinical outcomes are beginning to be identified (e.g., Alvarez-Moya et al., 2011; Goudriaan, Oosterlaan, De Beurs, & Van Den Brink, 2008; Kräplin et al., 2014).

The evidence for corresponding biological markers is at an earlier stage, with some notable discrepant findings (see below) and a reliance on small groups of problem gamblers that have not allowed investigation of sources of heterogeneity. As neurobiological research has predominantly used case-control designs, it is unclear whether the neurobiological changes that have been described reflect pre-existing vulnerability or are precipitated by harmful gambling.

Neurocognitive studies make use of behavioural tasks that have established links to brain function, typically from research in patients with focal brain injury. Pathological gamblers show risky decision-making on a number of tasks linked to the ventromedial prefrontal cortex, (Brevers et al., 2012; Cavedini, Riboldi, Keller, D'Annunzi, & Bellodi, 2002; Forbush et al., 2008; Grant, Chamberlain, Schreiber, Oslaug, & Kim, 2011; Lawrence, Luty, Bogdan, Sahakian, & Clark, 2009).

Impulsivity (the tendency towards rapid or unplanned behaviour) is a construct identified in personality research on harmful gambling (see Section 3.3.1 Personality and Temperament), which can also be examined with neurocognitive tests. Pathological gamblers show clear signs of impulsive choice—for example preferring immediate over delayed rewards on delay

discounting tasks (Dixon, Jacobs, & Sanders, 2006; Michalczuk, Bowden-Jones, Verdejo-Garcia, & Clark, 2011; Petry, 2001). Impaired performance on response inhibition ('impulsive action') tasks like the Go-No Go task, may be restricted to more severe cases (Fuentes, Tavares, Artes, & Gorenstein, 2006; Odlaug, Chamberlain, Kim, Schreiber, & Grant, 2011; Rodriguez-Jimenez et al., 2006) along with broader deficits in executive function (Forbush et al., 2008; Leiserson & Pihl, 2007).

Functional neuroimaging techniques, primarily functional magnetic resonance imaging (fMRI), have been used to examine brain responses as problem gamblers perform reward, decision-making and impulse control tasks in the brain scanner. These kinds of tasks activate a brain network in humans, colloquially termed the 'brain reward system', which includes the ventral striatum / nucleus accumbens and medial prefrontal cortex, as well as extended circuitry like the dopaminergic midbrain, amygdala and insula.

fMRI studies in problem gamblers have repeatedly shown changes in these regions compared to healthy controls, (Balodis et al., 2012; Reuter et al., 2005; Hewig et al., 2010; Miedl, Peters, & Buchel, 2012; van Holst et al., 2012), although the direction of signal change (i.e. over-activity or under-activity) is not consistent (Limbrick-Oldfield, van Holst, & Clark, 2013). Similar discrepancies are observed in neuroimaging studies in substance addictions (Leyton & Vezina, 2013).

Activity within this brain reward system may also be shaped by the structural characteristics of gambling games (see Section 2.3.1 Structural Characteristics). For example, near-misses trigger brain responses in the striatum and insula that overlap with those seen in actual wins, (Clark et al., 2009), and these brain responses are heightened in problem gamblers (Chase & Clark, 2010; Dymond et al., 2014).

Neurological patients with focal brain injury to the insula failed to show a behavioural response to near-misses, and also showed attenuation of a second distortion, the gambler's fallacy (Clark, Studer, Bruss, Tranel, & Bechara, 2014). Neuroimaging studies have begun to characterize how the brain reward system responds to other structural characteristics and cognitive distortions such as illusory control and winning/losing streaks (Akitsuki et al., 2003; Kool, Getz, & Botvinick, 2013).

Dopamine is a key neurotransmitter within the brain reward system, and is implicated in problem gambling by a syndrome in Parkinson's Disease where problem gambling can arise as a rapid side-effect of dopamine agonist medications (Weintraub et al., 2010). Problem gamblers have altered levels of dopamine metabolites in plasma (Bergh, Eklund, Sodersten, & Nordin, 1997) and elevated frequencies of some genetic polymorphisms that affect the dopamine system (Lobo et al., 2014; see Section 3.4.1 Genetic Inheritance).

Positron emission tomography (PET) imaging can be used to measure dopamine transmission in the brain. In contrast to substance addictions in which robust decreases in both dopamine

receptors and dopamine release are described (Volkow, Fowler, Wang, Swanson, & Telang, 2007), problem gamblers appear to show no significant group difference in dopamine receptor levels (Boileau, Payer, Chugani, Lobo, Behzadi, et al., 2013; Clark, Stokes, et al., 2012), but increased dopamine release in response to either amphetamine challenge or a gambling task (Boileau, Payer, Chugani, Lobo, Houle, et al., 2013; Joutsa et al., 2012; Linnet et al., 2011).

Other neurotransmitters are also implicated. The most promising form of a pharmacotherapy for problem gambling is the opioid receptor antagonist naltrexone, a long-standing treatment for heroin and alcohol dependence. Naltrexone has been shown to be superior to placebo in reducing urges to gamble, and a family history of alcoholism was a clinical predictor of a beneficial response (Grant, Kim, Hollander, & Potenza, 2008; Kim, Grant, Adson, & Shin, 2001).

The noradrenaline system plays a key role in peripheral arousal, and noradrenergic abnormalities in problem gambling could predispose elevations in physiological arousal (e.g., heart rate, skin conductivity) (Pallanti et al., 2010), although the evidence for whether these peripheral markers are reliably associated with harmful gambling is mixed (Diskin & Hodgins, 2003; Moodie & Finnigan, 2005; Yucha, Bernhard, & Prato, 2007). Finally, other work has begun to investigate the serotonin system (Potenza et al., 2013), which may be particularly relevant to the comorbidity with mood and anxiety disorders (Hollander et al., 2000).

Expert Panel Biographies

The contributors to this project included the international expert panel and a team of GREO staff and advisors. The roles and responsibilities of each are outlined below. Each member of the expert panel played a 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 GREO to communicate the Framework to a broad set of stakeholders in order to solicit feedback.

Profiles of each expert panel member 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 GREO team also served as reviewers. Any conflicts of interest that may affect joint authorship of this publication are noted for each author. Current members of the expert panel are marked with an *.

***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, but with a focus

on the cultural dimension of gambling and its social contexts. He has conducted extensive field studies in Swedish gambling venues and using 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 systems, and between gambling and religion. Several of Dr. Binde's empirical studies have concerned problem gambling, for example mutual support societies of problem gamblers and the impact of gambling advertising. He has also written about regulation issues, analyzed data from population studies and reviewed various areas of gambling research. His latest study is about gambling-related problems in the workplace, with a focus on embezzlement. Dr. Binde is member of the international advisory board of the Swedish Longitudinal Gambling Studies (Swelogs). Dr. Binde has no conflicts of interest as he has no current or past affiliations with the industry; all his research funding has come from government funded research agencies, with the exception of a minor grant from the Responsible Gambling Trust in the UK, which is an independent charity receiving economic support from gambling companies.

***Luke Clark, D.Phil.:** Dr. Clark is an Associate Professor in the Department of Psychology at the University of British Columbia, where he is also the inaugural Director of the Centre for Gambling Research at UBC, launched in 2014. His research focuses on the psychological and neural mechanisms that underlie gambling behaviour, and the relevance of these processes to problem gambling. His work utilizes a number of convergent approaches, including neuropsychological assessment, functional brain imaging, psychophysiology and pharmacological challenge. Before moving to UBC, he was a Senior Lecturer in the Department of Psychology at the University of Cambridge, U.K., where he worked closely with the National Problem Gambling Clinic in London on the largest studies of treatment-seeking pathological gamblers conducted in the U.K. He has published over 100 papers in peer-reviewed journals including Proceedings of the National Academy of Sciences, Brain, Journal of Neuroscience and Biological Psychiatry. He is an Assistant Editor for Addiction, and serves on the editorial boards for International Gambling Studies and the Journal of Gambling Studies. As relevant disclosures, the Centre for Gambling Research at UBC is supported by funding from the Province of British Columbia and the British Columbia Lottery Corporation (BCLC), a Crown Corporation that conducts and manages gambling provision across the province, and Dr. Clark has provided consultancy to Cambridge Cognition Ltd on issues relating to cognitive assessment.

***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.

***Lena C. Quilty, Ph.D.:** Dr. Quilty is an Independent Scientist in the Campbell Family Mental Health Research Institute, Centre for Addiction and Mental Health (CAMH), and faculty in the Departments of Psychiatry and Psychology, University of Toronto. She is a registered clinical psychologist and certified cognitive behavioural therapist. Dr. Quilty has an applied program of clinical research, with a focus on personality and cognitive moderators and mediators of illness course and treatment response. She has a particular interest in the role of reward-related processes and executive function in depression and addiction. At CAMH, Dr. Quilty led the development of a multidisciplinary research team focused on key mechanisms underlying pathological gambling related to emotional dysregulation and impulsivity, and the translation of this research to prevention and treatment. She prioritizes knowledge translation and exchange in her work, and has disseminated the results of her research in over 70 scholarly publications, and numerous local, provincial, and national academic conference presentations and invited talks and workshops to diverse end-users (e.g., patients, clinicians, industry stakeholders). She is a Consulting Editor for *Psychological Assessment and Assessment*. Dr. Quilty has received salary and operating funds from funding agencies including the Canadian Institutes of Health Research, Ontario Mental Health Foundation, Ontario Problem Gambling Research Centre, and Canadian Consortium for Gambling Research.

***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.

***Anna Thomas, Ph.D.:** Dr. Anna Thomas is a Senior Research Fellow and Manager of the Australian Gambling Research Centre in the Australian Institute of Family Studies. She has a PhD in psychology from Monash University in Victoria, Australia. Dr. Thomas has substantial experience conducting research in the area of addictions, most specifically in relation to gambling and problem gambling. She has a particular interest in gambling policy, harm reduction and antecedents of gambling problems. Dr. Thomas' PhD developed and tested a psycho-social, environmental model predicting electronic gaming machine problem gambling. Later research projects have extended this investigation including investigating the multi-dimensionality of gambling accessibility, a place-based study considering influential environmental factors at the local level, and investigation of differential predictors of gambling

preference. Dr. Thomas' research into harm reduction has included leading research examining a behavioural checklist to improve staff identification of gambling problems in venues, an evaluation of the removal of ATMs from Victorian gambling venues, an examination of gambling self-regulation, and a review of optimum design features in gambling pre-commitment systems. Dr. Thomas has also been involved in research considering reasons for relapse, service needs of family members affected by gambling and evaluating screening protocols for non-presenting disorders. The focus of the Australian Gambling Research Centre has been to conduct research designed to build understanding of gambling and gambling-related harm in Australia, as well as advance knowledge into reduction of harm from gambling. The Centre has a strong commitment to strengthening Australian research capability and capacity, and in conducting and communicating policy-relevant research. The Centre has been active in working to have gambling modules inserted into key Australian longitudinal surveys. Dr. Thomas has no conflicts of interest to declare. Research funding for her projects has largely come from government departments. She has not received any industry funding for her research.

***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.

***Doug Walker, Ph.D.:** Doug Walker is a professor of economics at the College of Charleston, in South Carolina. He also owns a small consulting firm, Casinonomics Consulting, LLC. During

his sabbatical in fall 2014, he was a visiting professor in the Department of Psychiatry at Harvard Medical School and the Cambridge Health Alliance, Division on Addiction, in Cambridge, MA.

Recognized as one of the world's top experts on the socioeconomic impacts of casino gambling, Dr. Walker has published two books and more than 50 articles and book chapters. His work has been published in journals such as *Applied Economics*, *Contemporary Economic Policy*, *Journal of Health Economics*, *Journal of Gambling Studies*, and *Public Finance Review*. His latest book, published in 2013, is titled *Casinonomics: The Socioeconomic Impacts of the Casino Industry*.

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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.

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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.

GREO Team

GREO’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 GREO 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, GREO 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.

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 psycho-biological 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 & Tarrrier, 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 (Ajdahi & 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 (el-Guebaly et al., 2008). A conceptual model of etiologically important factors in the development of gambling involvement and gambling problems was outlined for the Alberta longitudinal study (titled the Leisure, Lifestyle, Lifecycle Project - LLLP). The LLLP conceptual model was used to determine the constructs measured in this five year, four wave panel study (N = 1308). 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.

Etiological Framework for Problem Gambling (Williams, West, & Simpson, 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 (Abbott, Volberg, Bellringer, & Reith, 2004; Korn & Shaffer, 1999). This approach broadly addresses healthy public policy, comprehensive notions of prevention and broad community engagement. It uses 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, M. W., Volberg, R. A., Bellringer, M., & Reith, G. (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.

Future Research Directions

In 2013/2014, GREO (formerly OPGRC) undertook a stakeholder consultation process to develop its research program in future years. This process also entailed revising the Conceptual Framework of Harmful Gambling (Figure 1). As part of that consultation process, 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 such ongoing consultations to inform future research directions.

Recreational 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 harmed by gambling. More research needs to be focused on establishing a better understanding of non-gambling, recreational 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 manage because of financial and time constraints. Stakeholders advised GREO 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.

Reviewers also 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 for 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 & Design: More research needs to be conducted on the location of gambling facilities, and the impact of these facilities on the local economy, property values, harmful gambling, crime, and other factors. Studies are also needed on cultural differences in venue design, and how elements of venue design induce specific behaviours in individual gamblers.

Gambling Machine Design: Additional research is required on 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 role of new technologies in exacerbating or mitigating harmful gambling issues needs to be better understood. 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, 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 on the impact of treatment availability for harmful gamblers (i.e. hours of operation, location). This type of research would be related to the ‘gambling resources’ factors 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 needs to be better understood.

Impact of Incentives/Disincentives of Harmful Gambling: Stakeholders felt that more research is required on the financial cost of gambling (i.e., the consumer price) and how it 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 at most gambling venues. Thus, increasing entry costs may deter some gamblers. Loyalty programs and high-stakes rooms at casinos which might provide gamblers incentives for gambling – including friendly or lavish treatment, and complimentary dinners – need to be studied further so as to understand whether they increase feelings of confidence and self-worth or prolong gamblers’ stays.

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 may 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 illegal gambling in greater depth, given current regulations and restrictions on gambling.

Research on “High Rollers”: Stakeholders were interested in understanding the prevalence and nature of problem 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) may be associated with an increased risk of developing gambling problems.

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